Effects of Pesticides on Honey Bee Brood (continued from Page 1)

The results of my research suggest that larvae treated with imidacloprid levels ranging between 5 and 40 parts per billion were less likely to reach defecation. Of those larvae to reach defecation, those treated with imidacloprid were less likely to emerge as adults. The same results hold true for amitraz (levels ranging from 25 to 400 ppb) in that those larvae that were treated are less likely to survive to adulthood.

These results indicate that even the small quantities of imidacloprid and amitraz that are likely to be encountered in the field can be lethal to bee brood, but the severity of this impact on the entire colony is unknown.

Trish Toth, UF/IFAS Entomology Graduate Student

From the Desk of Jerry Hayes (continued from Page 2)

- Dr. Jamie Ellis will be collaborating with Dr. Paul Jepson on producing a unique Integrated Pest Management "manual" for Florida beekeepers. Beekeepers will be able to access all currently recommended treatment and management protocols and apply them to the unique Florida beekeeping world.
- Dr. Jay Evans will be looking at the symptoms and outcome of separate *Nosema apis* infections, separate *Nosema ceranae* infections, and *Nosema apis-Nosema ceranae* infections paired together in honey bees. Little is known about treatment of *Nosema ceranae* individually or with *Nosema apis*.
- The honey bee nutrition study that provided valuable information as completed by Dr. Amanda Ellis using fermented diets will be continued in-house using current resources.

None of the above opportunities happen without tremendous team effort. I would like to recognize the partnership that exists among the Florida beekeeping industry as represented by the HBTC, FSBA, UF, and DPI/Apiary Section. It is the strongest and most robust in the nation.

Jerry Hayes
Florida Department of Agriculture & Consumer Services
1911 SW 34 Street
PO Box 147100
Gainesville, FL 32614-7100
352-372-3505 x128
hayesg@doacs.state.fl.us
www.doacs.state.fl.us/pi

Jamie Ellis, Ph.D.
Dept. of Entomology and Nematology
University of Florida
Bldg. 970 Natural Area Dr.
PO Box 110620
Gainesville, FL 32611-0620
352 392 1901 x 130
jdellis@ufl.edu
UFhoneybee.com

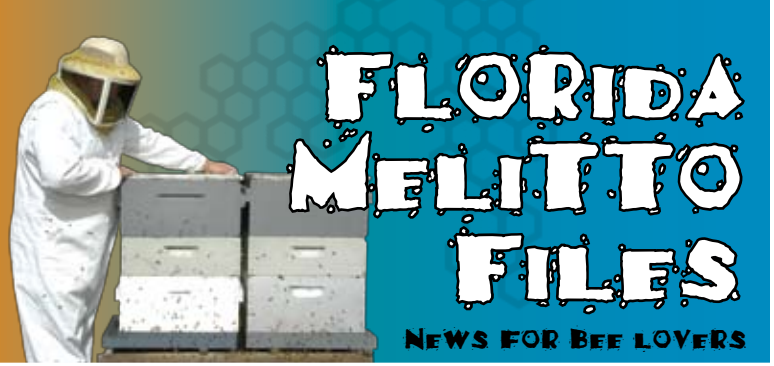
DACS-P-01492

Division of PLANT INDUSTRY
Fresh from Florida. Protection through Detection
Florida Department of Agriculture & Consumer Services
Charles H. Bronson, Commissioner

&

UF UNIVERSITY of FLORIDA
IFAS
Entomology and Nematology

SOLUTIONS for your LIFE



FLORIDA MELITTO FILES

NEWS FOR BEE LOVERS

Joint publication:

Florida Department of Agriculture & Consumer Services

University of Florida/ Institute of Food & Agricultural Sciences

Vol 2 Issue 4

OCT - DEC 2008

Studying the Effects of Pesticides on Honey Bee Brood

Due to recent declines in managed European honey bee populations, the impact of pesticides on beneficial insects, such as these important pollinators, has been in question. Much research has been conducted on the effects of pesticides on adult honey bees. The research concludes that, in large enough doses, pesticides can kill bees. However, little research focuses on honey bee brood. By treating bee larvae with one of two different pesticides, I am investigating any possible effect these pesticides might have on larval or pupal mortality.

