BEE NEWS & VIEWS

The Mississippi Beekeepers Association Newsletter

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May-June 2013

MSU Apiculture Gets Bee Colonies

By Jeff Harris

When I first arrived at Mississippi State University in July 2012, I knew that late summer was a poor time to establish colonies of honey bees. Audrey Sheridan, my technician, and I decided to wait until this spring to purchase hive equipment and bees needed for our extension and research program. Of course, this spring was cool and rainy, and as a result, the package and nuc suppliers throughout Mississippi have been slow to grow honey bees for demanding clients.

After we finally obtained our first 30 nucs in March, a flash flood carried them away two days after we set them in place. It was a total and sobering loss. Not to be denied, we have pushed forward with the help of several suppliers of bees in the state. We have been slowly building apiaries, and we are proud to finally have two apiaries established on the South Farm of MSU (40 and 20 colonies, respectively). We now have 90+ colonies of bees for research and extension.

One of 30 nucs lost to flash-flood.

I have been told that many years have passed since MSU has hosted an apiary of honey bees.

We hope to keep an apiary on campus and foresee using it as a resource for workshops and field days. If nothing else, it gives me a sanctuary to escape the dreaded office computer.

One of two new apiaries on MSU's South Farm

Our research programs have also begun this spring. We have two major projects. The first is a breeding program in which we will select for honey bees that are resistant to varroa mites and ideally suited for our Mississippi climate. This is a long term project that could run for years to decades depending on the progress of selection.

The second project will explore possible effects of chemical contaminants in beeswax comb on the physiology of queen honey bees that are raised near the combs. The experiment will compare various aspects of queen reproduction between queens raised in a low contaminant environment versus sister queens raised in a cell builder equipped with highly contaminated combs. We will conduct similar experiments with drones in the future.

We are very fortunate to have Dr. Ashli Brown and Dr. Darrell Sparks of the MSU and State Chemistry Laboratory as partners on this project. They will perform chemical analyses of our beeswax combs, the beeswax from queen cells, and the bodies of the

queens that were raised in the two different environments (low versus high comb contaminants). Audrey and I will raise the queens and evaluate their physiology.

You can help: We would like to get combs that are 3-5 years old from beekeepers that either keep bees in highly agricultural areas like the Delta or areas away from any agriculture. The goal is to find highly contaminated and relatively non-contaminated combs from real beekeepers. These combs will be the ones used in our experiments. If you would like to donate combs or exchange them for frames with plastic foundation, contact me at 662-325-2976 or JHarris@ext.msstate.edu.

Governor Signs Bill for Tax Exempt Status to Honey Bees

By Jeff Harris

Governor Phil Bryant signed Senate Bill 2244 into law on April 18, 2013. The bill was sponsored principally by Sen. Chris McDaniel and co-sponsored by Sen. Michael Watson and Sen. Sean J. Tindell. The purpose of the bill is described as:

An Act To Amend Section 27-65-103, Mississippi Code Of 1972, To Include The Sales By Producers Of Honey Bees Or Other Products Of Apiaries In The List Of Agricultural Products Exempt From Sales Tax; To Amend Section 27-65-111, Mississippi Code Of 1972, To Exempt From Sales Taxation The Gross Proceeds Of Sales Of Tangible Personal Property Made For The Sole Purpose Of Raising Funds For A School Or An Organization Affiliated With A School; To Exempt From Sales Taxation Sales Of Durable Medical Equipment And Home Medical Supplies When Ordered Or Prescribed By A Licensed Physician For Medical Purposes Of A Patient, And When Payment For The Equipment Or Supplies Is Made, In Part Or In Whole, On Behalf Of Or For The Benefit Of An Insured As A Covered Benefit Under An Insurance Policy, Contract Or Plan; To Exempt From Sales Taxation Sales Of Tangible Personal Property Or Services To Mississippi Blood Services; And For Related Purposes.

If you would like to see the language of the revised tax exempt law, go to the following link:

http://billstatus.ls.state.ms.us/documents/2013/pdf/SB/2200-2299/SB2244SG.pdf

Can you identify MBA members (Derwin Thrash, Stan Yeagley, Walter McKay, Ben Kern and Frank Garletts) surrounding Governor Phil Bryant during signing of the bill?

