



Illinois State Beekeepers Association Bulletin

May/June 2014 Volume 97 Number 3



Letter from the President

Mike Mason

Hello beekeepers! It is swarm season and I see many of our fellow beekeepers have traded their time from teaching, attending bee classes, and trying to boost their colonies for nectar flow to catching swarms and supering hives. It is a season of chaos for many of us that are accountable to our employers during the day and consumed by our beekeeping hobby by night and weekend. The changing season is invigorating and motivates us to try and do more than we probably should. Sometimes I wonder if it would be more enjoyable to scale back and enjoy it more.

I attended the University of Illinois "Bees and Beekeeping Short Course" in early April. The Short Course was excellent. Dr. Gene Robinson, Director of the Institute for Genomic Biology and Director of the Bee Research Facility gave opening remarks and spoke on Colony Collapse Disorder. Nick Naeger, University of Illinois, who is speaking at our Summer Meeting, gave a great talk on Sting Allergies. Randy Oliver spoke on Factors Affecting Colony Health and Best Management Practices for Healthy Colonies. We also got a lesson from 4 graduate students on Honey Bee Anatomy. Then we went out to the hives for some hands on training. I highly recommend you take advantage of this short course in the future. Several of the ISBA board were in attendance as well as many ISBA members which was good to see.

One attending individual commented to me on the number of ISBA board members in attendance. I replied that it was good to see so many board members there. For me it demonstrated a commitment to learning and being informed, which translates into a commitment to the process of passing that information on to our membership. The individual then asked if ISBA paid for their course fee. A valid question, but no, ISBA does not pay for board members to attend meetings or short

courses. All the board members that attended paid their own way and I was happy to see them there.

The bees that made it through the winter had a tough one but they seem to be strong in the season now. This rain and cool temperatures we have been having make it important that you feed them both protein and sugar water. They can deplete these quickly when the weather prevents them from foraging and the workers begin to cannibalize the brood. Make sure you are feeding during these periods of multiple days of rain so your colonies stay strong. Nutrition is huge in helping suppress disease.

We have a pretty good line up for the Summer Meeting at Illinois Valley Community College in Oglesby, IL. ISBA, Heart of Illinois Beekeepers Association and Illinois Valley Beekeepers Association did a great job putting together this meeting. Mel Disselkoen, is speaking on his method of On the Spot Queen Rearing and Miticide Free Beekeeping and Reading Hives, Making Starts, Evolving Trends and Success For The Future. Kathleen Prough, Chief Apiary Inspector from Indiana will speak on Forage Plants for Bees and Bee Diseases, and Nick Naeger, University of Illinois Graduate Student will speak on Poisons, Parasites, Pathogens And The Pros And Cons Of Group Living and 50,000 Roommates: Lessons From Bees On Managing Group Conflict. A great set of talks! I hope to see you all there!

Good luck with your colonies and keep your thumb on Varroa, our biggest threat.



The ISBA Annual Summer Meeting will be held **June 7, 2014** at the **Illinois Valley Community College in Oglesby, Illinois**. You should have gotten a registration form in the mail. Please return it with the fee in time for it to be received by June 2, 2014. The meeting will be held in the **Community Technical Center (CTC)**. Parking is in lots 1 and 7. Lot 1 is South of the CTC and Lot 7 is just East of the CTC. Send your Registration & Payment to: Illinois State Beekeepers Association, P. O. Box 21094, Springfield, Illinois 62708. Checks should be made out to ISBA. Lunch is included as well as morning and afternoon coffee, soda, rolls and cookies.

Most beekeepers I know dislike propolis with a passion. The presence of this sticky, resinous substance in bee hives makes opening and managing colonies very difficult.

Most of my clothes are permanently stained with propolis, usually on the backside from climbing into the bee truck and sitting down on a glob of it. I also was not so fond of propolis until we discovered that it has very amazing health benefits to bees. I hope by the end of the article, you become a propolis convert, too.

Propolis is the term beekeepers use to refer to plant resins that bees collect and deposit in the nest cavity. Bees add varying amounts of wax to the resins but, to my knowledge, they do not modify the chemical nature of the resins.

Why?

