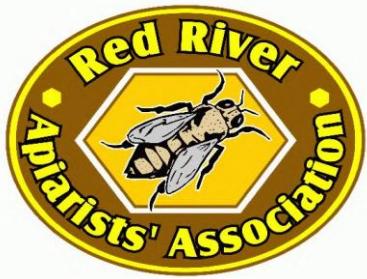


# **Red River Apiarists' Association**

57 Years



## **The Bee Cause**

**Early Summer 2020**

**2020 Issue 6**

# **Special Edition**



## Red clover today, Canola Tomorrow

THE BEE CAUSE

PAGE 2

2020 ISSUE 6

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**Remember to Keep Safe!**

**Reasonable safety precautions should be implemented when bee-keeping in a team setting, selling at a farmers market, or picking up supplies.**

**Manitoba has a low Covid-19 count  
COMPARITIVELY**

**Lets not erase all of our diligent gains!**

- Any assistants or employees should be screened daily.
- Social distancing in all activities should be observed

**Be Cautious, Stay Safe.**

**2020 Executive****President: John Russell**

128 Ph. 204-612-2337  
Victoria Ave. W.  
Winnipeg, MB R2C 1S5

Email: honeyb@mymts.net

**1st Vice President: Tim Kennedy**  
Ph. 204-269-0183

timothykennedy@yahoo.com Baldry Bay,  
Winnipeg MB R3T 3C4

**2nd Vice President: Paul Faurschou**  
Ph. 204-898-9669

PO Box 242 Garson, Mb  
pfaurschou@gmail.com

**Secretary: Monica Wiebe**

Ph 204-299-0648 1193 Lorette Ave.  
Winnipeg, MB R3M 1V8  
Email: mowiebe@mts.net

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**ph.: 204-694-6800**

**Email:  
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**Treasurer: John Speer**

**Ph 204-222-3007  
24063 Oakwood Road  
Sunnyside, MB R5R 0H4  
Email: [jurnss@outlook.com](mailto:jurnss@outlook.com)**

**MBA Delegate: Margaret  
Smith**

**Ph 204-254-4509  
1051 Porcher Rd  
St Andrews, MB R1A 3N4  
Email: [margshoney@gmail.com](mailto:margshoney@gmail.com)**

**RRAA Web Site Administrator**

**Duane Versluis  
Ph 204-268-4223  
Box 12  
Tyndall, MB R0E 2B0  
Email: [rraaweb@gmail.com](mailto:rraaweb@gmail.com)**

**Newsletter Editor: John R.**

**Email: [honeyb@mymts.net](mailto:honeyb@mymts.net)**

## **Wax Moth Larvae.....Good for something after all?**

A study by Brandon University in Manitoba, Canada, has found that waxworms, which normally live in beehives and eat wax, also can survive on polyethylene—the kind of plastic used in shopping bags and elsewhere.

They owe this ability to their intestinal microbes, and excrete glycol after they've finished a meal of plastics. Scientists say they're not sure yet what this glycol, a form of alcohol, could be used for.



In the lab, 60 of the "mysterious" waxworms were able to eat more than 30 square centimeters of a plastic bag in less than a week, the researchers report.

This doesn't mean that waxworms are the answer to the plastic problem. Researchers isolated a species of intestinal bacteria in the worms that was able to survive on plastic for more than a year as its only source of nutrients. But that didn't work as well as letting the worms munch away on their own.

Dr. Christophe LeMoine from Brandon's Department of Biology says "it seems that there is a synergy between the bacteria and their waxworm hosts that accelerates plastic degradation."

Dr. Bryan Cassone, who co-authored the study with LeMoine in the Proceedings of the Royal Society B biology journal, adds: "The plastic pollution crisis is far too big to simply throw these caterpillars at."

"What our research is trying to figure out is how the waxworm and its gut bacteria work together to allow such efficient breakdown of plastic. Once we figure this out, we can use the information to design better tools to eliminate plastics from our environment."

Waxworms are the caterpillar larvae of the greater wax moth; the moths don't eat a thing after they emerge from cocoons. "They are voracious feeders during the larval stages in order to build up enough nutrient reserves to subsist as adults," Cassone says. "As adults, their main purpose is to reproduce and they only live a few days."

The Brandon researchers found that the worms can survive on a sole diet of polyethylene. And eating that much plastic increased the microbes in their guts, suggesting that the bacteria love to digest plastic. "On its natural honeycomb diet, the excrement is solid but changes to a liquid on a plastic diet," Cassone explains. "We haven't really come up with a practical use for the glycol produced. Studies need to be done to figure out exactly what the glycol is and whether this alcohol can be harnessed."