More about Bee Pollination

By Jeff Harris

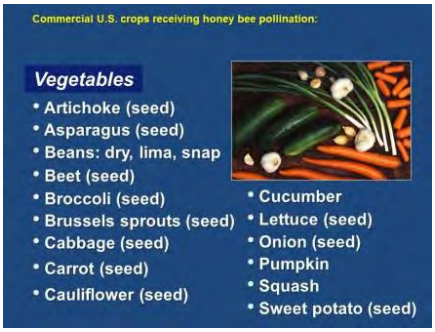
The honey bee (*Apis mellifera* L.) is probably the most important agricultural pollinator worldwide. The reason is simple – it can be managed for pollination. Some native bees (e.g. Blue Orchard Bee) can be encouraged to nest near fields or orchards. However, most insect pollinators are not easily controlled for crop pollination.

Like most native bees, honey bees have anatomical modifications that allow them to pack pollen for carrying back to the hive. In honey bees, it's the corbicula or modified basitarsus of the hind legs that holds the pollen during transport. Most people refer to this modification of the leg as the "pollen basket".

Honey bees are ideal pollinators for several reasons. First, a single colony of honey bees can provide tens of thousands of bees that visit flowers in search of food. Bees collect nectar and pollen as food. Nectar is concentrated to form honey, which is the primary energy source for bees. Pollen provides essential amino acids, minerals and dietary sterols. Foragers routinely search for these foods in an area of 8,000-10,000 acres around their hive. A single forager will tend to visit the same species of flowers during foraging trips, and this is important for ensuring pollination of a particular plant. However, a colony of bees can actually pollinate different plants simultaneously by sending out teams of foragers for each type of blooming plant in the vicinity of their hive.

Second, honey bees are broad spectrum feeders and will collect food from hundreds of different plants. In fact, there are more than 100 agricultural crops that benefit from honey bee pollination within the U.S. Some crops absolutely require honey bees to produce the commodity. A good example is almonds. Almonds can only be produced when two compatible varieties are cross-pollinated.

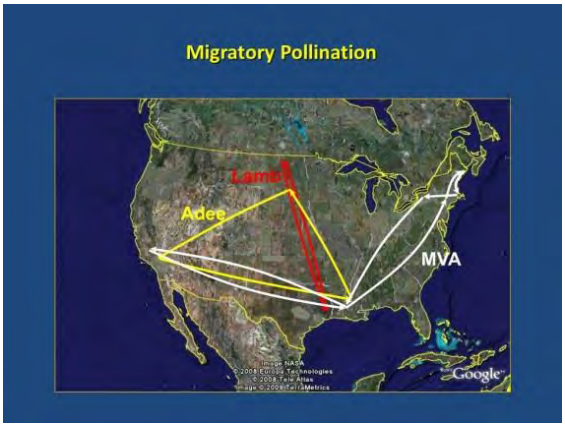
Honey bees are also used to produce seeds for vegetables that are sold to home gardeners. Some of the crops and vegetable seed production that benefit from pollination by honey bees are listed.



Third, beekeepers can easily manage colonies to produce new hives for pollination, and honey bees flourish anywhere that agricultural crops can be grown. Finally, honey bees can be transported to crops needing pollination. Beekeepers can load hives onto trucks and move them across country to pollinate crops.

For example, the routes of three migratory beekeepers in the U.S. are shown below. Growers of crops pay the beekeeper to place colonies on the ground just before the crop begins to bloom. Usually, the colonies are kept in place for 10-14 days or until the bloom is finished. The rental fee varies with the value of the crop -- $165.00 per colony for almonds and maybe only $30.00 per colony for blueberries.

The yellow route represents a beekeeper (Richard Adee) who pollinates almonds in California during January-February before going to south Mississippi during March-May where he grows his colonies to get ready for honey production in South Dakota during the summer. The red route is for Ryan Lamb who winters his colonies in east Texas before going to North Dakota for honey production in the summer.



The white-colored route represents an 8,000 mile annual trip made by Merrimack Valley Apiaries. That's once around the earth's equator! This is probably the most intensive migratory pollination route in the world. The bees leave Louisiana to pollinate almonds in California during January-February. They return to Louisiana for a few weeks in March before going to New York to pollinate apples in May. From there they are transported to blueberries in Maine, followed by cranberries in Massachusetts. They recover on autumn wildflowers in western New York before returning to Louisiana in October.

The benefits to the fruit or other grower are described below. If honey bees are placed near the orchards or fields to be pollinated just before the plants bloom, the bees will be eagerly visit the flowers at the optimal physiology for the blooming plant. The result is that more flowers can be pollinated per plant, and the flowers on the same branch are pollinated evenly through time.