There must be a reason bees go to the trouble of collecting plant resins. They are not easy to collect: bees have to scrape up the sticky resin with their mouthparts, pack it on their hind legs and, when back in the nest, other bees have to help pull it off their legs. There is no food reward in collecting propolis – they don't eat it, so why collect it? The older bee books say that propolis is a barrier to seal cracks and provide mechanical support in the nest (reviewed in Simone-Finstrom and Spivak, 2010). But this answer is not entirely satisfactory.

Nest Lining

When bees nest inside hollow trees, they coat the inside of the cavity with propolis, sometimes several millimeters thick.

Bees can deposit a very thick layer of propolis around the entrance to the tree cavity. They don't make this propolis envelope inside our man-made bee boxes, but they often reduce the size of the entrance with propolis and stick propolis between boxes and where the frames touch the box.

Despite our intentional or inadvertent attempts to select against colonies that collect lots of propolis, the bees persist, so they must need it.

The most important clue about its benefit comes from this fact: we know that propolis has remarkable medicinal properties for humans. It is highly antimicrobial, meaning that it is antibacterial, antifungal and even antiviral. So does it have medicinal benefit to the bees?

Benefit to Bee Health?

One of my previous graduate students, Mike Simone – Finstrom, became interested in the potential benefits of propolis to bee health.

We constructed some small five-frame nucleus boxes and Mike painted the inside of some with a propolis extract (propolis dissolved in 70% ethanol at a known concentration). One set of boxes was painted with extract of propolis from Minnesota, another set with 'green' propolis from Brazil. A third set was painted with just ethanol as a control. He put small colonies of bees in each box, paint-marked a set of newly emerged bees, and introduced them into each colony. After seven days, he collected the painted bees and examined their immune systems by measuring gene transcripts for antimicrobial peptides.

He found that bees exposed to a propolis envelope for just seven days had lower bacterial loads in and on their bodies, and had 'quieter' immune systems compared with bees in a colony with no propolis envelope. In other words, the propolis in the colony was killing off microbes in the nest, so that the bees' immune systems did not have to gear up and make peptides and cellular responses that fight off infection.

In essence, the propolis envelope acts as an external antimicrobial layer that enshrouds the colony, benefiting bee immune defenses (Simone-Finstrom, et al, 2009). Yes, it seals cracks and probably provides structural support, but the main benefit is probably its antimicrobial value.

In Human Terms

Here is an analogy of the benefits of the propolis envelope in human terms.

Think of a house or office with mold in the walls. Some people's immune systems are chronically activated in moldy environments, causing them to sneeze. If propolis was painted all over the walls of the house or office, it would probably kill the molds, which in turn would reduce the person's immune response.

Mounting an immune response, especially a chronic one, is costly to an individual and eventually takes a toll on overall health.

Chalkbrood and Propolis

Mike Simone-Finstrom ran another clever experiment. He infected colonies with chalkbrood

disease by grinding up chalkbrood mummies and homogenizing them in pollen patties. He found that the number of resin foragers (per unit time) increased in colonies after infection with chalkbrood, but did not increase in uninfected colonies.

The increase in the number of resin foragers was subtle, as resin foragers are relatively rare in most colonies, especially compared with pollen and nectar foragers. But the result was remarkable (Simone-Finstrom and Spivak, 2012).

Do bee colonies self-medicate?

We are currently repeating this experiment with another bee disease, American foul brood, to see if the increase in resin foraging after infection is robust.

In another experiment, Mike S-F found that colonies had less chalkbrood infection compared with colonies with no propolis envelope (Simone-Finstrom and Spivak, 2012). It is unclear how the propolis on the walls of the box helps fight off a brood infection. The mode of action of propolis is likely to come both from contact with it and from the rich smelling volatiles. More research is needed in this area.

Where is it Collected?

Two other graduate students are now pursuing other questions related to the health benefits of propolis to bees. One student, Mike Wilson (at one point I was advising three students named Mike – confusing!), is discovering from which plants bees collect resin.

This Mike climbs trees, and collects resin from leaf buds. Then he collects individual foragers returning to the hive with plant resin on their hind legs. He analyzes the resin from the plant and the resin from the bee using RPHPLC time-of-flight mass spectrometry and gets a metabolic 'fingerprint' of all the compounds present in each sample. He can match the fingerprints statistically using principle components analysis (Wilson, et al, submitted for publication).

