CANADIAN ASSOCIATION OF PROFESSIONAL APICULTURISTS

L'ASSOCIATION CANADIENNE DES PROFESSIONELS DE L'APICULTURE

Proceedings 2018/19

Lamplighter Inn, London, Ontario
November 15 & 16, 2018

CONTENTS

AGENDA

Canadian Association of Professional Apiculturists
2018/19 Business Meeting

Lamplighter Inn & Conference Centre, London, ON
'Chelsea 1' Room, November 15-16th, 2018

$90 Registration Fee for CAPA Members includes breakfast & lunch (November 15th) and breakfast (November 16th)

Thursday November 15th (7:00 A.M. – 5:15 P.M.) – *Breakfast, coffee break and lunch provided*

Welcome and Introductions	- Shelley Hoover
Agenda	- Shelley Hoover
President's Report	- Shelley Hoover
CHC Report	- Scott Plante
Minutes of 2017/18 AGM, Kelowna Meeting	- Renata Borba
Financial Report for 2018	- Martine Bernier
Apimondia	- Pierre Giovenazzo
National Statistical Trends in Honey	- Stephen Page (AAFC)
USA Update	- Samantha Brunner
AAPA Update (*remote participation*)	- Michael Simone-Finstrom
NBDC National Survey	- Patricia Wolf-Veiga
Provincial Reports	- Provincial Apiarists
New Disease Publication Report	- Steve Pernal
National Survey Report	- Julie Ferland
Importation Report	- Geoff Wilson
Chemical Report	- Jason Sproule
Awards Report	- Rhéal Lafrenière
CBRF Report	- Leonard Foster
Non-Apis Report	- Paul van Westendorp
Publication Sales Report	- Janet Tam
Research Report	- Leonard Foster
Communication Report	- Melanie Kempers
Africanized Bee Report	- Amro Zayed
Archives Report	- Rob Currie
Tech Transfer Team Report	- Nicolas Tremblay
New Business:	- Shelley Hoover

- Membership eligibility: veterinarians, other membership application
- Insects journal affiliation agreement

Friday November 16th (7:00 A.M. – 8:15 A.M.) - *Breakfast provided*

Proposed Budget 2019	- Budget Committee
Committee Selection	- Shelley Hoover

Canadian Association of Professional Apiculturists
2018/19 Business Meeting
Lamplighter Inn & Conference Centre, London, ON
November 15 & 16, 2018

MINUTES

Members Present
Georges Martin, Clement Kent, Cameron Menzies, Nuria Morfin, Nicolas Tremblay, Rhéal Lafrenière, Stephen Pernal, Patricia Wolf-Veiga, Shelley Hoover, Heather Higo, Rob Currie, Leonard Foster, Stephen Page, Fletcher Colpitts, Paul van Westendorp, Marta Guarna, Pierre Giovenazzo, Renata Borba, Paul Kozak, Jason Sproule, Ernesto Guzman, Julie Ferland, Sawyer Olmstead, Les Eccles, Janet Tam, Ana Montero, Mylee Nordin, Melanie Kempers, Paul Kelly, Alexandra Sebastien.

Guests
Samantha Brunner, Connie Rajzman, Wael Haddad.

Present Via Video Conference
Karen Kennedy, Samantha Muirhead, Geoff Wilson, Michael Simone-Finstrom (guest), Graham Parsons.

Welcome and Introductions
Shelley Hoover

President Shelley Hoover called the meeting to order at 8:05 am. President Shelley Hoover welcomed the membership to the 61st annual meeting and thanked the organisers. A round table of introductions was made for those in attendance.

Approval of Agenda
Shelley Hoover

MOTION:	**Motion to approve the agenda as circulated.**
MOVED BY:	**Heather Higo**
SECONDED BY:	**Paul van Westendorp**
CARRIED	

President's Report 2018
Shelley Hoover

Dr. Shelley Hoover, President, Canadian Association of Professional Apiculturists
Apiculture Unit Lead, Alberta Agriculture and Forestry
Lethbridge, Alberta

I would like to welcome you to the 61st annual general meeting of the Canadian Association of Professional Apiculturists. I want to extend a special thank you to our hosts, the Ontario Beekeepers, to the Canadian Honey Council, and to those CAPA members that helped organise our meeting and the scientific symposia, especially Renata Borba and Leonard Foster. It looks like it will be a very interesting meeting, and I hope you can all take

the time to participate in some of the other events this weekend. I also want to extend a special welcome to our guests, whether they are here in the room with us or joining us remotely.

2018 has been another busy year for CAPA. Although this is my 5th year on the executive, every year has brought with it tremendous opportunity for learning, and this year has been no exception. It has been a difficult and very busy year of change for me both personally and at professionally. Luckily for me, membership in CAPA brings with it great people to work with, people who are always willing to step up and help out, and who generously offer their time, their experience, and their wisdom without hesitation. Foremost among these are the past presidents of CAPA, especially Rhéal, Medhat, and Steve. I want to thank the rest of the executive, Past President Medhat Nasr, who has brought years of experience in apiculture and on the CAPA executive and helped make the transition to the new executive a smooth one, VP Les Eccles, who is always willing to pitch in, Secretary Renata Borba who has kept everything running smoothly and organised this great meeting down to the food we are going to eat, and our treasurer Martine, who has done a terrific job of working to keep our finances in order.

On behalf of the executive and the membership, I would also like to thank the Provincial Apiculturists, the committee chairs, and all the CAPA members who contributed their valuable time to CAPA endeavours, and to answer many requests made by various organizations and stakeholders.

CAPA had a busy 2018. Detailed activities are covered in the annual reports by committee chairs and provincial apiculturists. To briefly summarise them:

1. Julie Ferland and the members of the winterloss committee once again did an excellent job writing a report for the annual survey of honey bee mortality in Canada. This report is highly anticipated by the industry and media, so I thank all those involved in getting it produced in a timely manner. And I am happy that Julie was able to join us in person this year.
2. The tech transfer committee is relatively new to CAPA, but I would encourage you all to read their report. They have been very active and conducted a large number of projects. They are a strong link to producers, and I commend their efforts. The report they produced last year outlining the teams across the country has been shared with industry, and I know a number of other provinces are considering ways in which they can start their own technology transfer teams.
3. The research report outlines the huge amount of research in apiculture being conducted by our members in bee breeding, queen production and care, pollination, small hive beetles, nutrition and habitat, and disease and parasite control. There are a number of large collaborative efforts among our members right now, and I want to commend them for that, it speaks very well of our research members that they can unite their efforts to benefit the beekeepers in this way.
4. The IPM committee chaired by Jason Sproule and the provincial apiculturists have been busy working with Health Canada to implement the new regulations for Antimicrobial use in the beekeeping industry. Antibiotics will not be available over-the counter and beekeepers must have a prescription for antibiotics to use in their operations starting next month. The exact processes to get prescriptions will vary among the provinces, generally a Veterinary Client Patient Relationship is required, and there is already work being done to familiarise veterinarians with bee diseases. I encourage you to read the IMP report to update yourself on the status of Bayvarol, Hopguard II, and fumigillin-B. This year they have included an excellent resource in the form of a table of apiculture products registered with the PMRA, including the registrants and the expiration dates.
5. The Importation and Bee Movement Committee chaired by Geoff Wilson continued to monitor for changes to international requirements for import of honey bees, and to facilitate interprovincial movement while maintaining bee health.
6. Pierre Giovenazzo is the President of Apimondia 2019 on behalf of the CHC, as well as the chair of CAPA's Apimondia committee, and Steve Pernal is the chair of the scientific program. There has been a lot of activity with regards to this, and it will only get busier. I know we are all looking forward to hearing more about Apimondia, and looking forward to the events in Montréal as well.

A couple of congratulations are due to the executive as well, Martine has a new baby daughter, and as I am sure many of you know, Medhat will be retiring as the Provincial Apiculturist of Alberta in the New Year. I want to take this opportunity to congratulate them, and wish them the very best life has to offer. Medhat has had a tremendous impact on apiculture in our country, and will leave big shoes to fill in Alberta. Finding someone who can fill those shoes will not be an easy task for us. Again, congratulations Medhat.

As the president of CAPA, I am very proud to represent our members who have been working on behalf of this organization to serve our stakeholders. Thank you, to all the members for your effort on behalf of Canadian beekeepers, and for your support and advice through the first year of our new executive. Thank you for the good work that you do, and for being such great people to work with.

Shelley Hoover
CAPA President

MOTION: **Motion to accept the President's Report as presented.**
MOVED BY: **Les Eccles**
SECONDED BY: **Paul van Westendorp**
CARRIED

CHC Report
Scott Plante, CHC Chair

I have been beekeeping a long time. I was part of CAPA in 2001 and I had a good time here and learned a lot of things. As a chair of CHC, I wanted to make a change of how things were done before. I am looking at the spring hive loss and our numbers have been increasing for the last 2 years because of poor queens, weather and starvation. Queens are brought in mostly from the USA, and lots of packages come from NZ. All that sum up to about 11 million dollars that Canadian beekeepers are sending abroad. Not to talk about pests and pathogens that we bring with the importation of bees and queens, as well as Africanized genetics. CHC is meeting to come up with a 5-year plan for beekeeping. One thing that came up is that we need a national database. This database is going to be like a google map with dots marking yards were hives are located. Each dot will show the beekeeper's information for that yard, as well as additional information such as: "Does he sell queens?", "Does he sell packages?". I ran into a problem one year that I needed to purchase queens but couldn't find a local breeder. I finally found a breeder from BC, but the breeder wasn't sure about shipping queens from BC to QC. The question here is, can't we provide service around the country? We need to work on shipping service to provide from east to west. We also must be able to winter queens successfully, and start our operation early in the year. We have become so efficient at wintering bees inside. We need to move forward on this wintering issue with research. In regards to honey exportation, 82% of Canadian honey is exported to the US, and 15% to Japan. We would like to see a 50-50 split in the next few years, 50% to the US and 50% to the rest of the world. This year we teamed up with maple syrup growers, to lobby for labelling requirements in high sugar commodities. We don't have to put "high in sugar" in our honey labels. In regards to labour, there will be new biometrics requirement coming in January. Applications need to be in as soon as possible because this new requirement will delay the process.

Finally, CAPA and CHC need to work together. I would appreciate if next time more PAs would show up to the CAPA/CHC meeting. I invite you all to Apimondia 2019.

Discussion ensued about the CHC/CAPA meeting that preceded the AGM. Members suggested that the meeting should be organized in advance to allow enough time for travel planning (*e.g.,* travel authorization).

There was some discussion on the timing issue to purchase local queens. Prairie beekeepers for example want queens in April and BC stocks are not ready until June. Beekeepers need to plan ahead for their needs for the next year and many times they are not sure if they can get enough queens domestically, and when.

Members also asked about CHC's goal towards small scale beekeepers. Scott Plante: CHC is going through a 5-year plan that include working with small-scale beekeepers. In AB for example, small scale beekeepers have a group of about 1000 beekeepers. These groups want to save their bees. But if you don't treat your bees there will be lots of pests spread. Our plan is to include these groups in our discussions. These small-scale beekeepers are very qualified professionals. We have formally asked PAs to have a more harmonized approach towards these beekeepers, for them to feel the facts about keeping bees. There is a serious problem with re-infestation of *Varroa* from beekeepers nearby that do not treat. We must have a community that understand the danger of not treating. This is our main concern.

Provincial apiculturists expressed that they have been working with small scale beekeepers for many years. Many cities accept beekeepers in the city. People have a couple of hives in their backyard and this increases diseases and swarms in the city. BC offers free course to everybody to inform them about beekeeping. But the majority of the attendees are from out of province, not the ones in the city.

President Hoover thanked Scott Plante for his presentation.

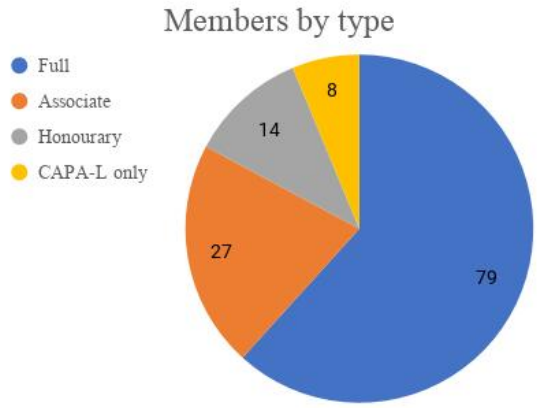
Minutes of 2017 Meeting
Renata Borba

Secretary Renata Borba indicated that the Minutes of the 2017/18 AGM (Kelowna-BC) were previously circulated on CAPA-L. Final Proceedings have been posted on the CAPA website.

MOTION:	**Motion to accept the Minutes of the 2017/18 AGM as circulated.**
MOVED BY:	**Marta Guarna**
SECONDED BY:	**Paul van Westendorp**
CARRIED	

Financial Report for 2017
Martine Bernier via videoconference

We have updated our membership list. I made a graph of the type of members that we have.



GIC Term Deposit Balance	1-Jan-18		$ 20,729.80
Account Balance	1-Jan-18		$ 18,232.97
Paypal Balance	1-Jan-18		$ 15,318.51
		Account opening balance	$ 54,281.28

REVENUE			**Planned for 2018**	**As of October 29th, 2018**	**Projected as of Dec 31st 2018**
Membership					
	12	2019 Full	$ 2,000.00	$ 480.00	
* if 50 full members pay. We need to continue to clean up the membership list					$ 1,520.00
	2	2019 Associate	$ 100.00	$ 40.00	
* if 20 associate members pay. We need to continue to clean up the membership list					$ 360.00
We collected some of the 2017/2018 that did not pay their membership:					
	18	2018 Full		$ 720.00	$ 720.00
	5	2018 Associate		$ 100.00	$ 100.00
	5	2017 Full		$ 200.00	$ 200.00
	3	2017 Associate		$ 60.00	$ 60.00
Meetings					
	11	2018 London Registrations		$ 990.00	$ 990.00
				$ -	$ -
2018 ENG Publication Sales			$ 22,500.00	$ 12,198.36	$ 13,058.36
* 36,11$ not recovered					
2018 FR Publication Sales				$ 922.17	$ 922.17
Shipping/handling on publications				$ 1,720.84	$ 1,847.72
GST/HST collected				$ 612.99	$ 668.55
* on publications and meeting registration					
GIC Term interests			$ 25.00	$ 3.81	$ 3.81
2015 HST Rebate				$ 163.29	$ 163.29
2016 HST Rebate				$ 499.55	$ 499.55
			$ 24,625.00	**$ 18,711.01**	**$ 21,113.45**
Expenditures					
Publications					
		S/H charges (all editions)	($ 7,000.00)	($ 1,831.60)	($ 2,000.00)

	Reprinting English Edition (5 000)	($ 20,000.00)	$ -	($ 14,000.00)
	Shipping honorarium (Janet Tam)	($ 150.00)	($ 105.95)	($ 105.95)
Meetings	2017 AGM Kelowna		($ 199.00)	($ 199.00)
	2018 AGM London		$ -	($ 2,900.00)
	2018 AGM London Remote access		$ -	($ 150.00)
	Travel of Executive to meetings	($ 2,000.00)	$ -	($ 2,000.00)
IBRA Donation		($ 500.00)	$ -	$ -
CBRF Donation			$ -	$ -
Student Merit Award			$ -	($ 2,100.00)
Student Presentation Award			$ -	$ -
CAPA Website Hosting		($ 420.00)	$ -	($ 600.00)
2017 HST Payment		($ 700.00)	($ 271.99)	($ 271.99)
2018 HST Payment				
GST/HST paid			($ 102.25)	($ 102.25)
Misc. (cards, shipping, postage, gift card etc)		($ 55.00)	($ 18.89)	($ 18.89)
Banking Fees (includes PayPal)		($ 200.00)	($ 177.58)	($ 180.00)
Consult with Accountant, advice, consult, no formal audit (~40hrs X $100/hr?)	* Will not be used in 2018, but will be in 2019	($ 4,000.00)	$ -	$ -
Holding for Apimondia or give CHC		($ 20,000.00)	$ -	$ -
	Expenditures	**($ 55,025.00)**	**($ 2,707.26)**	**($ 24,628.08)**
			Oct 29-Dec 31 spending	($ 21,920.82)
	Revenue-expenditures	($ 30,400.00)	$ 16,003.75	($ 3,514.63)
	GIC Term Deposit (1 year cashable at 0.40%; Matures 25 May 2		**$ 10,496.41**	**$ 10,496.41**
	GIC Term Deposit (30 days renewable at 0.05%; Matures 25 No		**$ 10,237.20**	**$ 10,237.20**
	PayPal (October 29th, 2018)		**$ 2,272.20**	**$ -**
	Cash in account as of October 29th, 2018		**$ 47,279.22**	**$ 27,630.60**
		Total Cash / Investments	$ 70,285.03	$ 48,364.21
			Oct 28 2018 actuals	Dec 31 2018 estimate

Discussion:

It was proposed that CAPA could fund professional development workshops across Canada for PAs to learn about new bee diseases, pests and techniques. This workshop could be offered a day or two before the annual CAPA meetings.

Action item:	**Budget Committee to consist of Rhéal Lafrenière, Renata Borba, Rob Curie, Martine Bernier.**
MOTION:	**Motion to accept the financial report as modified during the discussion**
MOVED BY:	**Rob Curie**
SECONDED BY:	**Heather Higo**
CARRIED	

Apimondia 2019 Update

Pierre Giovenazzo and Stephen Pernal

Pierre Giovenazzo - I will present you a short summary of Apimondia. I will also talk about how we propose to spend the money donated from CAPA for Apimondia. Steve Pernal, as the coordinator of the science program, will also talk about the research committee for Apimondia. The main change from other Apimondia meetings is that we are in complete control of the meeting now. We went through 3 PCOs and we choose one from Italy. Montreal is a great city. It has a beautiful congress centre right in the heart of the city, with about 14000 hotel rooms at walking distance. The perfect place for the meeting.

Apimondia has 7 commissions, each one regarding a part of beekeeping and pollination (*i.e.,* economy, biology, bee health, pollination, technology, apitherapy, development, and cross-cutting). Our expo room is mostly filled. If you have a company in your provinces that wish to be there, there is still time but space is limited. You can also register online already. There are lots of hotels to choose from. We will be offering tours. For more information, we have an active website and a Facebook page. Shelley Hoover, Steve Pernal, Paul van Westendorp, and myself form the current Apimondia committee. CAPA has committed to offer 20K for Apimondia. We could use this money to contribute to: 1) youth workshop; 2) CHC booth (CAPA has space for Honey Bee Disease book sales and CAPA promotion); 3) Symposium key note speakers; 3) CAPA travel Grants to young researchers; 4) Officially sponsoring the Canada social event “Cocktail”; 5) Best student Poster Award; 6) Best Student Presentation Award. What we want today is to propose that this contribution be rolled over to 2019. Also, that the committee has the authority to decide what we will do with the money. Now Steve Pernal will talk about the science program.

Stephen Pernal - I am not going to go through the whole program. Apimondia have an international oversight body so there is a number of people that we have to work with to put this together. We will have a lead speaker on the first day of the conference. During the rest of the congress we will have symposiums with a specific theme. We will have some invited guests in each symposium but the rest will be chosen from submitted papers. One slight difference in our Apimondia program is that we will be offering several workshops led by international experts in the each area. Some will be open to the public and some will require registration. Registration for paper submission is already open.

Discussion:

Do you have prepared material to send to beekeepers’ association to promote Apimondia? Each provincial CHC representative has the mandate to do that.

The members suggested that the committee should propose priorities to spend the money and get the membership to approve it. After the priorities are approved, the committee would have the authority to decide on how to spend the money. CAPA is sitting on a large sum of money and we could donate more than 20K.

Pierre proposed that we approve at least 3 priorities today:
1) Youth workshop
2) CAPA travel Grants to young researchers
3) CHC booth

MOTION:	**Motion to accept the three priorities to spend the money donated by CAPA as presented.**
MOVED BY:	**Jason Sproule**
SECONDED BY:	**Rob Currie**
CARRIED	

President Hoover thanked *Pierre Giovenazzo and Stephen Pernal* for their update.

Power Point presentation located in Appendix 1

AAFC National Statistical Trends in Honey, Beekeeping and Pollination
Stephen Page

Stephen Page showed an estimate of the honey price per province as collected from PAs, and discussed activities of the Bee Health round table.

We have a new record honey production. We had more colonies in 2017 compared to other past years. The average yields (production per colony) have stayed decently high. The colonies per beekeeper went down, but likely due to new small scale beekeepers. The average honey price per pound has increased but not quite at the levels we have seen in the past. The bulk of our exports go the USA.
Total honey bee packages and queens import is considerably high, which shows how dependent we are from other countries. The majority of queens come from the US, followed by NZ, Australia and Chile. We don't have data for prices for queens and 'nucs' in Canada. We need more information on hive movements and price for pollination.

Discussion ensued on how to get information regarding honey production, types of honey (floral source) and prices for each province. There is a group of beekeepers and researchers in BC that will be starting to use MNR to check for honey floral source.

President Hoover thanked Stephen Page for his presentation.

Power Point presentation located in Appendix 2

USA Apiculture Report (AIA)
Samantha Brunner, AIA President

I am the current AIA president and the inspector for North Dakota (ND). Bee Informed Partnership (BIP) have been trying to collect data on winter survival and management techniques. You can get this data online on their website. Losses this year were higher than last year. There were more small beekeepers reporting this

year than commercial beekeepers, which could have skewed the data. *Varroa* levels were high, as usual. Several backyard beekeepers are not treating for mites, according to our data. Viral levels have remained similar to last year.

In ND, we have about 674,000 colonies, it is very crowded. This is an increase of 9% from last year. Hive registration in ND is mandatory and keeps them from been too close to each other as well as protecting them from pesticide applications. Pesticide applicators need to contact beekeepers within 2 miles radius before pesticide application. Sites/yards are renewed every year. Beekeepers are fined if they do not register. When a beekeeper register, the location of the bee yard is recorded on the map. Each dot on the map has the beekeeper information for that particular site/yard. We also do regular health inspections and generate certificates for bee movement to states that require one. We have been working together with California (CA) on border inspection of trucks transporting bees. We worked out a program with CA where they send inspectors to ND to get colonies inspected in ND, which speeds up the inspection process at the border considerably.

The AIA are meeting with the ABRC, it will happen in January 9-12. I would like to invite CAPA members to attend our meeting.

Discussion ensued about colony registration and pathogen inspection in ND and the details of it. As well as a plan to make CAPA - AIA relationship more official.

President Hoover thanked Samantha Brunner for her report.

Power Point presentation located in Appendix 3

AAPA Update Report

Michael Simone – Finstrom, AAPA President, via videoconference

Michael Simone-Finstrom discussed with us about collaborations and cooperation between CAPA and AAPA.

Currently the AAPA has 130 active members. We also have the same problems with collecting membership dues as CAPA, so we went from about 210 to 130 members this year after updating our membership list. I am currently the president and Judy Wu-Smart is the vice-president. We try to have a mix of people in the executive office, from different research areas and institutions. We have an annual conference, and we alternate between the ABF and the AHPA. This year we will be joining also with the AIA. We are trying to make effort to have a strong connection with all these organizations because the goal of meeting together is that these communities have a sense of the research going on and us, researches, to be aware of the current/emerging beekeeping issues. During our annual meeting, beekeepers registered in the organization meeting can attend our research meeting, and vice-versa. The number of talks have be growing, instead of 1 and a half day we now meet for 2 full days. The submitted papers are published either in bee world or ABJ. We might be moving forward and publishing these in Insects instead. This is an open access journal, which beekeepers can have access to.

Most of our money go to awards, students and post-doc travel award. The post-doc award is new to our organization. We haven't had lots of post-doc award applications so we may not continue it. We also have an annual research award to a PhD graduate student, and an extension award. We have a list-serv as well, and it is the best way to connect to researchers and all members.

We have been discussing about how we can better advertise our organization. If you are not in a traditional honey bee lab, the students don't hear about our organization. What we want to do moving forward is to have a special issue in a journal for honey bee research. We have become affiliated with Insects. We will be publishing our first special issue in December 2018 with about 15 papers. They are focused on quantity and we

have pushed on having more quality than quantity published. We will continue to discuss this affiliation with our members, whether this is the best venue or not. We would like to have a bi-annual special issue, and CAPA could be involved on this as well.

The joint conference that we had in 2016 was really successful and it would be good to continue that and have a joint meeting with CAPA maybe every 3 years.

Proposed links for AAPA and CAPA:

- Having a joint special journal issue with CAPA would highlight the North American bee research
- Create an opportunity for a student from CAPA to come to our meeting and vice-versa.

Discussion ensued about a joint meeting. It could be difficult for members and PAs to attend a meeting in the US. An alternative would be to have a joint research meeting but have our AGM separately. Steve Pernal will attend the AAPA meeting in January and will bring our comments and suggestion to their AGM.

President Hoover thanked Michael Simone-Finstrom for his presentation.

Power Point presentation located in Appendix 4

National Survey Update
Patricia Wolf-Veiga, NBDC acting-manager

Before I start talking about the national survey I would like to show you our new lab. We have expanded our lab. We will be sharing space with the AAFC apiculture lab. We have more equipment now, which will increase our data processing turn around.

The national survey started in 2014 with Growing Forward 2 funding. Last year we added pesticide test to this survey. Our target is to sample .5% of all registered colonies in each province. We sample 10 colonies from each yard, we do visual field inspections (pests, disease signs). In the lab we test for common viruses as well as *Nosema* and *Varroa*. Last year we sampled from 9 provinces and 1 territory. We had great help from the BC inspectors as well as the Maritimes TTT. We also hired technicians to collect when there was no help from the province. We checked for the presence of *Tropilaelaps* and we did not detect any. As well as other exotic threats, such as SBPV (slow bee paralysis virus). We tested for Africanized origin. We worked together with Amro Zayed's lab. All samples were below the 25% threshold considered to be Africanized. Chemical residue was tested from bee bread and the pesticide levels were somewhat low. We checked for the presence of neonicotinoids only. We also tested for antibiotic resistance for AFB treatment using OTC. All PAs have received a copy of the report for their province and beekeepers have also received a copy for their operation. We are planning another national survey for next year. We have proposed this to CHC and to the PAs. It will be a 4 year project similar to what we have done in the past, but maybe with some small changes. For example, we are proposing to include some emerging pathogens, DWV- B and *Lotmaria passim*. We would like to collect samples 4 times per year.

Patricia showed graphs of the levels of the pathogens tested since 2014: *Nosema*, *Varroa*, AFB, viruses. For the viruses, ABPV was the least prevalent and Lake Sinai was detected in almost every operation. Same viruses seemed to be more prevalent in migratory operations, and *Varroa* levels were more present in stationary compared to migratory.

Discussion ensued on the timing of the sampling and the pesticide testing.

President Hoover thanked Patricia Wolf-Veiga for her update.

Power Point presentation located in Appendix 5

Provincial Reports
Provincial Apiarists

Provincial reports were circulated; main points were highlighted at the meeting.
Full Provincial Apiculturist Reports and summary table in Appendix 6

British Columbia – Paul van Westendorp

- There was an increase in the total number of beekeepers. Mostly small scale beekeepers, with little training or beekeeping education.
- We offer free beekeeping courses.
- We had also an increase in total number of colonies, we have now 52,000. Mostly because beekeepers are now registering their hives. The new antimicrobial/antibiotic law states that beekeepers can't get antibiotic prescription if they are not registered.
- We inspected about 3,500 colonies this year, in addition to about 2,000 colonies that come from out of province.
- About 40,000 colonies come from the prairies every year for pollination.
- No SHB have been detected.
- We have also increased our inspection services. We have a total of 10 apiary inspectors in the province.

Alberta – Samantha Muirhead

- 1,800 beekeepers, which is up from last year, and 312,000 colonies.
- We don't have data on honey production yet.
- We are now on 24% winter colony losses. Higher than average in AB (22%).
- We inspected around 3,572 colonies from 29 beekeepers.
- In AB, commercial beekeepers are those with over 400 colonies, and that is about 95% of the beekeepers in Alberta.
- We focused the SHB inspections in the north of AB in the region where a beekeeper had previously been found to have SHB.
- We had 3 cases of AFB in 3 different operations and corrective actions were taken.

Saskatchewan – Geoff Wilson

- We have about 115,000 producing colonies.
- Honey yield data is not available yet.
- Winter loss was higher than usual, 28%.
- We had a late spring, which contributed to our winter losses.
- A lot of beekeepers replaced colonies with bees from their own operation this year.
- We don't do a lot of random inspections. We do mostly for a specific reason, such as suspicion of a disease. We found 6 beekeepers with AFB this year.
- We have been doing a lot of vet training. The Western College has continued to provide a course to vet students on bees and bee diseases.
- SHB was not found in the province.

Manitoba – Rhéal Lafrenière

- We have seen growth in our beekeeping industry. We had over 114,000 colonies this year.

- I don't have data on honey production because we are still doing survey on that.
- In addition to help training veterinarians we have provided workshops and hands-on training. We are setting up some program dollars to support a vet-beekeeper relationship, where they can get some financial help for vet fees for example.

Ontario – Paul Kozak

- The number of beekeepers were down this year. We are at about 3,000.
- Colonies from 249 beekeepers were inspected for SHB, which is 8.2% of our total beekeepers number.
- We had a lot of rain this year. Production was down by 15% and bee population was low in consequence.
- SHB: every time we find a positive yard, that yard is considered a positive case. Once one colony in a yard is positive, the whole yard is assumed to be positive. We send our samples for molecular testing for SHB.
- We had 36 new positive cases. All in the Niagara county.
- Our current strategy is to mitigate the spread of SHB. No bees or equipment can move to other provinces if they are from a positive yard, as well as limited movement within province. We are not retaining colonies that are positive.
- We have worked together with NB in the field on SHB monitoring.
- We have donated money to TTT and they have put workshops together for pest surveillance and other topics.
- We have a monitoring program in collaboration with the apiary inspectors where we look for viruses, parasites, bacterial diseases, as well as pesticides.
- We also have a *Varroa* monitoring program. We want beekeepers to start reporting their *Varroa* mite. We will also be looking to test *Varroa* resistance to some miticides.
- Antibiotics: We have a working group with people from the industry and academia. We worked together with the veterinarians and offered training.

Quebec – Julie Ferland

- We had an increase in beekeeper number.
- We have about 40-50 commercial operations in QC, and 65,000 hives registered. This is a big increase compared to last years.
- Our winter losses are high, 32%.
- We inspected almost 4000 hives from about 100 beekeepers. Our inspections are mainly based on the request of the beekeeper.
- SHB survey happens in August and beginning of September. Top bar inspections in combinations with sheets and 2nd visual inspection. We did not find any SHB in hives that came from ON.
- We inspect all hives that return to QC from another province.
- Our first case of SHB in QC was in June. We found a SHB in a queen cage.
- We inspect every suspect case of pesticide poising. We only had one problem this year near a cranberry pollination site.