What is the value of pollination from honey bees? The most recent data comes from 2010. The total value of commodities that require pollination was about $81.5 billion. Honey bees were responsible for $19 billion (23%) and other insects (mostly leaf cutting bees) accounted for another $9.8 billion (12%) (data from Dr. Nick Calderone, Cornell University). Just for comparison, the total U.S. honey production for the same year was about 176 million lbs. valued at $282 million (data from the National Honey Board). Clearly, the value from pollination dwarfs the value of commercial honey production.

Although honey bees significantly contribute to the value of agricultural commodities, it is not true that humans would die of starvation if honey bees disappeared from the planet. The reason is that the top ten food plants that feed the world DO NOT require pollination by bees (or the pollination by bees contributes only a small percentage of the total value of the crop). These crops include corn, wheat, rice, barley, potatoes, cassava, soybeans, sweet potatoes, sorghum, yams and plantain. Most of these crops are self-pollinated or wind pollinated.

Insect pollinator densities have been in rapid decline in the U.S. over several decades. This trend applies to the native bees (and butterflies, etc.) and honey bees. There are many reasons, but the primary ones seem to be (1) habitat loss and (2) the use of agro-chemicals. However, diseases, parasites and loss of primary food plants by displacement from invasive plant species also impact pollinators.

The smaller family farms of the last century often had a diverse planting of crops and a substantial retention of native plants and trees and shrubs on field boundaries. These habitats provided food, shelter and overwintering sites for native bees. They also provided a more diverse diet for honey bees (which is healthier for the bees). The small farms have been replaced by huge acreages of monoculture crops that often have greatly reduced refuge area for native pollinators. Every square inch of arable land gets converted to row crop production.

To help honey bees and other insect pollinators, you are encouraged to provide natural wildflower areas that provide diversity of food, which is healthier for the bees than diets from row crops and other monocultures. You may also want to encourage native bees by providing nesting sites for them. Wooden blocks with drilled holes or dead trees can serve as nesting sites for many native bees like the Blue Orchard Bee (for more information, visit the following website, http://nativeplants.msu.edu/uploads/files/E2985ConservingNativeBees.pdf).

Note: Color slides from USDA, ARS Lab in Baton Rouge, LA.

The following excerpt from an old book comes from Audrey Sheridan who wanted to share it with you:

"City of the Bees"

By Frank S. Stuart
Whittlesey House, 1949

P R E F A C E

Though I deplore Prefaces, it may prevent misunderstanding to say briefly that this book is an imaginative fantasy.

I could lead you to the hillside and take you through the wood to the oak tree. Bee colonies really do establish themselves in trees. Badgers attack them, and so do hordes of robber bees. Diseases decimate them. Ants steal honey from bees' tongues. Wasps paralyze bees, and store the living, helpless victims in wasp larders.

High romance always deals with realities. The events recorded here really do happen to bees and birds and animals, in the same world where, so pitifully unheeding, "Civilized" man stamps and frets along his little rut into his grave, never looking round at the beauty, savagery, emotion, and wonder that he rushes blindly past.

C H A P T E R O N E

Gold-dust Ballerina
INTO the air! The bee shot up into the glowing sky, unable to beat her wings fast enough to ease the rapture of her being. Sixteen thousand times a minute, the tiny silver pinions beat the air-but this was not enough. For she had never known, and would never know, the sadness of winter.

Even the primrose and the daffodil have memories of cold silences. The nightingale cannot sing until the glory of her voice is rounded by the wistful knowledge that summer dies.

But this bee had been born on a day when Persephone stole back from Hades, smiling so that black trees, gray grass and ruffled birds stirred like sleepers kissed. To begin on such a day is to enter life with warmth that never ebbs, but throws its own sunshine outwards from within.

Not merely would she never know of winter-she would never see a world beyond the summer solstice, sorrowfully declining into cold, darkness and decay. Life, to her, was a lovely procession of increasing summer days always growing more beautiful. Each one was longer than the last, warmer and bluer; each night shorter and more genial; more flowers and more crowded the meadows and the hedges; the air became more sweet, and felt warmer and still warmer-like a lover's caresses; the birds were more voluble and ever happier; day by day, the earth more dearly unfolded its loving to exhibit new beauties to excite and new experiences to content. Perhaps Heaven is like that, with new loveliness disclosing and increasing forever, and never a midsummer day to mark the tragic point of no return.

As she ascended with delirious swiftness into the speedwell blue of the spring sky, unable in utmost effort to spend all the joy that thrilled her exquisite, featherweight body, she saw falling away beneath her an oakwood set on a hillside across which sheep drifted continually like little clouds over a changeless sky.

Immediately, the bee's happiness was increased by the exhalation of delight from all the things that she could see, whose joy sprang from the same boundless source as her own.