Trish Toth UF/IFAS Entomology graduate student

The first pesticide, imidacloprid, is a systemic pesticide used to treat sucking insects such as aphids and scale insects found on ornamental, fruit and nut trees. This product is not labeled for use when fruit trees are in bloom, but because of its systemic properties, small quantities can be detected in pollen and nectar several days after spraying. Forager bees can encounter the pesticide-contaminated pollen and nectar in the field and potentially return small quantities to the colony where it is stored or distributed as larval food. Investigators have measured amounts of imidacloprid in nectar and pollen of various flowering plants to range between 2 and 20 parts per billion. Imidacloprid has been shown to affect adult bee behavior causing bees to become disoriented, decrease food consumption and limit forager activity.

The second pesticide, amitraz, is not registered for use in the United States, but is sometimes used by beekeepers to control varroa mites. Increased resistance of mites to registered products could further increase illegal use of this varroacide. Amitraz is a lipophyllic compound that could easily accumulate in beeswax. However, it has been shown that amitraz is unstable in both honey and beeswax and is quickly broken down into its metabolites. Unlike imidacloprid, little information is present on the effect amitraz has on adult bee behavior and physiology.

Therefore, I have investigated the effects small quantities of imidacloprid and amitraz have on the number of larvae to reach defecation, and the number of pupae to emerge as adults.

(continued on back)

Jerry Hayes, FDACS/DPI
Asst. Chief Apiary Inspection

FROM THE DESK OF JERRY HAYES

If you are not familiar with the Honey Bee Technical Council (HBTC) you should be. The HBTC is the organization that advises the Commissioner of Agriculture on the status, condition and needs of the Florida apiculture industry. Honey bees, as managed by registered Florida Beekeepers, are vital to the diversity, quality and production of Florida agriculture through something only they can provide…pollination.

The HBTC executive committee (Chairman Bill Merritt, Florida State Beekeepers' Association (FSBA) President Laurence Cutts, Dr. Jamie Ellis, Mark McCoy, Jerry Latner, Mike Thomas and me), is tightly linked and responsive to the industry we love.

The HBTC lobbying efforts, along with those of the FSBA, have resulted in the Florida legislature's continued support of the Florida beekeeping industry amid all of the honey bee health issues that we and all Florida agriculture face. Florida has granted honey bee research funds to look at many issues facing our industry. The HBTC held a public meeting August 27 in Gainesville to discuss how best to recommend and manage these funds. The following direction was suggested to work towards helping Florida beekeepers.

- Though Dr. Amanda Ellis has left the Division of Plant Industry (DPI) to pursue the most important profession that no one can get a degree for, that of being a mother, while here she did an outstanding job directing multiple research projects. Having Dr. Ellis "in house" gave us the ability to use our budget wisely and produce valuable data efficiently. She will be sorely missed but we hope to replace her with a comparable researcher at both DPI and Dr. Jamie Ellis's University of Florida laboratory. The goal is a team approach to cover a lab-based analytic focus and a field-based component to search out gaps in varroa control research and to research better, safer, and more efficacious control methods.
- Continuation of Dr. Jamie Ellis's AFBEE program that has done so much to explain and train the general public about Africanized honey bees and about how to separate the "good" bees from the "bad" bees.
- Dr. William (Bill) Kern took the lead from the very beginning on the rigorous and difficult task of training first responders, emergency rescue teams, pest control operators and others in victim extraction and AHB eradication. This valuable effort to protect the public and protect our industry will continue.
- During the recent Colony Collapse Disorder (CCD) crisis, hundreds of samples of honey bees, honey comb, and bee bread were taken. Usually all of these samples, when analyzed, show many pathogens (virus, bacteria and fungi) and high levels of chemical residues. The most disturbing were those found in the comb, the vital home for all honey bee life. Dr. Rosalind James has been working on O3 as a potent sterilization and chemical oxidation activator. Her work has reached such a level, that a proof of efficacy demonstration project will be supported. Dr. James will be demonstrating the use of O3 in Florida for empty hive components, especially comb to remove dangerous pathogens and chemicals from the hive environment.