Newfoundland – Karen Kennedy

- We consider a commercial apiary if the beekeeper has more than 20 hives. We have 7 commercial producers in the province with 351 colonies.
- Winter mortality was about 20-25 % this year.
- Weather and starvation were the main reason for colony mortality.
- There has been no antibiotic use for many years.

- Currently the biggest concern is for how to prepare from when *Varroa* arrives. We have offered workshops.
- We see every commercial produce at least twice a year. Beekeepers go through us first before requesting antibiotics from a veterinarian.
- We are creating an AFB protocol

PEI – Cameron Menzies
PEI does not require beekeeper registration, so these are the best numbers I could get.

- We have about 6,300 hives, which is probably lower than last year.
- 4,500 to 5,000 colonies were hired out for blueberry pollination and we imported about 1,800 colonies from ON for blueberry pollination.
- Beekeepers are afraid of SHB. We did inspections for SHB on all hives that were imported into PEI. I also tried to check for colony strength in blueberry pollination.
- We averaged about 33lbs per hive, but this is just an estimate.
- 406 colonies were inspected and 1 was positive for AFB
- We imported queens mainly from Hawaii. Some beekeepers breed their own queen. We would like to offer some support to these beekeepers so they (and others) can produce their own queens.

Discussion ensued on the PEI support to local queen breeder.

New Brunswick – Fletcher Colpitts

- We had an increase of 68 beekeepers compared to last year
- The number of inspections were down because we focused on our veterinarian training program this year.
- Nothing has changed in terms of antimicrobial availability. It just changed how to get the antimicrobials.
- 372 hives were inspected from 9 beekeepers. The inspections were very limited since the veterinarians were with us. It was more like a demo to show them how to work a colony and etc.
- Colonies in NB were labelled/tagged so the owner of the colony can be identified.
- SHB numbers were down this year

Nova Scotia – Jason Sproule

- We inspected 672 colonies this year, from 30 beekeepers. We have 4 new people in the department that are helping with inspections.
- We found 4 cases of AFB this year. We don't find it very often.
- We did a beetle surveillance by the NB borders. We did not find any small hive beetle but other beetles, so the trap seems to work.
- This year we inspected every queen that was imported into NS
- We have a financial program available to beekeepers this year. The Bee biosecurity program is meant to provide funds to beekeepers for management practices, such as replacement of frames, purchase of beetle trap.
- We also put a workshop for veterinarians to work with the bee industry

New Disease Publication Report
Steve Pernal

New Publication Report 2018

Third Edition of CAPA Disease Publication (English and French)

In 2018, sales of the English edition of the CAPA "Honey Bee Diseases and Pests" (3rd edn.) were strong with 1188 copies being sold from January to the end of October 2018. Approximately 60 books remain; the last reprinting was done in December 2015.

A recent estimate of the cost of reprinting 5,000 of the English edition, from Ampersand Printers in Guelph, ON, is $12,189, not including taxes. As this expense was budgeted for current fiscal year, the committee has recently placed a print order. After proofs are received, an estimate of delivery will be obtained, which is anticipated to be by December of 2018.

Last year was the third in which the French edition of the new Disease Publication was available for sale. From January 2018 to the end of October 2018, 67 copies were sold. Approximately 600 copies remain. The committee does not recommend reprinting additional copies for selling at Apimondia.

We currently sell the English and French version for $10, not including shipping.

As per previous direction, the committee is preparing a Spanish translation of the disease publication courtesy of Dr. Ernesto Guzman. Ernesto reports he is progressing through the translation and will be able to complete the translation by the end of February 2019. The committee estimates another $10,000 be allocated for typesetting and printing 1,000 copies of the Spanish version in time for Apimondia 2019.

The committee may consider submitting the disease publication as an entry in Apimondia 2019's contest for beekeeping book awards.

Janet Tam has agreed to continue distributing the English version and Pierre Giovenazzo will continue to do so for the French version. Distribution of the Spanish version will need to be discussed.

S. Pernal, Co-Editor.
Editorial Committee: Rob Currie, Ernesto Guzman, Nicolas Tremblay

MOTION: Motion to accept the New Disease Publication Report as submitted.
MOVED BY: Heather Higo
SECONDED BY: Leonard Foster
CARRIED

Committee Reports

National Survey Report
Julie Ferland

Discussion ensued about providing data to the national survey after the provincial report is handed in. The CAPA website could have a link to each provincial report.

2018 - CAPA Winter loss Survey Report

In 2018, the Canadian Association of Professional Apiculturists (CAPA) National Survey Committee mainly worked on the winter loss survey. As in previous years, the committee developed a set of questions (see Appendix 1) with standardized definitions in order to gather data on the winter losses of colonies and management practices around Canada. These questions took into account the large diversity of beekeeping

industry profiles and seasonal activities within each province. Some provinces included supplementary regional questions which were out of the scope of the National Survey Committee.

Methodology

In each province, the survey material was provided to producers using various methods of delivery. The questionnaire was either sent by regular mail or email or administered online or by telephone. Provincial data was first tabulated and analyzed by the Provincial Apiculturist and all the provincial results were gathered to be analyzed and summarised at the national level in order to determine average bee losses across Canada. This year, data was obtained from Newfoundland and Labrador for the national survey as in 2016.

The targeted population was the beekeepers that were considered sideliners or commercial beekeepers. Depending on the province, the surveyed beekeepers were those who owned and operated:

- All beekeepers in Prince Edward Island;
- 10 or more colonies in British Colombia;
- 30 or more colonies in New Brunswick;
- 50 colonies or more in Manitoba, Ontario, Quebec and Nova Scotia;
- 100 colonies or more in Saskatchewan;
- 400 colonies or more in Alberta

The common definitions of a honey bee colony and a commercially viable spring honey bee colony were standardized as follows:

- Honey Bee Colony: A full-sized honey bee colony either in a single or double brood chamber, not including nucleus colonies (spits);
- Viable Honey Bee Colony in spring: A honey bee colony that survived winter, in a standard 10-frame hive (Langstroth box), with minimum of 4 frames with 75% of the comb area covered with bees on both sides on May 1st (British Columbia), May 15th (New Brunswick, Nova Scotia, Ontario, Prince-Edward-Island and Quebec) or May 21st (Alberta, Manitoba and Saskatchewan).

The survey covered all full-sized producing wintered colonies in Canada, but not nucleus colonies. Thus, the information gathered provides a valid assessment of bee losses and management practices across Canada.

The national percent of winter loss was calculated as follows:

$$\text{Winter loss Percent} = \left(\frac{\text{Sum of the estimated total colony losses per province in spring 2018}}{\text{Sum of total colonies in operation in each province for 2017}} \right) x\ 100$$

Results

The Provincial Apiculturists collected survey data from beekeepers across Canada who own 502,764 honeybee colonies. This represents 63.9 % of all colonies operated and wintered in Canada in 2017-2018. The national average percentage of colony winter loss was 32.6 %. Provincial averages ranged from 18.4% to 45.7%. The overall national colony loss reported in 2018 is the highest reported loss since 2009.

The full report is available on the CAPA website (http://www.capabees.com/capa-statement-on-honey-bees/).

The members of the CAPA National Survey Committee for 2018 were:

Julie Ferland (chair)

Chris Jordan	Chris Maund
Melanie Kempers	Medhat Nasr
Paul Kozak	Steve Pernal
Rhéal Lafrenière	Paul van Westendorp
Jason Sproule	Geoff Wilson

November 1, 2018

MOTION: **Motion to accept the National Survey Report as presented.**
MOVED BY: **Rhéal Lafrenière**
SECONDED BY: **Jason Sproule**
CARRIED

CAPA - Core Winter loss survey questions (2018) is available in Appendix 7

Importation and Bee Movement Report
Geoff Wilson, via videoconference

Discussion ensued about the 100 mile exclusion zone in California, and on the implementation of new methods to stop Africanization coming into Canada.

Importation and Bee Movement Report 2018
Geoff Wilson

With a continued lower price of honey and reduction in blueberry pollination, movement of bees appears to be at lower levels than previous seasons. This is true both in Canada's international trade and interprovincial trade. Despite these reductions, moving bees continues to be a financial necessity for many in Canada's beekeeping industry. Any time there is a movement of bees, there is also risk of moving and introducing pests and diseases. Most of the circumstances surrounding bee movement remain the same, so only a few highlights will be listed.

International Bee Movement

As was the case in 2017, the importation of packages of bees remains at a lower level than previous seasons. Although it cannot be directly linked, the reduction follows the decline in both pollination contracts for blueberries in the east and a continued reduced price of bulk honey.

There have been no changes to the international sources of bees. There were two incidents of small hive beetles that were imported into Canada in honey bee queen cages. Although provincial and federal governments effectively dealt with pest, these occurrences are a reminder that we need to continue to work well with our trading partners and to maintain vigilance to ensure that importation requirements are met. The emphasis in the upcoming year for this committee will need to be on the evolving bee health situation abroad, particularly Africanized bee genetics from the USA.

Inter-provincial Bee Movement

Movement between provinces continues to be important and is dictated by provincial requirements for bee health. This year, a new incidence of small hive beetles was found in Quebec, it was likely introduced through the interprovincial movement of bees; this highlights the risks of moving bees between provinces. After finding no additional beetles in the quarantine area, the Alberta government has recently removed the small hive beetle associated quarantine. This leaves Ontario, New Brunswick and Quebec actively following-up cases regarding small hive beetles – please contact the individual provinces for specific details. This pest remains as a concern for many provinces and their importation requirements.

The Canadian Honey Council continues to emphasize protection of bee health with the facilitation of trade through harmonized bee importation requirements for all provinces.

MOTION: **Motion to accept the Importation Report as presented.**
MOVED BY: **Jason Sproule**
SECONDED BY: **Patricia Wolf-Veiga**
CARRIED

IPM Report
Jason Sproule

2018 CAPA Integrated Pest Management Report

Prepared by: Jason Sproule

Increased Veterinary Oversight of Antimicrobials

In an effort to mitigate the development of microbial resistance to medically-important antimicrobials for human medicine, Health Canada is requiring changes to the oversight of antimicrobial use in agriculture. As of December 1st, 2018 several antimicrobials that have been available over the counter will move to the Prescription Drug List. Included among these are Oxytetracycline and Tylosin, both of which are used by Canadian beekeepers in the treatment and prevention of Foulbrood diseases: American Foulbrood and European Foulbrood. Beekeepers will now require Veterinary prescriptions to access these antimicrobials. This change presents several challenges. Beekeepers in many Provinces do not have a history working with Veterinarians. In order to provide a prescription Veterinarians must have a client patient relationship (VCPR) with the beekeeper. Descriptions of what constitutes a valid VCPR for other livestock is not practical for beekeeping and Provincial Veterinary Associations have been working to refine requirements and definitions to better suit a beekeeping model. Some Provinces have also offered training initiatives to better familiarize Vets with beekeeping practices.

Bayvarol

Bayvarol (a.i. flumethrin) miticide was registered in Canada in late November of 2016, but only became available to most beekeepers in 2018. Bayvarol is an impregnated plastic strip that hangs between frames in brood chambers and provides sustained release of the active ingredient over several weeks. Some feedback from beekeepers in multiple Provinces where spring applications of Bayvarol occurred, suggested poor control of Varroa mites. Specific Provinces are intentionally obscured for this report. The potential for cross-resistance with another miticide: Apistan (a.i. tau-Fluvalinate) is a concern as active ingredients are chemically similar, both being group 3A pyrethroid insecticides. Plans to conduct resistance testing in multiple Provinces were made in August 2018 and reports are pending.

HopGuard II

Hopguard II is biopesticide miticide formulated as a strip impregnated with Potassium salts of Hop Beta acids for control of Varroa mites. A registration package was submitted by Agriculture and Agri-Food Canada's Pest Management Centre to Pest Management and Regulatory Agency in July 2017. A regulatory decision has not yet been made but is expected within 18 months of the submission date.

Fumagillin-B

Fumagilin-B is an antimicrobial used in the treatment and prevention of Nosemosis, a disease caused by microsporidian pathogens: *Nosema apis*, and *Nosema cerenae*. In April of 2018 Medivet Pharmaceuticals announced their raw material supplier: CEVA Sante Animale, would no longer supply the active ingredient: fumagillin dicicyclohexylamine. As an alternative raw material supplier could not be sourced, Medivet Pharmaceuticals announced it would be closing by June. Remaining inventory of Fumagilin-B has been sold to major distributors and customers. Canadian Honey Council has been in discussion with the owners of Medivet with the goal of assuming the registration with Health Canada.

Formic acid

Formic acid is an organic acid used for the control of Varroa and tracheal mites. There are multiple formulations in use in Canada. One common use requires application of 65% formic acid liquid to meat soaker pads which are then placed in hives. Medivet Pharmaceuticals holds the registration with PMRA for the liquid formulation. With the closure of Medivet continued access to this formulation is uncertain. Canadian Honey

Council is investigating the possibility of taking over this registration. Other formulations such as Mite Away Quick Strips (MAQS; NOD Apiary Products Ltd.) and Mitegone ready-to-fill kits (Mitegone Enterprises) remain unchanged.

IPM solutions for Apiculture registered with PMRA.

Product	**Active Ingredient**	**Formulation**	**Registrant**	**Registration Expires**
Mites				
Oxalic acid	Oxalic acid dihyrdate; Ethanedioic acid	solid	Canadian Honey Council	2020-12-31
Formic acid	Formic acid (65%)	liquid	NOD Apiary Products Ltd.	2019-12-31
Formic acid	Formic acid (65%)	liquid	Medivet Pharmaceuticals Ltd.	2021-12-31
Mite Away Quick Strips	Formic acid (46.7%)	Gel strip	NOD Apiary Products Ltd.	2023-12-31
Formic Acid	Formic acid (65%)	Liquid for Mitegone ready to fill kits	MiteGone Enterprices int. (Vaclav)	2019-12-31
Bayvarol	Flumethrin	Strip	Bayer Inc.	2021-12-31
Apistan	Fluvalinate-tau	Strip	Wellmark International	2020-12-31
Apivar	Amitraz	Strip	Veto-Pharma	2022-12-31
Thymovar	Thymol	Impregnated Wafer	Pronatex Inc.	2020-12-31
Checkmite	Coumaphos	Strip	Bayer Inc.	2020-12-31
Small Hive Beetle				
Perm-Up	Permethrin	EC	United Phosphorous Inc	2019-12-31
Checkmite	Coumaphos	Strip	Bayer Inc.	2020-12-31

MOTION: **Motion to accept the Chemical Report as presented.**
MOVED BY: **Les Eccles**
SECONDED BY: **Steve Pernal**
CARRIED

Awards Report
Rhéal Lafrenière

November 1, 2018
CAPA Awards Committee Report

Members: Chair: Samantha Muirhead, Martine Bernier, Nicolas Tremblay, Rhéal Lafrenière, Paul van Westendorp.

Tracey Smith is no longer eligible to be a member of CAPA according to the requirements. Rhéal Lafrenière excused himself from voting for the Student merit award as he had written a support letter for one of the applicants. He also ask to be removed from the committee as this has been an issue in the past.

The Committee received 3 applications as follows: Derek Micholson, Gabrielle Claing, and Nadia Tsvetkov. The committee unanimously voted that Nadia Tsvetkov be awarded the 2018 CAPA student merit award.

On November 7 2018, Paul Kozak, Rhéal Lafrenière and Geoff Wilson nominated Dr. Medhat Nasr for the CAPA Award of Merit.

Nomination for Dr. Medhat Nasr for CAPA Outstanding Service Award for 2018

It is with great honour that we nominate Dr. Medhat Nasr for the CAPA Outstanding Service Award. Dr. Nasr (Medhat) has had a long and distinguished career in Apiculture and is very deserving of this award. Medhat is a great example of how a CAPA member can have a positive impact on the beekeeping industry in Canada and internationally. These impacts have been felt in all facets of CAPA including membership, research, extension, regulation and tech-transfer. Below are highlights from Medhat's career.

Medhat completed his undergraduate degree (1972) and M. Sc. (1977) at Cairo University in Giza, Egypt and received his Ph. D. at the University of California, Davis in 1993. Prior to completing his Ph. D., Medhat was hired by the Department of Environmental Biology at the University of Guelph in Ontario as a Research Associate (1990 - 1993) where he worked on breeding bees for resistance to tracheal mites.

In 1994, he accepted the position of the Tech-Transfer Apiculturist with the Ontario Beekeepers' Association. It was through this position that Medhat was instrumental in establishing the Tech Transfer Program (TTP). This was a new model for tech transfer in apiculture that has since been widely adopted in North America and abroad. During the six years that Medhat led the TTP, he collaborated with beekeepers and others to develop Ontario's queen and nuc production industry. A major part of this initiative was a breeding program that selected traits for tracheal mite resistance and hygienic behaviour. Medhat and his team worked to broaden the genetic diversity of honey bees in Ontario, including importing new stocks like the USDA Russian bees. The selected bees served as a basis for Ontario's Integrated Pest Management practices which he helped to develop with the Ministry of Agriculture and others.

In 2000, Medhat accepted the Extension Apiculture Specialist and Assistant Professor position at Rutgers University in New Jersey. During this period at Rutgers, he established a research program to study honey bee pests and blueberry and cranberry pollination. This program included initiatives to base pollination fees on colony strength, and to study impacts of irrigation and pollination on cranberry production.

His time in the US was short. By 2002, Medhat was back in Canada as Alberta's Provincial Apiculturist, a position that he holds until his announced retirement date (January 4, 2019). In these 16 plus years, with his strong leadership and ability to network across all levels of government and industry, he has helped to grow Alberta's bee industry into the third largest in North America. During his tenure, the number of honey bee colonies in Alberta rose from 190,000 to 310,000; this is greater than a 60 percent increase!

To support this astounding growth, Medhat has launched numerous beekeeping development initiatives in Alberta. Some examples of these programs are:

- 2002- Present: Best management practices (BMP) and Integrated Pest Management (IPM) of honey bee pests for Alberta beekeepers.

- 2004- Present: Alberta's Drug/Antibiotic Free Honey Program.
- 2004-2009: Enhancing the pollination fees based on colony strength for hybrid canola in southern Alberta
- 2005- Present: Developing honey export protocols to Japan.
- 2007 – Present: Developing and implementing "Alberta Pest Surveillance Program" in the face of high bee colonies mortalities and threats of Colony Collapse Disorder.

- 2011 – 2018: Developing and implementing the "Alberta Bee Bio-security Program".
- 2015 – Present: Develop and upkeep of the "Bee Health" app.

These programs have enabled beekeepers to keep healthier bees, increase the sales of Albertan honey to Japan by 400%, and improve the pollination industry for both the beekeeper and hybrid canola producers.

Medhat has also maintained an applied research program to enhance honey bee health. Since 1994 he has raised over $3.5 million for this research. In many cases, the results were directly responsible for generating the data to support registration of Varroa mite control products (i.e. 65% Formic acid, Mitewipe, Oxalic acid and HopGuardII). Another item of note was his contribution to developing a commercially available Varroa mite shaker that is used by thousands of beekeepers throughout Canada and the United States.

Medhat is always willing to share his knowledge, experience and passion for bees; he may be best known for his dedication to training and educating beekeepers. He has developed and delivered extension meetings and workshops and gives many talks as an invited speaker in Alberta and beyond. Medhat is a high demand speaker and has presented at academic and industry meetings throughout Canada, United States and overseas. In total, he has given over 250 presentations and over 120 media interviews on bees and beekeeping.

Medhat has had a great impact on CAPA itself. His executive roles include Vice-President (2010-2013), President (2013-2016) and his current position of Past-President. Medhat has also taken a leadership role in several of CAPA's standing committees such as the Bee Import committee (2010-2013) and the Chemical committee (1992-2013). During his tenure in the Bee Import committee, Medhat led the committee to advise the CFIA on bee import issues including developing permit conditions to allow queens from California and Hawaii, while mitigating the risks of small hive beetles, treatment resistant Varroa mites and Africanized honey bees. Working with the Chemical committee members, Medhat was also instrumental in leading the emergency registration of CheckMite+™ and Apivar® allowing beekeepers to manage resistant Varroa mites.

Medhat has previously been recognized with awards over the years, including such prestigious awards as, Award of Excellence from Ontario Ministry of the Environment (1998), Achievement Award from Alberta Beekeepers (2009), the Fred Rathje Memorial Award in 2010 from the Canadian Honey Council and the Roger A Morse Award for Teaching, Extension and Regulation from Eastern Apiculture Society of North America *(2015). We feel that adding the CAPA Outstanding Service Award to this list is certainly appropriate.

On a personal note, Medhat has been a mentor and friend to many of the Provincial Apiculturist, including the three that are nominating him for this award. He has always been in a lead role amongst his peers in CAPA. He has brought encouragement and strove to make everyone better, including himself. When this is combined with the confidence that he brings to the organization, it has allowed CAPA to take on challenges that originally seemed impossible. We hope that you agree that his contributions are outstanding and worthy of celebrating with our most prestigious award.

Thank-you

Paul Kozak, Provincial Apiarist, Ontario Ministry of Agriculture Food and Rural Affairs
Rhéal Lafrenière, Industry Development Specialist – Provincial Apiarist, Manitoba Agriculture
Geoff Wilson, Provincial Specialist: Apiculture, Saskatchewan Ministry of Agriculture

MOTION: **Motion to accept the outstanding service award nomination.**
MOVED BY: **Rhéal Lafrenière**
SECONDED BY: **Paul Kozak**
CARRIED

MOTION: **Motion to accept the Awards Report as presented.**
MOVED BY: **Rob Currie**
SECONDED BY: **Heather Higo**
CARRIED

CBRF Report
Leonard Foster

We funded 4 projects last year and we are also now managing the Siddoo scholarship. If you have a research idea or a student to nominate to the scholarship please do that. The scholarship is made to award someone that has a body of research to show.

Rhéal Lafrenière, Renata Borba and Scott Plante from CHC make the committee.

There is a guideline on the website on how to nominate a student.

Canadian Bee Research Fund
Board of Directors and Review Panel Meeting Minutes
February 6, 2018

Participants:

Leonard Foster	Albert Devries
Rhéal Lafrenière	Cynthia Scott-Dupree*
Scott Plante	Amro Zayed*

1. Called to order at 8:30 (MST) by Rhéal Lafrenière.
2. Cynthia Scott-Dupree joined as a guest participant since Leonard Foster removed himself from discussions of the CBRF proposals (he was listed as a co-applicant on one) and Atwal scholarship applications (since one of his students had applied).
3. Cynthia chaired a discussion of the ten applications received for the Atwal scholarship.

    Motion: That Alison McAfee be awarded the Atwal Scholarship for 2018.
    Moved by: Scott Plante
    Seconded by: Albert Devries
    Carried

    *There was discussion that the Board should consider awards for Master's students since it is very difficult for them to compete with PhD students.
    *Cynthia Scott-Dupree left the conference and Amro Zayed joined

4. Rhéal chaired a discussion of the three applications received for the 2018 CBRF competition.

    Motion: That all three projects be funded equally at approximately $7000 (pending finalization of 2017 financials) and that a condition of funding for the Rousseau project be subject to increasing the sample sizes.

Moved by: Albert Devries
Seconded by: Scott Plante
Carried

Leonard will follow up with each applicant to inform them of the award. Amro Zayed will provide some wording to Leonard for the Rousseau letter. (See appendix A)

Amro Zayed left the conference and Leonard Foster assumed the Chair.

5. Leonard asked for any operational feedback on the process used for CBRF and the Atwal scholarship adjudication process. Committee members indicated that all of the information provided for the Atwal applications was useful.
6. Rod offered that the CBRF should plan to have a booth at the upcoming Apimondia in Montreal in 2019. At the next CAPA/CHC AGMs, Leonard will solicit people to help man that booth. We will also need to organize a banner or some kind of backdrop/information board for displaying there.
7. Since final financials are not yet available, final decisions on the funds to be distributed to the three successful CBRF applications could not be finalized. Once the final financial statement is available, Leonard will follow up with all awardees to inform them of the final amounts and Rod will arrange to distribute the funds
8. There will be an email vote on the financial statements for 2017 when they become available.

Rhéal Lafrenière moved to adjourn.

Post-teleconference, February 21st, 2018.

1. Rod circulated the final financial statement for the CBRF account, received from Royal Bank. It was circulated and accepted by all members.
2. Leonard calculated the minimum disbursement at $21,191, with some additional to use part of the donations from this past year. He proposed that the disbursement be set at $22,500, with $7,500 going to each of the three projects. This was accepted by all members of the Board. Rod Scarlett will arrange for cheques to be sent to each applicant.

MOTION: **Motion to accept the CBRF Report as presented.**
MOVED BY: **Renata Borba**
SECONDED BY: **Heather Higo**
CARRIED

Non-Apis Report
Paul van Westendorp

Non-Apis Pollinator Committee Report
(Contributors; D. Ostermann, K. McKenzie, C. Walbauer CFIA, G. Parsons, P. van Westendorp)

The importation of any non-Apis pollinating insect into Canada requires a plant protection import permit. Importers must apply for a permit before importing species belonging to groups such as *Megachile, Bombus* or *Osmia.* Applications are reviewed by the CFIA to assess the risks to plant health in Canada. In making decisions regarding import requests, the CFIA is guided by international plant protection risk assessment standards. It

considers factors such as intended use, origin, susceptibility to injure plants, potential for economic or environmental harm, and presence and extent of distribution in Canada.

The CFIA's requirements under the *Plant Protection Act* for importing certain bees are listed in the Potentially Injurious Organisms directive D-12-02. These requirements apply to all pollinating insects, with the exception of honeybees (Apis spp.) which are regulated under the *Health of Animals Act.*

In addition to the presence in Canada of the pollinator itself, the CFIA also considers the occurrence of pathogens or parasites of the pollinator in the country of production. Presence and distribution of these pathogens or parasites in Canada further inform the decision making process. If the import is allowed, permits may specify conditions necessary to prevent the introduction or spread of plant pests. For example, conditions may specify requirements related to shipping or moving organisms, identity or purity testing, notification obligations and containment. In response to past requests for non-Apis pollinators from the United States, the CFIA has normally issued permits with minimal conditions.

While current regulations concerning non-Apis pollinators focus on their import from outside Canada. There is very little if anything either federally or provincially dealing with shipment of non-Apis pollinators within Canada. This is reflected in the un-regulated shipment across the country of *Osmia lignaria propingua* and *O. lignaria lignaria* that have taken place for many years. More significantly has been the large-scale shipment of *Bombus impatiens* (of Eastern North America) to service the greenhouse industry in Western Canada since 1999 after the native *B. occidentalis* was no longer available. No provincial or federal regulations were in place to restrict such shipment. It was through the cooperation of greenhouse operators, service providers and bumble bee producers (BioBest and Koppert) that safety measures were put into place to reduce the risk of *B. impatiens* establishing itself in BC. Over time, these measures proved insufficient and SFU researchers confirmed the establishment of *B. impatiens* in the Fraser Valley by 2008. Its impact on other (native) Bombus species remains unknown.

Newfoundland (& Labrador) introduced regulations protecting its native Bombus fauna. In about 2010, Koppert and BioBest brought *B. impatiens* into the province to service the (lowbush) blueberry and cranberry industries. The action was considered justified as the species is native to Eastern North America. *B. impatiens* is not native to Newfoundland and when queens were discovered in the field, provincial officials realized the real risk of non-native species introduction with associated diseases and parasites to the native pollinator fauna. A ban on imports has been enacted since then.

CFIA's Animal Health, Welfare & Biosecurity Division is responsible for the Biosecurity Standard and intends to review the current wording concerning the importation of bees found in the "Alfalfa Leaf Cutting Bee Producer Guide to the National Bee Farm-level Biosecurity

Standard" (Section 1.1 Bee Sources, Subsection, 5 Regulations and Compliance for Importing Bees). It is felt that this is an issue worth looking into further, and the committee, as well as other stakeholders, may be involved in an appeals process to strengthen the legislation for import of non-Apis bees. The committee is looking to discuss this issue with the broader non-Apis community.

Discussion ensued on the pathogen spill-over between *Apis* and non-*Apis* species, and future actions to expand our knowledge on this topic.

MOTION: **Motion to accept the Non-Apis Report as submitted**
MOVED BY: **Leonard Foster**
SECONDED BY: **George Martin**

Publication Sales Report

Janet Tam

CAPA Honey Bee Diseases and Pests Publication Sales Report 2018 (3rd Edition)

= US purchasers

= Overseas purchasers

Orders Filled in 2018

Invoice #	Date	Purchaser	Units Sold
18-01	2-Jan-18	Michael Greaves	2
18-02	8-Jan-18	Honey Exchange	20
18-03	9-Jan-18	Urban Bee Supplies	40
18-04	12-Jan-18	Bee Pride	8
18-05	12-Jan-18	Angela Demarse	1
18-06	12-Jan-18	Complete Media Supply	25
18-07	16-Jan-18	Brenda Jager	14
18-08	24-Jan-18	Lucy Coppes	6
18-09	16-Jan-18	BC Min of Ag	28
18-10	16-Jan-18	Black Bear Acres	50
18-11	22-Feb-18	Alberta Ag & Rural Devt	300
18-12	5-Feb-18	Kelley Beekeeping Co	50
18-13	5-Feb-18	Phil Olinger	1
18-14	5-Apr-18	OBA TTP	50
18-15	7-Feb-18	Mark Gillanders	1
18-16	7-Feb-18	Jeff Glendenning	1
18-17	8-Feb-18	Tom Gouldstone	1
18-18	9-Feb-18	Dave Kinsey	1
18-19	9-Feb-18	Cowichan Valley Bee Supply	10
18-20	9-Feb-18	Molly Armstrong	1
18-21	9-Feb-18	Virginia Mulder	1
18-22	9-Feb-18	Lac Ste. Anne County	25
18-23	12-Feb-18	Lyn Smith	1
18-24	12-Feb-18	Niesje Vanden Dool	1
18-25	16-Feb-18	Petr Ondracek	10
18-26	22-Feb-18	Bee Furniture	20
18-27	23-Feb-18	Chelsea Abbott	50
18-28	28-Feb-18	Mason MacDonald (Dal U)	30
18-29	22-Mar-18	Jody Brittner	1
18-30	2-Mar-18	Don Fowler (Cowichan Bkprs)	20
18-31	15-Mar-18	Jennifer Jinks	1
18-32	22-Mar-18	Mt Baker Bkprs	40
18-33	26-Mar-18	Marcel Koppejan	10
18-34	2-Apr-18	Ellen Watkiss	1
18-35	5-Apr-18	Jerry Jerrard	1
18-36	5-Apr-18	Dr. Tammy Nay	1
18-37	11-Apr-18	SBDC	55
18-38	5-Apr-18	Kelsey Sperle	1
18-39	17-Apr-18	Carol Harvey - N Okanagan Bkprs	40
18-40	20-Apr-18	PEI Dept of Ag & Fish	43

18-41	23-Apr-18	Don Fowler (Cowichan Bkprs)	20
18-42	24-May-18	Shelagh Dodge	2
18-43	24-May-18	Jennifer Wilcox	2
18-44	24-May-18	Christine Baer	1
18-45	15-Jul-18	West Coast Bee Supply	20
18-46	23-Jul-18	Serena Caunce	1
18-47	15-Jul-18	Anne Flemming	1
18-48	30-Jul-18	Peace River Vet Clinic	2
18-49	10-Aug-18	Urban Bee Supplies	40
18-50	23-Aug-18	Dr Rebeccah Stewart	1
18-51	23-Aug-18	NF Bkprs Assoc	25
18-52	23-Aug-18	Tim Olchowy	5
18-53	29-Sep-18	Country Field Bkpg Supply	40
18-54	29-Sep-18	NSVMA	36
18-55	2-Oct-18	BCHPA	30

TOTAL: 1188

MOTION: **Motion to accept the Publication Sales Report as submitted.**
MOVED BY: **Marta Guarna**
SECONDED BY: **Ernesto Guzman**
CARRIED

Research Report
Leonard Foster

Next CAPA meeting we will be due for the next CAPA/CHC research priorities, which involves CHC in that as usual. The research committee is dependent on the beekeeping organizing association and this year we had a group that was denied to present. Next year we will be dealing with a different beekeeper organization and maybe we wont have to deal with that, hopefully, but CAPA does not have the control that we hoped for.

