

The Bee Cause 54 years



Volume 14, Issue 7

October 10, 2017

*Next meeting 7:30 pm
Tuesday, 10 October 2017
at the Elmwood Legion
920 Nairn Ave., Winnipeg*

Speaker:

**A Fall Apiculture Dynamics
for 2017 winter season**

B Manitoba Honey Show

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Hydroxymethylfurfural

This article is for your information as a clarification and softening of the understanding in the hazard of Hydroxymethylfurfural in sugar syrup feed and honey.

Hydroxymethylfurfural (HMF), also 5-(hydroxymethyl)furfural, is an organic compound formed by the dehydration of certain sugars. It is a white low-melting solid (although commercial samples are often yellow) which is highly soluble in both water and organic solvents. The molecule consists of a furan ring, containing both aldehyde and alcohol and alcohol functional groups. (from Wikipedia, the free encyclopedia).

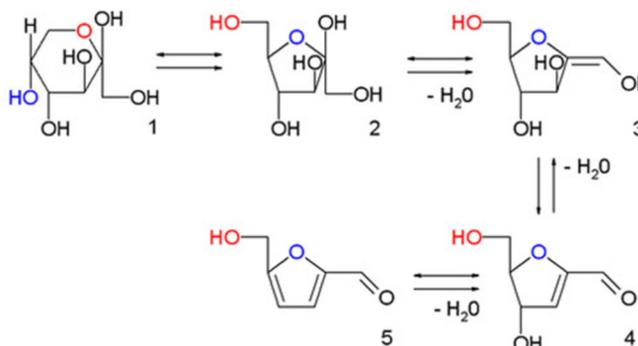
HMF can form in sugar-containing food, particularly as a result of heating or cooking and this formation has been the topic of significant study as HMF is regarded as being potentially carcinogenic to humans. Hydroxymethylfurfural is a marker of poor or overlong storage of foods such as honey. It is produced industrially on a modest scale¹ as a carbon-neutral feedstock for the production of fuels and other chemicals.

HMF was first reported in 1875 as an intermediate in the formation of levulinic acid from sugar and sulfuric acid. This remains the classical route, with 6-carbon sugars (hexoses) such as fructose undergoing acid catalyzed poly-dehydration. When hydrochloric acid is used 5-chloromethylfurfural is produced instead of HMF.

The image below displays a series of chemical equilibria : fructopyranose 1, fructofuranose 2, two intermediate stages of hydration (not listed) 3, 4, and finally HMF 5.

HMF is an organic compound produced by acid-catalyzed dehydration of sugars, primarily fructose and elevated levels in honey provide an indication of overheating, poor storage conditions or higher age of the honey.

HMF is slowly formed in honey with high pH, wherein, higher in forest origin honeys in comparison to floral honeys. (continued on Pg 4)



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Presidents Comments

**Red River Apiarists' Association
Minutes of the Regular Meeting
May 8, 2017**

Chairman: Waldemar Damert

Recording Secretary: Art Quanbury

The minutes of the September 13 2017 meeting were approved.

The meeting opened with a discussion of how the season went. Honey yields varied greatly from very high to poor. Some areas that were very dry had no yield in August and early feeding was initiated. The spell of cold weather in June was very confusing to the bees and the hive was often at odds with the queen. In some cases the queen was even killed by the workers. The result was lumpy/drone brood in the hive at times.

MBA Report

No report

Treasurer's Report

No report

Honey Show Report

The show is September 23 and 24. Same location at Forks. New T shirts have been purchased; free for volunteers; \$15.00 if you want a second one or don't volunteer. Members were urged to sign up to volunteer and to put some entries in the honey contest. A photographic section is included again this year.

Minutes approval

Motion: That the minutes of the previous meeting be approved as circulated.

Moved: Albert Beal

Seconded: Dave Weselak Carried

Break

Presentation

Mite Testing and control by Margaret Smith and Armand St. Hilaire (with contributions by others)

Waldemar has screened bottom boards and uses a drop test to determine mite count. First clean the board of all debris

and then count mite drop after 24 or 48 hours. Five mites in 24 hours indicates a need to treat. He treats with formic acid (15 ml for single brood box and 30 ml for a double. If temperature is above 25 degrees put pad on bottom, if below 25 degrees put on top of frames.