In our area, despite the presence of conifers, birch, alders and other trees, he found that bees collect resin mostly from cottonwood (*Populus deltoids*) and balsam poplar (*Populus balsamifera*). Cottonwood resin is yellow, balsam poplar resin is red. There are hybrid poplars in our area and when bees collect resin from them, this can be yellow, brown, orange or red.

Biological Activity

Mike Wilson is also testing the biological activity of

the individual resin loads against the bee pathogen, *Paenibacillus* larvae; the bacterium that causes American foulbrood. Mike W. runs these tests in the lab and has found out that balsam poplar is slightly better at inhibiting this bacterium than cottonwood resin. He has also determined that hybrid poplars are not nearly as good. This means that the resins have different 'strengths' and abilities to kill off bacteria and probably other microbes.

Presence of Propolis

This leads to the research by the third student, Renata Borba. Renata is testing whether bees need a full propolis envelope within the nest to help their immune system, or if just the presence of a propolis trap on top of the frames is sufficient. She is also repeating the self-medication experiment I referred to above, by infecting colonies with American foul brood (by spraying spore solution on the combs).

In addition to counting returning resin foragers before and after infection, she will collect the resin loads and, using Mike Wilson's metabolomic fingerprinting techniques, determine if the bees switch resin species after infection. Do bees select resins of greater 'strength' after infection?

The jury is still out – Renata will be repeating her experiments over at least two summers to obtain a large enough data set to analyze because resin foragers are relatively rare.

There are many questions still unanswered and others we need to resolve further. But I do have two take home-messages for beekeepers:

Messages for Beekeepers

It would be good to allow colonies to make a propolis envelope inside beekeeping equipment as it would benefit the bees' immune systems. You can help them do this in two simple ways:

- cut and staple commercial propolis traps in the inside of each brood box.
- construct bee boxes that have unfinished lumber on the inside and the rough surface will stimulate bees to line the inside of the box with propolis.

I don't recommend you make your own propolis extract to paint inside the boxes because it requires harvesting propolis and then dissolving it in 70% ethanol. It is easier to let the bees collect the propolis and deposit it directly where it is needed.

I do not advocate feeding propolis to bees. Bees do not eat propolis. Even though it is a natural plant

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Dealing with European Foulbrood

by Eleanor Schumacher

My bees and I are going through a trial (and trying not to take my marriage along for the ride). My beliefs are in question: “Can I only go on as a beekeeper who uses Terra-Pro twice a year?” ...and will that work to keep the European Foulbrood away?

My husband Raph and I spend a couple of nights a week in the garage, listening to the radio, scraping stiff old comb and brood and honey into barrels. As the weeks slide one into the next, I believe we have been destroying the 2013 comb for 6 weeks now. “How many more nights of this will he tolerate until he questions our vows?” I wonder.

A lot of introspection occurs when you try to clean European Foulbrood from your apiary. I begin to hate myself when I remember my attitude towards two hives: “Hive-zilla” and “Hive-zilla Jr.” These two were always aggressive. They were reliable honey providers, but had nasty attitudes, and just LOVED to sting me in the back! So I got back at them by giving them old comb from dead-outs. They were always so strong, and they were great at cleaning a little mold or wax moth out of the comb.

One day, I acquired some old comb from another beekeeper. It was very dry and thin, and looked very clean and safe. I had read that beekeepers with European Foulbrood could expect the disease to be eliminated after treating for 5 years. I thought “This old comb looks to have hardly been used, and its at least 5 years old. I'll give this dry old comb to Hive-zilla Jr. this spring – she'll be glad to have it.” If I could turn back time! Now, comb from 600 frames of my Southern Illinois beekeeping are up in smoke, while my husband and I honey-roast hotdogs for dinner – again!

Hive-zilla Jr. took sick, with a shotgun brood pattern and wilting, twisting, dying larva. I caught it early and took a swab sample right away and sent it to the Bee Research Lab in Beltsville, Maryland.

“Good news, Honey!” I told Raph, “The test from Beltsville came back negative for European Foulbrood! I'll treat for mites, because they must have Parasitic Mite Syndrome.” But the population dwindled quickly and before I knew it, I found the other hives robbing Hive-zilla Jr.

