GUILFORD COUNTY BEE KEEPERS ASSOCIATION

BEEKEEPING NEWS

October, November, December 2014

a local chapter of NORTH CAROLINA STATE BEEKEEPERS ASSOCIATION, INC.

::Meetings & Programs::

October 14th 7:00 pm...{no meal}. Program is a Webinar by Dr. Tarpy. (NCSU) in which he has updated his research on Honey Bee health.

*members to bring bee equiptment they have made or modified to show the group.

November 11th 6:30 pm...{covered dish meal}...Program provided by Adrienne Roething, Curator for Paul Ceiner Gardens, about Kitchen Gardens

December 9th 6:30PM...Christmas Party...everyone bring a favorite dish or dessert and meet in the AG Center auditorium ready for a great program!

Overwintering Honey Bee Colonies in Northern Climates

James D. Ellis and Katherine Hammons

Introduction One of the many challenges beekeepers face is minimizing honey bee colony losses during winter. This can be especially challenging to beekeepers in extreme northerly climates (such as Alaska and northern Canada). Special preparations must be made during the fall to ensure that colonies survive the winter months with minimal loss. Of course, there will always be some colony loss, but with good management, losses often can be reduced to below 10%. Bees naturally prepare for winter on their own, but they may need the assistance of a beekeeper to ensure survival through winters in extremely cold climates.

Fall Preparation

Preparation of the colony for winter must begin in late summer or early fall. In northern climates, preparation usually starts in August/September, though it may begin earlier depending on the location. Beekeepers must ensure that there are enough food stores for the entire winter and that the colony is healthy and strong. One of the leading causes of colony death during the winter is lack of food. Generally, there should be about 90 pounds of honey reserves for a colony in the North, since bees will not be able to forage in the winter. If there is not enough honey stored in the supers for the winter after the removal of surplus honey by the beekeeper, the hives can be supplemented with a mixture of high fructose heavy corn syrup or, better yet, sugar syrup (2 parts sucrose sugar: 1 part water by volume) in the fall. Bees will store the syrup as a substitute “honey” for use throughout the winter. Colonies that have enough honey or stored sugar syrup to survive winter will pass the “lift” test. To conduct a lift

test, attempt to lift the colony with one hand using the handle on the back of the bottommost super. If the hive is difficult to rock forward with one hand, then it likely has enough food reserves to survive winter. If the hive is easy to lift, then it probably needs more food.

Figure 1. Hives getting supplemental sugar syrup through top feeders. Other feeders also can be used to deliver sugar or high fructose corn syrup to colonies. Credit: University of Florida

Some colonies may be located in areas that experience a fall nectar flow from goldenrod, aster or other fall-blooming plants. This flow may allow the bees to store enough reserves, but honey production should be monitored carefully by the beekeeper during this time. The best way to learn about local honey flows in your area is to contact a horticulturalist at a local county or state extension center or mentor with an experienced beekeeper from your immediate area. An alternative to supplementing with syrup is to supplement weak colonies with extra honey from stronger colonies. Care must be taken if this path is chosen because diseases may be spread from one colony to another through infected honey or frames.

Beekeepers must also ensure that the honey stores are properly located within the hive. Brood should be located in the bottom hive body (brood box, or deep super), and surrounded by cells filled with pollen. The pollen-filled cells, in turn, should be surrounded by cells filled with capped honey. A typical colony will naturally create this brood/pollen/honey pattern.

Most races of bees cover stored pollen with honey, often sealing the honey, making it hard to measure the amount of pollen stored within a colony. Late summer and early fall bees can be fed abundant protein and store many food reserves in their body to feed to late winter and early spring brood.

Figure 2. A good brood pattern shows capped brood in the center, with pollen and honey surrounding the brood. Credit: University of Florida

Figure 3. A spotty brood pattern, as seen here, suggests a failing or missing queen or a colony with potentially bad health. Colonies with brood patterns like this in early fall often do not survive winter. Credit: University of Florida

Bees will cluster around the queen in the bottom brood box as temperatures drop. The center of the cluster is maintained at approximately 95°F while brood is present. As winter progresses, the cluster of bees will move up through the colony as a unit, slowly eating through their honey stores. It is important that food stores are available above and beside the cluster. Because wintering clusters tend to move up in the nest, remove any queen excluders that are still on the hives after the last nectar flow. Otherwise, the queen can be trapped below the excluder as the cluster migrates upward throughout winter.