Discussion ensued about a national meeting.

MOTION: **Motion to accept the Research Report as submitted.**
MOVED BY: **Clement Kent**
SECONDED BY: **Paul van Westendorp**
CARRIED

Full Research Committee Report in Appendix 8

Communication Report
Melanie Kempers

We received a notice last year that our host was not going to provide services anymore. He recommended a company, which we ended up hiring. We had some issues with the transition but the website is running smoothly now. Our new web host service is a bit more expensive. We have a 1-year contract with them but if we are not satisfied, we can find a new company at the end of our current contract.

2018 COMMUNICATIONS COMMITTEE REPORT

Committee Chair: Melanie Kempers
Committee Members: Rob Currie, Cameron Menzies, Rhéal Lafrenière, Nicolas Tremblay

No Stats for 2018:

Due to switching to a new webhost over the past year, the backend analytics are not available. The tracking will be re-enabled for 2019 and the statistics will be reset.

2018 Happenings:

Our new webhost is Kleurvision. Contrary to the previous report, this transfer took quite some time to finalize and there were some issues that caused links to lose function and updates were difficult to maintain. The archived reports did not function. Uploading new files was not possible. Membership applications were not being forwarded. Contact form submissions were also not being forwarded. All issues are now resolved and the site should function as needed.

Plans for 2019:

- Increase traffic to the site by associating key search words with content.
- Increase content (I would love suggestions on what you would like to see on the site).
- Link CAPA site to provincial organizations through content, news, etc.
- Take suggestions from membership for improvement.
- Use the site as a storage backup for annual reports and historical documents.

MOTION: **Motion to accept the Communication Report as delivered orally.**
MOVED BY: **Leonard Foster**
SECONDED BY: **Ernesto Guzman**
CARRIED

Africanized Bee Report
Ernesto Guzman for Amro Zayed

Defensive behaviour and Africanized phenotype starts when levels are at 25% or higher. It is not a problem yet but we don't want to wait until it becomes a problem. We need to work together to establish a plan and protocols to minimize importation of Africanized bees into Canada.

Discussion ensued on the costs of using chips to detect Africanization as well as the techniques used and timeline of the test implementation.

Report on Africanized Honey Bees, 2018

Africanized bees and their range in the US

Africanized honey bees (AHB) are a highly aggressive and invasive hybrid strain of honey bees that is derived from the African honey bee subspecies *Apis mellifera scutellata* with minor genetic contributions from West and East European honey bee races that were present in South and North America prior to the invasion of AHBs in 1956. The USDA (http://www.ars.usda.gov/research/docs.htm?docid=11059&page=6) has confirmed the existence of AHBs in the following states: California, Nevada, Arizona, Utah, New Mexico, Texas, Oklahoma, Louisiana, Arkansas,

Florida, and Georgia. Some AHB colonies were reported from Alabama and Tennessee, but it is not clear if AHBs have established in these areas. AHBs where recently confirmed in the East Bay area (near San Francisco), suggesting that AHBs are slowly expanding their northern distribution in that state (Kono and Kohn, 2015).

In 2017, researchers did confirm the expansion of AHBs in California (Lin et al., 2018); Lin et al collected 2699 bees from California and tested for AHB genetics using a maternal mitochondrial DNA marker. Lin et al. confirmed that the northern counties of Napa and Sacramento now appear to be the northernmost range of AHBs in California. A few counties north of Sacramento where sampled (e.g. Butte and Shasta) but AHBs were not found. It is important to note however that Lin et al. did not sample many counties north of Sacramento and Napa, and when they did, they often sampled a small number of workers (e.g. only 6 bees were collected from Yolo county). Another important caveat to consider is the standard mtDNA test employed by the researchers is not an ideal test (see ***detecting methods***).

Risks to Apiculture in Canada

The Canadian Food Inspection Agency (CFIA) published a *"Risk Assessment on the Importation of Honey Bee (Apis mellifera) Packages from the United States of America (V13), September 2013."* The CFIA noted that

> "*…AHB presents a threat to the public and animal health, as well as to Canadian beekeeping industry, because of the significant impact on productivities and potential trade issue with live honey bee material*"

The CFIA estimated AHBs Entry Risk Probability as "Moderate to High" , Exposure Risk Probability as "Small", Consequence Risk Estimate as "Moderate", and overall Risk Estimate as "Low to Moderate".

Annual movement of hives in the US, including from states that are known to have AHB to states that currently do not have AHB continues to be an area of concern for introducing AHBs in Canada. Swarm dispersal across the border is always a possibility, even though there have been no cases of AHB spreading into Canada through that route. Another potential risk factor is the threat of AHBs invading into regions that currently supply most of Canada's imported queens and bee packages, such as Hawaii, northern California, Chile, New Zealand and Australia. It is therefore important that the surveillance and testing used to monitor the occurrence of AHB around the world continues to be a high priority.

Detecting AHBs: mtDNA and morphometrics

There are two methods that are currently used to detect AHBs: Morphometric measurements and mitochondrial (mt) DNA testing. Both methods suffer from some setbacks. First, it is not clear if morphometric measurements are effective at detecting hybrid colonies. Second, mtDNA analysis fail to detect colonies with European queens mated with one or more Africanized drones because mtDNA is maternally inherited – all workers and drones from this colony will carry the European queen's mitotype. The CFIA's latest risk assessment noted this:

> "*Certifying populations free of AHB is an issue. The mitochondrial DNA and the morphometric analysis used to identify Africanization in samples of bees are not 100% reliable; mitochondrial DNA is maternally inherited, and hybrids might not be detected through morphometric analysis because of the different degrees of hybridization (Guzman-Novoa, 2012).*" [citation to Dr. Ernesto Guzman's CAPA AHB report, 2012]

and

> *"No further developments in identification methods have occurred; testing will not accurately detect the presence of Africanized stock in bee populations or packages."*

Detecting AHBs: SNPs

In 2015, a new test for detecting AHBs was developed by Dr. Ben Oldroyd (University of Sydney Australia) and Dr. Amro Zayed (York University) that uses 96 single nucleotide polymorphisms (SNPs). SNP markers reside in the nuclear genome, are bi-parentally inherited, and should allow for estimating a continuous degree of Africanization (i.e. 0 to 100% African, versus mtDNA which provides a binary answer such as African or not African). The test, along with the sequences for the SNP markers and the procedure for testing bees, was published in two peer-reviewed journals (Harpur et al., 2015, Chapman et al., 2015). In Canada, a 25% African ancestry was empirically determined to be the threshold for classifying bees as AHBs (>25% African ancestry) or non AHB (<25% African ancestry).

The test has been shown to accurately (>>95%) detect AHBs vs. typical European managed bees in the US, Australia (Chapman et al, 2015), and Canada (Harpur et al, 2015). The Australian Government is currently assessing the use of this SNP test for screening imported honey bee semen (Dept. of Agriculture and Water Resources, Australian Government. Importation of Honey Bee Semen: Draft policy review. 2015; http://www.agriculture.gov.au/SiteCollectionDocuments/biosecurity/risk-analysis/current-animal/draft-policy-review-importation-honey-bee-semen.pdf)

Currently, the cost of genotyping a single bee at 96 SNPs is substantial ($15 to $20). While suitable for testing semen, certifying colonies as AHB-free would require genotyping many individuals. A honey bee queen mates with 15 to 25 different males. Considering, a European queen mated with 1 out of 20, 2 out of 20, or 5 out of 20 African drones; the probabilities of detecting this level of Africanization if a SINGLE worker was tested are: 5%, 10% or 25% - too low to be acceptable (Zayed, analyses based on the binomial distribution. unpublished). Genotyping 50 workers would substantially improve the odds of detection to: 92.3%, 99.4%, and 99.9% respectively. However the cost of testing this many bees will be $750 to $1000 per colony. A recent study showed that 37 SNPs (out of the original 96 SNPs) can be used to study the ancestry of unknown honey bees, which reduces the cost of the SNP assay by one half to one third (Chapman et al., 2017)

A large scale applied research project funded through Genome Canada (Foster and Zayed, 2015) was recently announced and is expected to improve the cost effectiveness of this assay. The timeline for the updated test is 2 years. Nevertheless, it is important to lay the groundwork for recognizing SNP-based tests for AHBs as a potential CFIA's importation requirements. It is also important to CFIA to work with our queen suppliers to be prepared to meet this new requirement without disruption of queen imports. SNPs are becoming the 'gold-standard' for genotyping, and the current SNP test is significantly more accurate relative to its more historical counterparts.

AHBs in Canada

In 2016, the Canadian National Honey Bee Health Survey (https://www.gprc.ab.ca/doc.php?d=2016NHBHS), carried out by the National Bee Diagnostic Centre, tested bees from 314 apiaries (British Columbia, Alberta, Manitoba, Ontario, Quebéc and the Yukon Territory) for African ancestry using a mtDNA assay (see ***detecting methods***, above); the mtDNA tests were *positive* for Africanization in 26 apiaries (8.2%) and across all sampled provinces and territories. These samples where then independently analysed with a nuclear SNP test (see ***detecting methods***, above); all samples tested *negative* for Africanization (i.e. had African ancestries below the 25% threshold; they ranged between 0.6 to 15.9%).

Two possibilities can explain these conflicting results:

1) The mtDNA AHB test is reflecting African but not *A. mellifera scutellata* ancestry in our Canadian bees. Previous researchers have found African ancestry in managed honey bees from Canada, Australia, and Central/Northern US that may reflect importation of North African and Middle Eastern honey bees in the early 1900's (Harpur et al., 2015).

2) A number of AHB queens were accidently introduced into Canada; daughters of these queens hybridized with European colonies. This process, combined with selection against aggressive colonies, can over time lead to honey bees that have a mostly European nuclear DNA but an African maternal DNA.

Additional work is needed to better understand and put into context the results of the Canadian National Honey Bee Health Survey. Particular, additional tools that specifically track *A. m. scutellata* ancestry, and not generic African ancestry, would be very useful for interpreting the results from mtDNA and SNP testing.

Mitigation plans

It is important to continue to treat the risk of importing AHBs seriously. It is recommended that CAPA, CFIA, and provincial authorities collaborate to ensure that plans are in place to mitigate the risk of accidentally importing the highly invasive and aggressive AHBs into Canada; these plans should use the best tools for detecting AHBs. Provincial Apiary Programs should also develop protocols and strategies for responding to suspected or confirmed cases of AHB. Moreover, it is important to work with major exporting countries to ensure that the international queen bee supply chain is not contaminated with AHB genetics. It is important to note that the annual movement of hives in the US, including from states that are known to have AHB to states that currently do not have AHB, substantially increases the risk of introducing AHBs in Canada. Additionally, consideration should be given for developing a National AHB surveillance system and pest response plan within Canada. It is also important for the beekeeping industry and regulatory body across Canada to consider alternatives for queen sources if African bees have become a problem in regions that supply queens to Canada.

CHAPMAN, N. C., BOURGEOIS, A. L., BEAMAN, L. D., LIM, J., HARPUR, B. A., ZAYED, A., ALLSOPP, M. H., RINDERER, T. E. & OLDROYD, B. P. 2017. An abbreviated SNP panel for ancestry assignment of honeybees (*Apis mellifera*). *Apidologie*.

CHAPMAN, N. C., HARPUR, B. A., LIM, J., RINDERER, T. E., ALLSOPP, M. H., ZAYED, A. & OLDROYD, B. P. 2015. A SNP test to identify Africanized honeybees via proportion of 'African' ancestry. *Molecular Ecology Resources,* 15**,** 1346-55.

HARPUR, B. A., CHAPMAN, N. C., KRIMUS, L., MACIUKIEWICZ, P., SANDHU, V., SOOD, K., LIM, J., RINDERER, T. E., ALLSOPP, M. H., OLDROYD, B. P. & ZAYED, A. 2015. Assessing patterns of admixture and ancestry in Canadian honey bees. *Insectes Sociaux,* 62**,** 479-489.

KONO, Y. & KOHN, J. R. 2015. Range and Frequency of Africanized Honey Bees in California (USA). *PLoS One,* 10**,** e0137407.

LIN, W., MCBROOME, J., REHMAN, M. & JOHNSON, B. R. 2018. Africanized bees extend their distribution in California. *PloS one,* 13**,** e0190604.

MOTION: **To accept the Africanized Bee Report as presented**
MOVED BY: **Paul Kozak**
SECONDED BY: **Paul Kelly**
CARRIED

Archives Report
Rob Currie

We were tasked to find out more about the Merit Award. It was first conceived in 2001, and in 2005 they produced the first casting of the award. We will use this year the last cast of this award.

Discussion ensued on what we should give besides the cast, and whether to try to reproduce the same cast.

Action item: The awards committee to bring options at our next CAPA meeting on what should be given to the merit awardee.
MOVED BY: **Marta Guarna**
SECONDED BY: **Leonard Foster**
CARRIED

MOTION: **Motion to accept the Archives Report as presented**
MOVED BY: **Rhéal Lafrenière**
SECONDED BY: **Heather Higo**
CARRIED

Tech Transfer Team Report
Nicolas Tremblay

Discussion ensued about a new Tech Transfer Team in BC and AB.

Canadian Tech Transfer Teams for Apiculture:
A Summary of the Four Tech Teams in Canada
By Robyn McCallum, Nicolas Tremblay, Hannah Neil, and Les Eccles. 2017.

There are currently four technology transfer teams for apiculture in Canada that work directly with beekeepers to analyze and disseminate information. The scope of the teams includes improving honey bee health, managing diseases and pests, investigating bee nutrition, developing and answering research questions, and more.

A brief survey was conducted among the four teams to determine the similarities, differences, opportunities, and challenges facing the teams. Six questions were asked:

1) Which year was the team established?
2) What is the funding structure for the team?
3) What are the main goals for the next few years?
4) What are some major accomplishments of the team?
5) What are some of the challenges facing the team?
6) Are there opportunities to collaborate with other Canadian tech transfer teams?

The responses were compiled and are discussed below:

Table 1. Summary of the Structure of Canadian Tech Transfer Teams for Apiculture.

Consideration	**Team**			
	Atlantic	**Ontario**	**Quebec**	**Saskatchewan**
Number of beekeepers in province/region	1,045	3,351	992	1,150
Number of hives in province/region	47,762	105,431	57,743	112,000
Year team established	2016 (newest)	Early 1990s (oldest)	2006	2010

Funding structure	Federal government, Pan-Atlantic fund, Oxford Frozen Foods, Jasper Wyman's and Son, Nova Scotia Beekeeping Association, New Brunswick Beekeeping Association, Prince Edward Island Beekeepers Association, Bleuets NB Blueberries, Wild Blueberry Producers Association of Nova Scotia, Prince Edward Island Blueberry Growers Association, NB government, NS government, PEI government.	Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) for 3 main projects (training and workshops, resistant Ontario resistant honey bee selections (ORHBS) program, supporting information for regional beekeeping associations), additional projects via provincial and federal funding partners.	Funding now comes from contracts with beekeepers, contracts with blueberry and cranberry producers for hive strength inspections during pollination, research projects, teaching. Note: Contract producers can receive funding for services by the Ministry of Agriculture from Quebec (MAPAQ from Agri-conseils).	Saskatchewan Beekeepers Development Commission, funding via Agriculture Research Branch of Government of Saskatchewan, other projects funded externally, e.g. from Agriculture Development Fund (ADF) and Agricultural Demonstration of Practices and Technologies (ADOPT), reporting to steering committee.
Main goals for the next few years	Rearing local queens, improving Varroa mite management, studying pollination efficiency for wild blueberry, mitigating spring dwindle.	Varroa management tools, bee breeding, industry training.	Continuing to help producers, implementing ApiExpert (technoeconomic tool) in more businesses and making it more useful/applicable, continue projects on pollination, developing a new application of ApiProtection (this would allow beekeepers to mark bee yards but only allow agronomists and veterinarians from MAPAQ to see, helping guide decisions about pesticide recommendations)- this will launch April 2018.	Probiotic feed supplements and their relationship to *Nosema ceranae*, oxalic acid vaporization in the spring, assay of beekeeper-applied acaricides residues in brood wax, demonstration of Kenyan top bar and flow hive technologies.

Major accomplishments	Successful workshops and bee schools, miticide efficacy and resistance testing, pollination stocking density trial, Nosema lab diagnostics provided to beekeepers, sampling for National Bee Health Survey.	Suite of online and infield workshops for beginner and advanced beekeepers, ORHBS program, BMPs, testing novel Varroa treatments.	Keeping hives alive and strong throughout the season in the northern part of Quebec, particularly for wild blueberry pollination, managing Nosema without antibiotics, controlling Varroa using only organic treatments, developing and supervising two inspection teams for hive strength during blueberry and cranberry pollination, creating more than 50 articles dedicated to producers, making the "CRSAD services-conseils" profitable.	Consistently sold-out beginner beekeeper courses in Regina and Saskatoon, intermediate and advanced queen rearing courses, hygienic testing via liquid nitrogen demonstrations, queen replacement methods demonstrations, multiyear research project on Varroa management and size/timing of nuc establishment (final report in 2018).

Challenges	Varroa mites, spring dwindle, small hive beetle, low prices of wild blueberries are impacting pollination contracts, securing funding for beyond 2018.	Varroa treatments mid-season are needed, continual development of bee breeding for resistance bees, ensuring new beekeepers access credible information.	More personnel (currently only one consultant) to expand scope of tech transfer team work, increase collaboration between veterinarian team and tech transfer team.	Dealing with Varroa, productive but small industry, difficult to attract technical assistants to the tech team, have been without team lead for past two years.
Opportunities to collaborate with other Canadian tech transfer teams	Miticide projects	Miticide projects	Open to collaboration	Miticide projects-application methods and timing, differences in feeding methods (e.g. barrel feeding) and supplements.

Discussion

Year Established

Ontario's tech transfer team has been in existence since the early 1990s, while the other three tech teams began in the last twelve years. By establishing a community of collaboration, perhaps we could draw on the experience of the Ontario team to learn from past successes and challenges.

Funding Structure

There is wide variation in the funding structure among the four tech transfer teams in Canada, but all teams actively seek funding to fulfill their research and extension goals. There seems to be strong provincial support for all of these programs, and the Atlantic team appears to have the highest industry funding. Atlantic and Quebec are engaged across multiple sectors (e.g. wild blueberry, cranberry (Quebec) and beekeeping industries). Significant time is spent applying for funding to continue the teams.

Main Goals for the Next Few Years

Improving Varroa management is at the forefront for many of the teams across Canada, coupled with improving feed supplements and further investigating *Nosema ceranae*. Queen breeding was mentioned by both the Atlantic and Ontario teams. Pollination was highlighted by the two eastern teams as it relates to wild blueberries.

Major Accomplishments

Design and delivery of various beekeeping courses were highlighted as major accomplishments for many of the teams. Quebec highlighted their involvement in technology, particularly 'apps' for beekeepers and in organic treatments for pest and diseases. Ontario's work with ORHBS was emphasized.

Challenges

Technical and structural challenges were highlighted. Varroa mites continue to be a major challenge for beekeepers across Canada, and research is needed on emerging miticides and their delivery, efficacy, and potential resistance. Additionally, spring dwindle, pollination, and bee breeding were mentioned.

All of the tech transfer teams face pressures to secure funding and have enough resources (particularly personnel) to carry out the team's mandate.

Opportunities to Collaborate

All tech transfer groups responded they were willing to collaborate across Canada, particularly on miticide projects. It seemed as though many groups were unaware of typical industry practices across the country (e.g. prevalence of various feeding methods in different regions, most commonly used miticides among regions, queen breeding) and a national survey to capture the similarities and differences, successes and challenges, may be valuable.

Recommendations

The development of a Tech Transfer Team Committee as part of the Canadian Association of Professional Apiculturists (CAPA) may facilitate increased communication among the teams. Tech teams are encouraged to become active and engaged in this forum.

There appears to be numerous beekeeping courses and workshops being developed and delivered independently across the country. Communication among the tech teams may allow for sharing of curriculums and cost reduction, particularly for webinars.

Each tech transfer team is engaged in relevant and innovative research in the field of beekeeping. Steps to share results and promote recommendations may be advantageous across regions (e.g. pollination stocking density trial in NB may be relevant to Quebec; probiotic work in Saskatchewan may be applicable across Canada).

Promoting and presenting tech transfer team successes and challenges at annual CAPA meetings may increase communication and heighten awareness for teams in the industry. Further promotion at industry-level events, such as beekeeping or fruit-growing meetings, may be advantageous. Compiling successes and future directions of tech transfer teams, and sharing this with government partners, should be considered.

Contact Information:

Atlantic Tech Transfer Team for Apiculture
Contact: Robyn McCallum (rmccallum@perennia.ca)

Ontario Tech Transfer Program
Contact: Les Eccles (les.eccles@ontariobee.com)

Québec CRSAD Services Conseils
Contact: Nicolas Tremblay (conseilsapi@hotmail.com)

Saskatchewan
Contact: Hannah Neil (hannah.mae.neil91@gmail.com)

For more information, please contact:

Robyn McCallum, PhD, PAg
Lead Apiculturist, ATTTA
199 Dr. Bernie MacDonald Drive Bible Hill, NS B6L 2H5
(902) 896-0277 rmccallum@perennia.ca
http://www.perennia.ca/fieldservices/honeybees-and-pollination/
Nicolas Tremblay, agr.
Centre de recherche en sciences animales de Deschambault (CRSAD)
Conseiller Apicole Provincial 120-A Chemin du Roy Deschambault, QC G0A 1S0
(418) 806-1311 conseilsapi@crsad.qc.ca
www.crsad.qc.ca (Services-conseils apicoles)

(Version française)

Équipes canadiennes de transfert technologiques en apiculture
Un sommaire des quatre équipes au Canada
Par Robyn McCallum, Nicolas Tremblay, Hannah Neil et Les Eccles. 2017.

Il y a actuellement quatre équipes de transfert technologique en apiculture au Canada qui travaillent directement avec les apiculteurs afin d'analyser et de retransmettre de l'information. Ces équipes focussent sur l'amélioration de la santé des abeilles, la gestion des maladies et parasites, analysent la nutrition des abeilles, stimulent la recherche, y apportent des réponses et bien plus.

Un court sondage fut conduit auprès des quatre équipes pour déterminer les similarités, les différences, les opportunités et les défis auxquels elles doivent faire face. Six questions furent posées :

En quelle année votre équipe a-t-elle été mise ne place?
1) Quelle est la structure de financement de votre équipe?
2) Quels sont les principaux objectifs pour les prochaines années?
3) Nommez quelques accomplissements importants de votre équipe?
4) Nommez quelques défis auxquels l'équipe doit faire face?
5) Existe-il des possibilités de collaboration avec les autres équipes canadiennes?

Les réponses furent compilées et sont présentées un peu plus bas:

Tableau 1. Sommaire de la structure des équipes canadiennes de transfert technologiques en apiculture.

Considérations	Équipe			
	Atlantique	**Ontario**	**Québec**	**Saskatchewan**
Nombre d'apiculteurs dans la province ou région.	1,045	3,351	992	1,150
Nombre de ruches dans la province ou région.	47,762	105,431	57,743	112,000
Année d'établissement	2016 (plus récente)	Au début des années 90 (plus ancienne)	2006	2010
Structure de financement	Le Gouvernement fédéral, le fond pan atlantique, Oxford Frozen Foods, Jasper Wyman's and Son, L'Association des apiculteurs de la Nouvelle-Écosse, L'Association des apiculteurs du Nouveau-Brunswick, L'Association des apiculteurs de l'île-duPrince-Édouard, Bleuets NB Blueberries, Producteurs de bleuets sauvages, L'Association des producteurs de bleuets de la Nouvelle Écosse et de l'Île-duPrince-Édouard. Les gouvernements du NB, de la NÉ et de l'IPE.	Le ministère Ontarien de l'agriculture, de l'alimentation des affaires rurales (OMAFRA) pour 3 projets principaux (la mise en place de formations et d'ateliers, le programme de sélection d'abeilles domestiques ontariennes résistantes (ORHBS), fournir un soutien informatif aux associations d'apiculteurs régionales. D'autres projets grâce au financement de partenaires de financement provinciaux et fédéraux.	Le financement provient maintenant de contrats signés avec les apiculteurs, les producteurs de bleuets et de canneberges pour des inspections de force de ruche pendant la pollinisation, des projets de recherches et de l'enseignement. Note: Les producteurs sous contrat peuvent recevoir du financement sur les services grâce au réseau agri-conseil du ministère de l'agriculture des pêcheries et de l'Alimentation du Québec (MAPAQ).	La commission de développement des apiculteurs de la Saskatchewan, financé par la recherche en agriculture du gouvernement de la Saskatchewan, d'autres projets financés à l'externe comme le fond de développement en agriculture (ADF) et celui de la démonstration en agriculture des pratiques et technologies (ADOPT), doit se rapporter au comité de direction.

Principaux objectifs pour les prochaines années.	Élever des reines locales, améliorer la gestion du varroa, étudier l'efficacité de la pollinisation pour le bleuet sauvage, diminuer les pertes printanières.	Outils de gestion de la varroase, élevage d'abeilles, formations à l'industrie	Continuer à aider les apiculteurs, intégrer ApiExpert (outil technico-économique) dans plus d'entreprises et continuer à le rendre plus efficace, continuer les projets sur la pollinisation, développer une nouvelle application ApiProtection (cela permettra aux apiculteurs de localiser leurs ruchers mais de seulement rendre disponible ces localisations aux agronomes et aux vétérinaires du MAPAQ, ceci aidera les décisions au sujet des recommandations de pesticides, Disponible en avril 2018.	Établir la relation entre les suppléments alimentaires probiotiques et *Nosema ceranae*, la vaporisation de l'acide oxalique au printemps, essais sur les résidus d'Acaricides dans les cadres de couvain des apiculteurs les utilisant, démonstration sur la ruche kenyane et la « flow hive ».
Principales réalisations	Ateliers et formations populaires, essais d'efficacité et de résistance des acaricides, essais sur les densités de pollinisation, laboratoire de diagnostic de la nosémose disponible aux apiculteurs, échantillonnage pour le sondage national sur la santé des abeilles.	La suite des ateliers en ligne et sur le terrain pour les débutants et les avancés, le programme de sélection ORHBS, développement des meilleures pratiques, tester les nouveaux traitements de la varroase.	Garder des ruches vivantes et fortes tout au long de la saison dans le nord du Québec pour la pollinisation du bleuet sauvage, gestion de la nosémose sans antibiotiques, contrôle biologique du varroa, développer et superviser deux équipes d'inspecteurs pour les inspections de force de ruches pendant la pollinisation du bleuet sauvage et des canneberges. Rédiger plus d'une	Régulièrement vendre tous les billets pour les formations de démarrage à Regina et Saskatoon, cours intermédiaire et cours avancée d'élevage de reine, démonstrations de tests hygiéniques avec de l'azote liquide, démonstrations des méthodes de remplacement des reines,

			cinquantaine d'articles de vulgarisation dédiés aux producteurs. Rendre les services-conseils du CRSAD rentable.	projet de recherche de plusieurs années sur la gestion du varroa and sur la grosseur et la période de création des nucléi (rapport final 2018).

Défis	Le varroa, diminuer les pertes printanières, le petit coléoptère de la ruche, l'impact du prix bas du bleuet sauvage sur les contrats de pollinisation, sécuriser le financement pour après 2018.	Besoin de traitements de mi-saison pour la varroase, continuer de développer un élevage d'abeilles résistantes, s'assurer que les nouveaux apiculteurs aient accès aux bonnes informations.	Plus de personnel (seulement un conseiller) pour étendre la portée du service, améliorer la collaboration avec les vétérinaires et le conseiller.	Gérer la varroase, le domaine apicole est rentable mais petit, difficultés a attirer de nouveaux techniciens, sans chef d'équipe depuis deux ans.
Opportunités de collaboration avec les autres équipes de transfert technologiques.	Projets sur les miticides	Projets sur les miticides	Ouvert à la collaboration.	Projets sur les miticides : méthodes et temps d'applications, différences dans les méthodes de nourrissages.

Discussion

Année d'établissement

L'équipe de transfert technologique ontarienne existe depuis le début des années 90, tandis que les trois autres ont démarrés dans les douze dernières années. En mettant en place une collaboration commune, il serait peut-être possible de tirer profit de l'expérience de l'équipe ontarienne. Apprendre des succès et des défis du passé.

Structure de financement

Il y a de grandes différences entre les structures de financement des quatre équipes de transfert technologique du Canada. Mais toutes les équipes cherchent activement du financement pour effectuer leurs recherches et leurs objectifs de transfert. Il semble y avoir un important support financier provincial pour tous les programmes, l'équipe de l'Atlantique semble être celle qui reçoit le plus de financement de l'industrie. L'atlantique et le Québec sont engagés dans d'autres secteurs de production (bleuets sauvages, canneberges

(Québec) et apiculture). Un temps précieux, à la recherche de financement, est utilisé par tous afin de permettre de garder en place ces équipes.

Principaux objectifs pour les prochaines années.

