

# The Bee Cause



Volume 13, Issue 2

February 2016

Next general meeting is 7:30 Tuesday, 9 February 2016 at the **The Elmwood Legion 920 Nairn avenue , Winnipeg.**

**Speaker:**

February meeting: late winter management, getting ready to feed, supplies needed, social event, speakers  
Melissa on roof top beekeeping at U of W.

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**Spray Toxicity and Risk Potential of 42 Commonly Used Formulations of Row Crop Pesticides to Adult Honey Bees (Hymenoptera: Apidea)**

Yu Cheng Zhu, John Adamczyk, Thomas Rinderer, Jianxiu Yao, Robert Danka, Randall Luttrell and Jeff Gore  
J. Econ. Entomol. 108(6) : 2640-2647 (2015); doi:10.1093/JEE/TOV269

**Abstract** To combat an increasing abundance of sucking insect pests, >40 pesticides are currently recommended and frequently used as foliar sprays on row crops, especially cotton. Foraging honey bees may be killed when they are directly exposed to foliar sprays, or they may take contaminated pollen back to hives that may be toxic to other adult bees and larvae. To assess acute toxicity against the honey bee, we used a modified spray tower to simulate field conditions to include direct whole-body exposure, inhalation, and continuing tarsal contact and oral licking after a field spray. A total of 42 formulated pesticides, including one herbicide and one fungicide, were assayed for acute spray toxicity to 4-6-d-old workers. Results showed significantly variable toxicities among pesticides, with LC50s ranging from 25 to thousands of mg/liter. Further risk assessment using the field application concentration to LC or LC99 ratios revealed the risk potential of the 42 pesticides. Three pesticides killed less than 1% of the workers bees, including the herbicide, a miticide, and a neonicotinoid. Twenty-six insecticides killed more than 99% of the bees, including commonly used organophosphates and neonicotinoids. The remainder of the 13 chemicals killed from 1-99% of the bees at field application rates. This study reveals a realistic acute toxicity of 42 commonly used foliar pesticides. The formulation is valuable for guiding insecticide selection to minimize direct killing of foraging honey bees, while maintaining effective control of field crop pests.

The following table has been generated from the publication.

Table 2. Toxicity of 42 pesticides, expressed as formulation lethal concentrations LC50: mg/liter, toxicity rank by LC50, LD50 ug/bee: lethal dose.

Chemical	LC50 mg/liter	Toxicity rank by LC50	LD50 ug/bee
Dicrctophos	24.92	1	0.04
Thiamethoxam	62.56	2	0.10
Emamectin			
Benzoate	65.51	3	0.10
Clothianidin	67.27	4	0.11
Abamectin	68.32	5	0.11
Thiamethoxam+ I-cyhalothrin	107.32	6	0.17
Acephate	126.43	7	0.20
Zeta-cypermethri	138.31	8	0.22
Chlorpyrifos	141.10	9	0.22
Dimethoate	142.78	10	0.22
Methomyl	179.38	11	0.22
Cyfluthrin	182.54	12	0.28

(Continued on page 5)

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**Presidents Comments for February, 2016**

Greetings to all fellow beekeepers,

February is around the corner and January had some unusual warm spells mixed with rain. Most beekeepers wonder, is it good or bad for the bees? There is no simple answer for that. I believe it can be both good and bad. Let me elaborate on that.

There are 3 important points for your bee hive in late summer and fall.

**1. Queen.**

**A. Is she old or young?**

Old Queens usually stop laying much sooner than younger Queens, meaning you may have a nice cluster in the fall time but not many winter bees. Come February your cluster will dwindle to less than halve. Young Queens lay longer resulting in more winter bees.

**B. Is the Queen from the spring or late summer?**

If you have a young Queen from the spring or early summer and the hive is healthy and not overloaded with mites, you have a very good survival rate. Is the Queen from late summer or fall, you may have starvation problems because she will lay eggs in to the early winter and the bees and brood will consume most of the winter stores.

**C. Is she a raised Queen from local stock or is she imported?**

Local bee stock that has survived several winters, the pressure of short summers, your type and style of beekeeping, will be your ticket for success. Imported Queens are becoming more expensive and unreliable. Some beekeepers reported in 2015 a 65% failure through the summer. The excepted Queens are often superseded without the beekeeper noticing it. Many beekeepers do re-queen the imported packages in mid-summer when local Queens are available.