(continued on back)

FDACS/DPI

FROM THE DESK OF DR. JAMIE ELLIS

Dr. Jamie Ellis
UF Asst. Professor

Update on research projects at the UF Honey Bee Research and Extension Laboratory

Hello Florida beekeepers. I just wanted to brief you on a few of the projects that are underway at the UF Honey Bee Research and Extension Laboratory (HBREL).

1 The effects of pollen supplements on colony strength and pollen collection: We have begun a partnership with Straughn Blueberry farms to look at how pollen supplements affect bee pollination of crops. In the first of a series of projects, we have planned at Straughn farms, we will test how MegaBee™, FeedBee®, and Bee-Pro® affect adult bee population, brood production, and pollen foraging activity of Florida bee colonies. The ultimate goal of this project is to determine what diet works best in Florida conditions when colonies are used for crop pollination.

2 Controlling small hive beetles without chemicals: This two-year study will be completed in April 2009. In it, we are testing whether or not hygienic queens, baited traps, and insect-eating nematodes lower small hive beetle populations in honey bee colonies. We are testing all of these treatments by themselves and in various combinations with one another. Our desire is to present a non-chemical method of controlling beetles to the beekeeper.

3 Controlling Israeli Acute Paralysis Virus (IAPV) in honey bee colonies: We have teamed with Jerry Hayes's office and Beeologics (a company specializing in bee health) to test a novel method of controlling IAPV in honey bee colonies. The technology we are using is state-of-the-art and very promising. Our results are equally promising. We are hoping to continue studies into IAPV and other bee virus control. I will present more information on this project at the Florida State Beekeepers Association meeting in October.

4 The effects of Cop-R-Tox on bees: Cop-R-Tox is a wood preservative used to prolong the life of bee hives. Beekeepers have used the product for years now, assuming that it is safe. Some data on the product exists, but I wanted to revisit the issue using some new techniques. Hopefully, this will lead to better recommendations for preserving bee related woodenware.

5 Testing the efficacy of Exomite at controlling varroa: Exomite is a European product used to control varroa. We have begun a study where we are examining its action against varroa in Florida conditions. Hopefully, this product will give us some varroa relief.

Besides these studies, I have four students who investigate: (a) the effects of chemicals on bee ability to handle varroa (2 projects), (b) bumble bee colonies as reservoirs for small hive beetles (3 projects), (c) how hive beetles penetrate and integrate into honey bee colonies (8 projects), and (d) cape honey bee nesting habits (3 studies). These are some of the projects underway at the UF HBREL. Please contact us with questions: http://www.UFhoneybee.com.

UF/IFAS

Does Genetically Modified Corn Hurt Honeybees?

From Dr. Jamie Ellis
Assistant Professor of Entomology
UF Honey Bee Research and Extension Laboratory

Genetically modified crops (GM crops) are suspects in the Colony Collapse Disorder (CCD) paradigm. Herein, I review an article on the effects of GM corn on bees. This article is based on one written by Dr. Galen Dively from the University of Maryland. His original article can be found at: http://www.americanfarm.com/TopStory5.01.07f.html. Dr. Dively's experience is with Bt corn, and he reviews the subject well.