Each separate blade of young grass was reaching upward toward the sun. Among the infinite shapes and colors of these grasses, millions of insects were astir with wildest eagerness. Along the hedges, innumerable tiny leaves were secretly uncurling, thrusting off the dull cloaks that had hidden each one like a fairy queen in beggar's raiment. The faintest green mist across the treetops of the wood, like a vapor hiding a transformation scene, was caused by breaking buds, the spearpoints of spring's legions, shining as they marched in to free their own princess from the passionless grip of winter. The world was drenched with warmth, and things were moving everywhere; even the air itself seemed renewed, sweetened, more buoyant.

The air! Man has visions of flight—not the roaring progress of heavy, stinking iron machines, but that silent loveliness of gliding on outstretched arms that comes to everyone in dreams. Even that is but half-

flight—a wingless, semi-nightmare movement with fear haunting it. Man crawls earthbound on leaden feet.

But this bee, as she darted swiftly away from the wood and down towards the river that curled in the distance like the blade of a silver scythe, rested on air and was a part of its living lightness. Though her speed was over twenty miles an hour, she could stop suddenly, hover, fly backwards, climb at a tremendous pace, or proceed seven miles in an unresting flight. Seldom did her flights exceed a mile, but that was because of her eagerness to carry back food to the city to which she belonged…

Results from Overwintering Surveys

By John McCabe

Here's a summary of the results below and a link to the survey page, where you can download the excel file, if you want. In addition, as you may be aware, there also was another survey by BeeInformed.org occurring at the same time. I'm including links to both the details of my survey and theirs.

Country-Wide Avg. Loss: **26.31%**

Country-Wide Avg. Loss (Commercial): **24.83%**

Country-Wide Avg. Loss (Hobby): **29.97%**

Country-Wide Avg. Loss for Un-Treated Hives: **40.76%**

Country-Wide Avg. Loss for Treated Hives: **22.23%**

My Survey:

http://thistlecreekhoneycompany.appspot.com/BeeSurveyResults.html

BeeInformed Survey (Preliminary survey results indicate that **31.1%** of managed honey bee colonies in the United States were lost during the 2012/2013 winter), see http://beeinformed.org/2013/05/winter-loss-survey-2012-2013/

Trapping Pollen from Colonies

(from Fundamentals of Beekeeping)

Trapping pollen from your colonies during major pollen flows will ensure adequate supplies to feed back to your colonies whenever conditions warrant, as in early spring. To trap pollen effectively, force the field bees to enter the hive through an opening screened with either five-mesh hardware cloth or a 3/16-inch diameter perforated metal plate. A double-screened grid is much more efficient than a single screen. When a double screen is used, separate the layers by 3/16 to 1/4 inch and offset the openings. In addition to having a grid that removes most of the pollen pellets from the bees, traps also contain a box or tray to collect the pellets. The collection container should also be covered with seven- or eight-mesh screen to prevent bee entry. Traps should be covered also to prevent rain from getting into the pollen. Making the tray or collection part of the trap from wood will eliminate condensation, and using copper screen on the bottom of the pollen-collecting container will help prevent mold in the collected pollen.

Pollen traps vary greatly in design and positioning on the colony. The size, shape, and arrangement of the parts, the location of the trap on the colony, the method of installation, and other factors can be varied to suit individual needs and circumstances. Traps mounted at the top of the hive will give the cleanest pollen.

Pollen traps force bees to crawl through mesh that rubs much of the pollen loads from their legs into a drawer

Pollen should be trapped from only strong, disease-free colonies during major pollen flows. Traps should be removed at other times. During major nectar flows, pollen trapping is unprofitable. The pollen trap should not be allowed to remain on any colony for more than a few days so the colony is not deprived of adequate pollen stores. Traps should collect from 1/4 to 1/2 pound per day. Solid, bee-tight hive equipment is necessary; otherwise, the bees will seek out any secondary openings to avoid passing through the pollen trap grid.

Pollen should be removed from the trap daily and cared for properly. Moisture in the collected pollen may be a serious problem during inclement weather and in areas of high humidity. Freshly trapped pollen is perishable and must be frozen or dried. Pollen properly dried can be stored for years in a closed container without appreciable loss in its food value. Fresh pollen can be placed in paper bags and stored in a deep freeze below freezing temperatures until needed.

Studies at the University of Guelph, Ontario, have shown that mixing two parts freshly trapped pollen with one part granulated sugar and packing it tightly into sealed containers is an effective way of storing pollen. Pollen stored in this manner does not require refrigeration and can be incorporated readily into pollen supplement formulae. It was found to promote excellent brood rearing after two years' storage at room temperature.