Colony Health Colonies must be strong and healthy and have a productive queen when entering winter. This will discourage disease and ensure there will be enough bees in the cluster to create and retain heat. Weak colonies may need to be combined with stronger ones during late summer/early fall to increase chances of survival. A healthy colony consisting of 25,000 to 30,000 bees is an adequate size for overwintering success. Colonies with fewer than 15,000 bees are not likely to survive freezing temperatures, though they may survive in locations with milder winters. Re-queening in early fall ensures a healthy productive queen for the winter. Checking the health of the adults and the brood in the fall is important because having many bees clustered together in a tight space allows the proliferation of pests and pathogens.
The most common health problems during or leading into winter are rodents, Varroa mites (Varroa destructor), tracheal mites (Acarapis woodi), and Nosema (Nosema apis and N. ceranae). Varroa mites weaken colonies in late summer and can lead to weak colonies heading into fall and winter, leaving the wintering bees heavily infested. Because winter is a mainly broodless time, the phoretic mites feed on the bees' hemolymph all winter, reducing their vitality and shortening their lifespan. Under these circumstances secondary viral infections will often develop and emphasize the problem. Consequently, one must monitor Varroa populations and treat if necessary. Nosema and tracheal mites tend to be a bigger problem during the winter months.

Rodents can cause a big problem in the winter by entering hives looking for heat and shelter. Rodents can destroy comb and consume honey, leaving little for the bees. Entrance reducers or wired mouse guards can be placed at hive entrances as simple and easy defenses against nest invaders.

Hive Location
Hives must be sheltered from the wind, but still have adequate air flow to discourage the build up of moisture within the hive. Early morning sun helps heat the hives during the day. In locations that regularly freeze, consider using one of the many top-insulation systems to prevent heat loss from the cluster as it moves to the top of the food stores, but make sure there is adequate ventilation. This may be done with an upper entrance, an auger hole in the side of the top box, or a ventilation rim. Care must be taken to ensure proper air flow.

(continued)

Winter Management

The best thing a beekeeper can do once winter begins is to manipulate hives as little as possible. While quick checks are possible at lower temperatures, inspections should be brief and conducted only on warmer days (>50ºF) if absolutely necessary. The colonies will begin to rear brood when they sense the days are getting longer and rapidly expand the brood nest when pollen becomes available.

Summary

With the proper preparation, colonies can be overwintered in cold climates successfully. Colonies must be queenright and healthy, and must have plenty of honey stored by the bees so that it is accessible to them during the winter months. The hive must be in a sunny location, out of the wind, and wrapped if necessary. Colonies are far more likely to survive winter if these preparations are done properly. Even when all appropriate preparations are taken, some colonies still may not survive. Colony death is a regular part of beekeeping.

Research tackles colony collapse

Posted: Wednesday, July 23, 2014 12:19 pm. by ERIC MORTENSON / CAPITAL PRESS

Theories abound, but there's still no cure, no answer

CORVALLIS, Ore. -- The solution to a huge problem may be hiding in the minutia of labs like this one at Oregon State University, where researchers examine the period-size brains of honey bees, test their blood and grind their guts for inspection under a microscope.

They're looking for signs of parasites, viruses or nutritional lapses that may help explain colony collapse disorder. Ramesh Sagili, who leads the OSU research effort, believes there is no single "smoking gun" cause of CCD. Instead, he and most other researchers say a combination of factors is most likely to blame.

Parasitic Varroa destructor mites top the list, because they weaken bees and make them susceptible to viruses and other problems. Other factors include pesticide use, mono-crop diets, loss of natural forage due to agricultural plantings or development, climate change, drought, the stress of travel and poor hive management."I still believe it's a perfect storm" of combined factors, Sagili said.

But the lack of a definitive answer, eight years after CCD was discovered and despite millions spent on multiple research projects, has left the door open for claim and conjecture by activists and conspiracy theorists. Cell phones, solar flares and government antenna arrays have all been blamed. Environmentalists point to the sins of "Big Ag," especially pesticide use and mono-cropping.

The stakes are extremely high. An estimated one-third of the world's food supply depends on the work of pollinators, and commercial beekeeping services are especially critical to U.S. producers.

California's almond crop alone requires about 1.6 million colonies, more than 60 percent of the nation's commercial hives. Many beekeepers from Oregon, Washington and Idaho truck their hives south in February and work their way north, moving crop to crop as berries, nuts and fruit come into season.