LeMoine and Cassone also are continuing to study how the waxworms and bacteria work so well together, along with students in the university's Master of Science (Environmental and Life Sciences) program.

The plastic-eating abilities of waxworms have been identified before, in 2017 by university researchers in the U.K., but "the contribution of its intestinal microbiome remains poorly understood and contested," Brandon researchers say in an abstract. "In a series of experiments, we present strong evidence of an intricate relationship between an intact microbiome, low-density polyethylene (LDPE) biodegradation and the production of glycol as a metabolic by-product."

Cassone adds: "Within the waxworm, the process occurs remarkably fast (within a day or so). We now need to know why this is the case—we are therefore trying to figure out the animal side of things and how it works with its gut bacteria.

"The hope is this information will allow us to develop tools to help get rid of plastic waste without the need for live waxworms, which is likely untenable for large-scale plastic waste removal."

The Brandon University work was supported by grants from Natural Sciences and Engineering Research Council of Canada and the Canadian Foundation for Innovation. - **Jeff Kart, Forbes Magazine**



# When It's Time to Squish a Queen..... By Gene Rene'

There comes a time when a beekeeper has to step in and play referee, and it came earlier this month when I had to decide to squish an underperforming queen bee. Most of the time (as in 99 times out of 100), the bees can correct a situation where there is a queen that is simply not up to par. I tend to use more of a hands-off approach when I see supercedure cells and just let them take care of business, even if it looks in my opinion that the queen is doing great. The bees that come in close contact with her on a daily basis really know better than me most of the time. Besides that, every time I've tried to talk them out of it by



tricking them, they still supersede anyway.

In all fairness to the queen bee that I eventually had to squish, however, I did take careful notes over the course of a few months which by most commercial beekeeping standards is more than generous, even foolish perhaps. Since I am NOT a commercial beekeeper, I can afford this luxury of time with queens that need a little more encouraging to get in gear and become that wonderful egg laying machine that all of us

beekeepers hope to have in every colony. I've had some colonies where I've taken notes on the queen and wrote the words "not impressed – requeen next visit" on the back of the box. Come next visit and she is cranking out brood everywhere in the brood nest – awesome but not what I was expecting. So give your girls some time especially if they are new. You might be pleasantly surprised if you give them a little time. Sometimes just to build morale in the hive with a beginner queen, I will take a frame of eggs and very young brood from another hive and slip it into the underperforming hive. After that I think the worker bees get the impression that their own queen is the one responsible for the wonderful find, and they pat her on the back and say "way to go – see, I knew you could do it!"

I've used this technique in newly-mated queen hives, as well as when I hit the 3 week mark if I've simply replaced a bad queen with a seasoned-mated queen. Every so often when you give an experienced queen to a queenless hive, or in the case of installing a package right around the 3 week mark, the bees get the notion to supersede this queen and make their own. Sometimes adding a frame of uncapped brood will keep things running smoothly without a supercedure interrupting her progress. The boost in morale usually does wonders for your bees just like it does for us humans. We can get discouraged and really pumped up and so can your bees.

Well my under performing queen was given roughly 3+ months to prove her worth and as the fall season approached and the numbers of worker bees in the hive dwindled down to what appeared to be about a

frame full, the answer was now obvious. It was time to get rid of the bad queen and shake the workers out so they could beg their way into another colony for winter.

**- Continued on next page**

Canada

Manitoba 

## News Release

### GOVERNMENTS OF CANADA AND MANITOBA ANNOUNCE SUPPORT FOR LOCAL FOOD PRODUCERS AND FARMERS' MARKETS

The governments of Canada and Manitoba will be supporting a

#### **When It's Time to Squish a Queen..... By Gene Rene'** *--Continued*

My guess was she just didn't get mated well. We've had considerable rain this year with our weather patterns, much more than usual and that may have played a factor in her not getting a good mating flight in. It's really hard to say, but with fall approaching the colonies have almost completely evicted the drones by now, so even if I gave the failing colony a frame of eggs to work with, the odds are still stacked against them in generating another queen in October with cool to cold temps another month away. First cold night we get and the small cluster would freeze to death.

If you keep more than one hive which I highly recommend you do — I run between 30 – 60 depending on where we are in the season — I would consider keeping 3 hives as a hobbyist, a conservative number. Ten would be my minimum personally, just in case you want something to shoot for. I find that the more hives you get into to inspect the better beekeeper you will become because you'll begin to pick up on trends or signs of an under performing colony early and fix them with your stronger hives. Trust me, once you lay your eyes on a colony that is just busting, your goal is to get all of them to look like your champion hive. It's really easy once you start to see little things taking place like slow starting queens – just boost them with a frame of brood. Keeping high numbers of bees in every colony is also good for fighting off just about every possible bee pest there is. It really does come down to numbers. The more helpers there are to do clean up, maintenance, repair, foraging, etc the better.