Within a week, every hive was showing a shotgun brood pattern and dying larva. I sent another sample to Beltsville, and now it returned positive results. I couldn't bare to lose my other hives, so I treated with Terramycin according to the label, with

little success. I've had to repeat treatment cycles several times since then, and now I'll be switching to Terra-Pro, hoping it will prove more effective for the “Control” of European Foulbrood.

I'm looking to Europe for management suggestions on European Foulbrood. The “Shook Swarm Technique” is a much more common management practice over there. Beekeepers use Shook Swarm for a few reasons, for example, to get a colony to draw out beautiful comb honey. Shook Swarm is also said to be very helpful in controlling European Foulbrood. I decided that I would follow this method this spring in hopes of ridding EFB from my yards.

The Shook Swarm Technique for European Foulbrood is, as I understand it, a three part process. First, you complete a treatment cycle with Terramycin. Then you shake your bees onto fresh foundation. The third step is to re-queen. I ran into several questions to which I could not find answers. When in the season should I start? When do I pinch the old queen? How do I introduce the new queen?



Destroying old EFB comb - tiresome and expensive.

Going forward “in the dark”, I ran into options and tried different things, finding especially “What NOT to do.” Here are a few pointers of what not to do: ***Don't shake your bees too early.***

Randy Oliver asked a great question at the Illinois Short Course on Beekeeping at U of I in April. He said “What day does your honey flow start?” This is an important date to be aware of! Before this date, hives are very touch and go. I found out the hard way that shaking my bees before the start of the honey flow resulted in more absconding, starving, and even chilling – even with feeders! I'm glad I only shook a few hives before the first day of the honey flow, which at my

address, was April 21st this year, I would say. Right around Earth Day.

Shake your bees onto fresh foundation and clean equipment. Don't give them any drawn comb. It's tempting to include a few frames of clean, drawn comb in their new box to discourage them from absconding. But as I inspect the hives that I treated and shook onto a mixture of fresh foundation and drawn comb, much of the previously drawn comb is already showing EFB symptoms. This is a giant head-scratcher to me. Am I seeing symptoms that are carried over from the hive that I shook? Or was the EFB bacteria in fact in my "clean" drawn comb? This suggests that my "clean hive", who I called "Bessie", who did not show EFB symptoms, may have been co-habiting with the EFB bacteria, allowing it to co-exist. Experiencing this, I have decided that shaking onto fresh foundation only is much better. Once the honey flow is in full swing, after you shake your bees onto the foundation, and give them a feeder full of sugar water, they bees will really go to town drawing the fresh wax, and you can hope for the EFB to clear up for good.

"Bessie," by the way, was my best hive. She was my one hive among my EFB hives last year that only showed very slight EFB symptoms for one day. I quarantined her with the rest of my EFB hives, but didn't treat her because her symptoms vanished – just by moving her (that is said to happen with EFB sometimes). Bessie went on to make 90 lbs of honey for me, and after I harvested, and carefully gave her her own non-EFB honey supers back, she refilled them with honey and went into winter very heavy. In the spring, I couldn't believe that not only did Bessie die over the winter, but got completely robbed out by my other hives. Bessie's empty comb was clean, I thought.



Boiling hives and frames in lye water. Take pre-cautions when working with lye.



Boiled woodenware. Ready for a fresh start.

But using her "safe comb" in some of my shook swarms resulted in EFB symptoms in only a couple of weeks.

If you commit to the Shook Swarm Method, be very careful with your old comb. If you can bring yourself to tossing the whole old frame of brood and honey into a fire, I say "Go for it". I can't bring myself to do that. It feels like a lot of money I spent going down the drain – along with the hours I spent gluing, hammering and nailing my frames together.

I brought my frames of EFB/Terramycin-treated comb to my garage to scrape clean, so that I could boil my frames in lye and save the wood. Unfortunately, somebody left the garage door open for a half an hour – enough time for every hive in my home yard to rob the old comb and bring EFB back to their hives. My two healthy 2014 cut-outs, and two healthy 2014 hives from packaged bees now had to be treated and shaken as well.

If you must keep your frames, keep them wrapped up tightly in garbage bags and destroy the comb quickly!

