

# NCSBA Summer Meeting Synopsis

by Geneva Green

## MAIN SPEAKERS

We had a wonderful summer meeting at Elon University in July. Some of the many highlights were the three excellent speakers. They were great representatives of honey bee research, inspection and education.

**Maryann Frazier** is known for her research at Penn State. She has been instrumental in the new research on the long term effects of pesticides in the hive. As the senior extension associate specializing in apiculture, she teaches throughout the state and throughout the mid-Atlantic Region.

**Ed Levi** is part of the [Apiary Inspectors of America](#), Secretary of the Apiary Inspectors of America. In 1984, Ed became Apiary Specialist and Inspector for the Arkansas State Plant Board. He has years of personal and vocational experience with honey bees.

**Richard Fell** has recently retired from the Department of Entomology at Virginia Tech, although he continues to teach. His work is comprised of teaching and extension including work in Mali, Ecuador and South Africa.

Together they presented a unified message that to be good beekeepers we must study and understand how bees function, how decisions are made and even how their pests operate, and we must work in harmony with these behaviors.

## NC STATE REPORT

**Don Hopkins**, the head of our state inspectors, reported on the state of beekeeping. Jasmine losses were high down towards the coast. Purple Brood was normal at coast but also found in the Piedmont. Purple brood is a nutritional disease that usually affects one round of brood when the Cyrilla, Titi, is in bloom. It usually recovers in the next round afterwards and can be reduced or prevented with heavy feeding. This year is unusual that it has been found in areas where Cyrilla is not common. For more information see the article on [Purple Brood](#). Don discussed briefly commercial beekeeping in North Carolina and pollination of blueberries towards the coast.

**Dr. Tarpy**, our state apiculturist, could be seen all over the meeting: performing introductions, rescuing presenters with technical difficulties, serving as a bridge between speakers and answering questions all around.

He seemed optimistic despite budget cuts that would end State University's participation in the Master Beekeeping Program. He also encouraged participation in the Bee Informed Partnership, which hopes to elicit past and current information on the status of managed hives.

## **PESTICIDES AND BEES**

Maryann Frazier's Talk

Maryann Frazier's first talk at the meeting was on Pesticides and Bees. In considering the overall decline in pollinators in North America, she quotes the research done in 2007 at [http://www.nap.edu/catalog.php?record\\_id=11761](http://www.nap.edu/catalog.php?record_id=11761). Her new work is using a database program looking at pesticide application to pollinated crops, the number of bees visiting the crops, the application of miticides, or other treatments that beekeepers apply to the hive, and pesticide levels in local water sources. In samples of pollen, beeswax, royal jelly and flowers, 171 pesticides were detected, mostly pesticides that bees come in contact with i.e miticides, pesticides and fungicides used on pollinated crops. The most common are the following:

<b>Pesticide</b>	<b>Common Name</b>	<b>LD50 ppb.</b>
Carbaryl	Seven Dust	10500ppb.
Coumophos	miticide	463000ppb.
Fluvalinate	miticide	15866ppb.
Imidicloprid		280ppb.
metabolites of Imidicloprid		280ppb.
Chlopyrifos	organophosphate	1220ppb.
Chlorothalamite	fungicide	11000ppb.

The amounts found were well below the LD50 but the concern is not for acute toxic events but the slow build up of toxins that chronically affect the behavior and physiology of the honey bee. "The impacts of multiple pesticide residue in bee food most likely will be via synergistic interactions at sublethal levels on key behaviors and physiology." It is especially the synergistic effects between certain fungicides that have an additive effect on neonicotinoides and pyrethroids. There are also concerns about the metabolites, the chemicals that a pesticide breaks down into over time,

which can be more powerful than their predecessors. Another concern is adjuvants or synergists in pesticides since they are not considered active ingredients are not thoroughly tested. They are concerned about a lack of adequate warning on pesticide labeling.

The take home message from Maryann's talk was that we should be aware of what we are using in our hives and make informed choices. We should avoid Coumophos and Fluvalinate. When keeping bees around cultivated areas or pollinating crops, we should attempt to communicate with farmers about what they are using and how they are using it. Help increase our understanding of pesticide interactions by reporting all die offs. Remember whatever your bees are exposed to will be interacting with chemicals already in your beeswax. These effects may not result in a major die off but could affect fertility and productivity.