When you have to squish your under-performing queen, keep her in a bottle of rubbing alcohol. This makes a great swarm lure for spring time. I dip a Q-tip into the bottle and toss it into my bait hives during swarm season. - G.R

project, which will allow local food producers and farmers' markets to sell their products online, federal Agriculture Minister Marie-Claude Bibeau and Manitoba Agriculture and Resource Development Minister Blaine Pedersen announced.

"Farmers and food processors across the agri-food value chain are working hard to make sure Canadians continue to have access to their high quality and affordable food. Our government, along with our provincial counterparts, is working step by step to support our producers as they provide an essential service to all Canadians," said Bibeau. "By creating a centralized online platform for Manitoban producers to sell their products, we are increasing flexibility in the supply chain during a very challenging time."

"Increasing access to Manitoba's diverse selection of foods grown or processed in the province will build resiliency in our food system and proactively address concerns about food insecurity," said Pedersen. "Developing new marketing options at a time when important outlets such as restaurants, retail and farmers' markets are disrupted will help strengthen distribution of local food to Manitoba customers."

Canada and Manitoba will be providing a total of \$160,000 through the Canadian Agricultural Partnership to Direct Farm Manitoba to purchase a software platform that will allow Manitobans to order food online from local producers and farmers' markets. The funding will also go toward the development of a network of pickup and delivery options to connect consumers with their orders, and the development of COVID-19 safe handling and packaging practices for producers and processors.

"Canadians have always been able to count on farmers for good, healthy food. It has never been more important for our food supply to be reliable and diverse," said Phil Veldhuis, president, Direct Farm Manitoba. "We have been working hard to connect consumers directly to local farmers. We appreciate this investment to reinforce our local food system at this time of crisis."

The five-year, \$3-billion Canadian Agricultural Partnership includes \$2 billion for cost-shared strategic initiatives delivered by the provinces and territories and \$1 billion for federal programs and services.

For more information, visit [www.canada.ca/Agri-Partnership](http://www.canada.ca/Agri-Partnership).



# Recommended Reading:

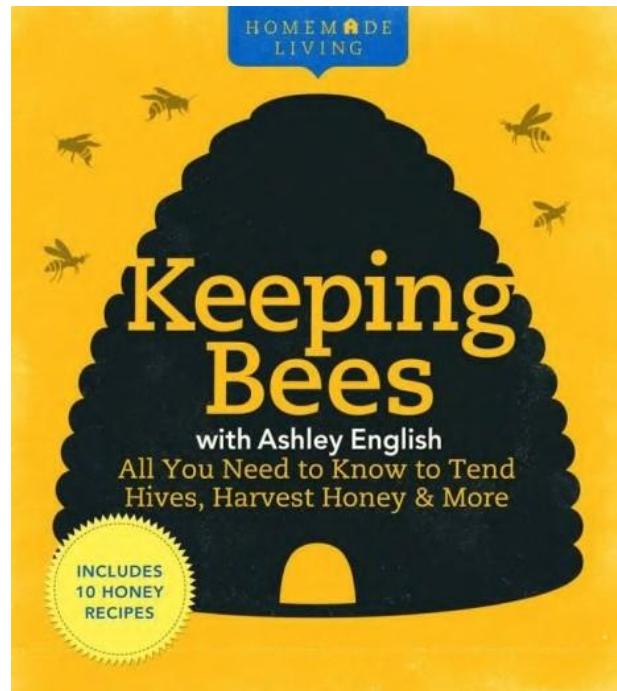
## Keeping Bees

With Ashley English

This book covers all the basics of beekeeping, and explains concepts such as obtaining bees, inspections, pests and diseases, honey harvesting and even has a few recipes at the end. In terms of photography and visual diagrams, there is no better book out there. This book has beautiful full-colour photos that accompany nearly every page. This imagery is quite helpful if you're a visual learner, like me. There are some concepts that English introduces in the book that would be nearly impossible to visualize if not for the photos throughout. For example: using a Ziploc bag as a plastic bag feeder directly on top of the frames within a hive.

Throughout the book, there are sidebar profiles of different beekeepers. Each "Profile of a Beekeeper" introduces a beekeeper and gives a short story about their interactions with bees. It's quite interesting to see all the different types of people that keep bees, and you may find yourself aligning to one or more of them. The best thing you can do as a beekeeper is to continue learning and interacting with others. Reading about other beekeepers allows you to explore new ways of beekeeping yourself.