**2. Feed.**

**A. The time when you start feeding is very important. We should not wait for the last honey drop to come in. When the day time temperature drops below 10\* Celsius bees slowdown the feeding to less then halve. The syrup becomes too cold for the bees to picked it up and invert, resulting in not enough winter stores. My rule-of-thumb is 20-24 liters of syrup for wintering per hive.**

**B. Too early feeding has negative results too. The queen loses the availability of open cells and will lay less eggs resulting in your cluster having less winter bees.**

**3. Wintering-buildings or outdoors wraps.**

Well, I do winter outdoors so there are no comments on wintering-buildings. Wintering wraps have to be able to insulate from the cold and also prevent from warming up when the sun hits the hives, so the bees don't feel the flux of the temperature. If the insulation is not sufficient the hive will start brooding to early, consume most of the winter feed ,and starve before spring. Minimum R10 for a good winter wrap is required. Don't forget to treat for mites. A good wintering location is also very important.

Looking forward to see you all!

Your president

Waldemar

### Red River Apiarist's Association

Minutes of the Regular Meeting  
January 12, 2016

Chairman: Waldemar Damert

Recording Secretary: Art Quanbury

Approval of the Minutes of the previous general meeting  
Motion: That the minutes of the general meeting held on November 10, 2015 be accepted

Moved: Armand St. Hilaire

Seconded: Alex Remkes

Carried

#### Financial Report

John Speer reported that the association over \$4000.00.

Membership fees are now due.

#### MBA Report

No report. Margaret Smith, the MBA rep. was not present.

#### President's comments

##### RRAA Bee Yard

Waldemar reported that we now have the ability to have two bee yards; one at the zoo and the other along the floodway at Lockport. Volunteers will be needed to set up and maintain both yards. Signup sheets were distributed for volunteers to indicate their willingness to spend time at the yards and their interest in learning how to raise queens. In preparation to the activity of raising queens in the yards Waldemar will hold two sessions on how to raise queens, probably in March and April.

##### MBA convention

Daryl Wright, the secretary of MBA presented information on the upcoming Convention on February 26 and 27. Many presentations will be given. Advance registration before February 13 will have a reduction in fees.

#### Rhéal Lafrenière

Rhéal presented details of the **Bee Act of Manitoba** and probable changes that might occur when the act becomes part of the Animal Health Act. It is likely that conditions may be more stringent. He stated that everyone who has bees and/or bee equipment must be registered. An application form is available online at: <http://www.gov.mb.ca/agriculture/permits-and-licences/>

Individuals with fewer than 50 hives are considered hobby beekeepers and are inspected infrequently. Individuals with more than 50 hives are considered commercial and are inspected annually. The inspector can enter a beeyard without permission and has considerable power to ensure the control of disease in bees. A beeyard must be disease free for 3 years before certain actions can take place; i.e.: sale of bees or equipment. Notification should be given if bees are sold. Regulations apply for the inter-provincial transport of bees. Strict sampling procedures are required to ensure freedom from disease.

New regulations may be coming to regulate the use of antibiotics. (antimicrobial stewardship). The intent is to limit the use of antibiotics to situations when they are really needed (not prophylactic use).

Rhéal announced a BioSecurity workshop on January 15. Attendance at a workshop is necessary for eligibility for funding of certain projects.

#### Election of Officers

Jim Campbell announced the slate of offices: all current positions to be filled by incumbent individuals: President, Waldemar Damert, 1<sup>st</sup> VP. John Badiuk, 2<sup>nd</sup> VP. Armand St. Hilaire, Treasurer, John Speer, Secretary, Art Quanbury, Newsletter Editor, Ken Rowes, MBA rep. Margaret Smith (new), Web design and maintenance, Duane Versluis, Three calls were made for nominations from the floor but none were forthcoming.

Motion: to accept the slate of officers for 2016 as stated by Jim Campbell.

Moved: Rhéal Lafrenière Seconded: Ken Rowes. Carried

Motion: That Jim Campbell be recognized for his service to RRAA as MBA rep for many years.

Moved: Rhéal Lafrenière Seconded: Armand St. Hilaire Carried.

#### Catching Swarms

Waldemar outlined his method for catching swarms in his beeyard. He uses a swarm trap made from a 4 hive nuc box. The frames have all but the top one inch of comb removed. The trap is placed 8 to 10 feet above the ground. He adds some queen pheromone to the trap.

#### Reducing Moth Problems

Moths do not like drafts so creating air movement through stored hive boxes can prevent them from laying eggs. A small fan mounted in one side of a blank super that is placed at the bottom of the stack of supers can create a suitable draft. This can also be used to dry dead bee bodies that are in a comb so they can be easily shaken out.