Colony losses nationwide ranged from 28 percent to 33 percent from 2007 to 2011, double or even triple the historical rate for over-winter hive loss. Experts say such losses are economically unsustainable.

Sagili believes proper nutrition is crucial to bee health, just as a good diet helps us stave off sickness. Bees transported from crop to crop are subjected to an unrealistic diet, he said. Bees working California's almond orchards, for example, are limited to "nothing but almonds" within the three-mile radius of their forage range. Almond blossoms are a good source of protein, but bees need more diverse fare, he said.

There is no doubt pesticides harm bees, Sagili said, but studies about their impact have been flawed. In some cases, a link to CCD was proclaimed after bees were subjected to unrealistic pesticide doses, he said.

Some activists have called for a ban on the use of neonicotinoids, a class of

pesticides commonly used to coat the seeds of food crops before planting. The U.S. Fish and Wildlife Service recently announced it would quit using neonicotinoids on its refuges in the Pacific Northwest and Hawaii.

Sagili agrees pesticides deserve continued study, especially on the "sub-lethal" effect of exposure. "They are a contributing factor for sure," he said, but finding a realistic concentration to test is a difficult challenge, because foraging conditions in the field vary greatly from controlled lab settings. A 2012 USDA report made note of that, saying it "remains a challenge to measure the effects of low-level, field-relevant exposure where it matters most: in real honey bee colonies. The social complexity of honey bees and the uncontrollable aspects of field research present substantial challenges to determining pesticide effects in whole-colonies."

An OSU experiment attempts to account for that: Forty hives have been set up at an OSU-owned research field, and the bees are allowed free flight and to forage in a natural manner. But the hive boxes contain a tight opening called a pollen trap, which knocks off most of the pollen bees are bringing back to the colony. Researchers have replaced the pollen with food containing varying levels of pesticide or fungicide. After a month's exposure, the bees will be checked for health problems.

Bees have a high degree of communal intelligence, however, which complicates the work. Sagili said foraging bees learn to bring back smaller loads of pollen so they can evade the pollen traps. In that case, researchers have to open the hives and remove the natural food by hand.

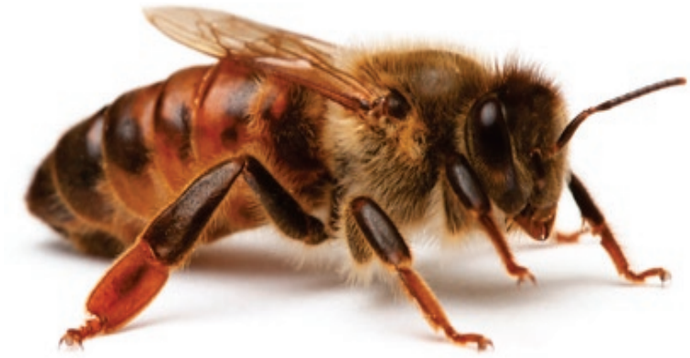
Sagili and other researchers put Varroa mites at the top of their list of bees' problems. The USDA has labeled Varroa mites the "single most detrimental pest of honey bees" and says it is "closely associated" with colony declines. Sagili calls them a "huge, huge concern."

"If you can control Varroa, you can improve honey bee health 70 to 80 percent without doing anything else," said Jerry Hayes, a researcher who directs Beeologics LLC, a biotechnology firm purchased by Monsanto Co. in 2011. He and others describe Varroa destructor mites in graphic terms. Make a fist, Hayes said, and hold it to your chest. That's the relative size of the mite to its host. "It's a big, big parasite," Hayes said. "It's like you having a parasitic rat on your chest." It feeds on the bee and is a vector for other viruses." Treating for it is no easy matter -- "Imagine trying to kill an insect on an insect," Cummings said -- but a new biotechnology approach spearheaded by Monsanto has caught the attention of researchers. It's called RNAi, or ribonucleic acid interference. In the body, RNA is the messenger system, delivering DNA instructions to cells. But a double-stranded form of RNA can "silence" or turn off specific genes. It can shut down parasites, and in the lab has achieved 50 percent Varroa reduction

Hayes, a former apiary inspection chief with the Florida Department of Agriculture, was hired by Monsanto two years ago to direct the work.

"The research is zooming forward, but you never know when you'll hit a hurdle or hit the wall," Hayes said. "It has a lot of potential."

