Gaston County Beekeeper's Association

Next Meeting Oct. 29th

7 pm Citizens Resource Center Dallas, NC

Keeping Colonies Alive

Highlights of the Keynote Presentation by Dr. Dewey Caron, Kelley's 2013 Field Day

By Camilla Bee

Caron kicked off a "Saturday of saturation" (from the flood of information on dozens of key topics, although there also were a few raindrops) with the keynote presentation on Keeping Colonies Alive. "It's a challenge," he stated. "Beekeeping's heyday was about World War II, and the number of managed colonies has steadily declined since the 1950s. Introduction of foreign bee mites in the late 1980s and especially since 2000, the various and widespread syndromes such as CCD (Colony Collapse Disorder) and Bee PMS (Parasitic Mite Syndrome) have diminished both the enthusiasm for keeping bees, and rates of success."

Is This a Real Crisis?

It is now fairly common knowledge that our critical pollinators are in trouble. "But," noted Caron, "this isn't anything new, although the level of losses is definitely more serious." Caron pointed out there have been significant honey bee losses going back as far as 1869, when bees in Indiana, Kentucky, and Tennessee, suffered unexplained heavy losses. Many of these loss episodes were regional and labeled things like spring dwindling, autumn collapse, disappearing disease, etc. One especially widespread loss episode, termed Isle of Wight Disease[2] in the early 1900s, greatly decimated native bees in the British Isles. The current epidemic appears more widespread and occurs in both North America and Europe.

Even in light of other honey bee crises beekeeping has survived, Caron remains deeply concerned about the current crisis. The prevalence of mites and diseases in the last decade has "certainly presented a tough row to hoe," he noted. Mites have forever changed the beekeeping picture in the last 10-15 years. In 1989, a survey in the Pacific Northwest documented a 22% overwintering loss, about double the "normal" loss level. Losses over the last seven years now average over 30%[3].

1 Caron has a PhD in Entomology from Cornell, and went on to share his extensive knowledge at the University of Maryland and University of Delaware. While "retired," Caron currently resides in Oregon, where he is very active with

WAS, the Bee Informed Partnership, the Oregon Beekeepers Association, and grandchildren. His textbook, *Honey Bee Biology and Beekeeping* continues as the major textbook used by university and bee course students. His books on Africanized bees and observation hives continue to be major references for those aspects. Kelley's proudly carries many of Caron's books.

2 The basis is a small parasitic mite, the *Acarapis woodi*, which infests the airways of the honey bee. First observed on the Isle of Wight in 1904, the mystery illness known as *Isle of Wight Disease* was not identified as being caused by a parasite until 1921. It quickly spread to the rest of Great Britain. It was regarded as having wiped out the entire native bee population of the British Isles (although later genetic studies have found remnants that did survive) and it dealt a devastating blow to British beekeeping; http://en.wikipedia.org/wiki/Diseases_of_the_honey_bee#Acarine_.28Tracheal.29_mites

3 www.beeinformed.org/2013/05/winter-loss-survey-2012-2013

What Can the Average Beekeeper Do?

With the world stymied as to the specific cause(s) of the international honey bee crisis, Caron encourages beekeepers to be involved in tracking success rates, and sharing what works and what doesn't work. He suggests reporting to and being involved with a major initiative, the Bee Informed Partnership (BIP), would be a good way to do this. The goal of the BIP is to "decrease the number of honey bee colonies that die over the winter.[4]" The organization is developing a honey bee health database to act as a repository for data, both from BIP surveys and other health surveillance projects. Motivating the project is "the conviction that beekeepers, when presented with beekeeper-derived data that objectively show which management practices worked and which did not, will adopt the more successful practices. This, in turn, will reduce colony losses and increase the availability of pollinating units overall.[5]"

What Does Work?

As data is being collected and analyzed, and as beekeepers share what works and what doesn't for them, Caron noted the one indisputable truth: "there is no one single thing you can do to totally prevent losses." He concluded "We all want to look for the 'silver bullet', the easy fix. It is obvious nothing is easy or simple with the current loss epidemic and solutions may need to involve several variations."