Améliorer la gestion de la varroase est l'objectif premier de la majorité des équipes au Canada. Certains souhaite améliorer l'alimentation et étudier plus profondément *Nosema ceranae*. L'élevage de reine est mentionné par l'équipe de l'Atlantique et celle de l'Ontario. La pollinisation est mentionnée par les deux équipes les plus à l'est (Québec et Atlantique) et est relié principalement aux bleuets sauvages.

Principaux accomplissements.

Mettre en place et donner une grande variété de cours en apiculture fut souligné par de nombreuses équipes. Le Québec se démarquent par son implication dans la technologie par le développement d'applications et les traitements biologiques des maladies et parasites. L'Ontario à mis beaucoup d'emphase sur ces travaux avec l'ORHBS.

Défis

Des défis techniques et structurels furent soulevés. Le varroa continu d'être un défi pour les apiculteurs partout au Canada, des recherches doivent être effectuées sur les nouveaux miticides, leurs modes d'applications, leurs efficacités et le risque de résistance. De plus les pertes printanières, la pollinisation et l'élevage d'abeilles furent mentionnées.

Toutes les équipes font face à une pression pour assurer leur financement et d'avoir suffisamment de personnel pour atteindre leur mandat.

Opportunités de collaboration

Toutes les équipes de transfert technologique ont répondus qu'elles étaient prêtes à collaborer entre autres à un projet sur les miticides. Il semble que plusieurs équipes ne sont pas nécessairement conscientes des pratiques types utilisés dans les autres régions du pays (ex : prévalence des différentes méthodes de nourrissages dans les différentes régions, les miticides les plus utilisés au travers des régions, l'élevage de reine) et un sondage national afin de faire ressortir les similarités et les différences, les succès et les défis, aurait toute ça place.

Recommandations

Le développement d'un comité des équipes de transfert technologique faisant de l'association canadienne des professionnels de l'apiculture (ACPA) pourrait faciliter l'augmentation des communications entre les équipes. Les équipes seront encouragées à devenir actives dans ce forum.

Il semble y avoir de nombreux cours et ateliers en apiculture qui ont été développés et livrés indépendamment dans tout le pays. La communication entre les équipes pourrait permettrai de partager des spécialistes, de réduire les coûts en particulier pour les webinars.

Chaque équipe de transfert technologique est engagé dans des recherches pertinentes et innovantes dans le domaine de l'apiculture. Le partage de ces résultats et la mise en place de recommandations pourrait être avantageuse entre les régions (ex : les essais de densité en pollinisation au NB pourrait être utiles au Québec, les travaux sur les probiotiques en Saskatchewan peuvent servir à tous).

Promouvoir et présenter les succès et les défis des équipes de transfert technologique à la rencontre annuelle de l'ACPA pourra améliorer la communication et élever la conscience des équipes dans l'industrie. De futures promotions au niveau des événements pour les producteurs (apiculteurs, producteurs fruitiers) seraient avantageuses. Une compilation des succès et des directions futures des équipes de transfert technologiques et un partage avec les partenaires gouvernementaux devrait être considéré.

Informations de contact:

Atlantic Tech Transfer Team for Apiculture
Contact: Robyn McCallum (rmccallum@perennia.ca)

Ontario Tech Transfer Program
Contact: Les Eccles (les.eccles@ontariobee.com)

Québec CRSAD Services Conseils
Contact: Nicolas Tremblay (conseilsapi@hotmail.com)

Saskatchewan
Contact: Hannah Neil (hannah.mae.neil91@gmail.com)

Pour plus d'informations, contactez:
Robyn McCallum, PhD, Pag
Lead Apiculturist, ATTTA
199 Dr. Bernie MacDonald Drive
Bible Hill, NS B6L 2H5
(902) 896-0277 rmccallum@perennia.ca
http://www.perennia.ca/fieldservices/honeybees-and-pollination/

Nicolas Tremblay, agr.
Centre de recherche en sciences animales de Deschambault (CRSAD)
Conseiller Apicole Provincial
120-A Chemin du Roy
Deschambault, QC G0A 1S0
(418) 806-1311 conseilsapi@crsad.qc.ca
www.crsad.qc.ca (Services-conseils apicoles)

MOTION: **Motion to accept the Tech Transfer Team Report as submitted**
MOVED BY: **Marta Guarna**
SECONDED BY: **Clement Kent**
CARRIED

New Business
Shelley Hoover

1. Membership eligibility: veterinarians, other membership application

During our last meeting we formed a committee to examine this item. The committee didn't bring any recommendation to the executives. We need some directions from the membership on how to apply to application proposals regarding to veterinarians.

MOTION: The executives should interpret the existing membership rules that full membership requires that a person spends the majority of their work time on the tasks regarding honey bees.
MOVED BY: **Jason Sproule**
SECONDED BY: **Paul van Westendorp**
CARRIED

2. Insects affiliation agreement

The open source journal 'Insects' have approached AAPA and CAPA, and AAPA has signed an affiliation agreement with Insects. We are seeking recommendation from the membership of whether we should be affiliated with Insects.

Discussion ensued about the benefits to CAPA to be affiliated with Insects. Members did not think we should join Insects. A better approach would be to support AAPA on their efforts to try to get an ESA journal or North American Apidologie.

MOTION: CAPA to support AAPA initiative to establish a North American version of Apidologie or an ESA journal.

MOVED BY: **Marta Guarna**
SECONDED BY: **Leonard Foster**
CARRIED

Proposed Budget 2018

Budget Committee – presented by Rob Currie

We are still waiting for a few members to pay their dues, so there will be a change to the budget once that happens. We have changed the prediction of sales to reflect the same number of sales for next year as we did for this year. We expect to sell some at Apimondia but we decided to be more conservative. For all the GST/HST and interest we used the same number as this year. We have added a few items in the expenditure, which were discussed during the meeting yesterday (Apimondia, queen booklet, storage unit for storing books ordered for Apimondia, etc.). We deleted the budget set for a CAPA meeting, student award, and student presentation award in 2019 since we will not be planning an AGM in 2019. We added a budget line for the merit award, and an award to send a student to the AAPA conference. CAPA workshop development event was added to the budget but no money will be allocated for that next year since there will be no meeting in 2019. The Apimondia budget was increased by 5K.

2018 CAPA Financial Statement

GIC Term Deposit Balance	1-Jan-18	$ 20,729.80
Account Balance	1-Jan-18	$ 18,232.97
Paypal Balance	1-Jan-18	$ 15,318.51
Account opening balance		$ 54,281.28

REVENUE				Proposed 2019	As of October 29th, 2018	Projected as of Dec 31st 2018
Membership		cost	members			
12	2019 Full	40	44	$ 1,760.00	$ 480.00	$ 1,520.00
* if 50 full members pay. We need to continue to clean up the membership list						
2	2019 Associate	20	15	$ 300.00	$ 40.00	$ 360.00
* if 20 associate members pay. We need to continue to clean up the membership list						
18	2018 Full				$ 720.00	$ 720.00
5	2018 Associate				$ 100.00	$ 100.00
5	2017 Full				$ 200.00	$ 200.00
* We collected some of the 2017/2018 that did not pay their membership						
3	2017 Associate				$ 60.00	$ 60.00
Meetings						
11	2018 London Registrations				$ 990.00	$ 990.00
	2019 meeting (Nov 2018)			$ -	$ -	$ -
			Number of Sales			
2018 ENG Publication Sales			1200	$ 12,000.00	$ 12,198.36	$ 13,058.36
* 36,11$ not recovered						
	2018 FR Publication Sales		160	$ 1,600.00	$ 922.17	$ 922.17
	Spanish publication Sales		200	$ 2,000.00		
	Shipping/handling on publications	Shipping cost: $1.43		$ 2,230.80	$ 1,720.84	$ 1,847.72
	GST/HST collected			$ 668.55	$ 612.99	$ 668.55
* on publications and meeting registration						
	GIC Term interests			$ 5.00	$ 3.81	$ 3.81
	2015 HST Rebate			$ 163.29	$ 163.29	$ 163.29
	2016 HST Rebate			$ 499.55	$ 499.55	$ 499.55
				$ 21,227.19	**$ 18,711.01**	**$ 21,113.45**
Expenditures						
Publications						
S/H charges (all editions)				$ (2,230.80)	$ (1,831.60)	$ (2,000.00)
* for S/H of the reprint						
	Reprinting English and French Edition (0+ 0)			$ -	$ -	$ (14,000.00)
	Printing and typesetting of Spanish edition			(10,000.00)		
	Shipping honorarium (Janet Tam)			$ (150.00)	$ (105.95)	$ (105.95)
	Queen Document			$ (1,200.00)		
	storage			$ (800.00)		

Meetings			
2017 AGM Kelowna		$ (199.00)	$ (199.00)
2018 AGM London		$ -	$ (2,900.00)
2018 AGM London Remote access		$ -	$ (150.00)
Travel of Executive to meetings (CAPA,AIA, AAPA)	$ (2,000.00)	$ -	$ 590.00
IBRA Donation	$ (500.00)	$ -	$ -
CBRF Donation	$ -	$ -	$ -
Student Merit Award (2100 but no in 2019 fiscal year)	$ -	$ -	$ (2,100.00)
* 600$ + travel expenses			
Student Presentation Award (given in some years at research symposium)	$ -	$ -	$ -
CAPA MERIT AWARD new queen model or other	$ (2,000.00)		
AAPA student travel Award (too late to submit to ABRC?)	$ (2,100.00)		
CAPA Website Hosting	$ (600.00)	$ -	$ (600.00)
* Ask Mel Kempers. * Paid twice, we must have a credit for 2018		$ (271.99)	$ (271.99)
2019 GST/HST Payment	$ (668.55)	$ (102.25)	$ (102.25)
Misc. (cards, shipping, postage, gift card etc)	$ (5.00)	$ (18.89)	$ (18.89)
Banking Fees (includes PayPal)	$ (200.00)	$ (177.58)	$ (180.00)
Consult with Accountant (~40hrs X $100/hr?)	$ (4,000.00)	$ -	$ -
* Will not be used in 2018, but will be in 2019 (4000$)			
CAPA Workshop for members professional development	$ -		
Holding for Apimondia or give CHC	$(25,000.00)	$ -	$ -
Expenditures	**$(51,454.35)**	**$ (2,707.26)**	**$ (22,038.08)**
$ (19,330.82)	Oct 29-Dec 31 spending		
Revenue-expenditures	**$(30,227.16)**	$ 16,003.75	**$ (924.63)**
GIC Term Deposit (1 year cashable at 0.40%; Matures 25 May 2019)	**$ 10,510.00**	**$ 10,496.41**	**$ 10,496.41**
GIC Term Deposit (30 days renewable at 0.05%; Matures 25 November 2018)	**$ 10,242.00**	**$ 10,237.20**	**$ 10,237.20**
PayPal (October 29th, 2018)	**$ -**	**$ 2,272.20**	**$ -**
Cash in account as of October 29th, 2018	**$ 27,630.00**	**$ 47,279.22**	**$ 30,220.60**
Total Cash / Investments	**$ 48,382.00**	$ 70,285.03	**$ 50,954.21**
		Oct 28 2018	Dec 31 2018
Should maintain at least $15,000 RESERVE — Predicted Surplus/deficit	$ 18,154.84	actuals	estimate

Recommendation on GICs

MOTION: **To approve the modified budget as presented.**
MOVED BY: **Rhéal Lafrenière**
SECONDED BY: **Heather Higo**
CARRIED

Committee Selection
Shelley Hoover

President Shelley Hoover reviewed the membership of each Committee and revised accordingly with input from the membership.

2019 CAPA EXECUTIVE & COMMITTEES

Executive	Shelley Hoover	President
	Les Eccles	Vice-President
	Medhat Nasr	Past-President
	Renata Borba	Secretary
	Martine Bernier	Treasurer
Standing Committees		
IPM	Jason Sproule	Chair
	Geoff Wilson, Paul Kozak, Rhéal Lafrenière, Medhat Nasr, Stephen Pernal, Graham Parsons, Samantha Muirhead, Les Eccles, Tom Thompson, Valérie Fournier, Julie Ferland	
Importation and Bee Movement	Samantha Muirhead and Paul Kozak	Co-Chairs
	Rob Currie, Ernesto Guzman	
	Cameron Menzies, Julie Ferland	
	Les Eccles, Graham Parsons	
	All Provincial Apiculturists ex officio	
Research	Marta Guarna	Chair
	Leonard Foster, Paul van Westendorp, Ernesto Guzman	
	Pierre Giovenazzo, Les Eccles, Heather Higo	
	Amro Zayed, Valerie Fournier, Robyn McCallum	
Awards	Rob Currie	Chair
	Martine Bernier, Samantha Muirhead	
	Nicolas Tremblay, Rhéal Lafrenière	
	Paul van Westendorp, Mylee Nordin, Ernesto Guzman	
CBRF Committee	Leonard Foster Chair	
	(Marta Guarna to take over after the current meeting)	
	Board Rep: Rhéal Lafrenière	
Ad-Hoc Committees Publications	Janet Tam	Chair
	Steve Pernal, Martine Bernier	
	Nicolas Tremblay	
Tech Transfer	Nicolas Tremblay	Chair

	Daniel Borges, Hanna Neil, Robyn McCallum, Miriam Bixby Les Eccles	
Archives	Rob Currie Melanie Kempers, Mark Winston	Chair
Non-Apis Pollinators	Paul van Westendorp Rob Currie, Robyn McCallum David Ostermann, Patricia Wolf-Veiga, Kenna MacKenzie, Graham Parsons, Nicolas Tremblay, Ana Montero-Castaño	Chair
Editorial Disease Publication	Stephen Pernal Rob Currie, Ernesto Guzman, Nicolas Tremblay	Chair
Communications	Melanie Kempers Rob Currie, Cameron Menzies Rhéal Lafrenière, Nicolas Tremblay, Kelsey Ducsharm	Chair
National Winterloss Survey	Julie Ferland Stephen Pernal, Melanie Kempers Rhéal Lafrenière, Cameron Menzies, Shelley Hoover Geoff Wilson, All Pa's	Chair
Africanized Bee	Amro Zayed Steve Pernal, Rhéal Lafrenière, Geoff Wilson Les Eccles, Paul Kozak, Ernesto Guzman, Nuria Morfin	Chair
Apimondia 2019	George Martin Steve Pernal, Shelley Hoover, Pierre Giovenazzo, Paul van Westendorp, Mylee Nordin, Andrée Rousseau	Chair

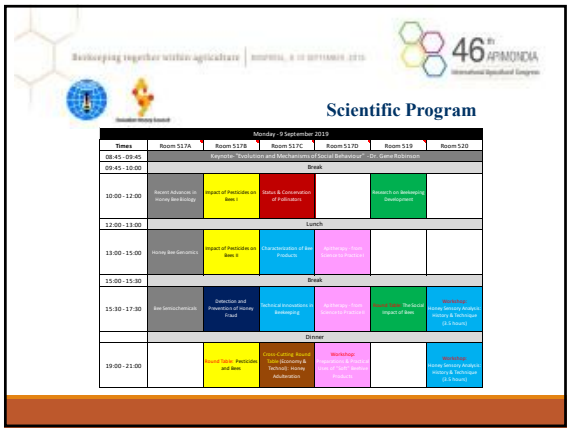
Action item: **The importation committee to communicate with CHC to define/to have conversation on work expectation with this committee**

MOVED BY: **Les Eccles**
SECONDED BY: **Renata Borba**
CARRIED

Meeting adjourned on Friday November 15th at 08:52. Moved by Shelley Hoover, seconded Renata Borba.

Appendix 1: 46th Apimondia – International Apicultural Congress

Pierre Giovenazzo and Stephen Pernal



Scientific Program

- 4 conference rooms simultaneously
  - Major room : English + French + Spanish
  - Other rooms: English + French
- Keynote speakers: 1 hour (8h45-9h45)
- Speakers: 15 minutes to 20 minutes (TBD)
- Posters (separate room)
- Round tables (ex. honey adulteration)
- Workshops (ex. Honey sensory class)

ApiExpo 2019

264 booths
4 401 m²

Registration

Officially opened 23rd April through the web

Description	Paid by 30-March-2019	Paid after 30-March-2019 and on site
Full Congress Entry Fee (member countries)	370 CAD	440 CAD
Full Congress Entry Fee (non-member countries)	445 CAD	520 CAD
Full Congress Entry Fee (developing countries)*	225 CAD	295 CAD
Full Congress Entry Fee (groups more than 10)**	300 CAD	375 CAD
Full Congress Entry Fee (students)***	225 CAD	225 CAD
Daily Entry Fee (congress + exhibition)	150 CAD	150 CAD
Add'l one Daily Entry Fee	60 CAD	60 CAD
Accompanying Person Fee****	225 CAD	225 CAD
Technical Excursion (per person)	139 CAD/each	139 CAD/each

Register Online

CLICK HERE TO PARTICIPATE TO THE APIMONDIA AMBASSADORS' PROGRAM

For any information on registration please contact apimondia2019.registration@gmail.com

Accommodations
http://www.apimondia2019.com/accommodations/
All listed Hotels are in walking distance and all are excellent choices!
Our Official Hotel is the Intercontinental

Tours
Fédération des apiculteurs du Québec is responsible
They have 3 tours and a "Welcoming Honey village"

World Bee Awards
Rod Scarlet in charge
+ Apimondia appointed a president: Enid Brown (from UK)

Promotion & Sponsorship

We have an active Website
Web site: http://www.apimondia2019.com/

We have an active Facebook page
Facebook: https://www.facebook.com/apimondia2019

Contacts

For any further information please contact:

APIMONDIA 2019 ORGANISING SECRETARIAT :
Website: http://www.apimondia2019.com

Rod Scarlett, chc-ccm@honeycouncil.ca;
Steve Pernal, Steve.Pernal@AGR.GC.CA;
Pierre Giovenazzo, pierre.giovenazzo@bio.ulaval.ca

CAPA $ contribution

CAPA Ad-Hoc committee Apimondia Montréal 2019

- Chair Pierre Giovenazzo
- Shelley Hoover
- Steve Pernal
- Paul van Westendorp

2018 CAPA money, $20 000, has not been used yet

CAPA $ contribution

Sponsorship opportunities

- Youth Workshop ($2500)
- CHC booth ($2500 help to pay for booth set up, CAPA has space for Honey Bee Disease book sales and CAPA promotion)
- Symposium "Breeding for disease resistance" ($2500 x 2 for Keynotes)
- CAPA travel Grants to young researchers ($2500 x ? grants)
- Officially sponsoring the Canada social event "Cocktail" (Sunday September 8)
- Best student Poster Award ($500 x ? awards; need CAPA judges)
- Best Student Presentation Award ($1000 x ? awards; need CAPA judges)
- Other suggestions?

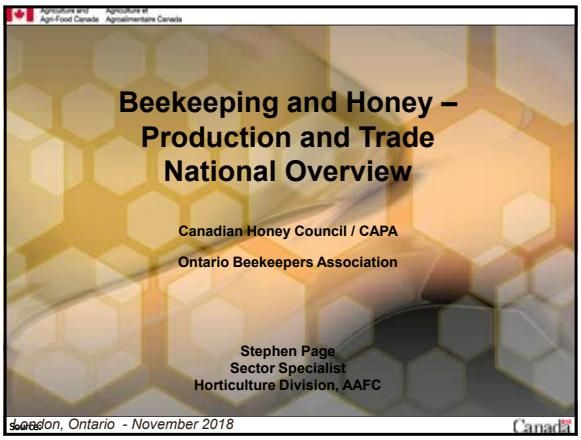
CAPA $ contribution

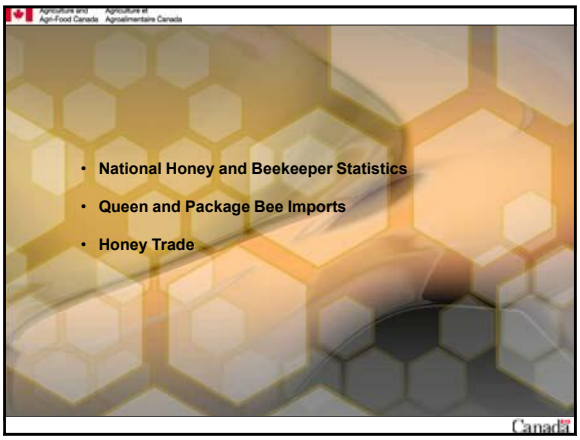
Propositions

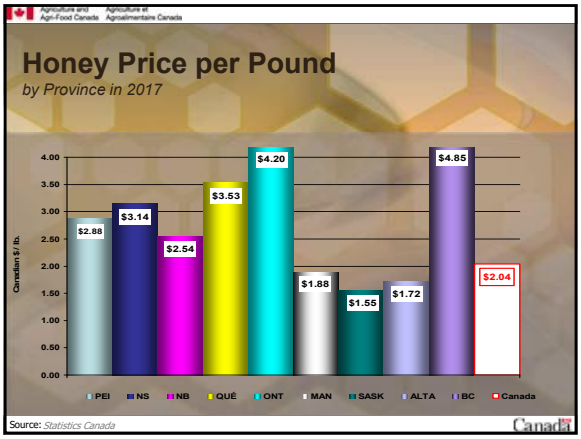
1. 2018 CAPA $20 000 contribution carried over to 2019;

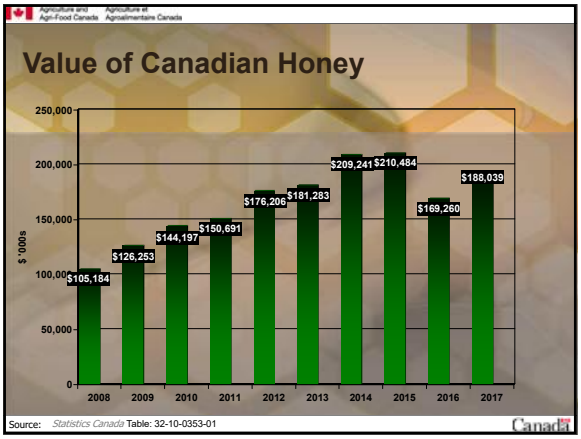
2. CAPA Ad-Hoc committee Apimondia Montréal 2019 has the authority to decide how the CAPA $ contribution will be used;

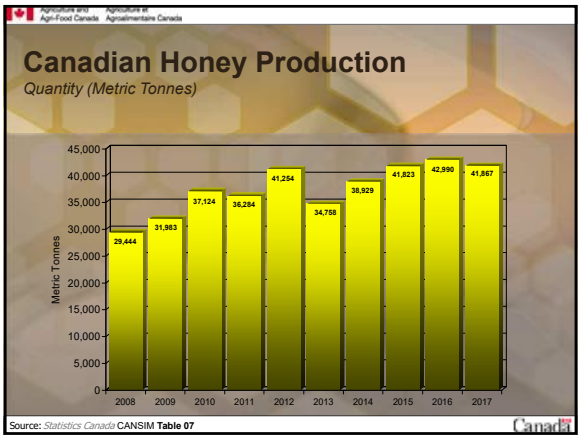
Appendix 2: AAFC Beekeeping and Honey – Production and Trade National Overview
Stephen Page

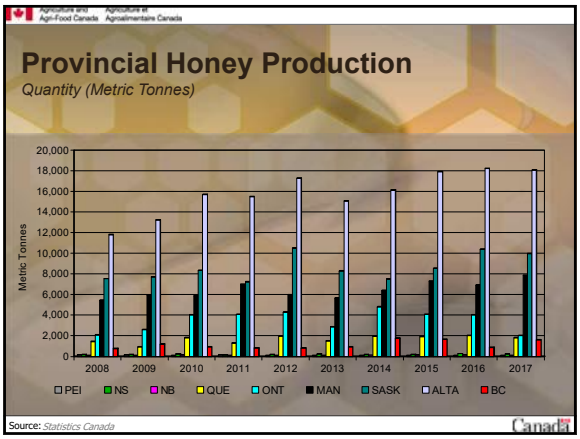


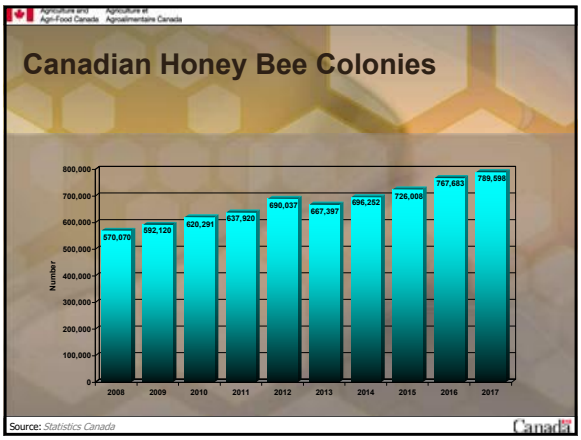


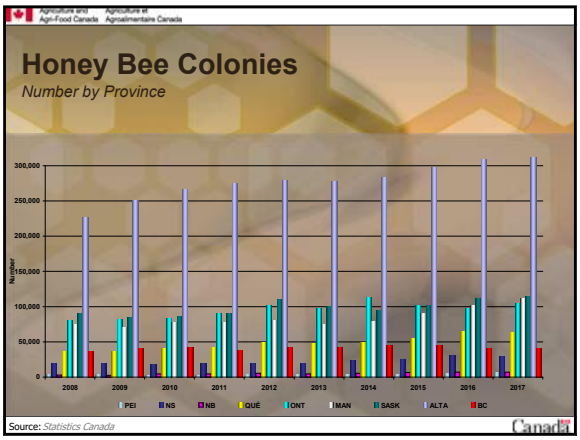


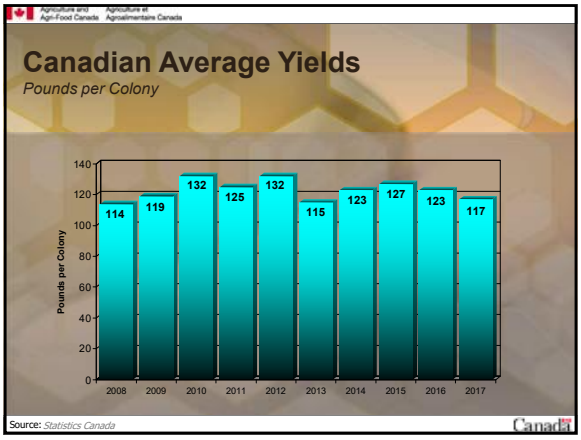


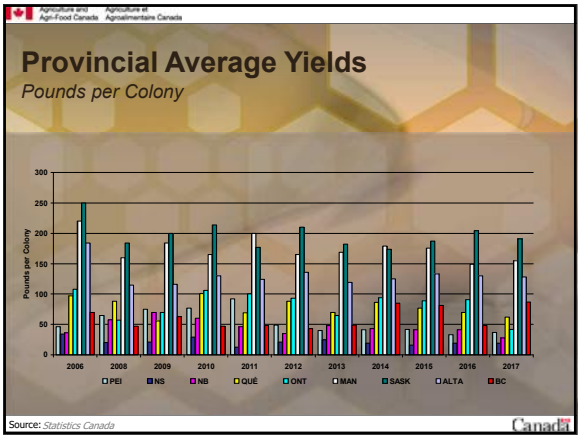


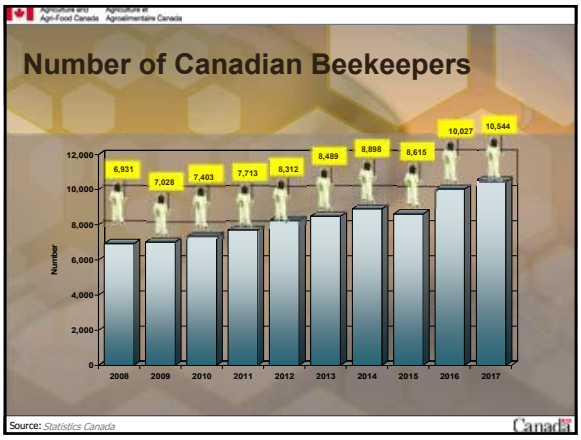


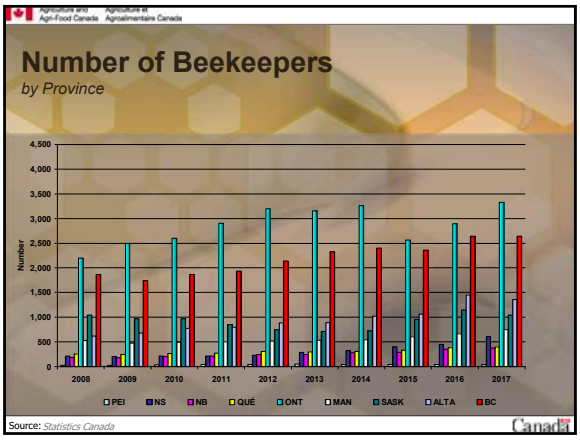

Canadian Honey Bee Colonies
Number
570,070
592,120
620,291
637,920
690,037
667,397
696,252
726,008
767,683
789,598
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Source: Statistics Canada
Canada

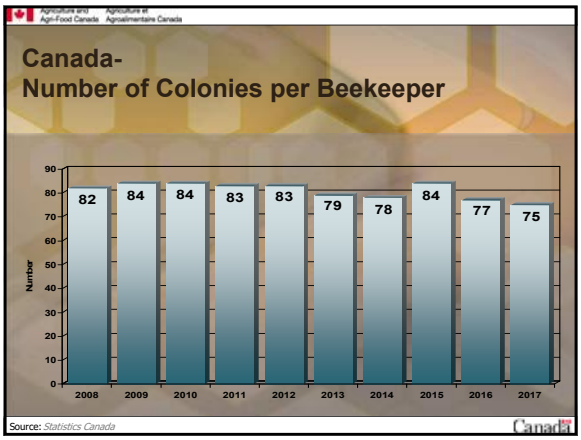

Honey Bee Colonies
Number by Province
Number
PEI
NS
NB
QUÉ
ONT
MAN
SASK
ALTA
BC
Source: Statistics Canada
Canada

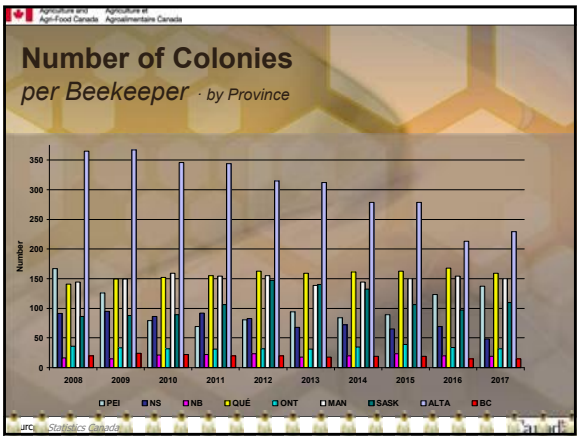

Canadian Average Yields
Pounds per Colony
Pounds per Colony
114
119
132
125
132
115
123
127
123
117
Source: Statistics Canada
Canada