#### Inspecting wintering Hives

A stethoscope can be used to determine the location of the bee cluster in the hive and this can provide information on their state. If bees have moved to the back of the hive they are getting low on food. If they are buzzing with a high pitch it is an indication they are stressed either by lack of food or cold temperature.

#### Loonie Draw

Keith Bamford: finishing box, Monica Wiebe: cookies, Carol Anderson; cookies, Nelson Szwaluk; card, Veronica Larmout; iPhone holder, Victor Dyck; escape board, Alex Remkes; candles, Monica Wiebe; iPhone holder, Doug Beckingham; cookies, Armand St. Hilaire; cookies, John Noll; wine bottle stopper

#### Next Meeting

The next meeting will be on February 9, 2016.

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**MBA Report February 2016**  
**Margaret Smith, RRAA MBA Representative**  
**By Margaret Smith**

On January 29, 2016, the Executive of the MBA held a conference call meeting. The following were the main topics for discussion:

**Committees within the MBA:** As well as the Resolutions Committee, I have been asked to chair the Education and Promotions Committee. This seemed like a good fit, as some of the projects that the RRAA is involved in are ways of educating the public about bees and beekeeping. These include the Honey Show at the Forks, and the Day of the Honey Bee. In the past, we also participated in things like the Royal Winter Fair and Ag Days in Brandon and the Morden Corn and Apple Festival. I have also been involved with Agriculture in the Classroom and some of its offshoots; Made in Manitoba Breakfasts, and Agriculture Literacy week. Some of these events have not been covered recently, for various reasons, but, if you think they sound interesting to you, perhaps you might speak with me.

**Signage for Apiary Yards:** Rheel Lafreniere, the Provincial Apiarist, has informed us that it will be required very soon for all beekeepers to post signage at each Apiary site with the proper contact information on it, including Name of the Beekeeper, phone and/or email information. This is so that there can be better contact for people with nuisance bee issues and swarms landing on their property. It is, once again, an opportunity to educate the public and landowners about these natural happenings and the habits of bees. MBA is looking into where these signs can be made and such information will be available for upcoming newsletters.

**MBA Convention, February 26-27, 2016 at Canad Inns, Polo Park.** The line-up of speakers is taking shape quite nicely and people have begun to pre-register. As you know, Jim Campbell will be honoured at the Friday night Banquet, so hopefully there will be some of you wish to take part in that event. You can get more information about the conference on the Manitoba Beekeepers' Association website. It's a great place to meet other beekeepers, exchange information, see the newest equipment ideas at the trade show and keep informed about the latest in honeybee research. One item of note is that on the afternoon before the Convention **Thursday, February 25<sup>th</sup>, 2-4:30 p.m., at International Truck Body Inc., Unit 5 - 1601 Church Ave.,** there will be a **tour of the Mobile Extracting Unit.** Interest has been high in this idea, so mark your date and come out to see it.

**MBA AGM extended Meeting during Convention**  
 Because there were not enough members out to the MBA AGM in November, there will be a furthering of the

meeting to deal with some **resolutions** that need to be passed. These Resolutions deal with:

- a) Program Manager/Tech Transfer Team.** Manitoba is now the only province that does not have a Tech Transfer Team. These people do research and try out many items and ideas to do with the health of bees within the province. Rheel and Daryl Wright will be working with Les Eccles, from the Ontario Tech Transfer Team to come up with business plan and process to begin such a team here. Growing Forward 2 could enter into an agreement of 75/25 % funding with the MBA .
- b) Small Hive Beetle Inspections** this has to do with inter-provincial movement of bees and equipment.
- c) Skunks ;** pushing for the registration of something to deal with skunks that would be legal to use.
- d) Merging the MBA Convention and the AGM and alternating the yearly Convention between Brandon and Winnipeg** Here is where Daryl and I will be working together to come up with an information gathering tool to be used to gather the ideas that people have on this subject.
- e) Senate Final Report -** MBA supports the final report of the Senate committee hearings on the importance of bees and the overwintering mortality

**Canadian Honey Council Report:** was received. One item out of this report that needed to be followed up on was that there is to be a Labour workshop of beekeepers held in Edmonton on February 11<sup>th</sup>, discussing the wording of various job descriptions for our commodity. This is so that the wording of advertising can be consistent across Canada. I will be attending this workshop on behalf of the MBA.

The other item is that the Canadian Honey Council is looking to hold its AGM in conjunction with the Convention if Galveston, Texas.

One piece of **Correspondence** that will affect the RRAA is that the MBA is asking the Manitoba Minister of Agriculture to pause in his proclaiming the Day of the Honey Bee until the MBA has finished reviewing that date. There is a move to try to have one date across Canada, rather than each province celebrating a different date. This means that there would not be such an event in May, this year.