Maryann also discussed her recent trip to Africa where those bees seem to be doing well. Although there are Varroa Mites, the African beekeepers have been largely unaware. The Apis Scuttelaria seems to be tolerating the mites. The introduction and use of Langstroth hives have not been met by success. It is difficult to obtain these hives and they are costly as well as not lasting as long as the traditional log hives, so many beekeepers have returned to these. It is also difficult to get smokers, gloves and hive tools. Beekeepers who visit are asked to bring new equipment with them and leave it on their return. All wax tested in Africa is clean of pesticides and chemical residue. The researchers are attempting to set up some kind of program to trade wax which is not valued there for tools and equipment.

## **HONEY PRODUCTION**

Ed Levi's Talk

Ed discussed Honey Production from the viewpoint of bees natural behavior. In understanding how the bees produce honey, we can better create circumstances that allow for more efficient honey production. Critical to this is population control. It is important to build up a population so that it is peaking during the honey flow. If you want to simulate a honey flow to increase laying, feed a 1/1 syrup mixture. It will take 6-7 weeks of the queen laying on drawn comb to have foragers ready to harvest the nectar. Once the flow starts, it may be necessary to "block the queen" to prevent her from overlaying and the hive swarming.

Splitting will stop swarming but two small hives will not produce the same amount of honey even if the numbers of bees are equal. To control swarming, balance the bees between hives, swapping a light hive and a

strong hive in the day when the bees are out foraging. Foragers will return to the other hive and strengthen the weak with increased population while reducing crowding in a strong hive. A similar method is called "Bee Balm", where frames of capped brood are moved into a weak hive. Since the brood is already capped, it is not strain on the hive but immediately increases the forager population. When bees are reducing the water content in nectar, they will fill a hive only 1/4 to 1/3 full thus increasing the surface area and the rapidness of evaporation, if there is room. The faster the honey is cured and then sealed, the more nectar they will collect during the flow. Giving your bees plenty of room for honey stores at the beginning of the flow will increase your yield.

Ed has been slowly weaning his bees off of chemicals. His personal approach has been to assess his bees using a number of methods for dealing with pests and diseases in his IPM arsenal without resorting to chemicals and then allowing losses of weak hives to build up resistance in surviving populations.

Some of these methods are as follows:

- Good Stock: Buckfast, Russian, VSH
- Grafting from survivor colonies
- Screened Bottom Boards
- Beetle Traps
- Nematodes in Soil for hive beetle larvae
- Drone Trapping
- Sugar Dusting
- Changing wax often
- Inspect and destroy any AFB affected hives
- Care in mixing equipment
- Cleaning tools between hives
- His suggestion is "To not overwinter bees on any comb that they overwintered on before and to not graft any queens from any hive showing signs of Nosema."

## **QUEEN REARING: PHEROMONES AND RE-QUEENING**

Richard Fell's Talk

To understand pheromones is to understand the communication that takes place in the hive. Re-queening as well as swarming behavior is a result of changes in pheromones. A pheromone is a chemical substance or blend secreted by an animal to the outside that effects the physiology or behavior of other animals of the same species. Pheromones can act as releasers,

which stimulate an immediate behavioral response or as primers, that act physiologically to alter endocrine or reproductive systems.

Some of the main pheromones at work in the hive are the following:

- Queen Pheromone [Mandibular Gland]: serves as both a long distance attractor of drones and a close
- Queen Attractive Scent
- Queen Footprint [Anhart Gland]: inhibits production of queen cups.
- Queen Abdominal [Tergal Gland]: stimulates the release of copulatory activity
- Dufour's Gland Pheromone [Vaginal Tract]: elicits retinue behavior
- Queen Feces Pheromone:[fecal exudate]: repels workers, increases grooming and reduces aggression
- Alarm Pheromone: sets up warning as danger to the hive, and marks enemy with sting.
- Scent Gland
- Brood Pheromone: recognition and incubation of brood. stimulation of pollen foraging. inhibition of worker ovary development. regulation of worker behavioral development.
- Worker Pheromone
- Worker Adult Surface
- Egg Pheromone: produced by queen to distinguish between queen laid and worker laid egg.
- Diploid Drone Cannibalism: allows the identification and destruction of diploid drones
- Queen Cell Pheromone: distinguishes queen cell from worker cell.