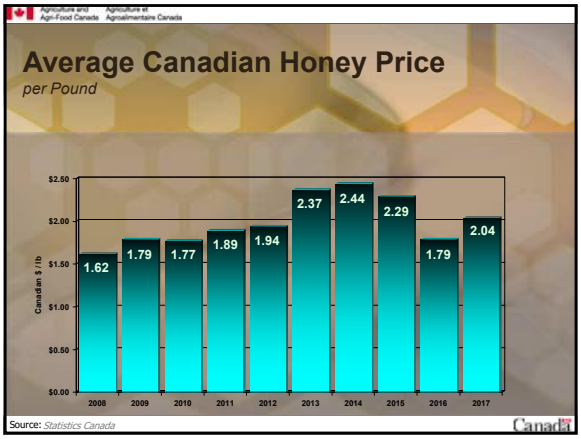

Provincial Average Yields
Pounds per Colony
Pounds per Colony
PEI
NS
NB
QUÉ
ONT
MAN
SASK
ALTA
BC
Source: Statistics Canada
Canada

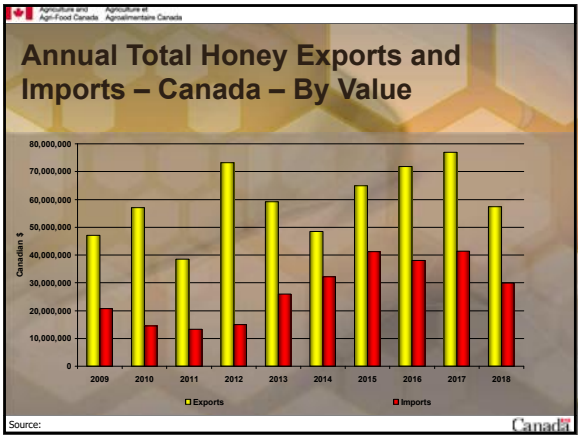

Number of Canadian Beekeepers
Number
6,931
7,028
7,403
7,713
8,312
8,489
8,898
8,615
10,027
10,544
Source: Statistics Canada
Canada

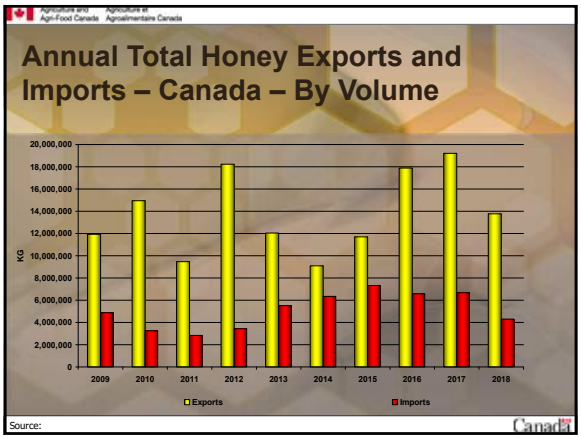

Number of Beekeepers
by Province
Number
PEI
NS
NB
QUÉ
ONT
MAN
SASK
ALTA
BC
Source: Statistics Canada
Canada









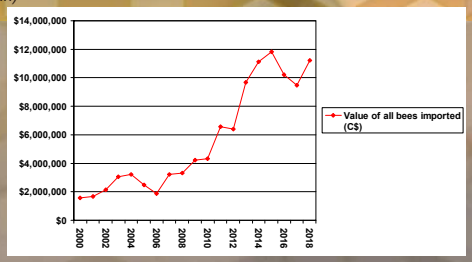


Honey imports to Canada	2018 - September C$	KG		YTD $/lb.
Total				$ 3.15
New Zealand	10,361,216	287,005		$ 16.41
Thailand	3,566,828	867,259		$ 1.87
Brazil	3,403,969	741,855		$ 2.09
United States	2,445,110	430,105		$ 2.58
Australia	2,166,672	226,573		$ 4.35
India	2,028,894	683,836		$ 1.35
Spain	1,069,281	226,452		$ 2.15
Greece	1,050,700	135,696		$ 3.52
Saudi Arabia	792,905	85,189		$ 4.23
Germany	592,167	86,135		$ 3.12
Viet Nam	334,382	127,023		$ 1.20
Turkey	301,818	82,063		$ 1.67
France	297,408	31,062		$ 4.35
Argentina	265,022	71,125		$ 1.69
Russian Federation	197,210	65,866		$ 1.36
Mexico	156,616	32,456		$ 2.19
Israel	105,447	9,031		$ 5.31
Zambia	96,136	13,850		$ 3.16
Romania	92,306	10,293		$ 4.08
Ukraine	77,511	22,839		$ 1.54
Austria	67,611	10,921		$ 2.81
	64,381	17,870		$ 1.66

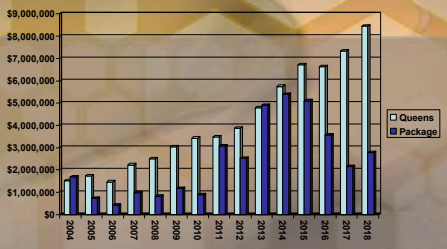
Honey Exports - 2018 to September	Total $	per lb price	Total KG
TOTAL	**57,391,419**	$ 1.89	**4,968,914**
United States	46,490,845	$ 1.84	1,796,256
Japan	9,056,333	$ 2.10	494,238
China	912,233	$ 2.72	329,800
South Korea	471,947	$ 2.20	315,367
Hong Kong	254,665	$ 2.72	281,403
Germany	81,223	$ 1.84	259,627
Taiwan	25,951	$ 2.65	230,840
Barbados	22,488	$ 2.86	213,593
Singapore	19,371	$ 2.49	207,844
Lebanon	18,722	$ 2.50	186,020
Kuwait	12,776	$ 2.50	145,868
Bermuda	9,945	$ 3.35	97,531
Netherlands	4,080	$ 2.93	84,862
Saint Pierre and Miquelon	2,896	$ 2.71	78,567

Total Value of Honey Bee Imports into Canada

($ Cdn)

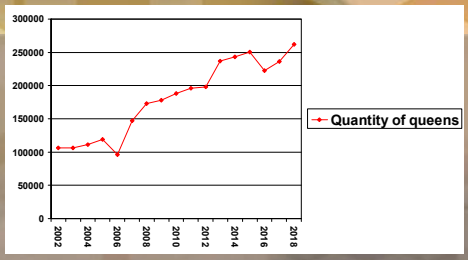


Value of Queens and Package Bees Imported to Canada



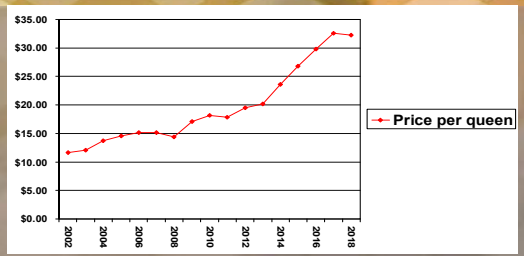
Queen Imports – Quantity

Canada, 2000 – 2015, Source Stats Canada Trade Data



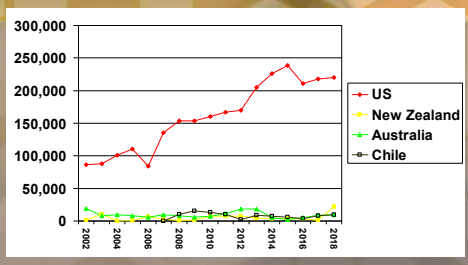
Queen Imports – Price per queen

Canada, 2002 – 2018, Source Stats Canada Trade Data



Queen Import Quantities by Source Country

Canada, 2002 – 2018, Source Stats Canada Trade Data



What would we like to know?

- Canadian queen production
- Canadian queen prices
- Prices for Nucs

- Hive movements between provinces
- Prices for pollination

- Split export prices for packaged and bulk honey
- Inventory held between harvests
- More?

Bee Health Roundtable:

- Unique opportunity – varied stakeholders together
  - Achievements to date:
    - Guide to prevent bee poisonings
    - BMPs
    - Planting/Forage Guide
    - Research Gap
- Now is the time to identify any work/projects/topics that can be undertaken together
- Nutrition/habitat forage cooperation
- Improving communications
- Extending opportunities to support bees – perhaps like “Communities in bloom”, or cooperation like the Western blueberry research underway?

Apimondia 2019

Appendix 3: USA Apiculture Report (AIA)
Samantha Brunner, AIA President

USA Report

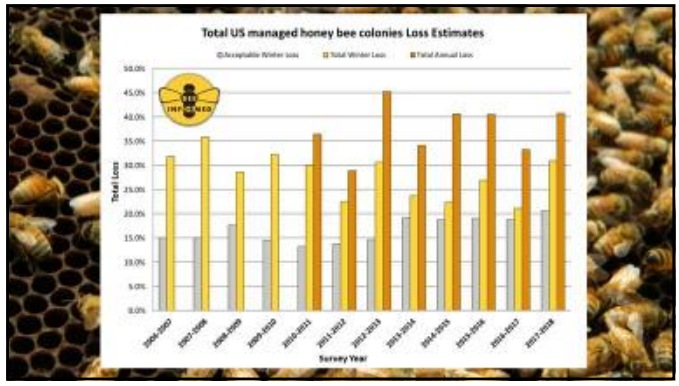
Samantha Brunner
President, Apiary Inspectors of America
North Dakota State Apiary Inspector

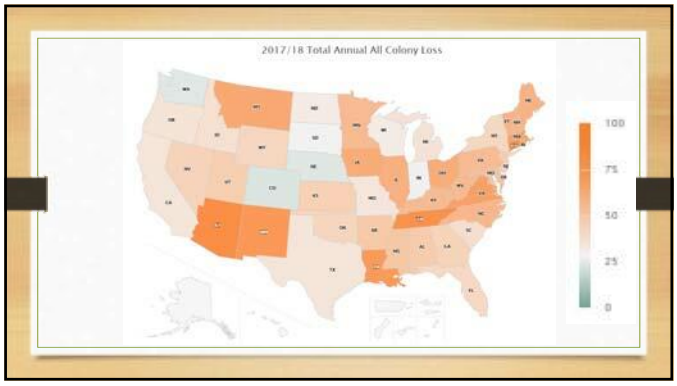
USA Colony Numbers 2017

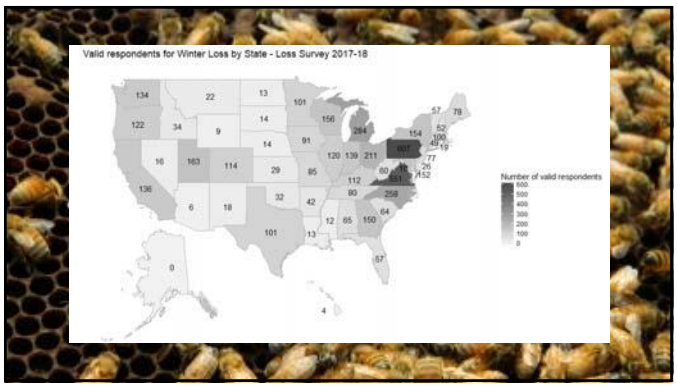
- USDA NASS estimates between **2.69 million to 2.99 million** hives in the US belonging to beekeepers with at least 5 hives in their operation.

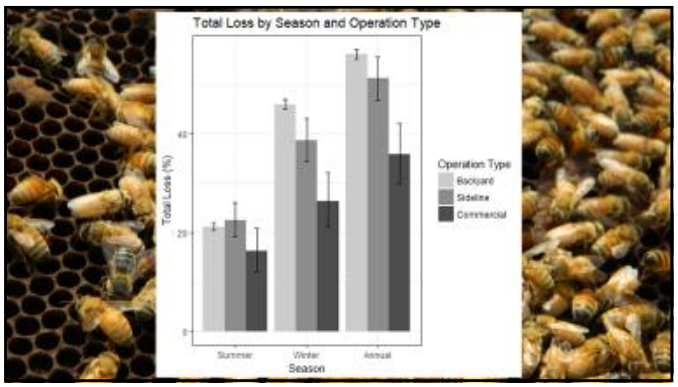
Survey Data

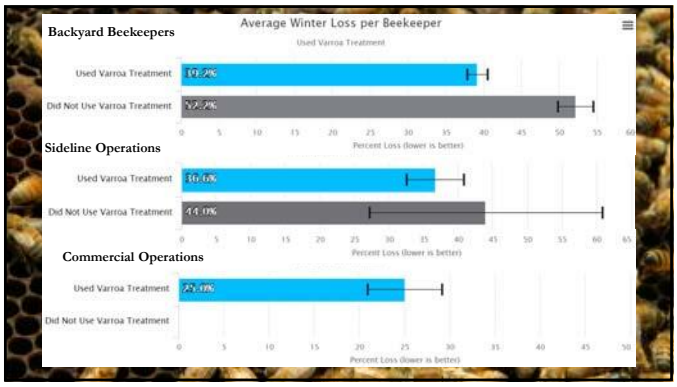
- **Two surveys of convenience**
  - **National Loss survey** (winter, summer, annual)
  - **National Management survey** (~82 questions) regarding year round management
    - Feed, treatment, winter prep, queens, etc.
- Technical Transfer in-field data:
  - 5 tech teams sampling >110 commercial operations around the country
- Other (Sentinel, etc.)
- APHIS National Honey Bee Survey
- USDA/ARS Diagnostic data
- State Apiary Data

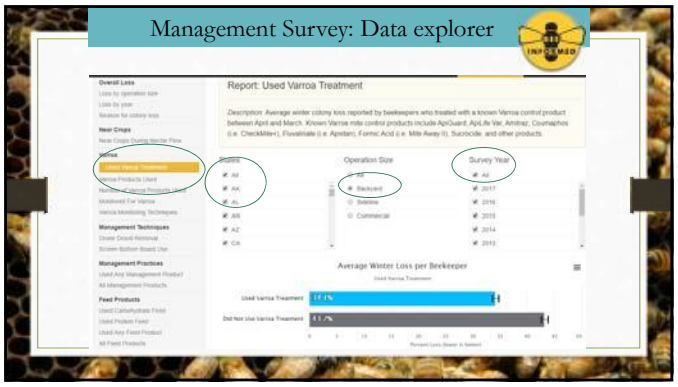


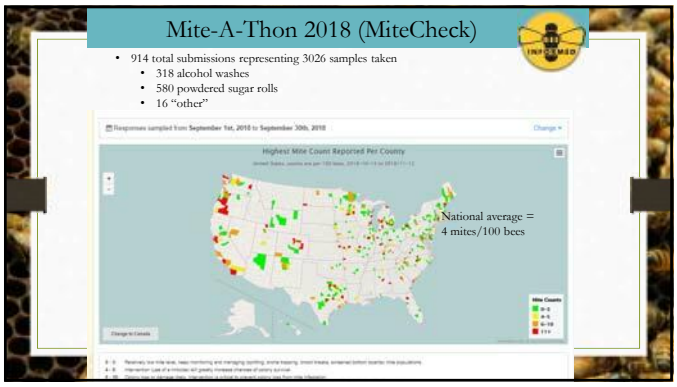


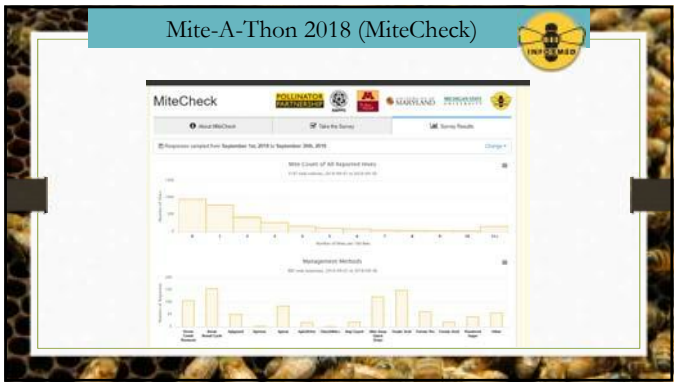

Valid respondents for Winter Loss by State - Loss Survey 2017-18
Number of valid respondents


Total Loss by Season and Operation Type
Total Loss (%)
Season
Summer
Winter
Annual
Operation Type
Backyard
Sideline
Commercial


Backyard Beekeepers
Average Winter Loss per Beekeeper
Used Varroa Treatment
Used Varroa Treatment
Did Not Use Varroa Treatment
Percent Loss (lower is better)
Sideline Operations
Used Varroa Treatment
Did Not Use Varroa Treatment
44.0%
Percent Loss (lower is better)
Commercial Operations
Used Varroa Treatment
Did Not Use Varroa Treatment
Percent Loss (lower is better)

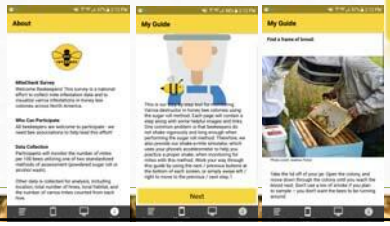

Management Survey: Data explorer
Report: Used Varroa Treatment
Operation Size
Survey Year
Average Winter Loss per Beekeeper


Mite-A-Thon 2018 (MiteCheck)
914 total submissions representing 3026 samples taken
318 alcohol washes
580 powdered sugar rolls
16 "other"
Highest Mite Count Reported Per County
National average = 4 mites/100 bees


Mite-A-Thon 2018 (MiteCheck)
MiteCheck

MiteCheck app coming!

- Sugar roll training videos
- Data entry right into MiteCheck from phone
- Will be available on iPhone and Android by end of year
- Citizen Science – all data entered into single database and heat map as shown on Mitecheck page

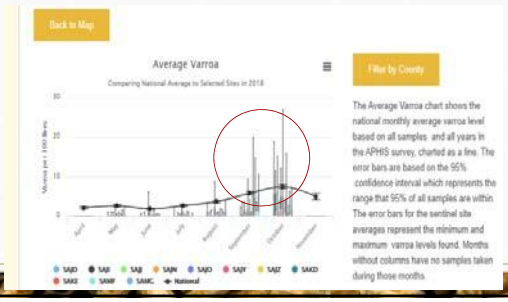


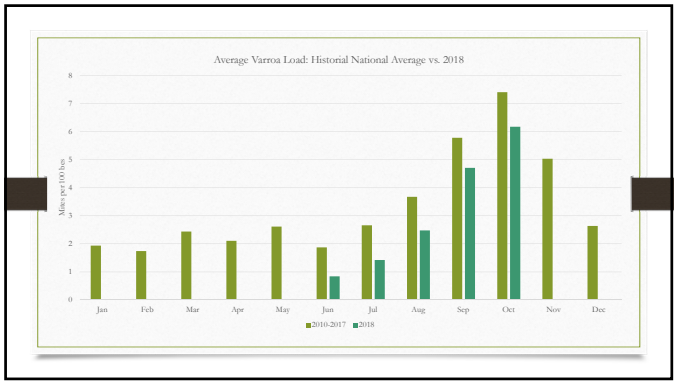
BIP Sentinel Heat Map

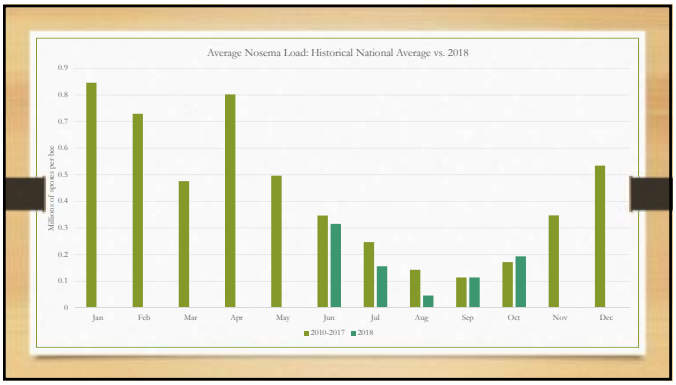
Can select any participating state and see varroa or nosema levels

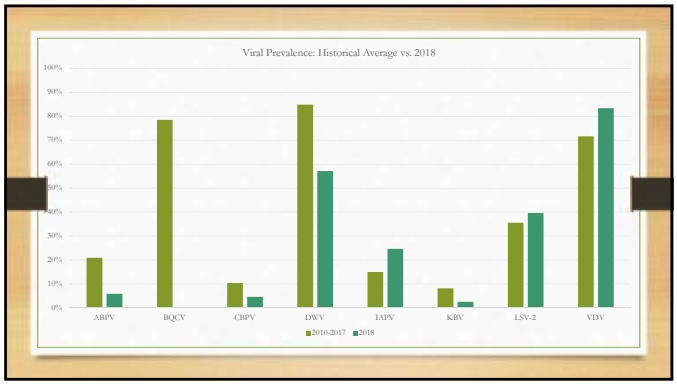
Let's choose MN…

BIP Sentinel: Sept/Oct





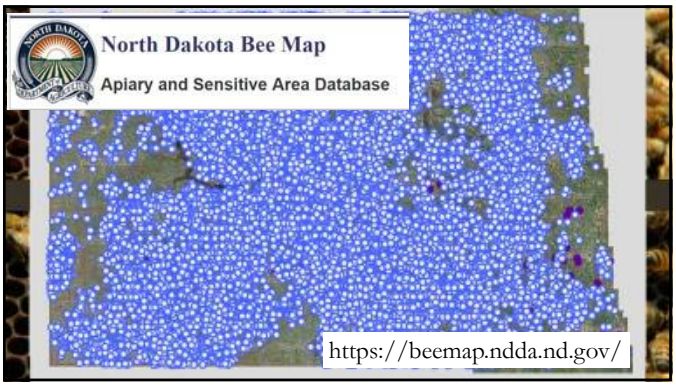




North Dakota Update

North Dakota 2018

- Colonies 674,335 –up 9%
- Beekeepers 308 –up 4%
- Apiaries 16,906 –up 5%



Inspections

- Health inspections done on about 3% of all registered locations.
  - Internal inspections done at beekeeper's request
- External Compliance checks- about 5% of all registered yards
- 54% of yards had Varroa mites, highest we recorded was over 13%
- 9.4% of yards were positive for Small Hive Beetles, at low levels
- 3 yards with Chalkbrood
- 1 with symptoms European Foulbrood
- 0 American Foulbrood

Voluntary Apiary Pre-Inspection Program California Border Station Inspections

- Pilot program in ND this year
- Inspections done in ND instead of at the border station
- Must be shipments going directly to CA from ND (no overwintering in other states)
- Must clean all equipment prior to inspection
- Must be inspected for Small Hive Beetles if going to certain CA counties

American Honey Producers Association
An Organization of Beekeepers for Beekeepers

2019 American Bee Research Conference

January 8-12, 2019 Tempe, AZ

Apiary Inspectors of America


Samantha Brunner
State Apiary Inspector
Plant Industries Division Director
701-328-4765
sbrunner@nd.gov

Appendix 4: AAPA Update Report
Michael Simone – Finstrom, AAPA President

What we've been up to South of the Border:

American Association of Professional Apiculturists Update

Mike Simone-Finstrom, AAPA President
USDA-ARS, Honey Bee Breeding, Genetics and Physiology Research Lab
Baton Rouge, LA

AAPA Membership Overview

- Currently ~130 active members
  - 38 Universities
  - 16 Extension-based institutions
  - 7 Research-based industry and government institutions
- Current officers
  - Judy Wu-Smart (University of Nebraska—Lincoln), Vice President
  - Maggie Couvillon (Virginia Tech), Secretary and Treasurer
  - Supporting committee leaders

Major activities: Annual conference

- Annual conference in conjunction with industry convention
  - Alternates between American Beekeeping Federation and American Honey Producers Association
  - Early January
- Joint with Apiary Inspectors of America
  - Efforts for more connections between AAPA and AIA
- Last three years ~125 official registrants (plus through beekeepers)
  - ~45-50 oral presentations (students, postdocs, lead investigators)
  - ~10-15 poster presentations at industry sponsored evening reception

Major activities: Annual conference

- Conference proceedings published
  - Previously done in a trade journal
  - Last two years published in *Bee World*
  - Overview article timed with proceedings publication in American Bee Journal
- *Bee World* may not want to continue, based on number of pages, though they've been happy with the traffic it generates
- *Possibly* publish with *Insects* in the future

Major activities: Awards

- Conference-based awards
  - Awards for student presentations (oral only, possibly poster this year)
    - 1 award for every 6 student entries
    - This year 18 students are presenting, so there will be 3 awards
    - $200 each
  - Post-doc travel grant
    - 1 award, last year was the first time awarded
    - Covers registration and travel cost to the conference up to $1000
    - Initiated due to general lack of travel grant opportunities for post-docs
    - <5 applications for each of last two years

Major activities: Awards

- Student Research Scholarship
  - Annual award to recognize outstanding research by graduate students
    - 1 award
    - $1000
    - 16 applications this year
- Extension Award
  - 1 award, last year was the first time awarded
  - Up to $1000 to support a specific extension activity
  - Initiated to help support extension programs as funding specific to extension programming is limited
  - Very few applications last year and this year, likely not to continue

Major activities: Announcements

- Listserv is the go-to for all apicultural research announcements for US
- Gets disseminated to 2-3 other listservs as well
- Best way to connect to the network of researchers

Major activities: *Insects*

- Discussions at last conference and business meeting:
  - How do we better "advertise" our association to inform and recruit new research groups that are conducting honey bee research?
  - Can we organize, as an organization, a special issue for a journal to highlight US/North American honey bee research by AAPA member labs?
  - More applied honey bee research sometimes doesn't have a great home for publication
  - The potential need to find a home for future proceedings
- In 2018 became an *affliated* organization with the journal *Insects*

Major activities: *Insects*

- Benefits to affiliation
  - 15% off publication fees for all association members
  - Annual publication of a special issue, free publishing of conference proceedings
  - Potential use of *Insects* for job and conference announcements
- Drawbacks
  - ???
  - Not wanting to have any association with a specific journal, journal logo on website
- AAPA was previously associated with Apidologie (logo is still on hard copy printings, though AAPA has zero affiliation and they've been completely uninterested in doing anything with our organization. History is unclear.)

Major activities: *Insects*

- The 2018 Special Issue
  - Co-edited with Margarita Lopez-Uribe (Penn State)
  - 23 number of titles were submitted for possible inclusion
  - 15 number of papers were submitted and on schedule
  - 9 number already accepted, 4 in revision
- Topics covered
  - Colony health, focusing on queens and drones (3)
  - Stressors: Pesticides and interacting factors (5), Disease/viruses (2)
  - Management related to stocks, beekeeping and supplements (3)

Insects Special Issue: Considerations

- *Insects* is an online only journal and relatively new
  - This is first year with an impact score, 1.85
- Due to online nature, all articles are assessed open access publication charges
  - For special issues, fees of the editor-authored papers are waived
  - Fees for 5 articles can be fully waived, or 10 can receive half of charges waived
  - They will make into a "book" for free if desired
- Overall, the journal is well setup to handle everything and seems to be built for this sort of thing

Insects Special Issue: Considerations

- *Insects* is VERY pushy in terms of getting immediate responses and decisions made
  - We have had to continually pushback on this (focus on quantity vs. quality)
  - *Really* wanted to publish everything as quickly as possible vs. our interest in publishing as a group for a more traditional special issue
  - Too business-like/corporate?
- Editorial interface is extremely clunky
  - As the main editors, have less control over review requests then ideal, but this can be remedied with extra communication
  - Though the journal is ultimately responsible for finding enough reviewers and sending reminders (a positive and a negative)

Insects Special Issue: The Future

- Inaugural issue likely to be fully published in December 2018
- Discussion for our next business meeting whether to continue
  - *Insects* has almost too many special issues
  - Is this the best venue? If not, who is?
  - Could set the stage for a North American *Apidologie* if interest continues or add support to the initiation of an ESA run journal
- Our proposal is to do the issue bi-annually
  - Influenced by CAPA's involvement and when/if you would like to start
- We have worked out some of the major kinks and understand the system, but could still use some work

Proposed links for AAPA and CAPA

- A joint special journal issue
- Student awards
  - CAPA and AAPA student travel awards to fund participation in the other organization. AAPA would fund someone to go to CAPA and vice versa.
    - Gives the students a chance to attend an international conference
    - Creates networking opportunities across the border
  - AAPA awards for assistance to Apimondia 2019 (if able to present)
- Joint conference
  - Every three years hold a joint AAPA/CAPA meeting, rotating between Canada and the US

Let's discuss!