Armand demonstrated the use of an icing sugar shake to test for mites. An excellent video of the procedure can be found on the Honey Bee Health Coalition web site. Take ½ cup of bees (about 300) and put in a jar with 2Tbsp of icing sugar. Bees can be collected by drawing the jar down over a frame of bees or bees can be shaken in a pail and then collected from there. Take bees from a frame with brood. Shake/roll for one minute and then leave for 5 minutes. Shake out through screened top on a white paper plate. Count the mites, using a magnifying glass if necessary. Spraying some water on the sugar will dissolve it so you can see all the mites. Less than a 2% count means no treatment is necessary. More than 3% means treatment is necessary.

Margaret demonstrated using an alcohol wash to count mites. Into a jar containing windshield washer fluid put ½ cup of bees. Shake for one minute. Pour through a strainer onto a fine cloth like that used for straining honey. Bees will stay in the strainer and mites will stay on the fine cloth. Can also run water over the bees to wash off more mites. Can also put bees in water and boil rather than use alcohol wash. This technique is considered the most accurate.

Swarm Catching

John Badiuk commented that he received a lot of calls to capture swarms over the summer. He wants to form a group of swarm catchers to help him catch swarms in Winnipeg. Anyone interested should contact him.

Loonie Draw.

Lots of prizes and activity. \$70.45 raised!

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September MBA report

(from Pg 1) HMF can be found in low amounts in honey, fruit-juices and UHT-milk. Here, as well as in vinegars, jams, alcoholic products or biscuits HMF can be used as an indicator for excess heat-treatment.

For instance fresh honey contains less than 15 mg/kg depending on pH value, temperature and age. Codex Alimentarius standard requires that honey have less than 40 mg/kg HMF to guarantee that honey has not undergone heating during process, except for tropical honeys which must be below 80 mg/kg.

It is because there is the risk of the high levels of HMF in feeding invert sugars and syrups that contain a high proportion of fructose meant to feed bees is formed at high temperatures and in long term storage.

Studies have proved HMF toxic to bees, that higher concentration of HMF in feed can affect bees. So heat, storage conditions where below 22 C degrees maintained are important, light has minimal impact.

[Ecotoxicology](#). 2016 Mar;25(2):320-8. doi: 10.1007/s10646-015-1590-x. Epub 2015 Nov 21.

Effect of hydroxymethylfurfural (HMF) on mortality of artificially reared honey bee larvae (*Apis mellifera carnica*).

[Kraimer S](#)¹, [Brodschneider R](#)², [Vollmann J](#)², [Crailsheim K](#)², [Riessberger-Gallé U](#)².

Author information

Abstract

Hydroxymethylfurfural (HMF) is a heat-formed, acid-catalyzed contaminant of sugar syrups, which find their way into honey bee feeding. As HMF was noted to be toxic to adult honey bees, we investigated the toxicity of HMF towards larvae. Therefore we exposed artificially reared larvae to a chronic HMF intoxication over 6 days using 6 different concentrations (5, 50, 750, 5000, 7500 and 10,000 ppm) and a control. The mortality was assessed from day 2 to day 7 (d7) and on day 22 (d22). Concentrations ranging from 5 to 750 ppm HMF did not show any influence on larval or pupal mortality compared to controls ($p > 0.05$; Kaplan-Meier analysis). Concentrations of 7500 ppm or higher caused a larval mortality of 100%. An experimental LC50 of 4280 ppm (d7) and 2424 ppm (d22) was

determined. The calculated LD50 was 778 µg HMF per larva on d7 and 441 µg HMF on d22. Additionally, we exposed adult honey bees to high concentrations of HMF to compare the mortality to the results from larvae. On d7 larvae are much more sensitive against HMF than adult honey bees after 6 days of feeding. However, on d22 after emergence adults show a lower LC50, which indicates a higher sensitivity than larvae. As toxicity of HMF against honey bees is a function of time and concentration, our results indicate that HMF in supplemental food will probably not cause great brood losses. Yet sublethal effects might decrease fitness of the colony.