KAP Report. One item of interest is that the Canadian Agriculture Federation is lobbying for better cell phone and emergency service in rural areas.

Our next MBA Exec. Meeting is to take place after the tour before the convention.

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Spring is not far away.



Bifenthrin+			
Avermectin	197.21	13	0.31
Permethrin	198.25	14	0.31
Imidacloprid+			
b-cyfluthrin	213.12	15	0.34
Oxamyl	214.03	16	0.34
Sulfoxaflor	229.50	17	0.36
Bifenthrin	258.30	18	0.41
Spinosad	302.26	19	0.48
Beta-cyfluthrin	312.15	20	0.49
Cypermethrin	332.55	21	0.52
Bifenthrin+	498.31	22	0.78
Zeta-cypermethrin			
Imidacloprid	552.20	23	0.87
Gamma-			
Cyhalothrin	575.31	24	0.91
Lambda-			
Cyhalothrin	575.41	25	0.91
Methoxyfenzide+			
Spinetoram	712.21	26	1.12
Carbaryl	895.25	27	1.14
Indoxacarb	1140	28	1.80
Esfenvalerate	1500	29	2.36
Thiodicarb	1774	30	2.79
l-cyhalothrin+	2059	31	3.24
chlorantraniliprole			
Tetraconazole	8105	32	12.77
Fenpyroximate	1.46E+04	33	23.07
Acetamiprid	2.51E+05	34	395.50
Fonicamid	9.76E+05	35	1537.34
Etoxazole	1.30E+06	36	2041.96
Novaluron	4.03E+07	37	63524.34
Propargte	8.06E+07	38	126866.99
Flubendiamide	5.96E+08	39	938523.93
Chlorantranilipole			
	2.93E+	17 40	4.6092E+14
Spiromesifen	2.75E+	19 41	4.3331E+16
Glyphosate	4.62E+	34 42	7.2843E+31

From July to early September to control a complex of sucking insects and a few lepidopterans are sprayed and acephate and neonicotinoids are often used because these insecticides may have both contact and systemic toxicities. To better protect bees and other pollinators, it is important to understand that 1) field sprays of pesticides may inevitably pose a risk to foraging honey bees and 2) the risk to honey bees could be minimized through careful selection with those of lower toxicity. Screening the commonly used pesticides can determine which have the low toxicity.

The data revealed a wide range of LC50 values among the 42 chemicals suggesting a possibility of minimizing the risk to pollinators by choosing lower bee-toxicity pesticides. Twenty insecticides (2-21) in the table are highly toxic chemicals including thiamethoxam, clothianidin, three organo-phosphates (acephate, chlorpyrifos, and dimethoate) and most pyrethroids tested. Ten were moderately toxic (22-

31) to bees including imidacloprid and a few carbamates. The remaining 11 (32 to 42) were slightly toxic to bees.

From this study tetraconazole (a fungicide), etoxazole (miticide), and glyphosate (a popular herbicide) have minor or no toxicity to bees based on the 48 hour mortality data, with the results support with a week-long observation.

A second result of the study showed different rate of field applications were significantly different from 0.83 to 125 oz/acre. So the risk to honey bees depend both on how toxic the chemical and how much is sprayed.

The data provided a scale to measure the risk of each insecticide within each category showing the higher the ratio is the higher the risk to bees.

The risk is influenced by two factors, the field application concentration and the dose-response. Noted was that four of the moderately toxic pesticides (23-31) shifted to high risk chemicals because of their high-dose-response.

The study opens the questions of trying to understand whether pre-mixtures and tank mixtures of major insecticides with other insecticides, and herbicides synergize toxicity to honey bees and negatively interact with other mortality-causing factors.

The article was shared by John Gavloski and Rheal Lafreniere, thanks for continuing to share critical information concerning apiculture in Manitoba.

This article was published in the latest edition of the Journal of Economic Entomology.

It does verify some of what we already know; many insecticides such as chlorpyrifos, dimethoate, etc. can result in significant risk to bees when applied to flowering crops, while others, such as Coragen (Chlorantraniliprole), and fonicamid are much less of a risk. They do try to rank products based on toxicity and risk. Some of the products are not commonly used here though.

John Gavloski, Ph.D. Entomologist —/\\—

### Pumpkin Bread

½ cup Honey  
 ½ cup olive oil  
 2 eggs, beaten  
 ½ cup pumpkin puree  
 1/3 cup milk  
 1 1/4 cups whole wheat flour  
 1 teaspoon baking powder  
 ½ teaspoon nutmeg, allspice, cinnamon

Wash pumpkin pieces and steam for 10 minutes until tender  
 Cool then blend using 2 cups of puree and the remainder freezing.  
 Beat honey and oil, add eggs and pumpkin alternating with milk  
 Flour a loaf pan pour mix in and bake at 350 F for 45 minutes.