Michael.SimoneFinstrom@usda.gov

Appendix 5: National Survey Update
Patricia Wolf-Veiga, NBDC acting-manager

GPRC
National Bee Diagnostic Centre
Technology Access Centre

National Honey Bee Health Survey: 2014-2017

Patricia Wolf Veiga (NBDC-TAC)

National Bee Diagnostic Centre /AAFC

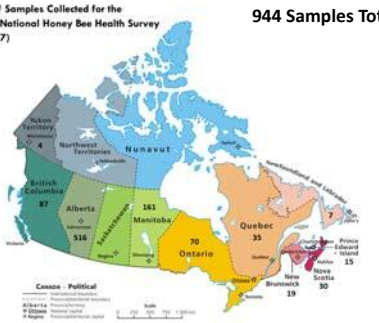
National Bee Diagnostic Centre /AAFC

Survey overview

- **Goal:** Determine the incidence and distribution of pests, pathogens and parasites affecting honey bees and establish the presence or absence of exotic threats to the beekeeping industry.
- **Target:** 0.5% of all registered colonies. In proportion to distribution and density of colonies within province.
- **Field Inspections**
- **Laboratory test**
  I. Nosema
  II. Varroa
  III. Tracheal mites
  IV. AFB and EFB
  V. 8 viruses
  VI. Neonicotinoids
  VII. Exotic Threats

Number of Samples Collected for the Canadian National Honey Bee Health Survey (2014-2017)

944 Samples Total



Acknowledgements: Technicians

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Patricia Wolf Veiga


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Emily Ryan


Dr. Carlos Castillo


Dr. Steve Pernal


Thomas Schweizer

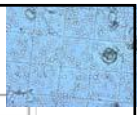

Bill Farney

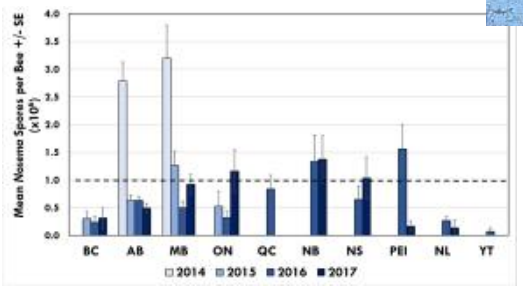

Jeff Kearns, Shelley Hoover, Lynae Ovinge

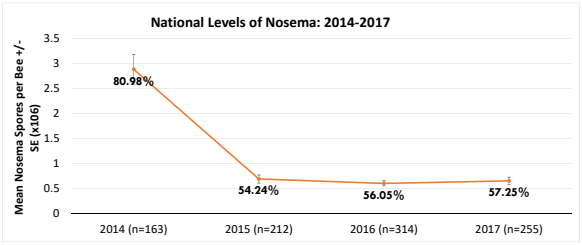

Elena Battle

*Not pictured, Ron Anderson

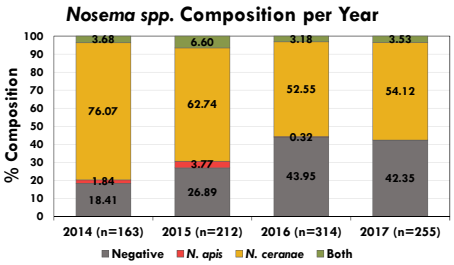
Nosema





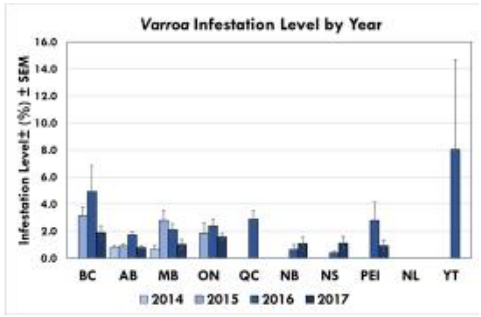


Nosema

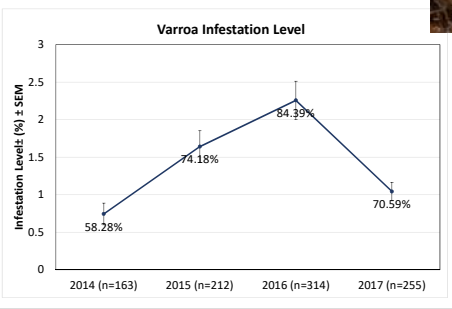


- *Nosema ceranae* the most prevalent species
- Single infections of *Nosema apis* becoming rare

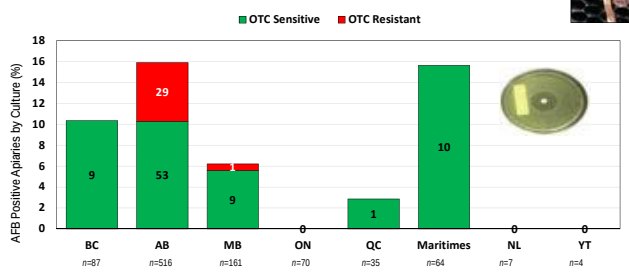
varroa



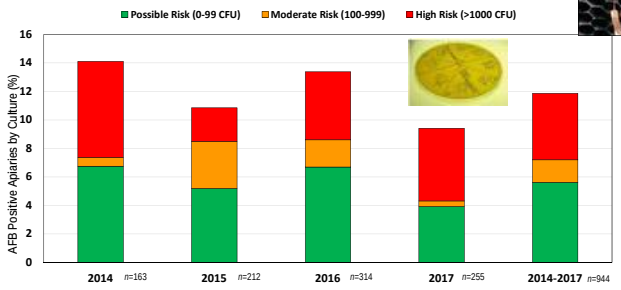
varroa



AFB Prevalence / Resistance by Province – 2014 - 2017



Apiary Level AFB Risk in Canada: 2014 - 2017

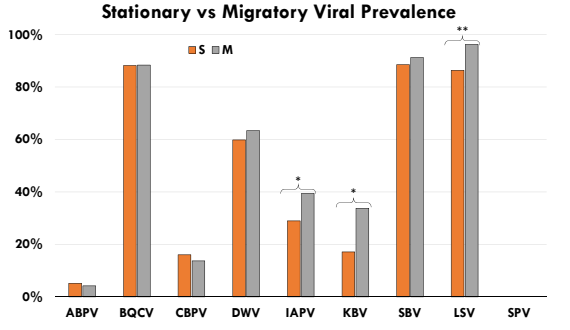


viruses

- The most prevalent viruses detected were BQCV, DWV and SBV.
- ABPV was the least prevalent, found in only few apiaries.
- Lake Sinai Virus complex (1-4) was identified in samples from all provinces in 2017.

Photo credits: Rob Snyder, beeinformed.org

Stationary vs Migratory Viral Prevalence



*=P<0.05, **= P<0.0001

Exotic threats

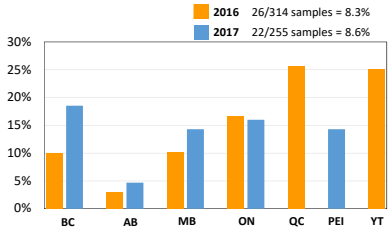
- Exotic parasite: *Tropilaelaps*
- Exotic pest: *Apis cerana*
- Exotic virus: Slow Bee Paralysis Virus

Not Detected

Photo credit: Pest and Diseases Image Library, Bugwood.org

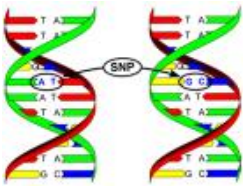
*These results provide empirical evidence to support Canada's zoosanitary status for the trade of bees with other countries

African origin – by mtDNA



* Tested by the method recognized by CFIA to certify queen exports from the U.S.

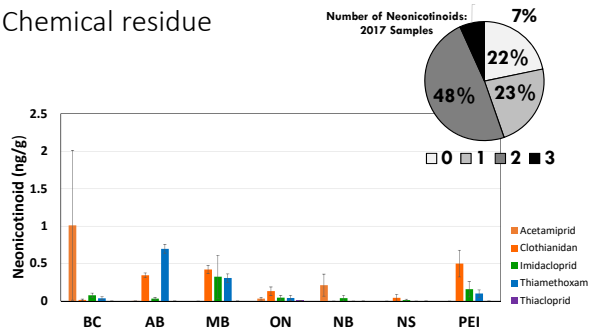
African origin – by SNPs (Genomic DNA)



2016 samples ranged from 0.6 to 15.9%
2017 samples ranged from 0% to 11.5%

All samples were below 25%
Threshold be considered Africanized

Chemical residue



* On average, these levels are below those normally associated with sub-lethal effects on honey bees

National Survey Phase 2 (2019-2022) - Proposal

- 4 years project:

a. 350 samples National Survey – 10 provinces

a. 150 Samples Temporal Study – 4 times per year

a. Exotic threats

a. Outbreaks and Emergent

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Technology Access Centre

Questions and Comments

GPRC | VITAL

Appendix 6: Provincial Apiarists Report
British Columbia

2018 PROVINCIAL APIARIST(S) ANNUAL REPORT

PROVINCIAL APIARIST(S):	Paul van Westendorp

BEEKEEPING STATISTICS

Number of Beekeepers	2,676
Number of Producing Colonies	52,033
Average Yield/Colony (kgs) & (lbs)	30 kg (~66 lbs)
Total Estimated Crop (Kgs x1000) & (lbs x1000)	1,542 kg / 3,392 lb (x 1,000)
Colonies Wintered (2017-18)	48,100
Estimated Percent Winter Mortality (%)	34%

INSPECTION STATISTICS	**Number of Colonies Inspected**	**Number of Beekeepers Inspected**
	3,600 (+1,700)	na

GENERAL COMMENTS

Wintering comments: For example: provincial winter survey results synopsis (3 paragraphs).	Colonies were not in the best condition in the fall of 2017 because of exceptionally poor spring build-up and major forest fires in the summer. While winter weather and varroa remain as the main contrubuting factors of high winter losses, many beekeepers continue to apply poor mite •
Inspection comments: For example: inspection program priority setting, disease inspection and analysis synopsis (3 paragraphs).	BC Apiculture Program has seen an expansion of inspection and extension services, up to 10 Apiary Inspectors in key areas (~seasonal, part=time). A total of approximately 3,600 colonies had been inspected. In early spring (2018) and additional 1,700 colonies had been inspected of Prairie No SHB has been diagnosed in any apiary in 2018. Central Fraser Valley remains key area of anticipated beetle introduction.
Production comments: For example: honey production statistical data collection and information synopsis (3 paragraphs).	Honey production in central BC may have been impacted by forest fires. Colony has shot up from approximately 40K to over 52K. This is not because of greater economic opportunties but more beekeepers registering •

Alberta

2018 PROVINCIAL APIARIST(S) ANNUAL REPORT

PROVINCIAL APIARIST(S):	Samantha Muirhead, Senior Research Technologist & Shelley Hoover, Acting Provincial Apiculturist

BEEKEEPING STATISTICS

Number of Beekeepers	1,801
Number of Producing Colonies	312,218
Average Yield/Colony (kgs) & (lbs)	Not yet available
Total Estimated Crop (Kgs x1000) & (lbs x1000)	Not yet available
Colonies Wintered (2017-18)	274,087
Estimated Percent Winter Mortality (%)	24.8% dead, 33.9% winterloss including non-viable colonies <4 frames by May 21st

INSPECTION STATISTICS

Number of Colonies Inspected	Number of Beekeepers Inspected
3,572	29

GENERAL COMMENTS

Wintering comments: For example: provincial winter survey results synopsis (3 paragraphs).	• The overwintering results where taken from all beekeepers registered with Alberta as of October 29, 2018. This represents 99.6% of colonies overwintered in 2017/2018, and the AF survey was used to calculate non-viable rates. • Winterkill is up from 2017 (29% including non-viable colonies < 4 fames on May 21st) and higher than winterlosses experienced by beekeepers over the previous 10 years (22%) The 2017-18 winter was unusually long and cold in Alberta, contributing to the increased loss rate.
Inspection comments: For example: inspection program priority setting, disease inspection and analysis synopsis (3 paragraphs).	• Alberta focused its inspection program on Small hive beetle detection within its SHB quarantine zone. 8 beekeepers in the zone had a total of 2,841 colonies inspected for the beetle. No beetles were found. • The remaining beekeepers where inspected to move their colonies to overwinter in British Colombia, or for selling colonies potentially out of province. A smaller number of inspections for reports of disease were not included in this report. • 3 cases of AFB were found in 3 different operations. Corrective actions where taken to control the disease
Production comments: For example: honey production statistical data collection and information synopsis (3 paragraphs).	• Survey results on honey production were not available at the time of writing this report. Statistics will be available late 2018 or early 2019

Saskatchewan

2018 PROVINCIAL APIARIST(S) ANNUAL REPORT

PROVINCIAL APIARIST(S):	**Geoff Wilson**

BEEKEEPING STATISTICS

Number of Beekeepers	1059
Number of Producing Colonies	115 000 (estimated)
Average Yield/Colony (kgs) & (lbs)	Not Yet Available
Total Estimated Crop (Kgs x1000) & (lbs x1000)	Not Yet Available
Colonies Wintered (2016-17)	115,000
Estimated Percent Winter Mortality (%)	28

INSPECTION STATISTICS

Number of Colonies Inspected	Number of Beekeepers Inspected
1542	55

GENERAL COMMENTS

Wintering comments: For example: provincial winter survey results synopsis (3 paragraphs).	Many beekeepers reported higher than anticipated loss in 2017/18 throughout the province Losses appear to be associated with a late arrival of warm temperatures in the spring Varroa were reported to be under thresholds and had little reported impact on wintering
Inspection comments: For example: inspection program priority setting, disease inspection and analysis synopsis (3 paragraphs).	Training of veterinarians was high priority for 2018, with courses for the SVMA, and Western College of Vet Medicine Most inspections are performed for sales or export - colonies are also inspected on suspicion of disease potentially increasing incidence of disease AFB was identified in 6 beekeeping operations, this increase is likely because of beekeepers attempting to reduce reliance on antibiotics - there were no incidences of SHB
Production comments: For example: honey production statistical data collection and information synopsis (3 paragraphs).	Honey production is expected to be lower than the five year avearge. Many beekeepers did not purchase replacement colonies, but replaced colonies from within their own operation through nucs and splits. This Dry weather and smokes from fires through much of the production area reduced the number of production days - this likely affected the bees ability to collect a crop.

Manitoba

2018 PROVINCIAL APIARIST(S) ANNUAL REPORT

PROVINCIAL APIARIST(S):	Rhéal Lafrenière, Provincial Apiarist & Daryl Wright, Bee Inspection Program Contractor

BEEKEEPING STATISTICS

Number of Beekeepers	834
Number of Producing Colonies	114,098
Average Yield/Colony (kgs) & (lbs)	164.3 lbs/colony (74.7 kg/colony)
Total Estimated Crop (Kgs x1000) & (lbs x1000)	18745.3 lbs (8501.7 kg)
Colonies Wintered (2017-18)	111,802
Estimated Percent Winter Mortality (%)	24.7

INSPECTION STATISTICS

Number of Colonies Inspected	Number of Beekeepers Inspected
4,067	203

GENERAL COMMENTS

Wintering comments: For example: provincial winter survey results synopsis (3 paragraphs).	• In terms of winter losses, 2017-18 appears to be average to slightly higher than average. Including spring culls up to May 21, 2018, winter mortality was calculated to be 24.7%. • In terms of colonies represented in the calculation, I received data from 60,443 full colonies and 12,936 nuclear colonies, for a total of 73,379 colonies or 64% of the colonies in the province. • For a detailed report on winter losses in Manitoba, please go to http://manitobabee.org/hive/category/newsletter/ Fall 2018 pages 8-10
Inspection comments: For example: inspection program priority setting, disease inspection and analysis synopsis (3 paragraphs).	• The inspection program priority is to inspect all commercial beekeeping operations (>50 colonies) every two years and non commercial beekeeping operations every four years. • The inspection program is contracted out to Daryl Wright Consultant and the annual agreement is to inspect approximately 4000 colonies per year. • Three (3) cases of AFB were identified through the inspection program and corrective measures are being taken to control the spread of the disease.
Production comments: For example: honey production statistical data collection and information synopsis (3 paragraphs).	• Honey production in 2018 was below average at 164 lbs per colony. Low precepitation throughout most of the summer produced near drought conditions in many parts of the province.The honey flow ended in July for many of the beekeeperse in the eastern portion of the province, where as the west had a slower start to the season but overall had a longer season and closer to average production (i.e. 170 lbs/colony). • General reports on the condition of the colonies going into winter were that varroa mite levels in the fall were low and the colony populations appeared smaller than usual. Reports of little brood production in August due to the shortage of natural pollen was common, especially by beekeepers in eastern and south central Manitoba.

Ontario

2017 PROVINCIAL APIARIST ANNUAL REPORT					
PROVINCIAL APIARIST:	Paul Kozak				
BEEKEEPING STATISTICS					
			Notes		
Number of Beekeepers	3,026		Beekeepers registered as of October 29, 2018		
Number of Producing Colonies	100,413		Colonies registered as of October 29, 2018		
Average Yield/Colony (lb/kg)	See honey survey				
Total Estimated Crop (lb/Kg x1000)	See honey survey				
Colonies Wintered (2017/2018)	62,236 (commercial)		Number of colonies wintered by commercial beekeepers in Fall of 2017. Based on results of the 2017/18 Winterloss Survey		
Average Winter Mortality (%)	45.7 (commercial)		Average winter mortaliaty of commercial beekeepers. Based on results of the 2017/18 Winterloss Survey		
INSPECTION STATISTICS	**Number of Colonies Inspected**	**Number of Beekeepers Inspected**	**Disease Colony Incidents (%)**	**Disease Beekeeper Incidents (%)**	
AFB	6,425	249	1.39	2.81	
EFB	6,425	249	0.00	0.00	
Chalkbrood	6,425	249	0.25	2.81	
Sacbrood	6,425	249	0.08	2.01	
Tracheal Mite					
Varroa Mite	2,257	230	23.13	48.70	As of Oct. 31, 2018
Small Hive Beetle	22,070	249	0.17*	1.21	*The Ontario Apiary program tracks SHB by location rather than colonies. Lab testing is used to confirm SHB infestation in a new location. Yards that have been confirmed positive in previous years are typically not sampled for SHB.
Other					

Quebec

2018 PROVINCIAL APIARIST(S) ANNUAL REPORT

PROVINCIAL APIARIST(S):	Julie Ferland Québec

BEEKEEPING STATISTICS

Number of Beekeepers	1129 (all beekeepers) / 290 (with 10 colonies and more)
Number of Producing Colonies	65 128 (all) / 62 638 (10 colonies and more)
Average Yield/Colony (kgs) & (lbs)	29,9 kg (65,78 lbs) / productives colonies (2017 data, estimated by ISQ)
Total Estimated Crop (Kgs x1000) & (lbs x1000)	1689 metric tons (total production beekeepers with more than 6 colonies, ISQ)
Colonies Wintered (2017-18)	62 403 (257 beekeepers with 10 colonies and more)
Estimated Percent Winter Mortality (%)	31.90%

INSPECTION STATISTICS	**Number of Colonies Inspected**	**Number of Beekeepers Inspected**
	3870 inspected colonies (12 911 colonies present)	92 beekeepers (any kind and reason of inspection/visit included), 154 interventions

GENERAL COMMENTS

Wintering comments: For example: provincial winter survey results synopsis (3 paragraphs).	• 257 respondents to the survey (10 colonies and more, 62 403 colonies), 31,9% of global winter mortality • principal causes of loss: Weather, Week colonies in fall, Queen problem and uncontrolled varroa •74,2 % of operation did varroa surveillance, majority with sticky board. Formic acid, oxalic acid and thymol are most frequent used treatments. Apivar is the first choice when a synthetic pesticide is chosen.
Inspection comments: For example: inspection program priority setting, disease inspection and analysis synopsis (3 paragraphs).	The majority of inspections are carried out by request of beekeepers who suspected a disease or a problem in their hives or who need a health attestation by our bee veterinarians. Small hive beetle (SHB) surveillance is the only one mandatory surveillance in Québec. Notification of SHB infestation is mandatory in Québec since 2012. For 2018, active surveillance for SHB was again carried out in southwestern Québec along the U.S. (Montégérie-Ouest) and Ontario (Pontiac and Vaudreuil-Soulange) border in august and beginning of september. 477 hives inspected by Top bar inspection and Beetle Bee Gone (BBG) traps installed during 10 to 14 days (1211 hives present in apiaries) located in 56 apiaries owned by 19 beekeepers. No adult beetle was found in this active surveillance. 3 SHB cases reported in Québec in 2018: CASE 1- in June in imported queens from California, CFIA detected the adult SHB in one cage. CFIA placed the lot in quarantine but authorized movement to 2 different locations. MAPAQ did a second inspection on all cages and ask to recage all queens in new cage before distribution to differents buyers. CASE 2- 29 june 1 adult found in hive of a comercial beekeeper during mandatory inspection after pollination in another province. We asked to install BBG in 100% of hives of the operation. Between June 29 and september 26, 7 adults have been found in 4 apiaries of this operation. Larvae have been found in two apiaries between July 5th and 10th. Hives with larvae were burn immediatly on place. Neighbors beekeepers and apiaries have been followed by MAPAQ inspector and traps have been installed in all hives in 10km radius of positive sites and we recommand to install traps in all hives of neighbors operations. No SHB found in neighbors at this time. Follow up will continu next year. All of these beekeepers are under volontary quarantine with movement restriction. CASE 3- self-report by hobbyist beekeeper very close to the USA border in Montérégie in September. Isolation order has been issued for this non-registrated beekeeper. Some adults were found in 1 small apiary. Control measures and interventions have been take for control the infestation and a follow up will be do next spring.For the moment, the more plausible source is a beetle flying over the US border. Inspection of every apiary in a 10 km radius around the infested apiary has been carried out and no SHB found. We did a visual Top bar inspection in 394 Ontarian hives when placed in Quebec in blueberry fields (25% of 1586 introduced hives). These Ontario hives had been inspected by OMAFRA before being allowed to enter Quebec. We inspected 25% (55/200) Ontario hives in cranberries pollination too. No SHB found in these inspections. Visual Top-bar inspection was also done in hives bought in Ontario by Qc beekeepers. 100% of all Qc hives were inspected when they come back into Quebec after being in Ontario for the season (honey production) or in New-Brunswick for a part of the season (blueberry pollination). Inspection level varied in function of the exposition risk in the other province. We continu to investigate suspected cases of bee poisoning by pesticides as reported by beekeepers (mainly targeting acute poisoning). For 2018, around 10 declarations led to an investigation by MAPAQ staff. In 3 of these suspicions, the concentration of pesticides in bees was high enough to explain, the observed acute mortality and the 3 cases was link to the use of Spinosad during cranberries pollination. One very interesting case implicate caged queens and pesticid, need more work... Our lab performed 69 bacterial culture for research of *Paenibacillus larvae*, 11 positive cultures was obtain from 3 different operations and American foulbrood was confirmed in these 3 operations (positive culture + clinical signs). All strains of cultured *P. larvae* are tested for resistance. No AFBr strain was detected in 2018. Lab performed 66 bacterial culture for research of Europeen foulbrood (*M. plutonius*). 16 positive cultures was obtain from 7 different operations (with clinical signs). Acarapis woodi was not found in all analyzed samples. We performed 133 *Nosema* spores count from 44 operations. We performed 62 PCR analyzes for determine *Nosema* species from 17 different operations (*N. ceranae* alone in 62 samples, 0 *N. apis).*
Production comments: For example: honey production statistical data collection and information synopsis	Based on ISQ (Institut de la statistique du Québec) report for 2017 season (published on 2018 June), total honey production reach 1689,1 metric tons in Québec (17,4% decrease compared to 2016). Honey production per colony is estimated to 29,9 kg, 18,1% of decrease compared to 2016. •2018 had a very bad beginning but the honey production seem to increase during the summer (who was relatively dry and very hot) and the fall production was interesting and allow beekeepers to save the 2018 production. It will not an exceptionnal season but probably not as bad as 2017. • ISQ report will be available in 2019 for 2018 production

New Brunswick

2018 PROVINCIAL APIARIST ANNUAL REPORT

Provincial Apiarist: Chris Maund

A. Beekeeping Industry Statistics

. No. of Beekeepers	388
. No. of Producing Colonies	11,998 total (8,141 producing honey)
. Average Yield/Colony (lb/Kg)	57.6 / 26.1
. Total Estimated Crop (lb/Kg x1000)	469.1 / 212.8
. Colonies Wintered (2017/2018)	12,761
. Average Winter Mortality (%)	30.3

B. Diseases and Pests

Beekeeper Disease/Pest	Number of Colonies Inspected	Number of Beekeepers Inspected	Disease Colony Incidence (%)	Disease Incidence (%)
. AFB	372	90	0	0
. EFB	372	90	2.2	1.1
. Chalkbrood	372	90	-	0.3
. Sacbrood	372	90	0	0
. Tracheal Mite	NA			
. Varroa Mite	NA			
. Other	NA			

C. Comments

- The total number of registered beekeepers is calculated as the number of beekeepers registered in the current year and in the previous three years.
- NA = not available.
- The total number of colonies includes colonies producing surplus honey and ones not producing surplus honey.
- **Spring monitoring for the small hive beetle:** The adult stage of the small hive beetle (SHB), *Aethina tumida* Murray, was monitored with a Beetle Bee-Gone ® cloth in New Brunswick (NB) colonies in May 2018, from NB beekeepers who had the SHB in 2017. Twelve adult SHB were found in 10 NB honey bee colonies, only in colonies overwintered indoors. None were found in colonies overwintered outdoors. This was the first report of the SHB surviving the winter in NB in colonies overwintered indoors. (The report is in the proceedings.)
- **Summer monitoring for the small hive beetle:** The adult stage of the small hive beetle (SHB), *Aethina tumida* Murray, was monitored with a Beetle Bee-Gone ® cloth in NB colonies in July 2018, which were near Ontario colonies which had been imported from SHB positive apiaries for wild blueberry pollination. One adult SHB was found in the NB colonies. This finding suggested that the improved 2018 New Brunswick honey bee importation requirements, which used the Beetle Bee-Gone ® cloth and stricter requirements, reduced the introduction and subsequent spread of the SHB in Ontario colonies to nearby New Brunswick ones. (The report is in the proceedings.)
- NB beekeepers near Maine were educated on monitoring the small hive beetle with the Beetle Bee-Gone ® cloth and SHB literature.

Small Hive Beetle, *Aethina tumida* Murray, Monitoring in New Brunswick Honey Bee Colonies in the Spring of 2018 – Preliminary Report

Andrew Byers (Apiary Inspector), Michel Melanson (Blueberry / Apiculture Specialist;
Apiary inspector – DAAF), Chris Maund (Integrated Pest Management Specialist
(Entomologist) and Provincial Apiarist – DAAF)

Introduction

The adult stage of the small hive beetle (SHB), *Aethina tumida* Murray, and suspected SHB larvae were found for the first time in New Brunswick (NB) on June 1, 2017. These were found in Ontario honey bee colonies brought to NB for the pollination of wild blueberries in the northeastern part of the province. During this time, twelve NB beekeeping operations were identified as having their honey bee colonies within a 3 km radius of the SHB positive Ontario colonies. Colonies from these twelve NB beekeeping operations were monitored throughout the summer of 2017 (July 6 to September 11) by staff from the NB Department of Agriculture, Aquaculture and Fisheries (DAAF). Of these twelve NB beekeeping operations, seven were subsequently proven to have colonies positive for the SHB. This was the first report of the SHB being found in honey bee colonies owned by NB beekeepers. Once the SHB was confirmed present in NB colonies, it was necessary to determine whether or not the SHB could overwinter in NB honey bee colonies. Consequently, this project was developed to monitor for SHB in the spring of 2018 before the importation of honey bee colonies for pollination.

Materials and Methods

During the spring of 2018 (May 2 to 31), DAAF staff monitored NB honey bee colonies to determine if the SHB overwintered inside honey bee colonies in the province of New Brunswick. Colonies from five out of the seven NB beekeepers who had the SHB in 2017 were monitored in the spring of 2018. A portion of the apiaries (13) owned by these five beekeepers were monitored. Five hundred and thirty-five (535) colonies out of 722 colonies from these five beekeepers were monitored. The percent of colonies monitored per apiary ranged from 44% to 100%, with smaller apiaries having a larger percentage of colonies monitored, compared to the larger ones. One microfiber cloth (Beetle Bee-Gone®) was placed across the top bars, in the corner, under the inner cover in each colony monitored. The sheet was placed in the corner of the hive since SHB tend to crawl to the corners or the perimeter of the hive to avoid honey bees. A portion of the cloth was held between the hive body and the inner cover to help keep it in place, Figure 1. The microfiber cloth was left in the colony for a minimum of two weeks prior to inspection.

Figure 1. Placement of Beetle Bee-Gone microfiber cloth in hive.

The Beetle Bee-Gone ® cloth (beegoodsmercantile.com) is a 12 X 15 cm cloth sold for trapping adult SHB. The texture of the cloth is similar to that of a fabric softener or dryer cloth.

Honey bees try to remove the cloth from the hive by chewing on it and pulling apart the fibers. The beetles then become entangled in the shredded areas of the cloth and die.

Results and Discussion

Following the spring inspections, the SHB was found in only two of the five monitored beekeeping operations. The SHB was found in four out of six apiaries monitored from these two beekeepers. One SHB was found in each of the three positive SHB apiaries and nine SHB were found in the fourth SHB positive apiary. The fourth positive apiary had seven positive colonies with nine SHB found. Twelve adult SHB were collected from ten colonies. All SHB found were from colonies overwintered indoors.

The infestation rate per positive colony was low, averaging 1.2 SHB per colony. The percent of SHB positive colonies monitored was 1.9% (10/535). The percent of colonies monitored was 74.1% (535/722).

This project focused on the monitoring of the adult stage only, nevertheless no other SHB life stages were observed.

The microfiber cloths were successful in trapping adult SHB, although the effectiveness was not evaluated. The cloth was shredded by bees if the colony was of sufficient strength and there was sufficient time for the bees to pull enough fibers from the microfiber cloth to entangle the adult SHB, Figure 2.

Although some apiary inspectors have reported that queens have been trapped in microfiber cloths, no queens were trapped in any of the 535 microfiber cloths inspected.

A very low percentage of cloths (< 1%) were missing. It was suspected that the cloths had been shredded or pulled between the frames by the bees prior to the end of the observation period.

Figure 2. Microfiber cloth being shredded by honey bees.

Conclusion

Following the spring inspections, it was concluded that the SHB adult was able to survive in NB honey bee colonies overwintered indoors. The microfiber cloths were successful in monitoring adult SHB during New Brunswick's spring weather.

Acknowledgements

This project was funded by the Canadian Agricultural Partnership Agri-Industry Development and Advancement, Advancing Crop and Livestock Sectors: Improving Crop and Livestock Health and Quality

The authors would like to thank the New Brunswick Beekeepers Association and the New Brunswick beekeepers involved in this project for their cooperation.

Small Hive Beetle, *Aethina tumida* Murray, Monitoring in New Brunswick Honey Bee Colonies in the Summer of 2018 – Preliminary Report

Andrew Byers (Apiary Inspector), Michel Melanson (Blueberry / Apiculture Specialist, Apiary Inspector – DAAF), Chris Maund (Integrated Pest Management Specialist (Entomologist) and Provincial Apiarist – DAAF)

Introduction

The adult stage of the small hive beetle (SHB), *Aethina tumida* Murray, and suspected SHB larvae were found for the first time in New Brunswick (NB) on June 1, 2017. These were found in Ontario (ON) honey bee colonies brought to NB for wild blueberry pollination in the northeastern part of the province. During this time, twelve NB beekeeping operations were identified as having their honey bee colonies within a 3 km radius of the SHB positive Ontario colonies. Colonies from these twelve NB beekeeping operations were monitored throughout the summer of 2017 (July 6 to September 11) by staff from the NB Department of Agriculture, Aquaculture and Fisheries (DAAF). Of these twelve NB beekeeping operations, seven were subsequently proven to have colonies positive for the SHB.

In 2018, spring monitoring of NB colonies showed for the first time that the SHB overwintered in New Brunswick honey bee colonies which were kept indoors during the winter. In the spring, two NB beekeeping operations were SHB positive out of five that were SHB positive the previous year.

To help prevent the reintroduction of SHB from imported ON colonies, improved importation requirements for honey bee colonies were made prior to the 2018 importation of colonies. The purpose of the summer SHB monitoring program was to determine the SHB infestation level in NB colonies nearby the ON colonies from SHB positive apiaries. This would give some indication as to whether or not the new 2018 importation requirements were more effective regarding the SHB. Additionally, the project was to monitor the level of the SHB in colonies from NB beekeepers who had the SHB in 2017.