The Queen Pheromone affects a variety of activity:

1. Recognition of the queen
2. Inhibition of queen rearing
3. Inhibition of worker ovary development
4. Foraging and brood rearing
5. Affect worker comb building behavior
6. Acts as modulator

Queen pheromone is spread through the hive through direct queen to worker transmission 35%, through messengers who pick up pheromone from queen and then spread it worker to worker 65%. The queen will spend 40% of her time being still and being attended upon where the pheromone will be picked up. In crowded colonies, distribution is disrupted which can cause swarming behavior. Another factor that may inhibit pheromone production and

distribution, could be long term residual effects of pesticides. By understanding the critical nature of pheromones to the health and development of the hive, we can better regulate our bees. Careful assessment of queen quality and replacement of queens with queens in equal state, i.e. mated laying queen replacing a mated laying queen, can solve a drop in pheromone levels.

The Ambrose Student Award Winner was Brenna Traver, a student under Richard Fell, who has been exploring *Nosema ceranae* which has been replacing *Nosema apis* in the United States. *Nosema* is a microsporidian obligate intracellular parasite. It can be a chronic or acute condition that disrupts the digestive system. It is spread through an oral fecal route and can be spread by trophylaxis, cleaning contaminated cells or consuming contaminated water or honey. It infects the cells in the digestive tract and can cause bees to age faster, increasing forager numbers, creating hunger in bees which causes longer foraging, and shorten the lifespan of the bees. *Nosema ceranae* appeared in the United States in 1984. It has overtaken the *Nosema apis* because it is more virulent, has a higher proportion of vegetative state and is more heat tolerant. Current methods of testing are not very accurate. Polymerase Chain Reaction with fluorescent testing is more expensive but more definitive. Her research showed no difference in age polytheism but stronger infection from February to March.

## **BEE STING IMMUNOLOGY**

Buddy Marterre's Talk

Buddy Marterre gave us a thorough understanding of the process by which the body reacts to foreign materials in this case bee stings as opposed to being poisoned by bee venom. When some individuals have a more extreme reaction to a bee sting, this is an allergy. Reactions can be categorized in two types: one is normal and can be normal to large local: which involves swelling just at sting site; one is inflammatory and can be mild or extreme. An inflammatory reaction is one that involves reactions in parts of the body other than the sting site and can include swelling, hives, nausea, vomiting, diarrhea, abdominal pains, dizziness, lightheadedness and tremors. An inflammatory reaction needs to be treated right away and the victim taken to the hospital. Reactions may last up to six days, so even when treated with an epi-pen, the victim should be seen by a professional. Once a person has had an inflammatory reaction, they should be seen by an immunologist who can determine the exact cause of the reaction and develop allergy shots to reduce the reaction to it.

Some tips to avoid stings are:

- Wear White
- Always wear your veil, to avoid ocular stings
- Avoid perfumes and bananas
- Use smoke judiciously
- Work slowly and deliberately
- Avoid Vibrations
- Remove stinger ASAP, most venom is injected in the first 20 seconds
- Wash your suit often, to get rid of alarm pheromone

### WORKSHOPS

There were a great number of excellent workshops some of which took place in the bee yard with the state inspectors. It is a wonderful opportunity to get to just examine a hive with an inspector nearby, to answer your questions and point out things you may not have seen. Some were led by our main speakers, including a quiz about pesticides presented by by Richard Fell and Maryann Frazier. Ed Levi spoke about incorporating IPM practices in beehive management. Our own Geneva Green presented a workshop on honey plants and siting hives to increase nectar availability. Lee Newlin, from Chapel Hill led an excellent workshop on cooking healthy with local foods and honey. Glenn Hackney, from the Inspector's office, taught about how to detect Nosema using a microscope.

### BANQUET

One of the best things about attending a state meeting is the chance to spend time with other beekeepers. The award banquet is a great opportunity to socialize and celebrate the members of your local club. Orange County Beekeepers had a lot to celebrate. The winners included Lewis Cauble, Todd Walker and Gail Young who won for honey and cooking with honey. Lewis also received his Master Beekeeper certification. Just competing is a great opportunity as well, entries from the club included Geneva Green, John Harrell and Mary Dietz. The club itself was honored with the Golden Chapter Award. The points between the three entering clubs were mostly tied and all three clubs were awarded a check for \$300 plus gift certificates for Brushy Mountain. Johnson County was slightly above in points and became the club of the year.