## Editor's Note & musings by Ken Rowes

White is the colour for marking 2016 queens.

Well I am well into the 2nd half of my honey house renovations making it more bug tight, with a new coat of paint. Also gave the old fridge a sterilizing.

I've been e-mail chatting with Nick Holmes, EBKA Webmaster (Essex Beekeepers Association) of the United Kingdom. There state of affairs has changed dramatically through weather flux.

Forage - at this time of year, normally next to none, but it has been VERY mild and so all nature is screwed up. Apparently autumn sown rape seed (canola I think it is called outside the U.K.) that isn't supposed to flower till late March has been flowering since early December.

First in the year we normally get snowdrops and crocus, and then catkins. Things are generally insignificant in terms of honey, that comes later in the year from farmers fields and is rape, then field beans, then borage (if it is nearby), then everything else. Some near me get good yields from chestnut trees and lime trees (aka Lindens not the ones with green fruit). Some do well from blackberry. Some take the bees a hundred and something miles north in August to the heather.

Ah well there are pro's and cons to the weather. While its not to bad for people, bees in a few ways it is not great for.

1. Because it has been so warm the bees have not balled, they have been up and about and flying, using up stores. As a result - even though I kept a feeder on top (?) I have lost my favourite hive :-(. I was also trying to overwinter a mini-nuc / queen mating hive, with one of her daughters, but that didn't make it because it ran out of food for the same reason.

2. Bugs. With it being a warm wet winter again (last year too) the overwintering wasp queens are not going to be culled by the cold - so we are going to have an even worse year than for wasp predation. This year I lost 4 hives to wasps - even with lots of wasp traps out working successfully.

3. With mild winters the forage gets messed up too - predated by their own bugs/fungi/diseases which are not sufficiently knocked back by the winter.

We need a week of proper cold. We had snow yesterday - it dropped half an inch and was gone by lunchtime.

So we have it better for the bees here. My hive soundings are all ok at present. See on Feb. 9th. Bee Well Ken

## CLASSIFIEDS

**1 For Sale:** Plastic queen excluders \$3.50 each.

*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 Apiarist Association.

Deadline for any submission to this newsletter is the second Saturday preceding the membership meeting to allow for publishing and mailing delays. Regular membership meetings are normally scheduled 7:30 PM on the second Tuesday of every month at the **Elmwood Legion 920 Nairn Avenue** in Winnipeg except the months as 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.

*We are on the web!*  
[www.beekeepingmanitoba.com](http://www.beekeepingmanitoba.com)

**Contact, Lance W. Phone # 712-6783, Email; lancewld@gmail.com**

**2 For Sale:** Nucs with 4 frames full of bees. Lots of brood on 2 of them. All nucs have 2015 raised queens from winter hardy, mite tolerant, own local stock. No foul brood in my apiary. Price TBD. 2) New inner covers 7/8" x 7/8", pine rimmed with 3/8" solid plywood. \$10.75 each

**Contact Ted Scheuneman: 204-338-6066**

**3. For Sale:** NEW Bee Cozies with insulation pad, 4@ \$15 each. NEW Mann Lake 3" Pro Feeders with cap & ladder, 2 cases of 5 feeders -@ \$25 / case. See Mann Lake web site for details on feeders. Much other beekeeping equipment available later -not presently accessible, perhaps at spring or Feb. thaw.

**Contact Charles\_polcyn@gmail.com or Charles 204-284-7064 Wpg. Or farm 204-348-2506.**

**4. Wanted:** Honey contact: John at 204-943-0166 Email:honeyb@mymts.net

**5. For Sale:** Three frame nucs for sale with new Carniolan queen; can deliver to Winnipeg. Price is \$180, deposit required; paul@interlakeforageseeds.com, Interlake Honey Producers Ltd. 204- 372-6920

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**Bee Time by Mark Winston  
Lessons From the Hive, a book review**

One of the nice things about being a beekeeper, is that wintertime allows some “get away” time; some down time. It is, for us, a time for some travel and for reading. On our recent trip to Cuba, Rob and I each had a chance to read Mark Winston’s Bee Time.