KEYWORDS:

Chronic intoxication; HMF; Honey bee; In vitro larval rearing; Supplemental food

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Winnipeg Beekeeping Hearing Date Set

Hello Cllr Wyatt,
The Public Hearing advertisement went out this past Thursday. The Public Hearing to permit beekeeping City-wide, in all Zoning Districts, will be heard at the October 10, 2017 Standing Committee of Planning Property and Development.
Braden Smith, Planner City of Winnipeg

Winnipeg Beekeeping Hearing

A public hearing is slated for 9:00 a.m. on Tuesday 10 October 2017 at City of Winnipeg Council Chambers at 510 Main Street. The purpose is to obtain feedback on proposed Bylaw changes to permit Winnipeg City Wide Beekeeping.

The Standing Policy Committee on Property and Development, Heritage, and Downtown Development is seeking public response to a proposed amendment to Winnipeg Zoning By-law No 200/2006 to accommodate urban beekeeping as a permitted accessory use in all zoning districts. The Notice was to be published on Friday 22 September 2017 in local newspapers.

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Australian Researcher Blames bad Beekeeping Practices

[Even if we're innocent, we should know what the problems are.]

Poor management practices have enabled spread of bee pathogens, bee research Robert Owens argues in the *Journal of Economic Entomology* (Entomological Society of America's). He argues that human activity is a key driver in the spread of pathogens afflicting the European honey bee (*Apis mellifera*) - the species primarily responsible for pollination and honey production around the world. He recommends a series of collective actions necessary to stem their spread. While some research seeks a "magic bullet" solution to honeybee maladies by human such as Colony Collapse Disorder, "many of the problems are caused by human action and can only be mitigated by changes in human behaviour."

Owen is author of *The Australian Beekeeping Handbook*, owner of a beekeeping supply company, and a Ph.D. candidate at the Centre of Excellence for Biosecurity Risk Analysis (CEBRA) at the University of Melbourne. In an essay in the *Journal of Economic Entomology*, he outlines an array of human-driven factors that have enabled the spread of honey bee pathogens:

- . **Regular, large-scale, and loosely regulated movement of bee colonies** for commercial pollination. (For instance, in February 2016 alone, of the 2.66 million managed bee hives in the United States, 1.8 million were transported to California for almond crop pollination.)
- . **Carelessness in the application of integrated pest management principles** leading to overuse of pesticides and antibiotics, resulting in increased resistance to them among honey bee parasites and pathogens such as the *Varroa destructor* mite and the American Foul Brood bacterium (*Paenibacillus larvae*).
- . **The international trade in honey bees and honey bee products** that has enables the global spread of pathogens such as *Varroa destructor*, tracheal mite (*Acarapis woodi*), *Nosema cerana*, Small hive Beetle (*Aethina tumida*), and the fungal disease chalkbrood (*Ascosphaera apis*).
- . Lack of skill or dedication among hobby beekeepers to adequately inspect and manage colonies for

disease.

Owen offers several suggestions for changes in human behaviour to improve honey bee health including:

- Stronger regulation both of global transport of honey bees and bee products and migratory beekeeping practices within countries for commercial pollination.
- Greater adherence to integrated pest management practices among both commercial and hobby beekeepers.
- Increased education of beekeepers on pathogen management (perhaps requiring such education for registration as a beekeeper).
- Deeper support networks for hobby beekeepers, aided by scientists, beekeeping associations, and government.

His belief: "The problems facing honeybees today are complex and will not be easy to mitigate. The role of inappropriate human action on the spread of pathogens and the resulting high numbers of colony losses needs to be brought into the fore of management and policy decisions if we are to reduce colony losses to acceptable levels."