Battle over insecticide pits beekeepers against Big Agribusiness



They're looking for signs of parasites, viruses or nutritional lapses that may help explain colony collapse disorder. Ramesh Sagili, who leads the OSU research effort, believes there is no single "smoking gun" cause of CCD. Instead, he and most other researchers say a combination of factors is most likely to blame.

Parasitic **Varroa destructor mites** top the list, because they weaken bees and make them susceptible to viruses and other problems. **Other factors include pesticide use, mono-crop diets, loss of natural forage due to agricultural plantings or development, climate change, drought, the stress of travel and poor hive management.**

"I still believe it's a perfect storm" of combined factors, Sagili said. But the lack of a definitive answer, eight years after CCD was discovered and despite millions spent on multiple research projects, has left the door open for claim and conjecture by activists and conspiracy theorists. Cell phones, solar flares and government antenna arrays have all been blamed. Environmentalists point to the sins of "Big Ag," especially pesticide use and mono-cropping.

The stakes are extremely high. An estimated one-third of the world's food supply depends on the work of pollinators, and commercial beekeeping services are especially critical to U.S. producers. California's almond crop alone requires about 1.6 million colonies, more than 60 percent of the nation's commercial hives. Many beekeepers from Oregon, Washington and Idaho truck their hives south in February and work their way north, moving crop to crop as berries, nuts and fruit come into season.

Colony losses nationwide ranged from 28 percent to 33 percent from 2007 to 2011, double or even triple the historical rate for over-winter hive loss. Experts say such losses are economically unsustainable. Sagili believes proper nutrition is crucial to bee health, just as a good diet helps us stave off sickness. Bees transported from crop to crop are subjected to an unrealistic diet, he said.

Bees working California's almond orchards, for example, are limited to "nothing but almonds" within the three-mile radius of their forage range. Almond blossoms are a good source of protein, but bees need more diverse fare, he said.

There is no doubt pesticides harm bees, Sagili said, but studies about their impact have been flawed. In some cases, a link to CCD was proclaimed after bees were subjected to unrealistic pesticide doses, he said.

Some activists have called for a ban on the use of neonicotinoids, a class of pesticides commonly used to coat the seeds of food crops before planting. The U.S. Fish and Wildlife Service recently announced it would quit using neonicotinoids on its refuges in the Pacific Northwest and Hawaii. Sagili agrees pesticides deserve continued study, especially on the "sub-lethal" effect of exposure.

"They are a contributing factor for sure," he said, but finding a realistic concentration to test is a difficult challenge, because foraging conditions in the field vary greatly from controlled lab settings.

A 2012 USDA report made note of that, saying it **"remains a challenge to measure the effects of low-level, field-relevant exposure where it matters most: in real honey bee colonies. The social complexity of honey bees and the uncontrollable aspects of field research present substantial challenges to determining pesticide effects in whole-colonies."**

An OSU experiment attempts to account for that: Forty hives have been set up at an OSU-owned research field, and the bees are allowed free flight and to forage in a natural manner. But the hive boxes contain a tight opening called a pollen trap, which knocks off most of the pollen bees are bringing back to the colony. Researchers have replaced the pollen with food containing varying levels of pesticide or fungicide. After a month's exposure, the bees will be checked for health problems.

Bees have a high degree of communal intelligence, however, which complicates the work. Sagili said foraging bees learn to bring back smaller loads of pollen so they can evade the pollen traps. In that case, researchers have to open the hives and remove the natural food by hand.

Sagili and other researchers put Varroa mites at the top of their list of bees' problems. The USDA has labeled Varroa mites the **"single most detrimental pest of honey bees"** and says it is "closely associated" with colony declines. Sagili calls them a "huge, huge concern." **"If you can control Varroa, you can improve honey bee health 70 to 80 percent without doing anything else,"** said Jerry Hayes, a researcher who directs Beeologics LLC, a biotechnology firm purchased by Monsanto Co. in 2011.

He and others describe Varroa destructor mites in graphic terms. Make a fist, Hayes said, and hold it to your chest. That's the relative size of the mite to its host. "It's a big, big parasite," Hayes said. "It's like you having a parasitic rat on your chest."