Citing research, he shared results that frame how difficult it is to decide the best practice. For example, drone removal to combat mites has improved survival in the north, but, nationally, statistically the practice doesn't matter. Studies of essential oil use or other chemical options are another example where research indicates what might work for some is not a universal fix.

"We simply do not yet have the data to understand why some areas/individuals are having very heavy losses," he said, encouraging us again to be part of the data collection process via the BIP. "Treat or don't treat? There is no one right answer. What seems to work well for one individual or for a particular area doesn't always garner the same result with other individuals or in different areas."

Signs of Potential Failure

Caron reviewed some early warning signs found in areas with lower overwintering success. They include:

- Fall issues, of bees not taking feed even though they have insufficient stores, and bees disappearing from the colony at a faster than normal rate
- "Snot" brood, likely reflecting multiple pathogens at play

• Fall dead-outs with a more extensive pick-up rate (finding and removing dead-outs)

It seems that stimulating colonies early in spring, helping them "grow-out" of problems and selection of stock that seems to consistently perform better are pro-active management options that help. Stimulating and dividing the best stock, rather than seeking bees elsewhere—provided losses are not too extensive—have been useful options for some beekeepers. Small-scale beekeepers just have to try all over again the next season with package and/or nuc purchases.

4 Beeinformed.org
5 Beeinformed.org

Likely Culprits?

Caron shared that researchers around the world are focusing on these major areas:

- Disease epidemics—viruses are little strands of RNA that change (mutate) all the time. Caron shared, "The relationship of vector and pathogen change too. Are we dealing with highly virulent viruses or has the Varroa mite/virus relationship changed? Or both? Is Nosema a significant factor? Are brood somehow more susceptible to older pathogens or have the bacteria changed and are now more infectious? A lot of questions with few answers."

- Pesticides, especially the pyrethroids, neonicotinoids, miticides, etc. Caron cited research that there is an average of five different pesticides detectable when we examine a colony; it happens when bees return from forage of plants treated with pesticides. But, the most prevalent pesticide found is a miticide. "Yes, the major chemical found in bees is the one we put there. Miticides don't act in a vacuum," he cautioned. "We don't yet understand how they act in combinations with other chemicals and other factors."

- Environmental stressors, such as climate change and its impact on nutrition and of course the stress we put on bee colonies with "industrial apiculture". Huge too is the lack of suitable consistent, adequate forage for bees.

- Poor nutrition, due in large part to increasing monoculture and again coming back to our bee stewardship, with heavy supplemental feeding—are we somehow changing the normal bee digestive system?

- And the "other" category: a variety of other possible contributors like GMOs, cell phones (or more precisely electromagnetic pollution, including even from the sun itself, and signs of the rapture among others.

So Now What?

Field Day's overcast skies cast an element of gloom, and listening to Dr. Caron discuss increasing rates of colony loss did little to dispel that what's facing honey bees is large and formidable. I think we all took a few deep breaths throughout the keynote speech, and wondered what are we doing to ourselves.

But, hope springs eternal in beekeepers. The fact that hundreds of people swarmed to a large tent on a damp morning in Kentucky, listened keenly to every word this expert shared, and spent the rest of the day meeting, learning, discussing and sharing bodes well for the future of the honey bee.

Overwintering Bees

By Meghan Milbrath, Research Associate in the Entomology Department at Michigan State University, Coordinator for the Northern Bee Network, and Owner of Bending Sickle Community Farm

When it comes to overwintering, there are a lot of factors that can be considered, but there are two that are objectively the most important: food and moisture. Either too little food or too much moisture will lower your chances of getting your colony through the winter. Thankfully, both can be managed.

Managing Moisture

• **Have an upper entrance.** You can use a spacer with a hole, an auger hole in an upper hive body, or a wedge under the inner cover, but somehow have a hole up top. This not only allows air to flow through the hive, but it also prevents them from getting closed in if too many dead bodies or debris fall to the floor and block the lower entrance (or the bottom gets blocked by drifts of snow).