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Bee Research Sheds Light on Human Sweat Perception, Metabolic Disorders

June 28, 2012 Arizona State University

Scientists at Arizona State University have discovered that honey bees may teach us about basic connections between taste perception and metabolic disorders in humans.

By experimenting with honey bee genetics, researchers have identified connections between sugar sensitivity, diabetic physiology and carbohydrate metabolism. Bees and In a study published in the open-access journal *PLoS Genetics* (Public Library of Science), Gro Amdam, an associate professor, and Ying Wang, a research scientist, in the School of Life Sciences in (continued on Pg 7)



Red River Apiarists' Association

Editorial note & musings

Finally a moment to focus on October's newsletter.

As many of you know September 30th was my daughter's wedding and for dad a very precious moment to enjoy. I sang two songs which I put together and had a professional singer help with it, so bees and all else took to the sidelines.

I would to thank all those who have contributed articles and ideas for the newsletter to enlighten and advance the RRAA beekeepers.

With a new winter season upon us treatments should be well under way or a Oxalic treatment in November when brooding has stopped planned. This is in my plans. My hive manipulations are done and I notice the wasps still pesky. Low night temperatures have tightened clusters. I have shifted colonies slightly so as the prevailing fall/winter winds do not blow into the entrances. And I am just getting to feed.

The headliner on Hydroxymethylfurfural was a concern for a few so I compiled some information. The amount in sugar syrup may be low and of little concern for bees so the caution is use very warm water vs. using boiling water which increases the HMF load and will be less of an impact on adult bees.

See you at the October meeting on the 10 October.

The RRAA , the Bee Cause, for you and through you:

The Bee Cause is the official publication of the Red River Apiarists' Association for distribution to its members and their colleagues in the beekeeping industry. It is published eight times a year on a monthly basis except December and the summer months of June, July, and August when membership meetings do not occur.

Articles can be best submitted in word documents as email attachments. Though they may be edited for spelling and basic grammar, no changes will be made to their contents, message and opinions. They are those of their originator and not of the Red River Apiarists' Association.

Deadline for any submission to this newsletter is the second Sunday preceding the membership meeting to allow for publishing and mailing delays and the legal obligation to allow membership to review last meetings' minutes for errors or omissions before next meeting. Regular membership meetings are normally scheduled 7:30 on the second Tuesday of every month at the Elmwood Legion 920 Nairn Avenue in Winnipeg excepts months noted above.

The Red River Apiarists' Association, formed in 1963, represents the beekeepers of the Red River Valley and environs in southern Manitoba. The association provides a forum for the promotion of sound beekeeping practices through education, networking opportunities, meetings, field days, workshops, presentations by local apicultural experts, as well as the dissemination of this monthly newsletter.

CLASSIFIEDS

1. **For Sale:** Abbey Road Distribution Ltd.—Abby Road 400 Oak Point Highway Wpg. , MB R2R 1V1 ph.: (204)694-6800 Fx: (204)697-1335 info@abbeyroaddistribution.com . 25 years of supplying the Beekeeping Industry. We carry a wide range of fasteners, tooling, shipping supplies and packaging materials suited for your industry: staples, nails, bulk screws, coil nails, strip nails, plastic & steel strapping stretch wrap & tapes service on most makes of stapling and nailing equipment.
2. **For Sale:** wax foundation moulded from clean capping wax. Contact : **Waldemar at text ph. 204-266-2277 or e-mail wdamert@yahoo.ca. (Beausejour Mb.)**
3. **Wanted: HONEY** contact: **John at 204-943-0166 or e-mail: Honeyb@mymts.net (Winnipeg)**
4. **For Sale:** Top bar hive. Comes with 30 frames, moveable dividers, 2 queen excluders, viewing window and a beautiful gabled roof. Photos available. Offers. Also long hive. Takes 21 regular frames. Same size as 2 supers. Comes with vertical queen excluder and beautiful gabled roof. **Contact: David 204 424 5042 (St.**

We are on the Web! www.beekeepingmanitoba.com

Anne Mb.