"It's like you and I walking around with an orange on our back," offered Dan Cummings, a beekeeper and almond grower in Northern California. "It's such a burden to the bees. It feeds on the bee and is a vector for other viruses." Treating for it is no easy matter -- "Imagine trying to kill an insect on an insect," Cummings said -- **but a new biotechnology approach spearheaded by Monsanto has caught the attention of researchers.**

It's called RNAi, or ribonucleic acid interference. In the body, RNA is the messenger system, delivering DNA instructions to cells. But a double-stranded form of RNA can "silence" or turn off specific genes. It can shut down parasites, and in the lab has achieved **50 percent Varroa reduction**

Hayes, a former apiary inspection chief with the Florida Department of Agriculture, was hired by Monsanto two years ago to direct the work. "The research is zooming forward, but you never know when you'll hit a hurdle or hit the wall," Hayes said. "It has a lot of potential."

***Venom gets good buzz as potential cancer-fighter (video) search**

http://www.cbc.ca/news/technology/canadian-beekeepers-sue-bayer-syngenta-over-neonicotinoid-pesticides-1.2754441

Venom gets good buzz as potential cancer-fighter! SAN FRANCISCO, Aug. 11, 2014 — *Bee, snake or scorpion venom could form the basis of a new generation of cancer-fighting drugs, scientists will report here today*. They have devised a method for targeting venom proteins specifically to malignant cells while sparing healthy ones, which reduces or eliminates side effects that the toxins would otherwise cause. The report was part of the 248th National Meeting of the American Chemical Society (ACS), the world's largest scientific society. The meeting, attended by thousands of scientists, features nearly 12,000 reports on new advances in science and other topics. It is being held here through Thursday. A brand-new video on the research is available at

http://www.youtube.com/watch?v=GRsUi5UrH7k&feature=youtu.be.

"We have safely used venom toxins in tiny nanometer-sized particles to treat breast cancer and melanoma cells in the laboratory," says Dipanjan Pan, Ph.D., who led the study. "These particles, which are camouflaged from the immune system, take the toxin directly to the cancer cells, sparing normal tissue." (More details at web address)

Venom from snakes, bees and scorpions contains proteins and peptides which, when separated from the other components and tested individually, can attach to cancer cell membranes. That activity could potentially block the growth and spread of the disease, other researchers have reported. Pan and his team say that some of substances found in any of these venoms could be effective anti-tumor agents. But just injecting venoms into a patient would have side effects. Among these could be damage to heart muscle or nerve cells, unwanted clotting or, alternately, bleeding under the skin. So Pan and his team at University of Illinois at Urbana-Champaign set out to solve this problem.

He says that in the honeybee study, his team identified a substance in the venom called melittin that keeps the cancer cells from multiplying. Bees make so little venom that it's not feasible to extract it and separate out the substance time after time for lab testing or for later clinical use. That's why they synthesized melittin in the lab.

To figure out how melittin would work inside a nanoparticle, they conducted computational studies. Next, they did the test and injected their synthetic toxin into nanoparticles. "The peptide toxins we made are so tightly packed within the nanoparticle that they don't leach out when exposed to the bloodstream and cause side effects," he explains.

Project Apis is a web site worth visiting. Lots of information there.

From the Editor: Greetings to all and welcome to our group. For those who are reading your newsletter for the first time I hope you will keep me informed about articles and suggestions for topics in future letters. From all the bee experts at NCSU and UNC-G and what we can add locally, I hope to pass along to you what they say is working....if and when we find what "IT" is to protect our bees! Best wishes for the coming year! *Norman Faircloth*

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!

James Brown, President

Vern Allen, Vice President

Sam Coble, Secretary

Jim Parker, Treasurer

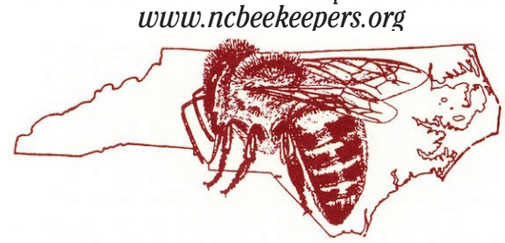
Directors

Jack Fleming,

James Firth, Ruth Edwards

Norman Faircloth, *Newsletter Editor*

- Don Hopkins, State Inspector: (336) 376-8250
- Guilford County Beekeepers Association web site www.guilfordbeekeepers.org
- North Carolina State Beekeepers Association *www.ncbeekeepers.org*



Guilford County Beekeepers Association

A LOCAL CHAPTER OF THE NORTH CAROLINA STATE BEEKEEPERS

Norman Faircloth, editor (nfaircloth@northstate.net)