BEE NEWS & VIEWS

The Mississippi Beekeepers Association Newsletter

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January-February 2013

One Step Closer to Tax Exempt Status for Honey Bee Products

The Farm Bureau Policy book for 2013 includes a policy in support of the MBA amendment to the Mississippi sales tax exemption certificate (Miss Code Ann. 27-65-103) to include bees and other apiary products. Stan Yeagley and Ken Morgan (Representative, House Agriculture Committee) have pressed for new language of the Vendor Sales Tax Exemption status to specifically list bees, honey and wax as being tax exempt. Of course, other members of the MBA legislative committee and members of the Farm Bureau apiculture commodity group have helped secure the policy statement. You may recall that last summer the Attorney General offered the opinion that bee products do fall within the tax exempt status, but this was countered by the Department of Revenue that still considered bee products as non-exempt. A bill moving to specifically list bee products as tax exempt failed to get out of a legislative committee.

The current policy by the Farm Bureau should help reenergize the subject in upcoming legislative sessions. The policy book lays out Farm Bureau's direction for the coming year. The policies reflect the feelings of the Farm Bureau membership about many issues including ones that affect all consumers. Once an issue gets placed in the policy book, then Farm Bureau can get behind that issue and support it. Farm Bureau can only support issues that are listed in the Farm Bureau Policy Book.

It is also important to understand that our bee issues were approved by all voting members of the Farm Bureau convention in December. So, our bee issue was approved by all farmers across MS and not just beekeepers. If we ever need to address a national issue important to beekeeping, the American Farm Bureau could be an excellent vehicle for championing our cause.

Hyde-Smith Secures Important Products for MS Beekeepers

Mississippi Agriculture Commissioner Cindy Hyde-Smith has announced approval by the United States Environmental Protection Agency (EPA) of two emergency exemptions to help Mississippi beekeepers control damaging varroa mite infestations in honey bee colonies.

The following products have received emergency exemptions under Section 18 of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA):

- HopGuard® manufactured by BetaTec Hop Products. HopGuard® cardboard strips treated with potassium salt of hop beta acids may be inserted in honey bee colonies or packages of adult worker bees prior to installation in a honey bee colony. This exemption expires November 30, 2013.

- Apivar® manufactured by Veto-Pharma S.A. Apivar® slow-release plastic strips contain the active ingredient, amitraz, which will release on contact with bees when strips are suspended in honey bee colonies. This exemption begins January 1, 2013, and expires December 31, 2013.

The varroa mite is a harmful, honey bee parasite that feeds on adult bees and developing brood. If left untreated, varroa mites can deform bees and eventually kill the colony.

The Mississippi Department of Agriculture and Commerce's Bureau of Plant Industry has authority under Section 18 of FIFRA to obtain an exemption from EPA for a non-labeled use of a pesticide if significant losses of an agricultural commodity are likely and alternative, labeled products are not available or effective.

For additional information, beekeepers may contact the Bureau of Plant Industry at (662) 325-3390 or toll-free at 1-888-257-1285.

Figure. Two miticides given Section 18 status for use against *Varroa* mites in MS during the upcoming year. Apivar® is an amitraz formulation from a French company (the label will be in English for the U.S. consumer). HopGuard® is a natural product formulation of beta acids derived from hops.

Bees Become Bigger Business at Bayer CropScience center

By WRAL Tech Wire

RESEARCH TRIANGLE PARK (RTP), N.C. — Bees are about to become bigger business at Bayer CropScience with a 6,600 square foot hive of activity located in the Triangle.

The company, which operates its North American headquarters in RTP, plans to open a North American Bee Care Center next July in RTP. Ground for the new facility will be broken in February.

The center is the latest addition to the company's growing presence in the Triangle. It recently opened a large, $20 million state-of-the-art greenhouse.

"We understand the necessity for healthy bees as pollinators and their critical role to agriculture, and by working with scientists, growers, beekeepers and customers, we strive to create new approaches and solutions to benefit bee health and the global food supply," said Jim Blome, chief executive officer of Bayer CropScience North America. "Because we are aware of the challenge to continue feeding a growing world population, our Bee Care Center will be a vital resource in our ongoing commitment to maintaining sustainable agriculture."