For those of you who have not delved into this book, it is well worth the read! Although there are places where it is a bit technical and lots of statistical items, there are also many examples of little tidbits of knowledge that we think we have in our heads, but sometimes forget. Take, for instance, those little things that we sometimes do automatically, but forget are important, like how we stop when we come to the gate of the bee yard to listen and watch, to get the feel for the way things are playing out at that moment in that yard, or how we always work our bees with some smoke.

While Mark has moved on from researching bees, to being the Academic Director of the Centre for Dialogue at Simon Fraser University and Professor in the Department of Biological Sciences, he has taken many things he learned from working with bees into his present work. One of those items worked into a chapter on Urban Beekeeping, which made me sit up and take notice. Given our present dialogue with the City of Winnipeg, there are several things in the book we could note, to inform that dialogue. From this topic to Colony Collapse Disorder, to honey, healing and wisdom of the hive, it’s a fascinating journey, one that will slow you down and make you take notice. I am sure that this book will inform the ways in which I approach my beekeeping.

Several of the Executive have been passing around our copies of this fascinating book. If you are willing to line up for a turn to read it, OK, but you may well wish to purchase a copy for yourself at McNally Robinson Booksellers.

Submitted by Marg Smith

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**Comments from Ron Rudiak**

Hello Everyone:

The issue of conditional registration for neonics is still outstanding 10 years since it was introduced for general use on crops here in Canada. The company is supposed to follow up with complete testing information to finalize the registration. For whatever reason the full registration for neonics did not take place in either the US or Canada.

This stuff is nasty for pollinating insects. I have observed dead and dying bees on the ground on several occasions when our colonies got into canola. A beekeeper can tell when his bees are working canola because light yellow pollen

is visible on their heads. Many of our bees became unable to fly on their way back from the field and didn't even make it back to the front of the hive to die there.

<http://www.theglobeandmail.com/news/politics/no-more-conditional-registration-of-pesticides-health-minister/article28272708/>

All the best, Ron Rudiak

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**How a Bee Sting Saved My Life: Testimony From a Lyme Disease Patient**

Wednesday, 18 November 2015 By *Christie Wilcox, Mosaic* | Report

"I moved to California to die."

This is taken from the article by C. Wilcox.

The more we learn about the venoms that cause such awful damage, the more we realise, medically speaking, how useful they can be. Like the melittin in bee venom.

Melittin does not only cause pain. In the right doses, it punches holes in cells' protective membranes, causing the cells to explode. At low doses, melittin associates with the membranes, activating lipid-cutting enzymes that mimic the inflammation caused by heat. But at higher concentrations, and under the right conditions, melittin molecules group together into rings creating large pores in membranes, weakening a cell's protective barrier and causing the entire cell to swell and pop like a balloon.

Because of this, melittin is a potent antimicrobial, fighting off a variety of bacteria and fungi with ease. And scientists are hoping to capitalise on this action to fight diseases like HIV, cancer, arthritis and multiple sclerosis.

For example, researchers at the Washington University School of Medicine in St Louis, Missouri, have found that melittin can tear open HIV's protective cell membrane without harming human cells. This envelope-busting method also stops the virus from having a chance to evolve resistance. "We are attacking an inherent physical property of HIV," Joshua L Hood, the lead author of the study, said in a press statement. "Theoretically, there isn't any way for the virus to adapt to that. The virus has to have a protective coat." Initially envisioned as a prophylactic vaginal gel, the hope is that melittin-loaded nanoparticles could someday be injected into the bloodstream, clearing the infection.

Dr. Christie Wilcox is a freelance science writer

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## Scientists to Breed Genetically Modified Bees: Here's Why

By Katrina Pascual, Tech Times | November 6, 6:07 AM

Canadian scientists are set to breed honeybees to make them resistant to disease and harsh winter conditions with a \$7.3 million budget. The move is poised to bring economic benefits to the country, particularly to food security.

Currently developed genomic tools at the University of British Columbia will enable breeding of made-for-Canada-honeybee that can resist pests and disease - something that will greatly accelerate selective breeding and slash years or decades off the process.

Canadian honeybee colonies and others around the world are facing massive die-offs in recent times, partly due to the proliferation of varroa mites and the diseases they transmit.

Around one in four honeybees also yield to the Canadian cold, pushing beekeepers to import from the United States. This increases the likelihood of bringing in diseases as well as Africanized "killer" bees.

"It is very clear that we have to develop innovative solutions for bee health because bee declines will have serious consequences for Canada's economy and food security, warned research lead Amro Zayed of York University.

The UBC team will analyze the genetic makeup of 1,000 bee colonies and will look for and breed 12 traits to help honeybees survive in the Canadian environment - and therefore be beneficial to the economy. In addition, it will also create a test to identify those with Africanized genes since bee importation isn't always preventable.