5. **For sale:** inner covers @ \$ 12.00 each **Contact: Ted Scheuneman 204-338-6066 (West St. Paul)**
6. **Wanted: Wax Cappings**

My name is Marlese Hazeu RRAA member and staff caring for paper copy mailings. I started a little give-profit company back in 2010. I hand make pure beeswax candles and give 100% of the profits to organizations who support women and children locally and around the globe.

Candles for Hope needs your help. If you have honey cappings or already rendered wax that you're willing to give us, we can turn that into hope for new moms and love for the poor in the Philippines and in Winnipeg. I have the ability to render anything from small ice-cream pails to larger drums with a Maxant wax melter.

Currently we are supporting Mercy in Action in the Philippines (www.mercyinaction.com/philippines-clinic), and Crisis Pregnancy Centre (www.pregnancy.ca) in Winnipeg.

Follow the love at www.candlesforhope.ca

Feel free to call or email myself at 204-667-9932 or candlesforhope@live.com.

Warmly,
Marlese

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(from Pg 5) ASU’s College of Liberal Arts and Sciences, explain how for the first time, they’ve successfully inactivated two genes in the bees’ “master regulator” module that controls food-related behaviors. By doing so, researchers discovered a possible molecular link between sweet taste perception and the state of internal energy.

“A bee’s sensitivity to sugar reveals her attitude towards food, how old the bee is when she starts searching for nectar and pollen, and which kind of food she prefers to collect,” said Wang, the lead author of the paper. “By suppressing these two ‘master’ genes, we discovered that bees can become more sensitive to sweet taste. But interestingly, those bees also had very high blood sugar levels, and low levels of insulin, much like people who have Type I diabetes.”

In Amdam’s honey bee lab at ASU, scientists suppressed two genes including vitellogenin, which is similar to a human gene called apolipoprotein B, and ultraspiracle, which partners with an insect hormone that has some functions in common with the human thyroid hormone. The team is the first in the world to accomplish this double gene-suppressing technique. Researchers used this method to understand how the master regulator works.

“Now, if one can use the bees to understand how

taste perception and metabolic syndromes are connected, it’s a very useful tool,” said Amdam, who also has a honey bee laboratory at the Norwegian University of Life Sciences. “Most of what we know about deficits in human perceptions is from people who are very sick or have had a brain trauma. We know shockingly little about people in this area.”

The researchers are now considering how, exactly, the bees’ sweet taste was enhanced by the experiment. The most metabolically active tissue of the bee, called the fat body, may hold the key. The fat body is similar to the liver and abdominal fat in humans, in that it helps store nutrients and create energy.

Amdam explains that taste perception evolved as a survival mechanism, for bees as well as for people. For example, bitter foods may be poisonous or sweet taste may signal foods rich in calories for energy. For all animals, taste perception must communicate properly with one’s internal energetic state to control food intake and maintain normal life functions. Without this, poorly functioning taste perception can contribute to unhealthy eating behaviors and metabolic diseases, such as diabetes and obesity.

“From this study, we realized we can take advantage of honey bees in understanding how food-related behaviors interact with internal metabolism, as well as how to manipulate these food-related behaviors in order to control metabolic disorders,” added Amdam.

In addition to Amdam and Wang, the team included former ASU research partners Colin Brent, a research entomologist with the USDA, and Erin Fennern, now with Oregon Health Science University. —/\—

Honey bees secret world of heat revealed

The Telegraph By [Richard Gray](#), Science Correspondent, Tuesday 03 October 2017

Honey bees precisely control the temperature inside their hives to determine which job their young will perform in the colony when mature, new research has revealed.

The secret of honey bees' success has been discovered living deep inside their hives - a special type of bee which acts like a living radiator, warming the nest and controlling the colony's complex social structure.

The "heater bees" have been found to play a crucial, and previously unappreciated, role in the survival of honey bee colonies.

Using new technology that allows scientists to see the temperature inside the bee hives, researchers have been able to see how heater bees use their own bodies to provide a unique form of central heating within a hive.