The center is designed to be "a gathering place for researchers, bee experts, students and other visitors to meet regularly with leading Bayer scientists." Bayer already operates a Global Bee Care Program. Highlights of the new center will include:

- "Full laboratory and research apiary, as well as honey extraction and workshop space needed to conduct bee health research and to support a practical apiculture. The research will focus on Integrated Pest Management for the multiple causes affecting bee health, such as parasites, like the Varroa mite, predators, diseases, seasonal management, and environmental stressors

- "The active promotion of bee-responsible use of Bayer products along with communication activities worldwide

- "State-of-the art meeting, training and presentation facilities for beekeepers, farmers and educators to provide resources and an interactive learning center."

Practical Sampling of Varroa Mites

Science Brief – *by Jeff Harris*

In recent years, honey bee health has become a primary focus of researchers in response to several episodes in which commercial colonies were lost in unusually high numbers in the U.S. and Canada (van Engelsdorp *et al*. 2009). Although not fully understood, high bee mortality stems from multiple factors that include the parasitic mite *Varroa destructor* Anderson & Trueman, viruses vectored to bees by *Varroa*, residues of agrochemicals in hives, and poor nutrition (Delaplane 2012). *Varroa* and the viruses it vectors are viewed as the primary killers of bees worldwide (Aronstein *et al.* 2012). The acaricides used to control *Varroa* are an

additional threat when they are sequestered as chemical residues in combs (Wu *et al.* 2011).

Most researchers believe that the use of chemicals to control *Varroa* mites should be minimized. However, implementation of integrated pest management strategies that would reduce pesticide use in hives requires that beekeepers can estimate mite density in a colony to know when a pest level has reached a critical action level (known as the economic threshold). There has not been a standardized sampling method at either the colony level or apiary level that could help beekeepers make treatment decisions. Most beekeepers sample to determine whether the mites are present or not. Even if they wished to accurately estimate mite densities, there has not been research to determine the minimal sampling size needed to achieve various levels of precision for the major sampling methods that beekeepers could use (sampling mites on adult bees, sampling mites in brood, and sampling colony floors with sticky boards).

Recently, Lee *et al.* (2010) published a scientific paper that had the primary objective of developing practical sampling plans that beekeepers could use to estimate *Varroa* mite populations in their colonies. The research team also developed more extensive sampling methods to be used by researchers wanting better precision for academic studies. A key point to their study is that they developed sampling methods for individual colonies and for entire apiaries so that commercial beekeepers could make treatment decisions with a reasonable assurance of precision.

The statistical details of the paper are excruciating to describe to other scientists, let alone to the average beekeeper with no background in experimental statistics. However, the basic outline of what the researchers did is informative. They used a variety of sampling techniques to measure mite populations in 31 commercial apiaries from 5 commercial beekeepers located in 4 different states. They sampled colonies at all times of the year. They took two sizes of adult bee samples to determine a minimum sample size necessary for reliable estimates of the density of mites in a colony of bees.

The researchers estimated mite populations for 954 colonies using *ca.* 12,000 small-vial samples of bees. The small vials had an average of 35 bees per vial, and the scientists took a small-vial sample from each frame of a colony that had bees adhering to it. They also took a large-vial sample (*ca.* 300 bees per vial) from a sub-set of 142 colonies to estimate the density of mites on adult bees. These large-vial samples averaged 338 adult bees and were taken from combs with capped brood. All samples were washed with alcohol to dislodge the mites (mites and bees were counted for all samples).

The researchers made intensive measurements of adult bee populations, numbers of worker and drone pupae, numbers of mites on adult bees and numbers of mites in worker and drone brood for a third sub-set of 62 colonies. These intensive measures involved microscopic examinations of brood combs to count mites in capped pupae, and weighing of the adult bee populations to determine the number of worker bees within a colony.