"We want to develop a molecular diagnostic for the signatures of different traits such as disease resistance and honey production so beekeepers can use that to guide their selective breeding programs," explained molecular biologist and co-study lead Leonard Foster.

The research is believed to provide economic gains of \$8 to \$15 million annually, particularly to beekeepers and the food and agricultural industries.

Of the over 700 native Canadian species, bees are the most common pollinator, helping create a diverse plant population. Beekeepers produce retail items such as honey and beeswax, as well as provide honeybees to farmers to ensure enough crop pollination.

In Ontario, for instance, 100,000 honeybee colonies are operated, generating about \$897 million of the almost \$7 billion agricultural crop sales of the province every year - around 13 percent of total annual crop value.

According to Genome British Columbia, which partly funds the genomic project, the research will make a difference to British Columbia's agricultural community.

"Moving this research from laboratory to hive, with the help of Canada's bee breeders, is a key goal. Within a year of completion we hope healthier bees will be leading honey bee colonies," said Genome BC president and CEO Alan Winter.

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## Lead Residues in Honey

Some years ago, around 2007, there was an effort to set a 'Maximum Residue Level' (MRL) for lead in honey, spearheaded by our Manitoba Honey Co-operative and the Canadian Food Inspection Agency (CFIA), a Federal Government body. As well as trying to maintain Canada's reputation for the highest quality of honey, this was also to be in line with food safety considerations. It could additionally be a means to prevent imports of cheap poor quality honey that is frequently blended with Canadian honey by low cost packers.

The standard level for any contaminants found in any agricultural product that are not approved for use in that industry is 10 parts per billion (ppb). Samples of honey from different areas were tested that showed widely different lead levels varying from 160 parts per billion (ppb) to undetectable levels. Initially these high figures were attributed to old galvanized extractors and honey tanks that were all soldered together. Similarly some old queen excluders were soldered as well as some early stainless steel equipment: it is now all welded. All this old equipment was demonized and got rid of - at least with the commercial beekeepers - but lead levels remained mysteriously high. In fact some honey that came from galvanized equipment had negligible lead levels whereas some honey from all-stainless equipment had high lead levels.

Back in the 1950s an American scientist examining ice cores in Greenland discovered a sudden increase in lead in the environment that correlated with the increase in automobiles and leaded gasoline. It was through this scientist's work that lead in gasoline was eventually banned. In the meantime it had been shown that levels of lead in blood at 100 ppb reduced IQ levels as much as 4%. Lead is a neurotoxin. Although leaded gasoline was generally banned around the year 2000 in the developed world, it has left high concentrations of lead in the soil adjacent to roads that were constructed prior to its phase out.

Returning to the here and now, a local beekeeper is also a pilot, flying crop-spraying aircraft and he was aware that piston engine aircraft, even today, still use leaded fuel. This fuel is called 100 low-lead, though it actually has 13 times more lead than previous leaded gasoline! These crop-spraying aircraft, frequently with big radial engines, fly very close to the ground and no doubt the exhaust from the engine mixes with the spray and is deposited on the crop. As crop-spraying aircraft get bigger they are switching to turbo-prop engines that run on a fuel similar to kerosene that is lead-free, so we currently have both types of plane busy spraying. Following a hunch, this beekeeper collected honey from fields that were sprayed with leaded gasoline powered engines and fields sprayed by turbo-prop engines.

Unfortunately the jury is still out on the source of the lead in honey. Results from the beekeeper's samples showed a small difference with the turbo-prop field having lower levels, but not enough to account for the huge differences found in honey samples elsewhere. Currently **(continued on pg 9)**

**(from pg 8)** there is no MRL for lead in honey and it is considered that it is probably varying levels of lead in the soil across the country that accounts for the wide differences in honey.

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### One of the world's top bee scientists Jonathan Lundgren has been suspended for publishing research on bee-killing pesticides.

Jonathan Lundgren was an award-winning scientist for 11 years with the U.S. Department of Agriculture. But once he started publishing data linking pesticides to bee and butterfly die-offs, he was ordered to stop talking. **When he refused, he was suspended.**

Now Jonathan is fighting back. He's filed a whistleblower complaint to make sure that corporations can't get away with gagging science.

#### Sources

Suspended USDA researcher alleges agency tried to block his research into harmful effects of pesticides on bees, butterflies, *The Washington Post*, October 28, 2015  
UK government gags advisers in bees and pesticides row, *The Guardian*, July 17, 2015  
Is the USDA Silencing Scientists?, *The Atlantic*, November 3, 2015

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### Beer Could Save the Disappearing Population Of Bees

By Alyssa Navarro, Tech Times | October 27, 2015

A key ingredient found in beer can save the declining population of honeybees, scientists say.