Overall, I highly recommend this book for any beekeepers, new and old. As I've mentioned above, this is an excellent book for beginners, but it also caters to experienced beekeepers with its innovative techniques and interesting explanations that you may have missed over the years. There are also helpful checklists for every season of the year, which I have personally bookmarked to review before doing hive inspections.



Reviewed By Chris Inch

## **Questions to ask your Queen Breeder / Nuc Supplier:**

- 1) Any diseases such as AFB in your operation over the last three years?
- 2) How old is the queen in the nuc you are selling me?
- 3) How high is your mite count right now? 4) What were your winter losses?



## At the Hive Entrance: Look, Listen, Learn

By Susan Chernak McElroy

Most everything I need to know about my bees, I learn by sitting in front of my hives. Armed with an old stethoscope and a magnifying glass, I can be found on most summer afternoons sitting at the hive entry boards, spell-bound. In fact, I have chairs or stools stationed all around my bee yard. Sometimes, I bring a large jug of ice-tea and a book or magazine to read while the bees buzz in soft amber clouds around me.

I don't consider this idle time, although it may look like it to the casual observer. I have read that if you are not getting into your hives at least every two weeks to do inspections, you are a poor beekeeper, or worse: a bee "haver." However, my hours of observation time are my primary method of hive inspection, and I find the most of the information I need without the need for suiting up, lighting smokers, or disrupting the hard work of the hive.

My bee mentor, Jacqueline Freeman ([www.spiritbee.com](http://www.spiritbee.com)) calls this "Putting in your thousand hours—" not a thousand hours inside the hive, but observing the hive from the outside as you sit beside your bees patiently, over many months. In the beginning of my beekeeping seasons, I was a patient observer mostly because I was keeping three Warre' hives. There were no viewing windows on the hives, and once a Warre' begins building up, removing single combs is major surgical event for the bees, so I had to restrict my inspections to whatever I could see on the landing board. It was an education that has served me and my bees well. With viewing windows on my hives now, I feel like I am in bee observation heaven.

So, what can you learn from sitting at the hive?

### Do I Have a Queen?

This is something everyone who catches a swarm of bees will be wondering over their first month or two with the bees. I've seen queens entering a new hive often this year since I switched over to walking the bees into the hive rather than dumping them in. As my eyes adjust to the movement of thousands of humming, fanning bees marching up a covered plank into their new home, I've been blessed to see the tell-tale long abdomen of royalty, hurrying up the ramp with her escorts clustered around—and sometimes on top of—her.

If you are not lucky enough to see a queen on the ramp, looking for her inside the hive is a major disruption of the new colony, and can quickly convince them all to drive away foul-smelling giants with fat fingers that go bumbling through the fragile new white combs. Bees do not welcome your inspections, which to them are invasions. Trust me on this. They will let you know with stings and head bumps when you have overextended your welcome. For some hives, just opening up the lid is overextending your welcome on some days.

So how can you know that you have a mated, working queen? With some practiced observation, you can see all you need to know at the hive entrance, or from your viewing window. This is what bees with healthy, mated queens do:

- They bring in pollen as soon as they get a few wax combs built, usually within three to five days.
- Wax building is strong and steady.
- They move in a steady, purposeful way both from and to the hive.
- There is busy activity on the landing board with bees guarding, cleaning, collecting nectar and pollen from returning bees, and carrying out hive detritus. • The sound of the hive is a smooth and steady hum. If you tap on the side, there will be a very short burst of louder humming that will immediately drop off to a normal hum state. Hive numbers will drop, then slowly begin to rise. • Anywhere from a month to two months, you will begin seeing lovely clouds of bees spiraling slowly in front of the hive as new foragers set their inner GPS tracking chips in preparation for heading out into the field.

- Continued on next page



## At the Hive Entrance: Look, Listen, Learn

By Susan Chernak McElroy

Continued

In contrast, this is what you may see and hear if your hive is queenless:

- Little pollen coming into the hive.
- Bees milling about aimlessly on the entry board.
- If you rap briefly on the hive, the bees will answer with a droning tone that slowly tapers off.
- Not many bees come and go, and those that do don't move with purpose. Purpose is something you identify only by watching hives over time.

This year, I started six new colonies from swarms. All but one were blessed with strong, successful queens. One was not. I merged that hive with another queen-right hive. All of these decisions I made were based only on what I could see from the entry boards.

### What's Going On In There?

Are your bees building up well, or just hanging on? Are they attracting robbers? Are they weak in some way? Are they getting ready to swarm? Most of these answers are literally right in front of your nose. A strong hive shows increasing numbers of bees coming and going. Sometimes the landing boards in mid-summer look like a subway platform at rush hour.