Statistical "magic" was used to compare the different sampling methods (small vial, large vial, intensive sampling) in order to develop sampling schemes that could accurately estimate mite levels in colonies with minimal effort by the beekeeper. For example, one question was how many small-vial samples would need to be pooled in order to estimate the mite load with adequate precision, or to be equivalent to the estimate of a large-vial sample.

I will only relay the methods that were developed for beekeepers (leaving out the recommendations for scientific researchers). The team recommends that a beekeeper wishing to estimate mite levels within a single colony take a large-vial sample of 300 bees from any frame in the upper brood chamber box (for colonies in which the broodnest occupies two or more hive bodies). The mite load is determine by washing with alcohol, and the mite density is calculated (e.g. 18 mites ÷ 300 bees = 0.06 mite per bee, which is equivalent to 6 mites per hundred bees, or 6%). If the beekeeper wants to estimate the total mite load of a colony, which are mites in capped brood and on adult bees, he or she can simply double the result from the adult bee sample (e.g. for the current adult bee load of 6%, the total colony load would be 2 × 6% = 12% which

means 12 mites per hundred individual bees – whether pupae or adult bees).

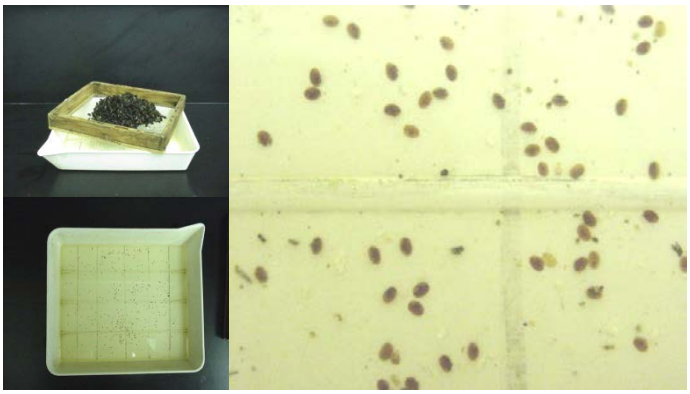

Figure. A large-vial sample of adult bees washed with alcohol (70% ethanol) to dislodge adhering *Varroa* mites. The mites drain through the sieve, while the bees are retained by the mesh. The total number of bees and mite are counted to estimate the density of mites (no. mites ÷ no. bees) (USDA, ARS stock photo)

Commercial beekeepers needing to make apiary-level treatment decisions do not have the time or resources to sample every colony they own. So, the research team developed sampling schemes to help in making an apiary-level treatment decision. It is important to note that a beekeeper cannot make a decision about treating all of his apiaries based on the sampling decision made for one apiary. This is because the mite loads can vary significantly between apiaries within a single commercial operation.

The basic procedure for apiary-level decisions involves averaging the adult bee densities for large-vial samples taken from a sub-set of colonies within the apiary – each colony is sampled by 1 large-vial sample (as above). Apiary-level treatment decisions can be made for apiaries with > 20 colonies using no more than 8 large-vial samples. This means that a beekeeper samples 8 different colonies in an apiary of 25 colonies, and he only samples 8 colonies in another apiary of 60 colonies. The researchers did recommend fewer samples for smaller apiaries. For example, 6 large-vial samples should be taken for an apiary with 20 colonies. Five large-vial samples should be used for an apiary with 10 colonies, and 3 large-vial samples should be used for an apiary with 4 colonies. The colonies sampled should be chosen at random and should span the entire geographical range of the apiary (not just concentrated in one area). The average mite density of these samples will reflect the average mite load of the entire apiary. So, if the average mite load from samples exceeds the economic threshold, the entire apiary is treated with chemicals to control *Varroa* mites.