Scientists are worried that with the loss of bees, the planet will lose the most able pollinating insects as well. Bees are vital in food production and maintenance of crops. When bees die off, commercial bees that remain are forced to travel farther and risk exposure to harmful pesticides, chemicals, and other irritants, scientists say. One of the solutions that scientists developed is the use of hop (*Humulus lupulus* L.) beta acids (HBA) on honeycombs.

In a study published in the journal *Springer Open Choice* in 2012, researchers tested droplets of HBA on a honeycomb with honeybees and varroa destructors. They found that honeybees were strong enough to survive, while the parasites experienced 100 percent mortality. The U.S. Environmental Protection Agency has also approved the use of HBA around honeycombs.

Another team of researchers from the University of Southampton and University of Reading recently found that the death of honeybees is also caused by diesel fumes.

According to the research published in *the Journal of Chemical Ecology*, the process is a domino effect: diesel fumes contain nitrous oxide that can chemically alter flowers' common compounds.

Honeybees use their sense of smell to find flowers they can pollinate, and because some of the flowers' scent has been chemically altered, honeybees have a hard time finding these flowers. In the end, the honeybees starve.

The study said that emissions of diesel fumes are only part of the bigger picture. Other factors that cause the death of bees are habitat loss, diseases, insecticides, environmental pollution and poor nutrition.

"Whilst it is unlikely that these emissions by themselves could be affecting bee populations, [when] combined with the other stresses, it could be the tipping point," said Guy Poppy, co-author of the study.

Researchers hope that with the assurance that HBA can be effective in repelling varroa destructors, more beehives can be saved.

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### Blowing in the wind: How hidden flower features are crucial for bees

May 29, 2012 **Source:** University of Cambridge

#### Summary:

As gardeners get busy filling tubs and borders with colourful bedding plants, scientists have discovered more about what makes flowers attractive to bees rather than humans. New research reveals that Velcro-like cells on plant petals play a crucial role in helping bees grip flowers – especially when the wind gets up.

As gardeners get busy filling tubs and borders with colourful bedding plants, scientists at the Universities of Cambridge and Bristol have discovered more about what makes flowers attractive to bees rather than humans. Published recently in the British Ecological Society's journal *Functional Ecology*, their research reveals that Velcro-like cells on plant petals play a crucial role in helping bees grip flowers -- especially when the wind gets up.

The study focuses on special cells found on the surface of petals, whose stunning structure is best seen under an electron microscope. According to lead author, Dr Beverley Glover: "Many of our common garden flowers have beautiful conical cells if you look closely -- roses have rounded conical petal cells while petunias have really long cells, giving petunia flowers an almost velvety appearance, particularly visible in the dark-coloured varieties."

Glover's group previously discovered that when offered snapdragons with conical cells and a mutant variety without these cells, bees prefer the former because the conical cells help them grip the flower. "It's a bit like Velcro, with the bee claws locking into the gaps between the cells," she explains.

Compared with many garden flowers, however, snapdragons have very complicated flowers; bees have to land on a vertical face and pull open a

heavy lip to reach the nectar so Glover was not surprised that grip helps. But she wanted to discover how conical cells help bees visiting much simpler flowers.

"Many of our garden flowers like petunias, roses and poppies are very simple saucers with nectar in the bottom, so we wanted to find out why having conical cells to provide grip would be useful for bees landing on these flowers. We hypothesized that maybe the grip helped when the flowers blow in the wind."

Using two types of petunia, one with conical cells and a mutant line with flat cells, Glover let a group of bumblebees that had never seen petunias before forage in a large box containing both types of flower, and discovered they too preferred the conical-celled flowers.

They then devised a way of mimicking the way flowers move in the wind. "We used a lab shaking platform that we normally use to mix liquids, and put the flowers on that. As we increased the speed of shaking, mimicking increased wind speed, the bees increased their preference for the conical-celled flowers," she says.

The results, Glover says, give ecologists a deeper insight into the extraordinarily subtle interaction between plant and pollinator. "Nobody knew what these cells were for, and now we have a good answer that works for pretty much all flowers," she concludes. "It's too easy to look at flowers from a human perspective, but when you put yourself into the bee's shoes you find hidden features of flowers can be crucial to foraging success."

**Journal Reference:**

- 1. Katrina Alcorn, Heather Whitney, Beverley Glover. **Flower movement increases pollinator preference for flowers with better grip.** *Functional Ecology*, 2012

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