Do you notice your hive bearding, that is, hanging in a dense clump from the front of the hive like a well-bearded? Your hive may be telling you that they are evaporating a lot of nectar in the hive and all superfluous bees need to hang outside for the time being. Or they might be preparing to swarm, depending on the time of the year. Sometimes in very hot weather, the bees will chill out on the landing board in a big beard.



If I see lots of fanning bees on the entry board, along with the bearders, I know honey is being processed. If I see rushing bees knocking hard into the bees in the beard, or jumping on their shoulders and shaking them, I know a swarm is about to take flight and soon!



Do you wonder if your bees have mites? If they are bearding, just look at them through a magnifying glass. It is simple to see mites that way. Actually, you don't even need the magnifying glass. I can see mites on bees as they are coming or going from the hive. Sometimes, I'll grab the mitey bee, pull the mite off, and let her go. It's a small triumph, I agree, but it's satisfying, nonetheless.

Do your bees "washboard," moving forward and back in rows, using their feet to "wipe" the hive? No one knows what this really means, but I've also seen bees do this inside the hive from the viewing windows, and it is thought to be an indicator of a strong hive.

Do you have hygienic bees? This is all the rage right now: Bees who clean mites from themselves, each other, and remove mite-infested larvae. You may see your bees vigorously nibbling between the body

creases of returning foragers, or see bees pulling out "purple eyed" pupae—immature bees that have white bodies and purple eyes—and tossing them off the landing board.

- Continued

**on next page**

## At the Hive Entrance: Look, Listen, Learn

By Susan Chernak McElroy

[Continued](#)

Do you see bees balling up and fighting on the landing board, or hear high-pitched, agitated buzzing with bees scurrying up the sides and face of your hive? This is a clear sign of robbing—stranger bees swooping in to steal honey from your bees.

Do you see many nasonov fanning bees on the landing board—bees with their tails hiked high in the air exposing the small, whitefish nasonov gland at the end of their abdomen? If you have a hive with a virgin queen, the bees will often send out a cadre of nasonov fanners to guide their young queen home from her mating flights.

If you are at the hive at the right moment, you may even get to see the ancient, yearly ritual of bees expelling their drones for the season—a melancholy time for me. It means my bee year is coming to a close. And it is hard to watch those fuzzy, clumsy drones get pushed out of the hive by the hundreds.



One of my favorite sights on the landing boards of my hives is the honey-kiss—two bees exchanging nectar, proboscises extending, antennae touching gently and excitedly.

So before you delve in for inspection, take the time to observe what you can see while the bees are working in an undisturbed environment. This is an opportunity to sharpen your skills when you can confirm your pre invasion observations with what you see inside the colony.

### <><><><> President's Message <><><>

Summer begins, and soon the flow comes. Clover is starting to bloom and canola in the next few weeks. Balancing hive strength, being swarm cell vigilant, and making sure the hives are supered room is abundant are the priorities of the week. There has been discussion of setting up a pay to use mobile extraction trailer, and speculation if there is a need in the community to make it a viable project. There is a survey on page 12, if this is something you may find useful if you still lack the equipment of your own. Dr Currie is speaking on syrup quality on the 25 in an all invite webinar. Emails were sent out province wide, and to the RRAA membership. If you didn't receive an invite, please contact me for one. Information on this webinar can be found on page 11.

The Swarm Catchers team 2020 was formed up, with over 30 volunteers. A big thank you for participating! The cool spring should not provide a very swarthy season, but we stand by to serve the community and save the ones we can.

Upcoming Novice Webinar! Saturday 10:00 AM — JUNE 27th

Invites coming soon to your inbox, or email [honeyb@mymts.ca](mailto:honeyb@mymts.ca) to request.

Keep well, stay safe, and keep a close eye on your colonies. - John Russell



# Help Your Bees Deal With Hot Weather

When temperatures rise to extremely high levels, your bees may be at risk. The world is suffering from higher than normal temperatures as the climate crisis rages on, but some colonies can suffer damage, or even losses. Most of the time, bees are best able to control the temperature inside the hive themselves, but when thermostats rise close to 100°F (especially for prolonged periods), your bees may need your help! In extreme temperatures, your bee colonies could literally melt.



## Water source

Water is critical for cooling the hive. Worker bees collect it in their honey guts and carry it back to the hive where it is used for evaporative cooling. If given a choice, bees will always choose to drink “dirty” water. They appear to favor water from ponds, creeks or streams that has become murky with algae. Make sure your bees have a water source that they like. If you are experiencing hot weather, you should see bees on your water source. If they are not there, then, the water source is not suitable and you need to try something else. It's best to establish a water source before the summer so that the bees can

easily find and utilize it when the temperatures get high. Water is a chief factor when choosing yard sites and locations. Creeks, marshes, sloughs that contain water all summer are a huge attribute. Bees forced to fly long distances for water are at a disadvantage, and can become a nuisance around watering stations or water troughs for horses or livestock.