Materials and Methods

Staff from the NB Department of Agriculture, Aquaculture and Fisheries (DAAF) monitored NB honey bee colonies to determine whether or not they would become infested with the SHB. Monitoring was done from July 3 to 26, 2018. Beekeeping operations were selected either due to proximity to high risk locations (i.e. nearby Ontario honey bee colonies from SHB positive areas), movement of colonies to high risk locations during blueberry pollination or for being previously SHB positive. Twelve beekeeping operations with a total of 34 apiaries were selected for monitoring in the summer of 2018, Table 1. Six of these twelve NB beekeeping operations were SHB positive in 2017. Locations of the selected apiaries were in various parts of the province, Figure 1. Apiaries were sampled at a rate of between 50 and 100%.

Table 1. Beekeeping operations, apiaries and colonies monitored for the small hive beetle in the summer of 2018

Beekeeper reference number	Apiaries monitored	Colonies monitored	Total colonies	Percent of colonies monitored per colonies in monitored apiaries
1	2	27	27	100
2	1	20	20	100
3	5	23	29	79
4	1	7	7	100
5	4	57	57	100
6	4	49	49	100
7	2	32	32	100

	8	1	36	36	100
	9	8	287	612	47
	10	3	52	52	100
	11	1	10	10	100
	12	2	32	64	50
Total	**12**	**34**	**632**	**995**	**64 (632/995)**

Microfiber cloths (Beetle Bee-Gone ®) were placed in colonies to determine the presence of adult SHB. One cloth was placed across the top bars under the inner cover in each colony monitored. The sheet was placed in the corner on the top bars since SHB tend to crawl to the corners or perimeter of the hive to avoid honey bees. A portion of the cloth was held between the hive body and the inner cover to help hold it in place.

The Beetle Bee-Gone® cloth is a 12 X 15 cm cloth sold for trapping adult SHB. The texture of the cloth is similar to that of a fabric softener or dryer cloth. Honey bees try to remove the cloth from the hive by chewing on it and pulling apart the fibers. The beetles then become entangled in the shredded areas of the cloth and die.

One beekeeping operation was also selected for supplementary monitoring using pollen patties to identify additional life stages of the SHB. One pollen patty was placed on the top bars of selected colonies to attract SHB adults to lay eggs. The pollen patties were inspected seven days later by the beekeeper for suspected SHB larvae and after another seven days by the inspector. Cloths were removed and inspected for SHB adults twelve to fourteen days after placement on the top bars.

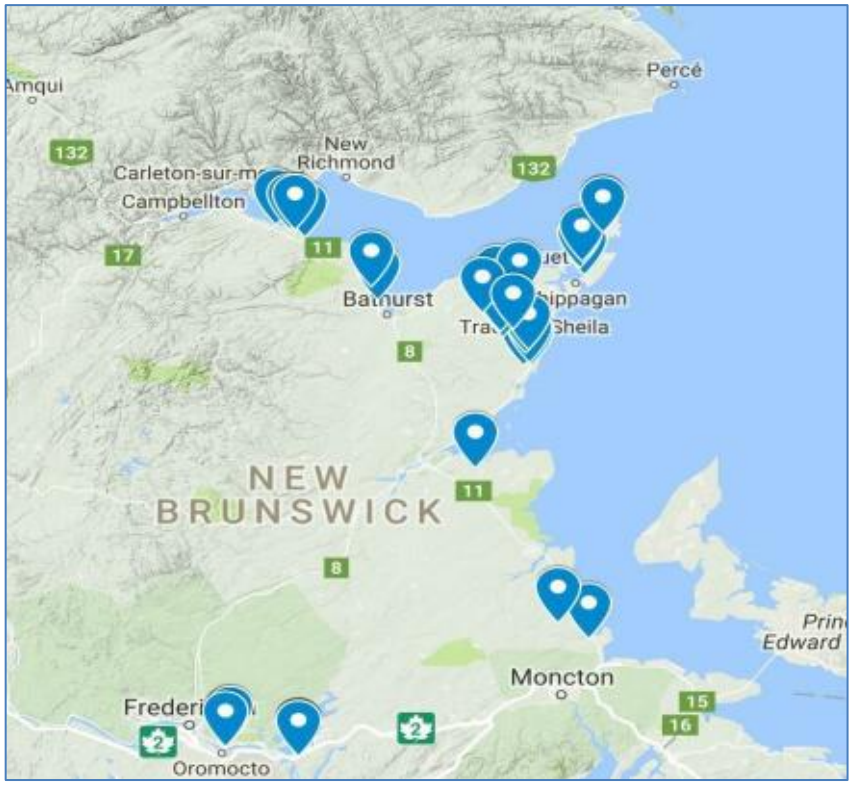

Figure 1. Locations of 34 New Brunswick apiaries selected for small hive beetle monitoring in the summer of 2018

Results and Discussion

One adult SHB was found, entangled in the cloth, in one honey bee colony out of the 632 sampled, representing a 0.16% infestation rate. No other SHB life stages were found. The adult SHB was found after the NB honey bee colony had been used for blueberry pollination and had been near Ontario colonies. This colony was owned by a NB beekeeper whose colonies were previously monitored for the SHB and none were found.

Comparison of SHB infestation rates in NB colonies during pollination from 2018 and 2017: **The SHB infestation rate in NB colonies near ON colonies in 2018 was**

0.16% (1/632). This rate was lower than in 2017 which was 3.38% (29/856). The lower 2018 rate may have been due to the improved 2018 honey bee importation requirements. It should be noted, though, that the 2017 monitoring program used a different monitoring method, a pollen patty and a SHB trap, compared to the cloth used in 2018.

The cloth was missing on the top bars in ten colonies out of 632 upon inspection on the twelve to fourteenth day. One sheet was found on a landing board and another on the ground in an apiary. These findings support assumptions made in the spring monitoring survey that the cloths had been shredded or pulled between the frames by the bees.

The Beetle Bee-Gone ® cloths used to monitor adult SHB appeared to be a useful, feasible and practical method for monitoring adult SHB in NB's spring and summer conditions. Higher populations of SHB are needed to determine the effectiveness of these cloths under NB conditions.

Based on observations, the cloths should preferably be inspected 10 to 12 days after placement in a strong honey bee colony as a longer period may increase the likelihood of the cloth being removed by honey bees.

Conclusion

Only one adult SHB was found in from 632 colonies monitored owned by 12 NB beekeepers. The improved 2018 honey bee importation requirements appeared to help in reducing the introduction and spread of the SHB from imported ON colonies to NB colonies.

Acknowledgements

This project was funded by the Canadian Agricultural Partnership, Agri-Industry Development and Advancement: Improving Crop and Livestock Health and Quality.

The authors would like to thank the New Brunswick Beekeepers Association and the New Brunswick beekeepers involved in this project for their cooperation.

The 2018 New Brunswick / Maine Border Small Hive Beetle (SHB)
Awareness Program

The 2018 New Brunswick / Maine border small hive beetle (SHB) awareness program consisted of training NB beekeepers near Maine to monitor for the SHB. The program involved seventeen beekeepers and 345 colonies. These beekeepers have colonies in the highest risk areas along the New Brunswick / Maine border of being infested with SHB adult beetles flying from Maine. Samples of Beetle Bee-Gone® cloths were provided to each beekeeper and the beekeepers were instructed on how to use the cloths for trapping the SHB adults and where to obtain more cloths. A fact sheet was handed out which described the SHB life stages. Beekeepers were reminded that the SHB must be reported to the Department of Agriculture, Aquaculture and Fisheries (DAAF). Beekeepers were cooperative. Ten beekeepers in the St. Stephen and Saint Andrews areas (Charlotte County) were visited in early July and seven beekeepers in the Woodstock (Carleton County) and Grand Falls (Victoria County) areas were visited in early August. There were no specimens received by DAAF from these beekeepers as of early September 2018.

Prepared by Fletcher Colpitts, New Brunswick Chief Apiary Inspector

September 20, 2018

Nova Scotia

2018 PROVINCIAL APIARIST(S) ANNUAL REPORT

PROVINCIAL APIARIST(S):	Jason Sproule

BEEKEEPING STATISTICS

Number of Beekeepers	631
Number of Producing Colonies	Not available
Average Yield/Colony (kgs) & (lbs)	Not available
Total Estimated Crop (Kgs x1000) & (lbs	Not available
Colonies Wintered (2017-18)	24,331
Estimated Percent Winter Mortality (%)	18.4

INSPECTION STATISTICS	**Number of Colonies Inspected**	**Number of Beekeepers Inspected**
	672	38

GENERAL COMMENTS

Wintering comments: For example: provincial winter survey results synopsis (3 paragraphs).	19 of 41 commercial beekeepers responded to our survey. These beekeepers account for 62% of the total number of hives in Nova Scotia (26,360). Based on these respondants, losses were estimated to be 18.4% •
Inspection comments: For example: inspection program priority setting, disease inspection and analysis synopsis (3 paragraphs).	Inspections are performed when ownership of bees or used equipment is transferred to another beekeeper. Typically, 10% or 10 hives per yards are brood inspected. Inspection resulted in 4 cases of AFB identified. 3 samples submitted for analysis indicate Oxytet is still effective. Results are pending for the 4th. No other reportable diseases were identified. •Two additional NSDA personnel from regional offices were trained as inspectors. There are now 4 NSDA inspectors able to respond to inspection requests throughout the Province.
	Approximately 140 Better Beetle Blaster traps were placed in hives within 10km of the NB border between July and September. No small hive beetle were detected. •100% of 3,462 imported queens were inspected upon arrival at the Halifax airport or NSDA office in Truro before release to beekeepers.
Production comments: For example: honey production statistical data collection and information synopsis (3 paragraphs).	Production data is submitted by beekeepers at the time of registation renewal (Nov 1). Unfortunately, data could not be prepared in time for this report. It will be available later in November. •A Bee Biosecurity Financial Program was introduced to offset the cost for beekeepers to cull brood frames, puchase Small Hive Beetle traps, and purchase mite shakers. •In consideration of Health Canada changes to Veterinary oversight of antimicrobials, 6 NS veterinanrians attended a introductory beekeeping course in Charlottetown, PEI. A similar course was offered by the NSVMA in October and was attended by 28 NS Veterinarians.

Prince Edward Island

2018 PROVINCIAL APIARIST ANNUAL REPORT

Provincial Apiarist: Cameron Menzies (PEI)

Note: The honey yield statistics are based on the respondents up to this date, which do not include PEI's two largest honey producers, who collectively manage over 4,000 honey producing hives. These two producers have informed me they have not yet completed their harvest. Below, their hive numbers are included in the estimate for the number of producing colonies but their yield data has not yet been factored into the average yield/ colony estimate.

A. Beekeeping Industry Statistics

. No. of Beekeepers	50 (estimate)
. No. of Producing Colonies	5,500 (estimate)
. Average Yield/Colony (lb/kg)	33 lbs
. Total Estimated Crop (lb/Kg x1000)	181,500 lbs
. Colonies Wintered (2017/2018)	6,695
. Average Winter Mortality (%)	41.2%

B. Diseases and Pests

Disease/Pest	Number of Colonies Inspected	Number of Beekeepers Inspected	Disease Colony Incidence (%)	Disease Beekeeper Incidence (%)
. AFB	406	13	0.25%	7.69%
. EFB	406	13	3.45%	30.77%
. Chalkbrood[1]	406	13	8.38%	30.77%
. Sacbrood	406	13	0%	0%
. Tracheal Mite[2]	406	13	n/a	n/a
. Varroa Mite[3]	406	13	11.58%	15.34%
. Other	406	13		

C. Comments

- Many colonies in 2018 on PEI began from New Zealand packages. Packages arrived to PEI in April during cold and rainy weather and many beekeepers struggled to get the colonies started from these packages up to pollination strength come wild blueberry bloom. The bulk of the high chalkbrood incidences were seen in colonies started from these packages in 2018.
- One beekeeper lost dozens of colonies in the summer to high EFB infection after the wild blueberry bloom. The beekeeper claims this disease pressure is directly caused by exposure to the blueberry fields.
- Despite relatively low reported average, most beekeepers claim 2018 was a good honey year through personal communication. The results from the two large operations missing in this data may reflect that.

[1] Only colonies with significant (i.e. high) chalkbrood noted during inspection
[2] Was not inspected for by Provincial Inspectors in 2018
[3] Only colonies with high varroa mite counts noted during inspection

Newfoundland and Labrador

2018 PROVINCIAL APIARIST(S) ANNUAL REPORT

PROVINCIAL APIARIST(S):	Karen Kennedy - NL

BEEKEEPING STATISTICS

Number of Beekeepers	7
Number of Producing Colonies	309
Average Yield/Colony (kgs) & (lbs)	410 lbs
Total Estimated Crop (Kgs x1000) & (lbs x1000)	17900 lbs
Colonies Wintered (2017-18)	351
Estimated Percent Winter Mortality (%)	14.1

INSPECTION STATISTICS

Number of Colonies Inspected	Number of Beekeepers Inspected

GENERAL COMMENTS

Wintering comments: For example: provincial winter survey results synopsis (3 paragraphs).	•
Inspection comments: For example: inspection program priority setting, disease inspection and analysis synopsis (3 paragraphs).	• There is no mandatory inpsection in NL. Inspections are conducted by the commerical beekeepers themselves, or assited by the PA if requested.
Production comments: For example: honey production statistical data collection and information synopsis (3 paragraphs).	•

Appendix 7: CAPA - Core Winter loss survey questions (2018)

The followings are the core questions that will be used in 2018 by each provincial apiarist for reporting the colony winter losses at the national level. As it has been since 2007, the objective is to estimate the winter kills with a simple and standardized method while taking into account the large diversity of situations around the country. This is a survey so these questions are to be answered by the beekeepers.

1. How many full sized colonies[4] were put into winter in fall 2017?

Outdoor wintering	Indoor wintering	Total

2. How many full sized colonies[1] survived the 2017/2018 winter and were considered viable[5] on May 1st (British Columbia), May 15th (Ontario, Quebec and Maritimes) or May 21st (Alberta, Manitoba, Newfoundland and Saskatchewan)?

Outdoor wintering	Indoor wintering	Total

3. Which method of treatment did you use for Varroa control in **spring 2017**? What percent of hives were treated? *(Choose all that apply)*

	Treatment	Percent of hives treated (%)
☐	Apistan (fluvalinate)	
☐	CheckMite+ (coumaphos)	
☐	Apivar (amitraz)	
☐	Thymovar (thymol)	
☐	65% formic acid – 40 ml multiple application	
☐	65% formic acid – 250 ml single application	
☐	Mite Away Quick Strips (formic acid)	
☐	Oxalic acid	
☐	Other *(please specify)* _____	
☐	None	

4. Which method of treatment did you use for Varroa control in late **summer/fall 2017**? What percent of hives were treated? *(Choose all that apply)*

	Treatment	Percent of hives treated (%)
☐	Apistan (fluvalinate)	
☐	CheckMite+ (coumaphos)	
☐	Apivar (amitraz)	
☐	Thymovar (thymol)	

[4] Does not include nucleus colonies

[5] Viable : A viable colony, in a standard 10-frame hive, is defined has having 4 frames or more being 75% bee-covered on both sides.

☐	65% formic acid – 40 ml multiple application	
☐	65% formic acid – 250 ml single application	
☐	Mite Away Quick Strips (formic acid)	
☐	Oxalic acid	
☐	Other *(please specify)* _____	
☐	None	

5. Have you monitored your colonies for Varroa during the 2017 season?
   - ○ Yes – sticky board
   - ○ Yes – alcohol wash
   - ○ Yes – other (*please specify*) _____
   - ○ No

6. Which method of treatment did you use for **nosema** control in **spring 2017**? What percent of hives were treated?

	Treatment	**Percent of hives treated (%)**
☐	Fumagillin	
☐	None	

7. Which method of treatment did you use for **nosema** control in **fall 2017**? What percent of hives were treated?

	Treatment	**Percent of hives treated (%)**
☐	Fumagillin	
☐	None	

8. Which method of treatment did you use for **American foulbrood** control in **spring** 2017? What percent of hives were treated? *(Choose all that apply)*

	Treatment	**Percent of hives treated (%)**
☐	Oxytetracycline	
☐	Tylosin	
☐	None	

9. Which method of treatment did you use for **American foulbrood** control in **fall 2017**? What percent of hives were treated? *(Choose all that apply)*

	Treatment	**Percent of hives treated (%)**
☐	Oxytetracycline	
☐	Tylosin	
☐	None	

10. To what do you attribute the main cause of death of your colonies? (Please check every suspected cause and rank the causes according to their relative importance.)

	Cause of death	Rank (1 = the most important)
☐	Don't know	
☐	Starvation	
☐	Poor queens	
☐	Ineffective Varroa control	
☐	Nosema	
☐	Weather	
☐	Weak colonies in the fall	
☐	Other (Please specify) _____	
☐	Other (Please specify) _____	
☐	Other (Please specify) _____	

Appendix 8: Research Report

Project title: Sustaining and securing Canada's honey bees using 'omic tools
Principal Investigators:

Name: Leonard Foster (University of British Columbia)
Address: 2125 East Mall, Vancouver, BC, V6T 1Z4
E-mail: foster@chibi.ubc.ca

Name: Amro Zayed (York University)
Address: 4700 Steele Ave, Toronto, ON, M3J 1P3
E-mail: zayed@yorku.ca

Collaborators: Dr. Katherine Baylis (Univ. Illinois Urbana-Champaign), Dr. Miriam Bixby (Univ. of British Columbia) Dr. Carlos Castillo (National Bee Diagnostic Centre), Dr. Robert Currie (Univ. of Manitoba), Dr. Nicolas Derome Université Laval), Leslie Eccles (Ontario Beekeepers Association), Dr. Valérie Fournier (Université Laval), Dr. Pierre Giovenazzo (Centre de recherche en sciences animales de Deschambault), Dr. Marta Guarna (Univ. of British Columbia), , Dr. Shelley Hoover (Alberta Agriculture and Rural Development), Dr. Stephen Pernal (AAFC), Dr. Jianhong Wu (York University)

Project description: Honey bees are an essential component of Canadian agriculture, contributing at least $4.6 billion to our economy through their pollination activities and honey production. But Canadian beekeepers have lost an average of 27.1% of their colonies every winter since 2006-07. Diseases that weaken or kill colonies are important causes of these unsustainable declines that, left unchecked, are expected to *pose serious threats to the productivity of major Canadian agro- industries (*e.g. *oilseeds, tree fruits, berries, cucurbits and forage crops*) *and jeopardize our food security.* Canadian beekeepers mitigate high winter losses by importing more than 200,000 queen bees annually, mostly from Hawaii, California, and New Zealand. The heavy reliance on imported queens poses several risks to Canadian beekeepers, including high volatility associated with border closures and the introduction of mal-adapted stock or undesirable genetics. In particular, the Canadian Food Inspection Agency has highlighted the introduction of the highly invasive and aggressive Africanized 'Killer' bees as a serious risk of importing honey bees from the US.

Our group has pioneered the application of 'omic tools to applied bee health. Canadian honey bees have high levels of genetic diversity and most economically valuable traits are highly heritable in bees: these make for ripe conditions to develop 'omics-assisted breeding tools for the beekeeping industry. We will improve the health and sustainability of Canadian honey bees by carrying out a large-scale association mapping study to develop genomic and proteomic markers for selectively breeding 12 economically-valuable traits (**Activity 1**). The integration of 'omics and GE^{3}LS research will allow us to deliver, with supporting science and economics, marker-assisted selective breeding tailored to Canada but potentially applicable across the world. The best way to disseminate stronger breeds of bees will be through the existing queen supply chain but this involves risky importation so in parallel, we will develop a genomic assay to screen imported queens for Africanized genetics (**Activity 2**), in order to eliminate this as a possible cause of border closure. Working with a broad group of stakeholders, end-users, national and international collaborators, we will **deliver**:

1) 'Omic tools needed for selective breeding of healthy and productive honey bee colonies adapted to the Canadian climate, pathogen profile, and beekeeping practices

2) Best-practices for implementing 'omic tools for improving bee health within Canada

3) High-throughput surveillance and compliance tools, and associated regulatory recognition, to quickly and

efficiently differentiate Africanized from non-Africanized honey bees in Canada and major exporting countries

These deliverables are expected to generate 9 measurable socioeconomic benefits that range in value from $8 Million/y up to $150 Million/y, annually. The socioeconomic benefits include direct benefits to beekeepers, who will spend less money and make more profits from managing healthy and productive 'omic bred honey bees, indirect benefits to our agro-economy and food security that depend on healthy bees, and social benefits to the Canadian public who are concerned about the health of bees. We will capitalize on an excellent existing infrastructure for knowledge mobilization to engage a wide spectrum of end-users to realize these socioeconomic benefits. In particular, by engaging early adopters and connecting them with 'omic service providers, we expect to start realizing some of our socio-economic benefits by the end of the project.

Our innovative research will generate 21st century tools to solve two major threats facing the Canadian beekeeping industry by improving the health of locally-bred honey bees and mitigating the risks of importing Africanized honey bees. Through these efforts we will realize a stronger, healthier and more sustainable bee population that supports billions of dollars of Canadian crops and ensures our food security. Our research will serve as a road map for improving honey bee health across the globe.

Start Date: October 2015
End Date: September 2019
Total Funding for Project: $7 334 000 (18% in Québec)
Funding Sources: Genome Canada, Genome BC, Genome Quebec, UBC, York University, ACIDF, BCHPA, OBA

Principal Investigator:

Name: Stephen Pernal AAFC) (co-PI)
Carlos Castillo, Patricia Wolf Veiga (Grande Prairie Regional College) (co-PI's)
Address: AAFC Beaverlodge, P.O. Box 29, Beaverlodge, AB T0H 0C0
Email: Steve. Pernal@agr.gc.ca

Abstract or project description:

The aim of the project is to record the nature, extent and prevalence of endemic and exotic disease and pest organisms in Canadian apiaries using advanced molecular detection technologies. This baseline information will play a central part in regional colony health management practices and provide an opportunity to identify exotic organisms before they establish themselves within Canadian bee populations. This project will also facilitate harmonization of molecular detection methodologies with EU reference laboratories and those of the USDA. The data generated will also support Canada's position for international trade in honey bee stock and hive products.

Start Date: 30 June 2014
End Date: 31 March 2018

Total Funding for Project: $1.27 M
Funding Sources: AAFC Agri-Marketing: Assurance Systems (with Beekeeper Commission of Alberta as Applicants); Cash funding provided by Beekeepers Commission of Alberta, Manitoba Beekeepers, CropLife Canada and Syngenta Canada.

Project title: Health of Bee Pollinators in Canadian Agriculture

Principal Investigator:

Name: Stephen Pernal
Address: AAFC Beaverlodge, P.O. Box 29, Beaverlodge, AB T0H 0C0
Email: Steve. Pernal@agr.gc.ca
Telephone: 780-354-5135

Co-Investigators: Marta Guarna (AAFC), Sophie Cardinal (AAFC), Steve Javorek (AAFC), Mark Wonneck (AAFC), Sonia Gaul (AAFC) Karen Burgher-MacLellan (AAFC), Rob Currie (Univ. Manitoba), Shelley Hoover (Alberta Agriculture and Forestry).

Graduate Students: Megan Colwell (Ph.D., University of Manitoba).

Abstract or project description:

Managed and native pollinators are critically important to agriculture in Canada, yet these insects have suffered substantial losses in abundance and diversity for many years. Our team, which brings together researchers with diverse expertise, will examine factors concerning the health of both honey bees and wild bees. Honey bee colonies, located in honey production and pollination management systems, will be manipulated and intensively sampled to determine which of the major stress factors identified to be associated with colony loss in Canada, including the internal parasite *Nosema ceranae*, viruses, poor nutrition or exposure to pesticides, pose the greatest relative risk to colony survival. This large-scale experiment will have the power to look at the web of pests and pathogens in honey bee colonies and relate them to productivity parameters, economics and winter mortality. This study will provide clear recommendations to beekeepers as to optimal management strategies for improving the long-term health and survival of honey bee colonies in Canada.

Our work with native bees will systematically identify the types and densities of wild bees found in six agricultural ecoregions across the country. Detailed analysis of bee samples will provide information on their exposure to pesticides through pollen, the diversity of microorganisms in their digestive tracts and whether they harbor known or novel pathogens. These complex datasets will allow us to examine the interactive effects of landscape pattern and pesticide use on native bee abundance and diversity in agricultural landscapes as indicators of native bee health. We will also examine the potential for "pathogen spillover", which can occur when infected domestic hosts interact with closely-related wild populations, such as between managed bees species and native bees.

We anticipate the work in this project to provide specific recommendations to enhance pollinator health and improve the sustainability of bees as pollinators in agricultural ecosystems.

Start Date: 5 Jan 2014
End Date: 31 March 2018
Total Funding for Project: $2.3 M (Honey Bee and Native Bee Activities)
Funding Sources: AAFC

Project title: AFB Surveillance and Management
Principal Investigator:

Name: Stephen Pernal
Address: AAFC Beaverlodge, P.O. Box 29, Beaverlodge, AB T0H 0C0
Email: Steve. Pernal@agr.gc.ca
Telephone: 780-354-5135

Co-Investigators: Patricia Wolf Veiga (Grande Prairie Regional College)

Abstract or project description:
Paenibacillus larvae is typically diagnosed via extraction of bacterial spores from honey, adult bees or from infected pupal remains and then culturing on selective microbiological media. Though this has nominal value in quantifying levels of environmental spores of the pathogen, no predictive models exist to provide a risk assessment of the probability that hives will develop clinical symptoms. Moreover, minimal research has been done using molecular tools to provide quantification of infection levels or to directly compare with microbiological methods of detection.

We propose to: 1) Characterize Canadian strains of P. larvae by establishing relatedness, virulence and assessing resistance to oxytetracycline and tylosin; 2) Enhance AFB diagnostic techniques by improved culturing on selective media and detecting and quantifying the pathogen using molecular techniques; 3) Establish models to predict the likelihood of developing clinical expression of the disease by analyzing bacterial spore levels in adult bees or honey and correlating these with the expression of clinical symptoms in bee colonies.

Our work will result in an important surveillance tool that will predict the likelihood of developing clinical symptoms of AFB within apiaries. In the future, these data can also be used for area-wide management of AFB and to assist veterinarians in their requirements to have diagnoses obtained before therapeutic antibiotics are prescribed. Information from the risk model will also be integrated with antibiotic resistance data to provide a more comprehensive disease management framework. Overall, this will reduce risk for the beekeeping industry, mitigate undesirable antibiotic residues in honey, and provide tools that the beekeeping industry can use in compliance with restricted access to antimicrobials.

Start Date: 1 Apr 2018
End Date: 31 March 2021
Total Funding for Project: $150,00 **Funding Sources:** AAFC

Project title: Optimization of bee colony sucrose syrup feeding during cranberry pollination to maximize cranberry pollen collection

Principle Investigator:
Name: Georges Martin
Address: 120-A chemin du Roy, Deschambault (Qc), G0A 1S0
Email: georges.martin@crsad.qc.ca
Telephone: 418-286-3353 ext.294

Co-Investigators (including graduate students):
Name(s): Pierre Giovenazzo
Address: Département de biologie, 3044A Pavillon Vachon Université Laval, Québec (QC), G1V 0A6
Email: pierre.giovenazzo@bio.ulaval.ca
Telephone: 418-656-2131 ext.8081

Abstract (300 words or less): Bees collecting pollen from cranberry flowers are more efficient pollinators than those collecting nectar. With a single visit, they achieve 86% fruit set compared to 50% for nectar collecting bees. Thus, increasing the cranberry pollen foraged by bees should increase flower pollination. In a previous study, we found that honey bee colonies fed with a sucrose solution (1:1) collected significantly more cranberry pollen compared to unfed colonies. Similar results have been obtained in kiwifruit pollination and colony

sucrose feeding is now a management procedure in this crop pollination. Our research project aimed to test different sucrose feeding regimes of bee colonies during cranberry pollination services and measure the effect on pollen and nectar harvesting. This study was conducted over three years, from 2015 to 2017, with 50 new colonies each year. The colonies were divided in 5 experimental groups and were all equipped with a bottom board pollen trap during the cranberry pollination. We found that a single 5L feeding of 1:1 syrup on the first day of the cranberry pollination is the optimal method to significantly increase cranberry pollen collection by bees (110% increase, $p<0.05$). We also measured an increase in colony development during 1 of the 3 years of this study. A new study should be done to quantify the cranberry yield linked to this practice and estimate the economic impact.

Start Date: April 1, 2015
End Date: March 30, 2018
Total Funding for Project: 353 000$
Funding Sources: Agriculture and Agri-Food Canada, Centre de Recherche en Sciences Animales de Deschambault, Les Atocas de L'Érable, Association des Producteurs de Canneberges du Québec

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Project title: Evaluation of cranberry pollination deficit and effects of higher hive stocking rates
Principal Investigator:

Name: Georges Martin
Address: 120-A chemin du Roy, Deschambault (Qc), G0A 1S0
Email: georges.martin@crsad.qc.ca
Telephone: 418-286-3353 ext.294

Co-Investigators (including graduate students):

Names: Madeleine Chagnon (UQAM), MadeleineChagnon@protonmail.com
Isabelle Drolet (CETAQ), idrolet.agr@gmail.com
Jean-Pierre Deland (Ocean Spray), jdeland@oceanspray.com

Abstract or project description (300 words or less): Although some cranberry growers use more than 4 hives/acre, the current recommendation for colony density is 2 hives/acre and is based on observations rather than scientific data because there are very few scientific publications on the subject. The present study was carried out to determine if there is a pollination deficiency in Quebec cranberry industry and if an increase in the density of hives would allow better yields (which translate into heavier and higher number of fruits). We selected 5 farms in conventional cranberry production using a density of 2 hives/acre for pollination. On those farms, the colonies are distributed in lots varying in size from 40 to 120 colonies. On each farm, we identified 3 fields of the Stevens variety that were about 750m apart. They were selected following the recommendations of the growers and fertilizer advisors at each farm to have a similar stem density and yield potential. A lot of 2, 4 or 8 hives was placed at the end of the fields at a rate of one lot per field. We determined that there was a pollen deficiency of 13 to 18% ($p<0.05$) in some fields for the Stevens variety when a concentration of 2 hives/acre was used compared to 8 hives/acre. Our results do not allow us to conclude that this deficit is present on the whole farm. The current distribution method of colonies (lots of 40 to 120 hives scattered on the farm) could be an important factor influencing yields. Larger scale work is needed to determine the actual concentration of hives/acre required to obtain this gain and to verify if the additional investment in pollination service is profitable.