In his article, Dr. Dively states, "the weight of evidence based on a multitude of studies argues strongly that the current use of Bt corn is not associated with CCD." First he notes that the Bt endotoxins produced by the corn plant are specific either to moths or beetles, depending on the endotoxin, and will not hurt (or are "biologically inactive" against) honey bees. Furthermore, CCD symptoms do not resemble symptoms associated with Bt-affected insects. Dr. Dively also states that the expression of the endotoxins in the pollen is "barely detectable" in most Bt corn hybrids.

Interestingly, Dr. Dively states that numerous researchers have investigated the effects of Bt endotoxins on honey bees by feeding the purified endotoxins to bee larvae through honey or sugar syrup with no measurable effects identified. He further cites studies in New Zealand where the authors fed bees pollen treated with endotoxins at doses above what would be found in nature and this did not negatively affect bee survival. I summarize his other statements below:

- Endotoxin-laced pollen did not affect weight and survival of honey bees – University of Maryland study
- Endotoxin-laced pollen did not affect hypopharyngeal gland development of newly-emerged bees – New Zealand and Switzerland study
- No effects of endotoxin exposure on mortality, syrup consumption or learning capacities of free-flying honey bees
- No effects of GM corn pollen on bee weight, foraging activity, colony strength and brood development – University of Maryland, Dr. Dively study

There is a final way GM corn could affect honey bees, although the link remains fuzzy. GM corn is grown from seeds that are dipped in insecticides prior to planting. These insecticides are meant to protect the young plant as it grows and establishes. Interestingly, these seeds often are dipped in one of any number of pesticides that belong to the neonicotinoid pesticide family. Data for/against neonicotinoid effects on bees exist. It is important to note that neonicotinoids and other seed dressings are systemics. This means that the chemicals are taken up into the plant and translocated to areas in the plant that bees visit. Some fear that such pesticides can be present in pollen and nectar as bees forage on the crops. This is such an issue that some European countries have banned or are considering banning the use of these chemicals. Even as I write this article, German groups are blaming a seed treatment (Clothianidin – a neonicotinoid) for causing CCD. So the debate rages on. For more information on GM corn and its effects on bees, see: Rose, R., Dively, G.P., Pettis, J. (2007) Effects of Bt corn pollen on honey bees: emphasis on protocol development. *Apidologie* 38(4): 368-377.

Explaining The Best Management Practices

From Michael K.O'Malley
Coordinator, AFBEE Program
University of Florida

These Best Management Practices (BMPs) aim to preserve public safety and protect the beekeeping industry from being liable for any AHB incidents. To help beekeepers understand the importance and reasoning behind them, two BMPs, along with a brief description, have been featured in this and in the last several issues of the Florida **Melitto Files**. I discussed BMP points **9** and **10** in the last issue of the **Melitto Files** and, I continue with the final two points, **11** and **12**, below. A complete list of Florida BMPs is available by visiting on the web http://www.doacs.state.fl.us/pi/plantinsp/apiary/apiary.html.

11 To protect public safety and reduce beekeeping liability, do not site apiaries in proximity of tethered or confined animals, students, the elderly, general public, drivers on public roadways or areas where a stinging incident may have a higher likelihood of occurring.

This "out of sight-out of mind" practice stems from both good common sense and a recognition of the current robust legal system in America. In the event of a lawsuit as a result of a stinging incident, whether from a beekeeper's colony or a nearby feral colony, a beekeeper will have a solid defense if his or her bees are not located in proximity to areas frequented by human traffic or land used to keep penned/corralled livestock or pets. Additionally, if apiaries are located in these areas, there is a good chance that an onlooker will get unwillingly stung eventually. Regardless of the potential for a lawsuit, such a situation does not help to further the good name of the beekeeper in the community, nor does it reinforce the vitally important public image of those gentle bees in the white boxes.

12 Treat all honey bees with respect.

Treating all honey bees with respect is a fundamental pillar of beekeeping. Honey bees are indispensable, and I am certain that readers of the Florida **Melitto Files** understand more than most the importance of honey bees and the need to exercise respect.