When it came to re-queening, I tried several different things. I tried shaking bees onto queens in a cage. It didn't always work. I lost a good Minnesota Hygienic queen this way – they wouldn't accept her. I tried shaking them onto clean queen cells that I grafted from the couple of hives from my "safe yard", far from the EFB danger zone. I did learn this: When shaking bees, look in your new hive at where your bees are clustered, and sink that queen cell into the center of them. They will not gravitate to where you have decided is a good place to put their queen cell, and your queen cell can chill. I also tried letting them raise their own queen before shaking them and letting most

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APIARY INSPECTION SUPERVISOR'S REPORT

Steve Chard, Illinois Department of Agriculture

As I write this article (May 16), it's actually snowing in the Ogle, Lee and DeKalb County areas.

Is this Illinois or Montana?? On a serious note, many beekeepers in Illinois (and elsewhere) suffered major honeybee losses this past winter with the extremely harsh conditions. Based upon the information we have received, the average loss in Illinois was at least 50%+. Some beekeepers lost all of their colonies. According to the latest survey conducted by USDA, the average loss at the national level was 30.5%. The Department wishes all beekeepers the very best in recovering from these extensive losses.

In the midst of this somber news; however, there may be some help for beekeepers that have suffered losses. As part of the newly approved Agricultural Act of 2014 (Farm Bill), the USDA Farm Service Agency is carrying out a disaster assistance program called, "Emergency Assistance for Livestock, Honeybees and Farm-Raised Fish Program" (ELAP). An FSA Fact Sheet is shown in this Bulletin that describes the program in detail. We hope that beekeepers can gain some relief from their losses by applying for assistance from this program.

Now, for some good news. BetaTec, the company that manufactures HopGuard for varroa mite control, has petitioned the USEPA for an emergency use permit to sell a new product, HopGuard II. According to BetaTec, HopGuard II will correct the problems encountered by beekeepers with the original product (flimsy cardboard that was difficult to place between frames and the strips weren't effective for a long enough period). The Department is gathering information in support of BetaTec's petition to USEPA and will request approval for use in Illinois. We'll keep you posted on this development.

Previously, I mentioned that the Department had participated in a national honeybee survey at the request of the USDA-Animal Plant Health Inspection Service in an attempt to help document which bee diseases/parasites/pests of honey bees are and are not present in the US. This survey was also being conducted to investigate potential causes of Colony Collapse Disorder (CCD). As part of this survey, samples are collected by each participating state and analyzed by APHIS. Thanks so much to all the beekeepers who allowed us to sample their colonies this past year. In addition, APHIS is developing plans to conduct a 2014 survey and the Department plans to participate in that survey as well. If the 2014 survey becomes reality (sufficient funding?), we'll be contacting perspective beekeepers for sample collection.

The Department has already issued a number of moving permits this spring. If you plan on moving bees across county or state lines, please be sure to contact your local Department Apiary Inspector to do an inspection and ultimately receive the needed moving permit. Please give your Inspector ample advance notice to do the inspection so you can receive the permit in a timely manner.

Your Bulletin Editor, Eleanor Schumacher, has shared her experiences/frustrations stemming from hives infected with European foulbrood in this issue. Last year, the Department found a much higher incident rate of EFB in the state through inspections as compared to previous years. The EFB strain we encountered last year was much more damaging than what we had witnessed in the past. Please be on the outlook for this problem and call your Department Apiary Inspector if you believe your hives are affected. The Department wants to monitor this problem very closely in considering potential next steps.

Steve Chard, Supervisor

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The Benefits of Propolis by Marla Spivak, PhD, continued

product, it is a powerful antibiotic. One summer, we tried feeding propolis dissolved in sugar syrup to bees and it did not cure American foul brood within the colonies.

I would not feed it to my bees.

Beekeeping Lore

Lastly, I bring up a challenge to beekeeping lore.

It has not been tested if bees incorporate propolis into brood cells. There seems to be a beekeeping legend that brood combs turn dark because bees deposit propolis in them. I do not think this is the case. In a tree cavity, bees DO put propolis on the cells that touch the tree wall (Figure 3). On rare occasions, I have seen some new comb look as though the rim has a very narrow band of resin around it. But I do not know how common this is, or if bees add more resin into the cell.

To test this, the wax comb would need to be dissolved, filtered and the residue tested for the presence of plant resins. We have tried to dissolve

brood combs in ethanol and end up with a sludge that looks like 'slum gum' (the mess left after you have melted the wax out of old brood comb). It probably contains remnants of the silk cocoons, bee feces and wax. But does it contain propolis? I think not. But I'm very open to solid evidence to the contrary.