## Provide shade

One of the simplest ways to alleviate heat in your hives is to provide shade. Again, choosing locations with tree lines or canopy coverage helps bees focus on other tasks than cooling.

## Proper ventilation

The best way to vent a hive is by providing an upper entrance so the heat can rise through it. Removing entrance reducers, and ensuring that the entrances and bottom boards are clear and clean make a difference.

## Insulation

Another way to help your colony stay cool is to provide insulation. Many beekeepers use insulation in winter to keep colonies warm in cold weather, but it's also useful for keeping colonies cool in hot weather. Insulation under the roof especially will help to keep temperatures steady inside the hive, even when they have spiked

outside. Painting your colonies white, or a light color is also effective. Dark colors on supers and brood chambers have a higher solar gain than light colors.

2020  
ISSUE 6

# Beekeeping Webinar

## "The Importance of Quality Feed for Bees"

**June 25, 2020 - 7:30 pm (start time)**

**(Participants are encouraged to login 15 minutes prior to the 7:30 start time)**

### Presentation by:

**Dr. Rob Currie  
Professor, Head  
Department of Entomology  
Faculty of Agricultural and Food Sciences  
University of Manitoba**



Dr. Currie (Rob) is a Professor and Head in the Department of Entomology at the University of Manitoba.

Rob's main research interest relates to the biology and management of bees (honey bees, leafcutting bees and native pollinators) and the crops that they pollinate. A major focus of his research is how parasites and diseases interact with other stressors such as nutrition to negatively impact the survival of bees during the winter.

This **free webinar** is being organized for the beekeeping industry of Manitoba to highlight the importance of feeding high quality feed to honey bees in order to maximize colony survival during the winter. Important aspects of feeding bees and bee health including how beekeepers can assess the quality of the feed will be discussed.

This presentation is open to ALL Beekeepers, regardless of how many colonies they have, so feel free to share this poster with all your beekeeper friends.

Please email [honeyb@mymts.net](mailto:honeyb@mymts.net) for an invite, or use the below address between the brackets.

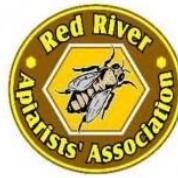
<https://umlearn2.webex.com/umlearn2/k2/e.php?MTID=ta7cf73fcb4f98d008b766e2181d6fd0d>.

**\*\*Participants are encouraged to login 15 minutes prior to the 7:30 start time on June 25<sup>th</sup>, 2020\*\***

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Manitoba  
Beekeepers'  
Association



South Central Beekeepers Association



MANITOBA COOPERATIVE HONEY PRODUCERS LTD.

**BRANDON AREA BEEKEEPERS' ASSOCIATION (BABA)**

**PROVINCIAL BEEKEEPING UPDATE AT 7:15 FOLLOWED DIRECTLY BY THE WEBINAR AT 7:30**

## MEMBERSHIP SURVEY:



A private company is looking at developing a mobile extracting service.

Below are a few questions to assist in developing the service and providing the “best-fit” in terms of equipment and pricing.



### Details:

Fully automated 20 frame extracting line. Honey screening & filtration system. Barrel and jar filling station.

Separated warm room from extraction line. Holding tank while extracting. Mobile unit. Fully washable surfaces.

How well would this service meet your needs?

Answer Choices:

- Extremely well • Very well
- Somewhat well
- Not so well
- Not at all well

Based on the information presented to you, how likely would you be to use this service? Answer Choices:

- Extremely likely
- Very likely
- Somewhat likely
- Not so likely
- Not at all likely

How relevant is this service to you?

Answer Choices:

- Extremely relevant
- Very relevant
- Somewhat relevant
- Not so relevant
- Not at all relevant

How likely would you use this service rather than purchasing your own equipment? Answer Choices:

- Extremely likely
- Very likely
- Somewhat likely
- Not so likely
- Not at all likely

How frequently would you use this service in season?

Answer Choices:

- Several times a week
- About once a week
- Several times a month
- About once a month
- Less than a month or never

What would be an affordable price for this service?

Question Type: Open Ended

What else would you want to know about this service?

Question Type: Open Ended

# Email answers to :

## honeyb@mymts.net



## What Are Bearding Bees?

Congregating bees on the front of the hive is called bearding and new beekeepers often panic at the sight. Bees can mound themselves up in layers or form a single layer on a large area of the front of the hive in a reaction to conditions within the hive. Methods that new beekeepers often try include smoking the bees back into the hive, squirting them with water, and scraping them off and dumping them into the hive.