They have found that these specialised bees, whose body temperatures are considerably higher than other bees in the colony, not only keep the hive warm but also control the social make-up within a colony.

Bees, and other social insects such as ants, share jobs within a colony so each individual has specific role that benefits the colony as a whole.

It is this division of labour that has allowed bees to become so successful as they behave like a highly organised, single "superorganism" rather than a cluster of selfish individuals.

Heater bees are responsible for maintaining the temperature of the brood nest in a hive, where young bees, known as pupae, are sealed into wax cells while they develop into mature bees.

The scientists discovered that the heater bees work to subtly change the temperature of each developing pupae by around a degree and this small change determines what kind of honey bee it will become.

Those kept at 35 degrees C turn into the intelligent forager bees that leave the nest in search of nectar and pollen.

Those kept at 34 degrees C emerge as "house keeper" bees, conducting chores such as feeding the larvae and cleaning the nest.

Professor Jürgen Tautz, head of the bee group at Würzburg University, in Germany, said this allows the heater bees to control what sort of job a bee will fulfil when it matures and so ensure there are always enough bees filling each role within the colony.

He said: "The bees are controlling the environment they live in to make sure they can fill a need within the colony.

"Each bee in a colony performs a different profession – there are guard bees, nest building bees, brood caretaking bee, queen caretaking bee and forager bees, which are the ones we are familiar with as they leave the colony.

"By carefully regulating the temperature of each pupae, they change the way it develops and the likelihood of the role it will fulfil when it emerges as an adult."

The findings will be revealed later this month in a new BBC series *Richard Hammond's Invisible World*, where technology is used to give a glimpse into previously unseen worlds.

Thermal imaging cameras reveal how individual heater bees warm up the nest to precisely the right temperature.

By beating the muscles that would normally power their wings, heater bees increase the temperature of their bodies up to 44 degrees C – nearly 10 degrees hotter than a normal bee.

They then crawl into empty cells within the brood nest, transmitting heat to the surrounding cells where the bee pupae are developing. The waxy cells also help circulate the heat around the rest of the hive.

In the past beekeepers have seen these empty cells as undesirable and have attempted to breed queens that did not leave them empty, but Professor Tautz now claims they are an essential part of ensuring the health of a bee colony.

Warmth is essential for bees as they need a body temperature of around 35 degrees C to be able to fly.

The heater bees, which can number (continued on Pg 9)

(form Pg 8) from just a few to many hundreds depending on the outside temperature and size of the hive, also press themselves against individual cells to top up the temperature of each pupae to ensure it develops into the right kind of bee.

Professor Tautz added: "The old idea was that the pupae in the brood nest were producing the heat and bees moved in there to keep warm, but what we have seen is that there are adult bees who are responsible to maintaining the temperature.

"They decouple their wings so the muscles run at full power without moving the wings and this allows them to raise their body temperature extremely high.

"Their body temperature can reach up to 44 degrees centigrade. In theory they should cook themselves at that temperature, but somehow they are able to withstand this high temperature.

"By creeping into empty cells, one heater bee can transmit heat to 70 pupae around them. It is a central heating system for the colony.

"Now we know that these empty cells are important, then bee keepers can try to avoid selecting for queens that don't leave these cells empty. It can help to ensure that colonies can regulate their temperature properly and have the right mix of individuals."

Temperature is known to have an influence on the development of young in other animal species.

In crocodiles, the sex of hatchlings is determined by the average temperature of the eggs during a key point in the incubation period, so if they are kept above 34.5 degrees C the offspring will be male.

Many species of fish and turtles also use temperature to determine the sex of their young.

Dr. David Aston, chair of the British Beekeepers Association's technical and environmental committee, said: "There has never been a good reason for the presence of individual empty cells across the face of the comb.

"Now Professor Tautz has provided an explanation and beekeepers will look more closely at the brood combs to see if they can observe heater bees at work."

Richard Hammond's Invisible World will begin on BBC One on March 16. The episode with the heater bees will be shown on March 23.

Professor Tautz has asked us to make clear that the temperature changes brought about by the heater bees alter the probability of the tasks that will be performed by larvae when they mature.