Finally, the researchers commented on the economic threshold that had been previously published for *Varroa* mites in the southern U.S. The often used value of 10% load on adult bees as an economic threshold for late summer was developed for stationary apiaries (Delaplane and Hood 1997, 1999). Migratory beekeepers may actually need to use a lower threshold because there is a lot of movement of mites between holding yards and among apiaries from different commercial beekeepers at pollination sites. The researchers suggest that more work needs to be done to determine the best minimal thresholds for a variety of beekeeping practices. Until then, each individual beekeeper may need to choose a threshold level that suits his or her activities. I know that many beekeepers feel that the 10% value for adult bee loads is not conservative enough, and many use a value of 5% as the economic threshold for late summer. I have used the 10% level for over a decade with few colony losses – but it is up to your personal experience to decide which threshold you are going to use.

The goal is that all beekeepers use a sampling scheme to decide whether chemicals are needed to control mite populations – if mite densities are below threshold, chemical treatment can be delayed until another sampling period. This research goes a long way toward helping commercial beekeepers who may have thousands of colonies to reliably sample *Varroa* mites in their colonies.

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See also a series of online publications by CAP researchers:
http://www.beeccdcap.uga.edu/index.html

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Bees are a Big Industry in the U. S.

By Debra J. Groom

Ithaca, NY -- A Cornell University study published in the May 22 issue of the journal Public Library of Science ONE showed that crops pollinated by honey bees and other insects contributed $29 billion to farm income in 2010.

See the original paper [Calderone, N.W. (2012) Insect Pollinated Crops, Insect Pollinators and US Agriculture: Trend Analysis of Aggregate Data for the Period 1992–2009. *PLoS ONE* 7(5): e37235. doi:10.1371/journal.pone.0037235] or a summary in the December 2012 issue of *Bee Culture*.

The study analyzed the economic value of honey bees and other insect pollinators for 58 crops, including species that are directly dependent on insects for pollination, such as apples, almonds, blueberries, cherries, oranges and squash, and species that are indirectly dependent on insects, such as alfalfa, sugar beets, asparagus, broccoli, carrots and onions. Directly dependent crops require pollinators to produce a fruit, while indirectly dependent crops require pollinators to create seeds, but not the crop itself.

The findings show that in 2010, the value of directly pollinated crops was $16.35 billion, while the value of indirectly dependent crops was $12.65 billion. More specifically, honey bees pollinated $12.4 billion worth of directly dependent crops and $6.8 billion worth of indirectly dependent crops in 2010.

Bees and other insects that pollinate plants in the United States have suffered in recent decades from mites, pesticides, pathogens, land development and habitat fragmentation. But even with this, production of insect-pollinated crops has mostly increased this century and the Cornell study shows insect pollinators' value to farmers may be hard to replace. Other insects, including alfalfa leaf cutter bees, bumblebees, horn-faced bees and orchard bees, added $4 billion and $5.9 billion in directly and indirectly dependent crops, respectively.

"This lets people for the first time look at a peer-reviewed paper that says here are the revenues derived from these crops, and if we want to keep producing these crops, we have to recognize the importance of insect pollinators," said Nicholas Calderone, associate professor of entomology at Cornell and the paper's author.

The paper also analyzed trends in various metrics from 1992 to 2009 for crops that depend on pollinators. For directly dependent crops, production, cultivated area and revenues increased steadily over the course of the study period, with some slowing over the past few years. Recently, growth in the U.S. population has outpaced the production of these crops, suggesting a growing dependence on imported food, but also, a possible opportunity for U.S. growers.

Over this same period, the number of managed honey bee colonies in the United States has gradually declined, reaching a low in 2008 with 2.3 million colonies, with increases of roughly 200,000 new colonies each year in 2009 and 2010. The trends show that any shortfall in managed or wild pollinators could seriously threaten production levels of directly and indirectly pollinated crops, according to the paper.

In the mid-1980s, parasitic mites that had infected eastern honey bees in Southeast Asia began infecting western honey bees in the United States.

Figure. Honey bees collect pollen for food, and in so doing, they pollinate many agricultural crops. A recent study by Nick Calderone estimates that pollination by bees contributes $29 billion dollars to agricultural production (photo by Jeff Harris).