• **Put something absorbent on top.** It is good to have something absorbent between the bees and the top of the hive (before the inner cover) that can trap moisture. This can be a quilt box (easily made by putting leaves/straw in a pillow case or burlap bag inside an extra super), newspaper, candy board, or absorbent insulation. As the bees are in cluster, they are eating honey and working their muscles, and this metabolism results in hot air that can rise up, condense on the inner cover, and drip back down on them on a cold day.

• **Make sure water can't collect on the bottom.** If you have a screened bottom board, this isn't a huge concern, but if you have a solid bottom board, try to tilt the hive forward so any water can run out the front.

Managing Food

Much of the food management is actually done through August and September, by feeding, combining weak hives, or equalizing by giving lean hives resources from strong ones. However, there are things you can do as you put them to bed for the winter that can help.

• Rearrange frames. Bees move up through the winter, so they will run out of food at the top. If you have a box that isn't full on top, your bees can hang out there and starve, even if there is honey down below. Either remove empty frames from the top, or rearrange so that emptier honey frames are on the very edges, and the frames in the middle are full.

• Supplemental feeding. Even though it is too cold to use syrup, you can feed as insurance against a particularly demanding season. I make a dry-ish clumpy mix with the following: 7 parts dry sugar, 1 part water with Honey B Healthy®, 2 parts pollen substitute (e.g. MegaBee®). I put this on a half sheet of newspaper on top of the hives (covering the back 2/3 of the frames). A spacer with an auger hole under the inner cover provides room for the mound of sugar. You can also do a fully dry mix, just use only sugar, or use a pre-made candy board. Put this on once the bees are in cluster, but before they would be up near the top (October through January). You can peek under the cover and check to see if they are using it (January on) and add more as needed. If they don't use it over the winter, you can feed it to your bees later.

Other Considerations

Beekeepers do many other things to prepare their hives for winter. Sufficient food and ventilation are non-negotiable, but other management techniques are used to put bees to bed for winter.

• **Wrapping.** Wrapping can reduce wind and provide protection from winter, and is especially useful if your hives are in an exposed location. It isn't essential to keep the hive warm—remember that bees are keeping the cluster warm, but are not trying to heat the whole hive box (think march of the penguins). If you do choose to wrap, use something that breathes a little like tarpaper or a commercial carton (not trash bags or Tyvek®), and make sure to leave your upper and lower entrances unobstructed. Wrapping reduces airflow and you don't want to sacrifice moisture management. After I found my bees can survive without it I stopped wrapping because it is expensive and a lot of work, so it doesn't fit my management strategy (overworked and underpaid).

• **Mouse guards.** Mice can do a ton of damage. I generally try to put mouse guards on in the fall (after checking for mice!), but I don't always get them on every hive, and some have come through just fine. I have gotten mice in a few hives, and the result is a mess. You can use a wooden entrance reducer, or you can use ½" hardware cloth over the entrance, or a fancy specific mouse excluder.

• **Closing screened bottom boards.** I have some solid bottom boards, some fancy screened ones with inspecting boards, and some with screens that can't be closed off. Many people with screened bottom boards try to get them closed before it gets cold, which makes sense to block the wind. However, I have some hives with screened bottom boards that I left open all winter, and they have done just fine.

With the techniques listed above, I've had success both using them and not using them[1], so I don't feel strongly about their implementation. The trick is to find the combination that fits your management philosophy and budget.

Branch Apiaries and Diagnostic Lab

Thank you for choosing Branch Apiaries and Diagnostic Lab with assisting you with your colony health and management. You will note below procedures for sending your Honey Bee sample to our Lab. Please follow the directions below for collecting and shipping your sample. It is crucial that you follow the direction so we can ensure we have a quality sample to diagnose.