References

- 1 Simone M, Evans J, Spivak M. 2009. Resin collection and social immunity. *Evolution*, 63, 3016–3022.
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Dealing with EFB by Eleanor Schumacher, continued

of their capped brood hatch out before shaking them. I shook them a few days after the queen hatched, before she was ready to lay. I put a queen excluder between the brood box and the bottom board to keep the queen from flying out. I'm happiest with how these hives are progressing in numbers and wax, but I won't know if they were actually able to get rid of the EFB until this fall or even next spring.

I still have yet to see how this whole process will pan out. I loved natural beekeeping. I'm sad to have

picked up EFB. It will be a long time before I feel confident about which of my yards are treatment yards, and which can go natural, and until I have that confidence, I won't be able to share queen cells or frames of brood with my friends. That makes me sad. But I guess what makes me happy is that now I can help beekeepers with European Foulbrood, and hopefully we who have EFB will be able to find better and better ways to manage the disease, and hopefully find an efficient way to eliminate it all together.

Heartland Apicultural Society's Summer Conference in Carbondale

Plan to attend the 13th annual HAS conference, July 10-12, 2014, at Southern Illinois University in Carbondale, IL. This conference is open to everyone interested in beekeeping, including beginners. Regional & National vendors, as well as experts in the field of beekeeping, will be present.

Classes include: Pesticides in the Hive, Quality Queens, Queen Rearing (larger class for 2014!), Making Splits and Nucs, Hive Inspections, Honey House Construction, Sustainable Beekeeping, Establishing an Online Presence, and more!

Featured speakers include: Larry Connor, Zach Huang, Stu Jacobson, Reed Johnson, Krispn Given, Tony Prettyman, Juliana Rangel-Posada, Barry Richards, John Skinner, Jennifer Tsuruda, Tom Webster, Dwight Wells, Kent Williams, Michael Wilson

For registration information, visit www.heartlandbees.org

The Buzz About Town

June 21, 2013 – Heart of Illinois Beekeepers Field Day at Wildlife Prairie Park 3826 N Taylor Rd., Hanna City, IL

We will be hosting our field day this year at Wildlife Prairie Park and we will be using club hives for demonstrations. There will be fun activities for everyone including a scavenger hunt, smoker contest, and bee games. We'll have a speaker from the University of Illinois Bee Lab. We'll also do some honey tasting and tips on what honey contest judges are looking for in anticipation of the upcoming Heart of Illinois Fair and the Illinois State Fair. The club will provide the main dish, just bring a side dish to share. Use of honey in your recipe is encouraged!

Contact **Steve Manzke, Apiary Manager at sjmanzke@telstar-online.com** for more information.

The ISBA expresses sincere sympathy for the family of **Jerry Hayes** (Monsanto/American Bee Journal) on the passing of **Jerry's wife Kathy Hayes**, at their home on Friday, April 18th. Kathy and her family bravely battled cancer for the past year after overcoming breast cancer several years ago. Kathy was under hospice care for the past month after multiple attempts at treatment proved unsuccessful.

To honor Kathy's memory the family is asking in lieu of flowers, contributions in Kathy's name to the American Cancer Society's Relay for Life. Team Mama's Cupcakes is captained by Kathy & Jerry's oldest daughter Erin Hayes Munson. This is a link to the site where you can donate and see a beautiful picture of Kathy & Erin and read her story. http://main.acsevents.org/site/TRfr_id=58360&pg=personal&px=36755266

LONG LANE HONEY BEE FARMS

Our popular **Beekeeping Institute** this year will run from **June 9 - 13** and features Master Beekeepers David Burns and Jon Zawislak along with Charley Nye, Bee Lab Manager from the University of Illinois and Alex Wild, Illinois Biologist and Insect Photographer.

To register for classes and for more info, go to www.honeybeesonline.com or call us at 217-427-2678.

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Will County Beekeepers "Small Scale Queen Rearing Class", July 27, 2014 at the Kruss Apiary #2, 17317 Bluff, Lemont, IL.

Get hands-on experience creating queens. Though, no prior experience is necessary we recommend reading the book "Queen Rearing Essentials" by Dr. Lawrence Connor and having a basic understanding of honey bee biology. Attendees are required to wear veils during live demonstrations. Grafting tools will be provided.