In 2006-07, beekeepers experienced heavy losses to their colonies. While mites appear to be the cause of roughly 70 percent of the losses, the remaining losses (referred to as colony collapse disorder) are not fully understood, with possible explanations including pesticide use, beekeeper management practices, climate change and other pathogens, reports the paper.

As a hedge, U.S. growers are working to increase the number of non-honey bee pollinators, including horn-faced bees and orchard bees, Calderone said.

Crop, insect pollinator and economic data were provided by the U.S. Department of Agriculture's National Agricultural Statistics Service, whose website is run through Cornell's Mann Library.

The study was funded in part by a grant from the National Honey Board.

Upcoming Events

The Central Mississippi Beekeeper's Association offers a Beginning Beekeeping short course on March 1-2, 2013 at the Ag & Forestry Museum, Jackson, MS. The registration fee is $25.00 per person (or $30.00 for two). Please contact Angie Hamilton at 601-259-9504 or 601-594-4526 to obtain a registration form. See also www.msbeekeeping.com.

Roger Bemis will teach the basics of Queen Rearing at the public library (www.foleylibrary.org) in Foley, AL on March 1-2, 2013. Cost for the course is $50.00. If interested contact Roger at bemisroger@yahoo.com or 251-213-0168.

Buy, Sell or Service Needed

Open mated VSH Queens for sale. Breeders purchased from Glenn Apiaries and Adam Finkelstein. Queens kept in mating nucs 3 weeks until laying well. Free marking of all queens. Queens are $20 each. Shipping will be by express mail every Monday starting the first Monday in April. Shipping fee is $20 per order with free shipping on orders of 10 or more. Contact Johnny Thompson at broke_t@bellsouth.net or call 601-562-0701.

Work Needed. My name is Tom Vanden Bosch. I am an experienced beekeeper from Hesperia, Michigan. I am searching for work with a commercial beekeeper. If you know of an apiary that needs a dependable energetic worker, please call me at 616.403.1500 or email me at vandenboschthomas25@gmail.com. Your help is greatly appreciated.

Pollination Service Needed. I am starting my first large vegetable garden next spring. I would be very grateful to have a beekeeper maintain hives on my garden site and to exchange hive products for vegetables. The garden will be in west Lowndes County near the Elm Lake golf course. If interested, please call Mark Huerkamp 662-386-3452.

Electronic Newsletter Reaches You Faster

The MBA electronic newsletter is available to members and will get to you faster than regular mail. The quality is also better than the hardcopies we mail out. Pictures are in color and are very sharp. As well as being more convenient to members, the electronic newsletter helps save on the labor and expense involved in preparing and sending our members hardcopies. Contact Jeff Harris (jharris@entomology.msstate.edu) to submit your e-mail address and request electronic delivery.

Test Your Knowledge of Honey Bees

1. Which of the following statements accurately describe the life cycle of *Varroa destructor*?
    a. colonies die only after 5 years of infestation
    b. most damage to bees occurs during the phoretic phase of the mite's life
    c. this mite prefers workers over drones by an 8:1 ratio
    d. the reproductive phase is limited to *ca*. 12.5 days in the capped brood cell
    e. varroa males leave the cell with the emerging host

2. Place the major solids that are found in honey in order of most abundant to least abundant.
    a. proteins & amino acids > sugars > acids > minerals
    b. sugars > acids > proteins & amino acids > minerals
    c. sugars > proteins & amino acids > acids > minerals
    d. minerals > proteins & amino acids > acids > sugars
    e. sugars > acids > minerals > proteins & amino acids

3. Which of the following sugars is the most abundant monosaccharide found in honey?
    a. fructose
    b. glucose
    c. maltose
    d. all of the above
    e. none of the above

4. Which of the following sugars precipitates from honey to cause granulation?
    a. fructose
    b. glucose
    c. maltose
    d. sucrose
    e. trehalose

5. The anti-microbial properties of honey are caused by which of the following substances.
    a. high sugar concentration
    b. low pH
    c. hydrogen peroxide
    d. all of the above
    e. none of the above