Collection of Samples:

1. Upon deciding what colony or colonies you wish to have diagnosed, please collect one (1) cup of Bees. The Bees should be older Bees such as foragers. You may also collect a sample from the inner cover. Please do not send Bees that are on the Brood combs.

2. The collected Bees should be placed in container with a closeable top as not to leak that is filled with alcohol. 70 % Isopropyl or rubbing alcohol is sufficient. Fill the container until the bees are covered and add one additional inch of alcohol over the Bees. Note: The sample container will be discarded.

3. Ensure that the sample container does not leak however do not shake the container. Package the sample Mail safe and ship to the address listed below.

Please complete the section below

Name:

Address:

Telephone:

Date of collection:

Please diagnose for Varroa Mite, Tracheal Mite, Nosema Apis and Ceranae
(Please circle one or all)
I wish to know the actual spore count per Bee __yes__no

Branch Apiaries and Diagnostic Lab
137 Rowe St.
Gastonia N.C. 28053
704-913-2060

Branch Apiaries and Diagnostic Lab is looking forward to assisting you with your Beekeeping diagnostics. Please note the diagnostic testing is free of charge. However with the rising cost of running such a Lab any donations are greatly appreciated.

We wish you the best in your Beekeeping and look forward to assisting you in the future. Depending upon sample load we will usually have your results within one week

from the date we received your sample. Please do not call to check the status of your sample. If you have not heard from us within two weeks please call and check the status of you diagnosis.

Thank you

Branch Apiaries and Diagnostic Lab

Neonicotinoids let virus thrive in bees – Another nail in the Neonic Coffin?

From Chemistry World

Scientists in Italy believe they have found a molecular trigger by which neonicotinoid pesticides may harm colonies of honey bees. The team's experiments suggest that exposure to neonicotinoids results in increased levels of a particular protein in bees that inhibits a key molecule involved in the immune response, making the insects more susceptible to attack by harmful viruses.

Francesco Pennacchio, of the University of Naples Federico II, and colleagues identified a gene in insects that codes for a protein family similar to that found in other animals that is known to regulate the immune response. This leucine-rich repeat protein family, or LRR, has been shown to suppress the activity of a key protein involved in immune signaling, called NF-κB. When the researchers exposed bees to sub-lethal doses of the neonicotinoid clothianidin they saw a significant increase in the expression of the gene encoding the LRR protein, and a concomitant suppression of the NF-κB signalling pathway. These effects were not seen when bees were exposed to the organophosphate insecticide chlorpyriphos.

When the team infected bees with a common pathogen – deformed wing virus – and exposed them to clothianidin and another neonicotinoid, imidacloprid, at concentrations similar to those that would be found in the field, there was significantly increased replication of the virus, which was not seen either in untreated bees, or those exposed to chlorpyriphos. The virus is common in bees and usually remains inactive – kept in check by the bees' immune system. The results suggest that insecticide-induced suppression of bees' immune systems lets the virus replicate unchecked.

'The reported effect on immunity exerted by neonicotinoids will allow additional toxicological tests to be defined to assess if chronic exposure of bees to sub-lethal doses of agrochemicals can adversely affect their immune system and health conditions,' says team member Francesco Nazzi of the University of Udine. 'Moreover, our data indicate the possible occurrence in insects, as in vertebrates, of a neural modulation of the immune response. This sets the stage for future studies in this research area, and poses the question on how neurotoxic substances may affect the immune response.'

Susan Kegley runs the Pesticide Research Institute, an independent consultancy in the US. She tells *Chemistry World*: 'The EU has already implemented a minimumtwo-year suspension of the use of the most toxic neonicotinoid insecticides – clothianidin, imidacloprid and thiamethoxam – on bee-attractive crops, to take effectDecember 1, 2013. The US EPA [Environmental Protection Agency] remains unconvinced that neonicotinoids could be a primary factor in recent pollinator population declines. This new study, in conjunction with other observational studies showing enhanced susceptibility to pathogens caused by exposure to neonicotinoids, should prompt US EPA to re-evaluate the science.'