	Month	Management Calendar	Blooming Plants
North Florida Ensure that colonies have enough food. It can be cold in N. Florida during winter	**Oct – Dec** Similar manage-ment schemes in Oct, Nov, and Dec. Pests become less of a problem late in year.	1) Varroa populations peaked in Aug/Sept. The economic threshold is 60+ mites/day on a sticky screen or 17+ mites in an ether roll for a **colony of average strength**. Treat if you exceed these numbers. Options include: Apiguard, ApilifeVAR, Mite Away II 2) Can treat colonies for Nosema disease using Fumigillin. Colonies may need as much as 4 gallons of medicated syrup to control *Nosema cerana* 3) Monitor for and control small hive beetles (options include Checkmite+, GardStar, Hood traps and West Beetle traps) 4) Feed colonies if light (colonies can starve!) 5) Can treat for tracheal mites (mix vegetable oil and powdered sugar until doughy - not sticky to touch: place a pancake-sized patty on top bars of brood chamber)	**Oct:** Spanish Needle, Mexican Clover[N], Primrose Willow[N], Spotted Mint[N], Golden Rod[N], Vine Aster[N], Smart Weed[N], Bush Aster[ND] **Nov:** nothing new blooms **Dec:** nothing new blooms
Central Florida: Varroa remain an issue through winter due to warmer temps	**Oct – Dec** Similar manage-ment schemes in Oct, Nov, and Dec. Pests become less of a problem late in year.	1) Varroa populations peaked in Aug/Sept. The economic threshold is 60+ mites/day on a sticky screen or 17+ mites in an ether roll for a **colony of average strength**. Treat if you exceed these numbers. Options include: Apiguard, ApilifeVAR, Mite Away II 2) Can treat colonies for Nosema disease using Fumigillin. Colonies may need as much as 4 gallons of medicated syrup to control *Nosema cerana* 3) Monitor for and control small hive beetles (options include Checkmite+, GardStar, Hood traps and West Beetle traps) 4) Feed colonies if light (colonies can starve!) 5) Can treat for tracheal mites (mix vegetable oil and powdered sugar until doughy- not sticky to touch: place a pancake-sized patty on top bars of brood chamber)	**Oct:** Spanish Needle, Mexican Clover[N], Primrose Willow[N], Spotted Mint[N], Golden Rod[N], Vine Aster[N], Smart Weed[N], Bush Aster[ND] **Nov:** nothing new blooms **Dec:** nothing new blooms *Brazilian Pepper blooms from September through October and is a significant fall source of nectar for bees.
South Florida Varroa are an important issue in S. Florida in winter because colonies rarely are broodless	**Oct – Dec** Similar manage-ment schemes in Oct, Nov, and Dec. Pests become less of a problem late in year.	1) Varroa populations peaked in Aug/Sept. The economic threshold is 60+ mites/day on a sticky screen or 17+ mites in an ether roll for a **colony of average strength**. Treat if you exceed these numbers. Options include: Apiguard, ApilifeVAR, Mite Away II 2) Can treat colonies for Nosema disease using Fumigillin. Colonies may need as much as 4 gallons of medicated syrup to control *Nosema cerana* 3) Monitor for and control small hive beetles (options include Checkmite+, GardStar, Hood traps and West Beetle traps) 4) Feed colonies if light (colonies can starve!) 5) Can treat for tracheal mites (mix vegetable oil and powdered sugar until doughy - not sticky to touch: place a pancake-sized patty on top bars of brood chamber)	**Oct:** Spanish Needle[ND], Mexican Clover[ND], Primrose Willow[ND], Smart Weed, Melaleuca[ND], **Nov:** nothing new blooms **Dec:** Maple, Willow *Brazilian Pepper blooms from September through October and is a significant fall source of nectar for bees.

[N]Continues to bloom in Nov, [D]Continues to bloom in Dec, [ND]Continues to bloom in Nov and Dec