Freshly trapped pollen from multiple floral sources

The following excerpt comes from *Science Daily (www.sciencedaily.com)*:

Gene That Helps Honey Bees Find Flowers (and Get Back Home) Discovered

May 29, 2013 — Honey bees don't start out knowing how to find flowers or even how to get around outside the hive. Before they can forage, they must learn how to navigate a changing landscape and orient themselves in relation to the sun.

In a new study, researchers report that a regulatory gene known to be involved in learning and the detection of novelty in vertebrates also kicks into high gear in the brains of honey bees when they are learning how to find food and bring it home.

Activity of this gene, called *Egr*, quickly increases in a region of the brain known as the mushroom bodies whenever bees try to find their way around an unfamiliar environment, the researchers observed. This gene is the insect equivalent of a transcription factor found in mammals. Transcription factors regulate the activity of other genes.

The researchers found that the increased *Egr* activity did not occur as a result of exercise, the physical demands of learning to fly or the task of memorizing visual cues; it increased only in response to the bees' exposure to an unfamiliar environment. Even seasoned foragers had an uptick in *Egr* activity when they had to learn how to navigate in a new environment.

"This discovery gives us an important lead in figuring out how honey bees are able to navigate so well, with such a tiny brain," said Gene Robinson, a professor of entomology and neuroscience and director of the Institute for Genomic Biology at the University of Illinois. "And finding that it's *Egr*, with all that this gene is known to do in vertebrates, provides another demonstration that some of the molecular mechanisms underlying behavioral plasticity are deeply conserved in evolution." Robinson led the study with graduate student Claudia Lutz.

What is Honey?

Honey = (15-20 % water) + (80-85 % sugars) + trace amounts of minerals & acids

Major sugars: glucose (31 %), fructose (38 %), sucrose (1.3 %) and other sugars (9%)

Legal water content: < 18.6 % water

Fermentation: Honey contains sugar-tolerant yeast that will cause fermentation if it is not pasteurized. Fermentation is the conversion of sugars into ethanol and carbon dioxide (foaming). The ethanol gets converted to acetic acid in the presence of oxygen to create a sour taste. Any honey with water content > 19 % will ferment; honeys with water content at 17-19 % are likely to ferment; but honey with water content < 17 % will not ferment. Pasteurization greatly delays fermentation: honey is heated at 140-145 ^{o}F for 30 minutes (no direct heat – water jacket).

Granulation: The high sugar content of honey results in the natural process of crystal formation. Granulation does not signify spoilage of honey. Crystallized honey can be liquefied with gentle and uniform heating. The speed of crystallization helps determine the size of crystals. Debris in honey will cause crystallization; therefore, filtering heated honey helps to slow granulation.

Types of honey:

A. **Extracted** – Removing honey from the combs is difficult for the hobbyist since there is no simple, neat, and inexpensive way of doing so. Wax cappings are removed by uncapping, and the combs are centrifuged to sling the honey from the cells in the honeycomb. Extractors may be small and hand-cranked or large and motorized.

B. **Chunk** – The wax cappings are left on combs that are to be cut into sections. A thin wax foundation without wires is used. Combs are cut to fit jars, and the sections are left to drain overnight. A section of comb is placed into each jar, and the remainder of the jar is filled with extracted honey.

C. **Comb section** – Special wooden or plastic boxes (or rounds) are given to bees during a heavy flow. Often bees are crowded so that they fill these small boxes. As with chunk honey, the foundation is thin and without wires. The bees fill each box or round and cap it. Comb sections are harvested while the combs and cappings are still white.

D. **Creamed** – A spreadable form of honey that is made by the purposeful granulation of honey. First, pasteurize and filter honey. Cool rapidly to about 80° F. Seed with 5-10% finely ground crystallized honey; mix well; allow the seeded mixture to settle for an hour or two, skim off the foam if necessary, and pour into desired containers. Keep the containers at a temperature between 54° F and 60° F (57° F is ideal), and the honey will be smoothly crystallized within a week or so.

Buy, Sell or Service Needed

Strong 5 frame medium nucs for sale. $100 placed in your equipment $160 in my new equipment.
VSH queens $20 each plus shipping.
Contact Johnny Thompson at 601-562-0701

2013 Queen Rearing Short Course at Foley, Alabama Library; held Saturday, July 20, 2013 at 9:00 AM to 4:00 PM; registration fee $75.00 per person (please register by July 15); bring your protection gear; contact: Roger Bemis at (251)-213-0168 or P.O. Box 353 Bon Secour, AL 36511, or email at bemisroger@hotmail.com.

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