All of these methods are useless and if your bees want to beard, let them! Beard is their way of regulating the temperature and humidity in the hive during hot muggy weather. The brood nest cannot be allowed to overheat above the 94°F, resulting in foragers becoming water gatherers which is evaporated inside the hive to cool it down. Fanning bees are also working hard to lower the temperature, but when the ambient temperature overruns these mechanisms, all unneeded bees leave the hive and hang out on the porch forming a 'beard.'

Rainstorms and hot summer sun can make life difficult for these exposed bees and if a quick storm runs through, you will see these bees mostly disappear and then reappear when the coast is clear.

## What to do about bearding bees

Make sure that your bees have a readily available water source and adequate room for ventilation. Add another super on top for better airflow. Additional holes in the supers and hive bodies also allow for better ventilation. But even if you have taken care of all these obstacles to good ventilation, the bees still are going to beard when the temperatures rise in the nineties with high humidity. Hive manipulation is not a good idea when bearding occurs, as the bees on the outside aren't in the most docile temperament.

Frequently happening in the late day or early evening, and when there is a nectar dearth, the bees can remain outdoors all night until the temperatures finally subside. And bees can beard for weeks on end. But ultimately they are doing what they do best, taking care of the health of the hive. - Claire Jones

### Older Articles of Seasonal Interest

These articles have appeared in previous BeeCause issues, and will be archived for RRAA member access in our soon to be announced group drop box. If you don't have your old copies handy, email me for the back issue containing the article you wish.

[honeyb@mymts.net](mailto:honeyb@mymts.net)

Pollen Paties: April 2018

Feeding Syrup: April 2018

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# A Bee C: Scientists translate honeybee queen duets

Victoria Gill, BBC News

**Scientists using highly sensitive vibration detectors have decoded honeybee queens' "tooting and quacking" duets in the hive.**

Worker bees make new queens by sealing eggs inside special cells with wax and feeding them royal jelly. The queens quack when ready to emerge - but if two are free at the same time, they will fight to the death. So when one hatches, its quacks turn to toots, telling the workers to keep the others - still quacking - captive.



Dr Martin Bencsik, from Nottingham Trent University, who led this study, described the tooting and quacking of these "wonderful animals" as "extraordinary".

"You can hear the queens responding to each other," he said.

"It has been assumed that the queens were talking to other queens - possibly sizing one another up vocally to see who is strongest.

"But we now have proof for the alternative explanation."

Tooting, the researchers found, is a queen moving around the colony - announcing her presence to the workers. The quacking is from queens that are ready to come out but are still captive inside their cells.

The queens are not talking to each other, explained Dr Bencsik, "it's communication between the queen and the worker bees - an entire society of tens of thousands of bees trying to release one queen at a time.

"Quacking queens are purposefully kept captive by the worker bees - they will not release the quacking queens because they can hear the tooting."

"When the tooting stops, that means the queen would have swarmed [split the colony and set out to find a new nest] and this triggers the colony to release a new queen."

Dr Bencsik said bee society was "absolutely splendid" to

"All decisions are group decisions," he said.

"It's the worker bees that decide if they want a new queen or not."

The researchers hope this eavesdropping exercise will help beekeepers avoid interfering with this delicate collective decision-making and to predict when their own colonies might be about to swarm.





# Royal Jelly Isn't What Makes a Queen Bee a Queen Bee.

-Gwen Pearson

FOR DECADES, SCIENTISTS thought an excess of something special, a substance called royal jelly, elevated a regular honey bee larva to a queen. New research suggests we had it backward: It's what future queens aren't fed that matters.



Royal jelly, which also is called "bee milk," looks like white snot. More than half of it is water, the rest is a combination of proteins and sugars. Special glands in the heads of worker bees secrete the stuff, which gets fed to babies.

A developing queen bee is fed royal jelly exclusively—not pollen and honey like her proletarian sisters. Some describe withholding royal jelly from worker bees as nutritional castration. These bees don't get the special Food of the Gods. Or, perhaps, food of genetic monarchies. And so, we thought, their ovaries shrivel, and they don't become a queen.

It turns out, it's the other way around. Not feeding an immature queen pollen and honey is what makes her royal, not her exclusive access to royal jelly.



## Queens and Genes

Radically different looking animals can be created from identical genetic material; a worker bee and a queen bee differ only in which genes are activated. Genes make proteins, which build the rest of our bodies. By manipulating the environment of their offspring, honey bees genetically alter their bodies via nutrition.

We've known for a while that bees' diet is involved in building different kinds of bee bodies. Science is still figuring out just how that happens. Queen larvae are surrounded by royal jelly; they float on a sea of sugary bee gland snot in enlarged cells. Worker bees eat beebread (a type of fermented pollen) and honey. Nurse bees mash this into a "worker jelly" and add glandular secretions as a garnish. Workers don't get the special stuff in queen jelly, and their ovaries shrivel.