Registration is \$30 per person. Limit 20 participants. Start time and duration will be communicated to participants prior to the class date.

Contact **Jim Lindau at (815) 600-9633 or BuzzWorthyBeeWorks@gmail.com**

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Waxing Philosophical ~ the Beekeeping Puzzle

"Time to Make the Bee Bread"

This issue's question: Can honey bees eat and digest pollen before converting it into bee bread? ~ Jerry Hayes, St. Louis, MO

1. It depends on how strong the pollen is in its religious views.

~ Larry Quicksall, Effingham, IL ~1 vote

2. Once the bees eat and digest the pollen it will no longer come out as bee bread.

~John Hansen, Lyons, IL ~1 vote

3. Conclusion seems to be yes they can.

<http://www.inkcorrosion.org/reports/000592/front.pdf>

~David Bergman, Grayslake, IL ~9 votes

(ed. note: here is an excerpt from the above link, a study titled "Pollen Nutritional Content and Digestibility for Animals", published in "Plant Systematics and Evolution" © Springer-Verlag 2000.

"Pollen digestion has been studied most extensively in bees, but a complex and some-what confusing set of interpretations has emerged. Adult bees possess a crop, in which nectar and pollen may mix, thus providing a pre-treatment that could lead to germination or pseudo-germination. The crop leads through the proventricular valve to the gut, a region that differs substantially in osmotic pressure from the crop. Thus, pollen consumed by adult bees is subjected to immersion in a sugar solution followed by an abrupt osmotic gradient. In contrast, larval bees have no crop. Pollen enters the gut without internal exposure to nectar sugars or sudden changes in osmotic pressure. The pollen consumed by larval bees, however, is part of a food provision including a large quantity of nectar. Thus, larval pollen has been exposed to a liquid sugar environment prior to ingestion. For most bee species, larvae consume the pollen within a few days of pollen collection. For honey bees, however, pollen may be stored in the hive for an extended period of time. Adult honey bees add secretions that inhibit pollen germination (Klungness and Peng 1983). Additionally, the stored pollen undergoes considerable biochemical change due to the activities of microbial organisms. Thus, there may be differences in pollen digestion between larvae and adult bees, and among bees that differ substantially in sociality.

"Kroon et al. (1974) noted that pollen grains will burst when transferred suddenly between chambers that differed in osmotic pressure. These researchers

determined that the osmotic differential between the honey bee crop and ventriculus was sufficient to burst pollen grains, and suggested that the burst grains then traveled through the gut where their contents were accessible to digestive enzymes. They hypothesized that this "osmotic shock" was a necessary prerequisite to digestion. Peng et al., however, (1985, 1986) did not find burst pollen grains in the anterior midgut of the honey bee. Instead, these researchers found that *Medicago sativa* (alfalfa) and *Taraxacum officinale* (dandelion) pollen slowly degraded and lost their contents during their passage through the midgut."

Next issue's question is submitted from Marcin Matelski from the Windy City Bees Google Group:

We've all heard, or read, that it takes 8 lbs. of nectar/honey to produce 1 lb. of wax. That statement alone is a contradiction of itself. Nectar is not honey. I've read that 1 lb of honey equals to about 3.65 lbs of nectar. I've also read reports from commercial beekeepers in Canada of their observations, where colonies are able to forage for 20 lbs. of nectar (in a single day), which then they estimated to be ~8 lbs. of honey. Bees were foraging on canola. Based on that, if it takes 8 lbs. of honey to produce 1 lb. of wax, it would take ~20 to 30 lbs. of nectar to produce that same pound of wax. But, according to this 1861 ABJ article " Cost of producing wax", one experiment took 20 lbs of honey and another 13 lbs. of honey to produce a pound of wax. *(ed. note: To read this article, google "how much nectar does it take to produce a pound of wax", and scroll down to the "American Bee Journal – Vol 1 – Page 88" entry, or type in this link:)*

books.google.com/books?id=rMS4AAAAIAAJ&pg=PA88

So, my first question is: Is it "How much Nectar?" or "How much Honey?" when calculating how much of the bees' resources it takes to make 1 lb of wax?

And, my 2nd question is: Does anyone know of any studies done to determine how much nectar, or honey, it takes to produce 1 lb. of wax?



Illinois State Beekeepers Association

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