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THE FOLLOWING PUT BEES "ON EDGE"

- Anything that seems like a bear—mammal smell, jarring, nighttime disturbance.
- Any inadvertent taps on hive with the smoker, hive tool, etc.
- Alarm pheromone from crushing bees, stinging bees, or upset hive next door.
- Cool or windy weather. Shady hive location.
- Being hungry, lack of honeyflow, robbing
- Being bothered by skunks, cattle, ants, etc.
- ANY KIND OF FAST MOVEMENTS

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Fall Feed

As usual a 2:1 ratio of sugar to water in warm water.

Another way to look at it litres per hive — 8 or 16 L / hive.

If 8 L you can measure 8 litres of water into a 5 gallon pail and mark the pail. Then measure 16 L of sugar in to the pail and mark that.. Then add the water then slowly add the sugar as you stir.

Leave over night and stir again before applying to bees.

Note some new health additives to bee feed for bee health is the use of essential oils such as lemon grass oil and oregano oil to the syrup.

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2017 Manitoba Honey Competition Winners

September 22-23, 2017 saw members of the Red River Apiarists' Association participating in the Annual Honey Show in the Atrium at The Forks. This annual event is put on as a public educational component of our program. While there were times when it was slow, for the most part there was a steady stream of people of all ages coming in to ask questions, see what the displays were all about, see the results of the honey "competition" and to buy from Donna Hourd's wonderfully stocked tables of honey, candles and other products. Many thanks to the Honey Show Committee for all their organization. Thanks to all those who took time to help with set-up, to judge the honey and wax samples, to greet the public and answer questions, and finally help with the take-down—We could not have done it without you!

It was good to have more members take a chance with their honey and wax entries this year. Here are the results of the "competition":

Class 1

- | | |
|-----------------------|---|
| 1. Liquid White Honey | 1st Robert Heath
2nd John Russell |
| 2. Liquid Amber Honey | 1st Donna Hourd
2nd Robert Heath
3rd Alex Remkes |
| 4. Bee-Ginner | 1st Gordon Janzen
2nd Timothy Kennedy
3rd David Weselak |
| 5. Granulated Honey | 1st Donna Hourd
2nd Gordon Janzen
3rd Robert Heath |

Class 2

- | | |
|-------------------|--|
| 1. Chunk Honey | 1st Robert Heath |
| 2. Comb Honey | 1st Robert Heath
2nd Alex Remkes |
| 3. Frame of Honey | 1st Donna Hourd
2nd Robert Heath |
| 4. Beeswax | 1st Donna Hourd
2nd Robert Heath
3rd Timothy Kennedy |

Class 3

- | | |
|---------------|--|
| 1. Best Taste | 1st John Russell
2nd Marg Smith
3rd Donna Hourd
4th Timothy Kennedy |
|---------------|--|

Champion Exhibitor, by total points

Robert Heath



2017 Manitoba Honey Show Competitors Show case.

Red River Apiarists' Association—Winnipeg, Manitoba
 2017 MEMBERSHIP APPLICATION

I apply for membership in the Red River Apiarists' Association. Membership
 Includes one years subscription to the newsletter "The Bee Cause" (8 issues)

RRAA membership fee (cheque payable to RRAA or Red River Apiarists' Association. @ \$25.00/year
 New: Optional Beekeeper Liability Insurance (details on RRAA web site, Links, Insurance) @65.00 +\$5.20 = \$70.20

Total payment Enclosed.....\$ _____

Name _____ Tel. # _____

Address _____

City _____ Prov. _____ Postal Code _____

E-mail address _____

Signature _____

New Member [] Renewal [] Student U of M Beekeeping course [] (free 1st year) other specify. _____

Newsletter Delivery in electronic pdf via e-mail [] or paper copy via Canada post []

This completed form may be brought to the meeting or mailed with your cheque to: **John peer, RRAA Treasurer**
Box 16, Group 555. Winnipeg, Manitoba R2C 2Z2