That's the conventional explanation. But Dr. May Berenbaum, a professor at University of Illinois and an author of the new research, says there isn't a simple answer to the question What do bee babies eat?

"We had the hardest time figuring out what larvae eat," she says. "Among other things, worker jelly and royal jelly appear to have, and there is no consensus, a slightly different ratio of mandibular to hypopharyngeal gland secretion ... It all happens in the dark surrounded by 50,000 stingers. So it isn't the easiest insect in the world to work on."

Beebread and honey are derived from plant materials, and like many plant materials, they contain a variety of phenolic chemicals. We eat them all the time; flavonoids are the plant chemicals that give plants their unique flavors (and help plants discourage plant-eating insects, among other functions).

Royal jelly, however, has no detectable phenolic acids. None. From previous research, the researchers knew that flavonoids increase immune responses of adult worker bees. That's a good thing; it has the side effect of helping bees detoxify pesticides faster. The scientists wondered how developing bees would react to phenolic compounds.

To find out, they fed two groups of bee larvae diets with and without p-coumaric acid, a common type of flavonoid. Then they looked closely at differences in gene activation between the groups. The results were startling, unexpected, and nifty.

.....continued on next page.



## Royal Jelly Isn't What Makes a Queen Bee .....continued.

Bees reared on the p-coumaric acid diet had ovaries significantly smaller than those reared without that compound. That's the kicker, because what makes a queen bee a queen? She's the only bee in the hive laying eggs. Fourteen genes known to be involved in worker-queen differentiation were upregulated, or increased in expression.

Queen bees also are bigger and live longer than worker bees. In one set of genes known to regulate organ size in animals, p-coumaric acid significantly changed the expression of over half of genes involved in that signaling pathway.

"We never set out to change perceptions on queens and caste determination," says Berenbaum. "I'm interested in detoxification; how insects cope with phytochemicals they consume. Much to our surprise and delight, a whole suite of other genes that were implicated in caste determination changed."

"It was one of those impossible to miss sorts of phenomena. I think ... the idea of royal jelly is so appealing, people haven't really questioned it."

### The Silencing of the Genes

With over four centuries of living with bees, why are humans still learning so much about them? To answer that question, I reached out to Dr. Ryszard Maleszka at Australian National University. Maleszka, who is not an author of the new research, works specifically on honey bee epigenetics.

Epigenetics is the study of how environments affect gene expression. "With our current knowledge we only scratch the surface of biological systems, and honey bee biology is no exception," Maleszka says. "We are dealing with 500 million years of animal evolution so there is much to discover."

"[This research] is a wonderful example of an evolutionary invention whereby common plant chemicals have been recruited to be crucial elements of gene regulation ... By using environmental ingredients honey bees found a clever solution to a challenging problem: How to generate two contrasting organisms, long-lived reproductive queens and short-lived functionally sterile workers, using the same genetic hardware."

Lots of factors go into making a queen beyond the plant chemicals examined in the new research: A compound with the wonderful name of royalactin, for example, has been proposed as critical to queen development. Maleszka has delivered a stinging rebuke to the idea that a single compound in royal jelly is the "switch" that makes a queen, though. In 2008, his lab was able to create queen bees without any royal jelly consumption, by turning off (silencing) a set of genes. Other bee researchers have questioned the "one molecule to rule them all" idea of queen development. The reality is likely that, like everything else in biology, it's complex and many factors are involved.



The real power of this new research may be in explaining why worker bees don't become queens. Instead of chemical castration by denying workers royal jelly, this elaborate feeding process provides chemical protection for the queen's ovaries. She is sheltered from the potential toxic or metabolic effects of plant chemicals. As we continue to improve our techniques, hopefully we will come closer to a firm answer about just what honey bees eat in their hives, and why.

# R.R.A.A.

Association for distribution to its members and their colleagues in months of June, the beekeeping industry. It is published eight times a year on a July, and August when membership meetings do not occur.

The RRAA , the Bee Cause, for you and through you:  
The Bee Cause is the official publication of the Red River Apiarists'

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monthly basis except December and the summer

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attachments. Though they may be edited for spelling and basic grammar, no changes will be made to their contents, message and opinions without the authors written & expressed consent.

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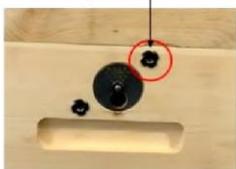
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I hereby apply for membership to the RRAA .....\$35.00/year

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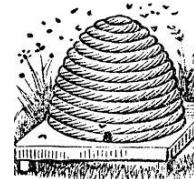
  
  
  

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