6. Which of the following treatments would be best for an environmentally- and health-conscience hobbyist beekeeper that only has 10 colonies?
    a. using Apistan strips
    b. using drone trap combs
    c. using coumaphos strips
    d. using formic acid gel packs
    e. using amitraz soaked on cardboard strips

7. A beekeeper has 3,000 colonies from which to remove a honey crop. What technique would be used to remove the honey supers in the most efficient manner?
    a. placing a Porter bee escape in the inner cover, which is placed below the honey supers
    b. using a fume board with butyric anhydride
    c. brushing the bees from the combs
    d. smoking the bees down into the brood chamber
    e. all of the above

8. The most important contribution of bees to agriculture is:
    a. the production of honey
    b. the pollination of managed crops and fruit trees
    c. the production of venom for pharmacological studies
    d. all of the above
    e. none of the above

9. Which type of honey product is considered the most prized by knowledgeable consumers?
    a. extracted honey
    b. creamed honey
    c. chunk honey
    d. comb section honey
    e. none of the above

10. Pollination of almonds in California requires:
    a. 1.2 million colonies for the entire state
    b. examination of bees by "middle men" that are paid by the almond growers
    c. a contract between grower and beekeeper
    d. all of the above
    e. none of the above

Answers to these questions and a new set of questions will be provided in the March/April 2013 issue.

Answers to last month's questions:

False - Worker bees get maximal inhibition of ovary development by contact with queen substance, or 9-ODA, but ovary development is inhibited even if workers do not contact the queen.

True - *Apis dorsata* is known as the Giant Honey Bee, and its nest size often exceeds 100,000 individuals.

False - Western honey bees were first introduced in 1622 by Europeans coming to America.

True - Most races of western honey bees have laying workers that produce drones parthenogentically (asexually).

False - Insect circulatory systems can only generate low blood pressures, and the hearts are usually open ended tubes.

False - A worker in the queen's court will contact her for short duration, a few minutes at most, before spreading her pheromones through contact with other workers in the colony.

False - A worker from an Africanized honey bee colony cannot deliver a fatal sting to the average person. The venom of AHB is no more toxic than the average European honey bee.

True - European bees are less likely to abscond a nest site due to poor food resources than Africanized bees. AHB have evolved a migratory lifestyle; they are nomads that often abscond in response to low availability of food.

True - Queen rearing begins 10-12 days before a primary or reproductive swarm.

True - Africanized bees convert more of their food resources into brood than do European bees. Their migratory lifestyle requires less permanent storage of food and a constant production of bees for swarming.

"Bee News & Views" is brought to you by the following:

MISSISSIPPI STATE UNIVERSITY EXTENSION SERVICE

MSU Department of Biochemistry, Molecular Biology, Entomology and Plant Pathology

Nectar Flow

The song of bees has made you wise,
taught you about flowers and trees,
once so foreign, now old friends.
Watching wide eyed for their comings and goings,
the ebbs and flows of nature's sweetness,
you've come to know the seasons,
learned that weeds can be wonderful,
secret allies instead of foes
that help create ambrosia a drop of sugar at a time.

Honeybees sing out with insight,
living their lives against our definitions
that we prescribe, line by line,
an attempt to classify, identify,
cement in stone what is and isn't.

The beating of small wings,
thousands fanning together,
a whirlwind of silky air
is the music playing in your ears,
your hearts and souls,

The miracle of something as simple,
as complex as honey,
defying definition,

A sweet reminder that we are just human,
and some things are still beyond our understanding.

By Kirsten Traynor

About the author: Kirsten is a doctoral student at Arizona State University working in honey bee physiology with Dr. Robert Page, Jr. She recently conducted research in the laboratory of Dr. Yves Le Conte in France, and the work was funded by a Fulbright Scholarship. She and her husband, photographer Michael Traynor, share many artistic talents and a love for honey bees.

Request for Submissions

Please contribute articles, stories, book reviews or news items that might interest your fellow beekeepers to (jharris@entomology.msstate.edu).

Enjoy beekeeping!

Jeffery W. Harris