Start Date: April 1, 2016
End Date: March 30, 2018
Total Funding for Project: 87 000$

Funding Sources: Ministère de l'Agriculture des Pêcheries et de l'Alimentation du Québec, Centre de Recherche en Sciences Animales de Deschambault, Club Environnemental et Technique Atocas Québec, Ocean Spray, Association des Producteurs de Canneberges du Québec

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Project title: Mass storage of honeybee queens during winter in Canada
Principle Investigator:

Name: Andrée Rousseau
Address: 120-A Chemin du Roy, Deschambault (Québec), GOA 1S0
Email: andree.rousseau@crsad.qc.ca
Fax: (418) 286-3597
Telephone: (418) 286-3353 p. 272

Co-Investigators (including graduate students):

Name(s): Pierre Giovenazzo
Address: Pavillon Vachon, 2325 Rue de l'Université, Québec City, QC G1V 0A6
Fax:
Telephone: (418) 656-2131 poste 8081

Abstract (300 words or less): Queen breeders across Canada produce their earliest queens end of May when mature drones and first virgin queens are produced. But the Canadian beekeeping industry needs queens earlier, after wintering (end March-early April), to replace dead or failing queens / colonies. Consequently, our industry is highly dependent on queen imports (from California USA mainly) at the beginning of the season. The goal of our project is to maintain locally produced mated queens live and fertile from September to April. To accomplish this, various queen banking/storage methods will be tested (temperatures below or above cluster formation and queen density in banks). Efficacy of tested methods will be evaluated by measuring queen survival, sperm viability within queen's spermatheca and the post banking performance of queens introduced in colonies the following season. Hopefully, results from this project will allow beekeepers have access to locally raised queens early spring and thus reduce their dependency toward queen imports.

Start Date: July 2018
End Date: April 2020
Total Funding for Project: 7500$
Funding Sources: Canadian Bee Research Fund, Centre de recherche en sciences animals de Deschambault.

Project title: Small Hive Beetle, *Aethina tumida* Murray, Monitoring in New Brunswick Honey Bee Colonies in the Spring of 2018 – Preliminary Report
Principle Investigator:

Name: Andrew Byers
Address: contact Co-Investigators
Email: contact Co-Investigators
Fax: contact Co-Investigators
Telephone: contact Co-Investigators
Co-Investigators:
Name: Michel Melanson
Address: Crop Sector Development, New Brunswick Dept. of Agriculture, Aquaculture & Fisheries, 1350 Regent Street, Fredericton, NB, E3B 5H1

Fax: 506-453-7978
Telephone: 506-453-3480

Name: Chris Maund
Address: Crop Sector Development, New Brunswick Dept. of Agriculture, Aquaculture & Fisheries, 1350 Regent Street, Fredericton, NB, E3B 5H1
Fax: 506-453-7978
Telephone: 506-453-3477

Abstract: The adult stage of the small hive beetle (SHB), *Aethina tumida* Murray, was monitored with a Beetle Bee-Gone ® cloth in New Brunswick (NB) colonies in May 2018 from NB beekeepers who had the SHB in 2017. One Beetle Bee-Gone ® cloth was placed in each monitored honey bee colony on the top bars in the corner of the hive for approximately two weeks. Twelve adult SHB were found in ten NB honey bee colonies, only in colonies overwintered indoors. There were not any SHB found in colonies overwintered outdoors. The percent of SHB positive colonies monitored was 1.9% (10/535). This was the first report of the SHB surviving the winter in NB honey bee colonies overwintered indoors.

Start Date: 2 May 2018
End Date: 31 May 2018
Total Funding for Project: $9.000.00
Funding Sources: Canadian Agricultural Partnership Agri-Industry Development and Advancement, Advancing Crop and Livestock Sectors: Improving Crop and Livestock Health and Quality. **Applicant:** New Brunswick Beekeepers Association Incorporated.

Project title: Small Hive Beetle, *Aethina tumida* Murray, Monitoring in New Brunswick Honey Bee Colonies in the Summer of 2018 – Preliminary Report

Principle Investigator:
Name: Andrew Byers
Address: contact Co-Investigators
Email: contact Co-Investigators
Fax: contact Co-Investigators
Telephone: contact Co-Investigators

Co-Investigators:
Name: Michel Melanson
Address: Crop Sector Development, New Brunswick Dept. of Agriculture, Aquaculture & Fisheries, 1350 Regent Street, Fredericton, NB, E3B 5H1
Fax: 506-453-7978
Telephone: 506-453-3480

Name: Chris Maund
Address: Crop Sector Development, New Brunswick Dept. of Agriculture, Aquaculture & Fisheries, 1350 Regent Street, Fredericton, NB, E3B 5H1
Fax: 506-453-7978
Telephone: 506-453-3477

Abstract: The adult stage of the small hive beetle (SHB), *Aethina tumida* Murray, was monitored with a Beetle Bee-Gone ® cloth in NB colonies in July 2018 which were near Ontario colonies which had been imported from

SHB positive apiaries for wild blueberry pollination. One Beetle Bee-Gone ® cloth was placed in each monitored honey bee colony on the top bars in the corner of the hive for approximately two weeks. One adult SHB was found in the NB colonies. The percent of SHB infested colonies was 0.16% (1/632). This rate was lower than in another study, with a different monitoring method, in 2017 which was 3.38% (29/856). This finding suggested that the improved 2018 New Brunswick honey bee importation requirements, which used the Beetle Bee-Gone ® cloth and stricter requirements, reduced the introduction and subsequent spread of the SHB in Ontario colonies to nearby New Brunswick ones.

Start Date: 3 July 2018
End Date: 26 July 2018
Total Funding for Project: $9.000.00
Funding Sources: Canadian Agricultural Partnership Agri-Industry Development and Advancement, Advancing Crop and Livestock Sectors: Improving Crop and Livestock Health and Quality. **Applicant:** New Brunswick Beekeepers Association Incorporated.

Project title: Improving Honeybee Queen Shipping Methods
Principle Investigator:

Name: Andrée Rousseau
Address: 120-A Chemin du Roy, Deschambault (Québec), GOA 1S0
Email: andree.rousseau@crsad.qc.ca
Fax: (418) 286-3597
Telephone: (418) 286-3353 p. 272

Co-Investigators (including graduate students):
Name(s): Pierre Giovenazzo
Address: Pavillon Vachon, 2325 Rue de l'Université, Québec City, QC G1V 0A6
Fax:
Telephone: (418) 656-2131 poste 8081

Abstract (300 words or less):

Recent studies have documented adverse conditions in Canadian and USA honeybee queen shipments. Objectives of this project were: 1) to measure environmental conditions experienced by queens shipped from USA to Canada and within Canada and 2) to test different queen shipping methods (cage models and presence of attendant worker bees) on the internal cage temperature, queen survival and sperm viability in queen spermatheca. During spring and summer 2017 and 2018, we placed data loggers (temperature and relative humidity) in several commercial honeybee queen shipments. During summer 2018, we measured the impact of various shipment temperatures (6, 26 and 40 °C) on sperm viability within the queen's spermatheca (N=60 queens). Additionally, a sample of these queens was introduced in colonies to evaluate colony performance and survival (N=35 colonies). Knowledge obtained from his study will help improve queen shipping conditions to maximise sperm viability, queen acceptance and colony performance.

Start Date: May 2017
End Date: March 2019
Total Funding for Project: 79 092$
Funding Sources: Agriculture and Agri-Food Canada, Centre de recherche en sciences animales de Deschambault, Canadian Bee Research Fund, Bee Maid, Api-Culture Hautes Laurentides, Pope Canyon Queens.

Project title: Emerging Threats to Pollinators
Principal Investigators:

Name: Steve Pernal, Marta Guarna - AAFC
Address: 1 Research Road, Beaverlodge, AB T0H 0CO
Email: marta.guarna@canada.ca; steve.pernal@canada.ca
Telephone: 780-354-5150; 780-354-5135

Co-Investigators and collaborators (including graduate students):

Names: Sophie Cardinal – AAFC, Leonard Foster- UBC, Ryan Schwarz - Fort Lewis College, Carlos Castillo and Patricia Wolf Viega - NBDC

Abstract or project description (300 words or less):

One of the factors implicated with declines in bee health and abundance is the presence of emerging parasites and pathogens including: the newly-introduced microsporidian *Nosema ceranae*, recently characterized trypanosomatids *Crithidia mellificae* and *Lotmaria passim*. There is limited information available on the prevalence of these organisms in bee species, the pathology they trigger and the molecular mechanisms involved in pathogenesis. Better characterized organisms such as *Crithidia bombi*, known to impair bumblebee health, also highlight the potential for pathogen spill-over from managed to native pollinators. Clearly there is a need to address the paucity of information on emerging disease threats in pollinator communities, and to determine their impact on pollinator health.

This project aims to investigate whether these parasites are widespread in managed and wild pollinator communities, which species are present, and how they affect pollinator health. A survey of honey bees and wild bees collected in different provinces followed by diagnostic testing will provide information on their prevalence in Canada. To address the question on their effect on pollinator health, we will perform controlled infection experiments of honey bees and evaluate molecular and proteomic markers of immune defence of bees, and survival. Infections are planned with the individual microsporidian and trypanosomatid parasites, and with combinations thereof, as we have found that co-infections are common in Canadian bee populations.

Start Date: April 1, 2016
End Date: March 31, 2019
Total Funding for Project: $200,252
Funding Sources: AAFC: $200,252, UBC in kind: $50,000

Project title: Assessing the effect of sperm viability on queen performance and colony productivity
Principal Investigator:

Name: Marta Guarna, Steve Pernal - AAFC
Address: 1 Research Road, Beaverlodge, AB T0H 0CO
Email: marta.guarna@canada.ca; steve.pernal@canada.ca
Telephone: 780-354-5150; 780-354-5135

Co-Investigators and collaborators (including graduate students):

Names: Carlos Castillo - NBDC, Jeff Pettis -Pettis and Associates

Abstract or project description (300 words or less):

Poor queen quality is recognized as an important factor affecting honey bee colony performance and survival. In the 2015 Statement on Honey Bee Wintering Losses in Canada published by the Canadian Association of

Professional Apiculturists, beekeepers cited 'poor queens' as a main cause of winter colony losses. Thus, understanding why queens are failing is a priority. There are several factors that can affect queen health and performance including poor mating, disease load, and pesticide exposure. However, the condition of local and imported queens from selected and unselected stocks in Canada is not well documented. In addition, recent data from our collaborator, Jeff Pettis, indicated that the viability of the sperm that queens carry in their bodies can be linked to poor colony performance. It is not clear, however, to what extent decreases in sperm viability affect queen performance and longevity as well as colony productivity and survival. This project aims to address this important question as well as to assess the status of queens used in Canadian operations. The results may help guide queen producers and beekeepers on queen handling and management decisions that may have a profound effect on their operations, reducing the need for frequent queen replacement and improving the productivity and survival of their colonies.

Start Date: April 1, 2016
End Date: March 31, 2019
Total Funding for Project: $207,630
Funding Sources: CBRF: $6,000, PAm cash: $90,000, NBDC+AAFC in kind: $117,630

Project title: Blueberry Pollination and Bee Health
Principal Investigator:

Name: Marta Guarna - AAFC
Address: 1 Research Road, Beaverlodge, AB T0H 0CO
Email: marta.guarna@canada.ca
Telephone: 780-978-1690

Co-Investigators and collaborators (including graduate students):

Names: Leonard Foster and Heather Higo - UBC, Steve Pernal - AAFC, Patricia Wolf Veiga - NBDC.

Abstract or project description (300 words or less):

Blueberries are Canada's top fruit export. In 2016, fresh and frozen blueberry exports were valued at over $400 million. Blueberries are cultivated in over 75,000 hectares that produce over 200,000 metric tonnes of fruit. Canada's blueberries are grown in wild (lowbush) and cultivated (highbush) varieties, and most of Canada's cultivated blueberries are produced in British Columbia (BC) and are pollinated by honey bee colonies from BC and Alberta.

There is increasing concern amongst beekeepers that pollinating blueberries is harming the health of their bees and affecting later colony productivity. Beekeepers report poor colony health and increased frequency of European foulbrood (EFB) disease which can result in increased use of antibiotics. Antibiotics may leave residues on the hive and result in the removal of the colony for honey production.

Risk factors that affect health and productivity are not well defined but may include: nutritional deficiency to the characteristics of blueberry pollen combined with lack of supplemental foraging sources, and/or effects of in-hive and environmental chemicals, including agrochemicals. To understand these risk factors and test a potential management strategy, we will monitor colonies with and without nutritional supplementation (via protein patties) before and after they pollinate blueberries. Colonies will be inspected to determine their strength and to assess their disease status. Disease status will be evaluated by recording visual symptoms of disease and molecular analysis of pathogens and parasites, including EFB, AFB (American foulbrood), Nosema spp., and Varroa. Adult bees and pollen samples will also be collected for chemical analysis.

We aim to understand risk factors and finding management strategies to increase bee health during pollination. Increasing pollinator health will ensure that beekeepers continue to confidently offer colonies for pollination

and that blueberry growers continue to benefit from the pollination services of managed honey bees to obtain high crop yields.

Start Date: April 1, 2018
End Date: March 31, 2020
Total Funding for Project: $150,000
Funding Sources: Cash: CBRF/CHC: $7,500, BCHPA: $20,000, BC Blueberry Council: $12,500, PAm: $30,000. In kind: AAFC: $20,500, UBC: $7,000, NBDC: $15,000, Beekeepers: $37,500

Project title: Stock Assessment
Principle Investigator: Shelley Hoover, Alberta Agriculture and Forestry
Name: Shelley Hoover
Address: Lethbridge Research and Development Centre
Email: shelley.hoover@gov.ab.ca
Telephone: 403-317-2170
Co-Investigators (including graduate students):
Name(s): Marta Guarna, Steve Pernal, Beaverlodge Research Farm; Patricia Wolf-Viega, NBDC

Abstract (300 words or less): There is little empirical information available to Alberta beekeepers on the performance of commercially available imported honey bee stocks in Alberta, especially in comparison to commercially available domestic stocks, which are available later in the year. This project would give us an indication of the variation that exists in performance and initial queen quality among stocks, and also provide data on the productivity of mid-season splits over their first and second summer. It also provides us with valuable data to show queen breeders regarding the performance of their stocks in our environment. Finally, we will be able to use the field data to determine the importance of measurable queen quality parameters to predict colony-level performance.

Start Date: 01/01/17
End Date: 31/12/18

Total Funding for Project: $70,500
Funding Sources: ACIDF, Alberta Beekeepers Commission

Project title: Getting more bang for your buzz: Does pollination compensate for canola yield lost under sub-optimal soil moisture, nitrogen fertilization and/or seeding rates?
Principle Investigator: Ralph Cartar, University of Calgary
Name: Ralph Cartar
Address: Department of Biological Sciences, University of Calgary, 2500 University Dr. N.W., Calgary, AB
Email: cartar@ucalgary.ca
Telephone: 403-220-3640
Co-Investigators (including graduate students):
Name(s): Georgios Adamidis, University of Calgary; Andony Melathopoulos, Oregon State University; Shelley Hoover, Alberta Agriculture and Forestry; Breanne Tidemann and Steve Pernal, AAFC

Abstract (300 words or less):
Our research investigates the agronomic contexts in which the benefits of honey bee pollination to canola yield might be more pronounced, opening the possibility for strategic management of honey bee pollination at more

realistic stocking rates for western Canada (e.g., 0.5 colonies/ha as in Australia). Specifically, we are testing whether the benefits of honey bee pollination to canola yield are enhanced under: 1) sub-optimal growing conditions, and 2) avoidance of late-season compensation in which seed yield results disproportionately from later-maturing side branches versus main branches. These situations exist in three agronomic practices/situations in canola cultivation: 1) reduced seeding rates, 2) nitrogen application below recommended rates, and 3) under conditions of moisture stress during the vegetative growth and seed development (pod filling). The ability of bee pollination to compensate for suboptimal agronomic conditions have recently been observed in orchard and field crops, including canola. The mechanism responsible for this compensation remains poorly understood. In canola we postulate that it stems from (a) a trade-off between early and late allocation of reproductive resources, in which bee pollination optimizes the use of a plant's limited resources during early bloom (the trade-off hypothesis), and/or (b) uncertainty in the timing of the end of the growing season, in which early bee pollination provides greater certainty of high-quality seed by harvest time (the reproductive assurance hypothesis).

Start Date: 05/2016
End Date: 05/2019

Total Funding for Project: $281,625
Funding Sources: Canola Council of Canada, Alberta Beekeepers Commission

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Project title: Increased sustainability Managing Bee Pests (Varroa Mites and Nosema) for Alberta Beekeepers
Principle Investigator: Shelley Hoover, Alberta Agriculture and Forestry
Name: Shelley Hoover
Address: Lethbridge Research and Development Centre
Email: shelley.hoover@gov.ab.ca
Telephone: 403-317-2170
Co-Investigators (including graduate students):
Name(s): Medhat Nasr and Rassol Bahreini, Alberta Agriculture and Forestry; Robert Currie and Rosanna Punko, University of Manitoba

Abstract (300 words or less): This project addresses the lack of options for Varroa and Nosema control.

Start Date: April 1 2014
End Date: December 31, 2018

Total Funding for Project: $553,859
Funding Sources: ACIDF, Alberta Beekeepers Commission

Project title: Spring Protein Supplements for build-up of colony populations for pollinating canola
Principle Investigator: Shelley Hoover, Alberta Agriculture and Forestry
Name: Shelley Hoover
Address: Lethbridge Research and Development Centre
Email: shelley.hoover@gov.ab.ca
Telephone: 403-317-2170

Abstract (300 words or less): This project will compare commercially available protein patties used to feed honey bee colonies. We will measure patty consumption and bee population build-up of colonies fed different supplements during the spring.

Start Date: 01/01/18
End Date: 31/12/18

Funding Sources: Alberta Agriculture and Forestry, Poelman Apiaries Ltd.

Project title: Queen Production in Canola
Principle Investigator: Shelley Hoover, Alberta Agriculture and Forestry
Name: Shelley Hoover
Address: Lethbridge Research and Development Centre
Email: shelley.hoover@gov.ab.ca
Telephone: 403-317-2170

Abstract (300 words or less): This project will evaluate the feasibility and quality of queen production during hybrid canola pollination in southern Alberta.

Start Date: 01/01/16
End Date: on going

Funding Sources: Alberta Agriculture and Forestry

Small Hive Beetle, *Aethina tumida* Murray, Monitoring in New Brunswick Honey Bee Colonies in the Spring of 2018 – Preliminary Report

Andrew Byers (Apiary Inspector), Michel Melanson (Blueberry / Apiculture Specialist; Apiary inspector – DAAF), Chris Maund (Integrated Pest Management Specialist (Entomologist) and Provincial Apiarist – DAAF)

Introduction

The adult stage of the small hive beetle (SHB), *Aethina tumida* Murray, and suspected SHB larvae were found for the first time in New Brunswick (NB) on June 1, 2017. These were found in Ontario honey bee colonies brought to NB for the pollination of wild blueberries in the northeastern part of the province. During this time, twelve NB beekeeping operations were identified as having their honey bee colonies within a 3 km radius of the SHB positive Ontario colonies. Colonies from these twelve NB beekeeping operations were monitored throughout the summer of 2017 (July 6 to September 11) by staff from the NB Department of Agriculture, Aquaculture and Fisheries (DAAF). Of these twelve NB beekeeping operations, seven were subsequently proven to have colonies positive for the SHB. This was the first report of the SHB being found in honey bee colonies owned by NB beekeepers. Once the SHB was confirmed present in NB colonies, it was necessary to determine whether or not the SHB could overwinter in NB honey bee colonies. Consequently, this project was developed to monitor for SHB in the spring of 2018 before the importation of honey bee colonies for pollination.

Materials and Methods

During the spring of 2018 (May 2 to 31), DAAF staff monitored NB honey bee colonies to determine if the SHB overwintered inside honey bee colonies in the province of New Brunswick. Colonies from five out of the seven NB beekeepers who had the SHB in 2017 were monitored in the spring of 2018. A portion of the apiaries (13) owned by these five beekeepers were monitored. Five hundred and thirty-five (535) colonies out of 722

colonies from these five beekeepers were monitored. The percent of colonies monitored per apiary ranged from 44% to 100%, with smaller apiaries having a larger percentage of colonies monitored, compared to the larger ones. One microfiber cloth (Beetle Bee-Gone®) was placed across the top bars, in the corner, under the inner cover in each colony monitored. The sheet was placed in the corner of the hive since SHB tend to crawl to the corners or the perimeter of the hive to avoid honey bees. A portion of the cloth was held between the hive body and the inner cover to help keep it in place, Figure 1. The microfiber cloth was left in the colony for a minimum of two weeks prior to inspection.

Figure 1. Placement of Beetle Bee-Gone microfiber cloth in hive.

The Beetle Bee-Gone ® cloth (beegoodsmercantile.com) is a 12 X 15 cm cloth sold for trapping adult SHB. The texture of the cloth is similar to that of a fabric softener or dryer cloth.
Honey bees try to remove the cloth from the hive by chewing on it and pulling apart the fibers. The beetles then become entangled in the shredded areas of the cloth and die.

Results and Discussion
Following the spring inspections, the SHB was found in only two of the five monitored beekeeping operations. The SHB was found in four out of six apiaries monitored from these two beekeepers. One SHB was found in each of the three positive SHB apiaries and nine SHB were found in the fourth SHB positive apiary. The fourth positive apiary had seven positive colonies with nine SHB found. Twelve adult SHB were collected from ten colonies. All SHB found were from colonies overwintered indoors.
The infestation rate per positive colony was low, averaging 1.2 SHB per colony. The percent of SHB positive colonies monitored was 1.9% (10/535). The percent of colonies monitored was 74.1% (535/722).
This project focused on the monitoring of the adult stage only, nevertheless no other SHB life stages were observed.
The microfiber cloths were successful in trapping adult SHB, although the effectiveness was not evaluated. The cloth was shredded by bees if the colony was of sufficient strength and there was sufficient time for the bees to pull enough fibers from the microfiber cloth to entangle the adult SHB, Figure 2.
Although some apiary inspectors have reported that queens have been trapped in microfiber cloths, no queens were trapped in any of the 535 microfiber cloths inspected.
A very low percentage of cloths (< 1%) were missing. It was suspected that the cloths had been shredded or pulled between the frames by the bees prior to the end of the observation period.

Figure 2. Microfiber cloth being shredded by honey bees.

Conclusion

Following the spring inspections, it was concluded that the SHB adult was able to survive in NB honey bee colonies overwintered indoors. The microfiber cloths were successful in monitoring adult SHB during New Brunswick's spring weather.

Acknowledgements

This project was funded by the Canadian Agricultural Partnership Agri-Industry Development and Advancement, Advancing Crop and Livestock Sectors: Improving Crop and Livestock Health and Quality

The authors would like to thank the New Brunswick Beekeepers Association and the New Brunswick beekeepers involved in this project for their cooperation.

Small Hive Beetle, *Aethina tumida* Murray, Monitoring in New Brunswick Honey Bee Colonies in the Summer of 2018 – Preliminary Report

Andrew Byers (Apiary Inspector), Michel Melanson (Blueberry / Apiculture Specialist, Apiary Inspector – DAAF), Chris Maund (Integrated Pest Management Specialist (Entomologist) and Provincial Apiarist – DAAF)

Introduction

The adult stage of the small hive beetle (SHB), *Aethina tumida* Murray, and suspected SHB larvae were found for the first time in New Brunswick (NB) on June 1, 2017. These were found in Ontario (ON) honey bee colonies brought to NB for wild blueberry pollination in the northeastern part of the province. During this time, twelve NB beekeeping operations were identified as having their honey bee colonies within a 3 km radius of the SHB positive Ontario colonies. Colonies from these twelve NB beekeeping operations were monitored throughout the summer of 2017 (July 6 to September 11) by staff from the NB Department of Agriculture, Aquaculture and Fisheries (DAAF). Of these twelve NB beekeeping operations, seven were subsequently proven to have colonies positive for the SHB.

In 2018, spring monitoring of NB colonies showed for the first time that the SHB overwintered in New Brunswick honey bee colonies which were kept indoors during the winter. In the spring, two NB beekeeping operations were SHB positive out of five that were SHB positive the previous year.

To help prevent the reintroduction of SHB from imported ON colonies, improved importation requirements for honey bee colonies were made prior to the 2018 importation of colonies. The purpose of the summer SHB monitoring program was to determine the SHB infestation level in NB colonies nearby the ON colonies from SHB positive apiaries. This would give some indication as to whether or not the new 2018 importation requirements were more effective regarding the SHB. Additionally, the project was to monitor the level of the SHB in colonies from NB beekeepers who had the SHB in 2017.

Materials and Methods

Staff from the NB Department of Agriculture, Aquaculture and Fisheries (DAAF) monitored NB honey bee colonies to determine whether or not they would become infested with the SHB. Monitoring was done from July 3 to 26, 2018. Beekeeping operations were selected either due to proximity to high risk locations (i.e. nearby Ontario honey bee colonies from SHB positive areas), movement of colonies to high risk locations during blueberry pollination or for being previously SHB positive. Twelve beekeeping operations with a total of 34 apiaries were selected for monitoring in the summer of 2018, Table 1. Six of these twelve NB beekeeping operations were SHB positive in 2017. Locations of the selected apiaries were in various parts of the province, Figure 1. Apiaries were sampled at a rate of between 50 and 100%.

Table 1. Beekeeping operations, apiaries and colonies monitored for the small hive beetle in the summer of 2018

	Beekeeper reference number	Apiaries monitored	Colonies monitored	Total colonies	Percent of colonies monitored per colonies in monitored apiaries
	1	2	27	27	100
	2	1	20	20	100
	3	5	23	29	79
	4	1	7	7	100
	5	4	57	57	100
	6	4	49	49	100
	7	2	32	32	100

	8	1	36	36	100
	9	8	287	612	47
	10	3	52	52	100
	11	1	10	10	100
	12	2	32	64	50
Total	**12**	**34**	**632**	**995**	**64 (632/995)**

Microfiber cloths (Beetle Bee-Gone ®) were placed in colonies to determine the presence of adult SHB. One cloth was placed across the top bars under the inner cover in each colony monitored. The sheet was placed in the corner on the top bars since SHB tend to crawl to the corners or perimeter of the hive to avoid honey bees. A portion of the cloth was held between the hive body and the inner cover to help hold it in place.

The Beetle Bee-Gone® cloth is a 12 X 15 cm cloth sold for trapping adult SHB. The texture of the cloth is similar to that of a fabric softener or dryer cloth. Honey bees try to remove the cloth from the hive by chewing on it and pulling apart the fibers. The beetles then become entangled in the shredded areas of the cloth and die.
One beekeeping operation was also selected for supplementary monitoring using pollen patties to identify additional life stages of the SHB. One pollen patty was placed on the top bars of selected colonies to attract SHB adults to lay eggs. The pollen patties were inspected seven days later by the beekeeper for suspected SHB larvae and after another seven days by the inspector. Cloths were removed and inspected for SHB adults twelve to fourteen days after placement on the top bars.

Figure 1. Locations of 34 New Brunswick apiaries selected for small hive beetle monitoring in the summer of 2018

Results and Discussion
One adult SHB was found, entangled in the cloth, in one honey bee colony out of the 632 sampled, representing a 0.16% infestation rate. No other SHB life stages were found. The adult SHB was found after the NB honey bee colony had been used for blueberry pollination and had been near Ontario colonies. This colony was owned by a NB beekeeper whose colonies were previously monitored for the SHB and none were found.

Comparison of SHB infestation rates in NB colonies during pollination from 2018 and 2017: The SHB infestation rate in NB colonies near ON colonies in 2018 was 0.16% (1/632). This rate was lower than in 2017 which was 3.38% (29/856). The lower 2018 rate may have been due to the improved 2018 honey bee importation requirements. It should be noted, though, that the 2017 monitoring program used a different monitoring method, a pollen patty and a SHB trap, compared to the cloth used in 2018.
The cloth was missing on the top bars in ten colonies out of 632 upon inspection on the twelve to fourteenth day. One sheet was found on a landing board and another on the ground in an apiary. These findings support assumptions made in the spring monitoring survey that the cloths had been shredded or pulled between the frames by the bees.
The Beetle Bee-Gone ® cloths used to monitor adult SHB appeared to be a useful, feasible and practical method for monitoring adult SHB in NB's spring and summer conditions. Higher populations of SHB are needed to determine the effectiveness of these cloths under NB conditions.
Based on observations, the cloths should preferably be inspected 10 to 12 days after placement in a strong honey bee colony as a longer period may increase the likelihood of the cloth being removed by honey bees.

Conclusion
Only one adult SHB was found in from 632 colonies monitored owned by 12 NB beekeepers. The improved 2018 honey bee importation requirements appeared to help in reducing the introduction and spread of the SHB from imported ON colonies to NB colonies.

Acknowledgements
This project was funded by the Canadian Agricultural Partnership, Agri-Industry Development and Advancement: Improving Crop and Livestock Health and Quality.
The authors would like to thank the New Brunswick Beekeepers Association and the New Brunswick beekeepers involved in this project for their cooperation.

PRINCIPAL IVESTIGATOR: Valérie Fournier
COLLABORATION: Marc Bélisle (Sherbrooke University)
GRABT PROGRAM: MAPAQ, Prime-Vert
PROJECT TITLE: Impact of wildflower strips on bumblebee biodiversity and winter survival in apple orchards
DURATION: 3 years (May 2017 to May 2020)
TOTAL COST: 70 000$
STATUS: ongoing (PhD student: Amélie Gervais)

ABSTRACT: L'objectif général de ce projet de trois ans est d'examiner l'impact d'aménagements déjà existants sur la biodiversité des bourdons retrouvés dans les vergers de pommiers du Sud du Québec. Les objectifs spécifiques sont de: 1) déterminer l'impact des aménagements sur la diversité, l'abondance et la survie hivernale des reines de bourdons (années 1, 2, 3); 2) déterminer l'influence des aménagements sur le taux de pollinisation des fleurs de pommier et les rendements en fruits (années 2, 3); et de 3) réaliser une analyse de rentabilité économique propre aux aménagements en pomiculture, mais pouvant aussi s'adapter à d'autres cultures du Québec (années 2, 3).

PRINCIPAL IVESTIGATOR: Valérie Fournier
COLLABORATION: Pierre Giovenazzo
GRANT PROGRAM: NSERC and FQRNT MSc scholarship
PROJECT TITLE: Biological control of varroa mites using the predator mite *Stratiolealaps scimitus* (Acari: Laelapidae)
DURATION: 2 years (May 2016 to May 2018)
TOTAL COST: 30 000$
STATUS: **Done** (MSc student Sabrina Rondeau graduated this summer). Manuscript submitted (PloseOne); title: **Risk assessment and predation potential of *Stratiolaelaps scimitus* (Acari: Laelapidae) to control *Varroa destructor* (Acari: Varroidae) in honey bees**.

ABSTRACT: Our study aimed to investigate the potential of the predatory mite *Stratiolaelaps scimitus* to control varroa infestations in honey bees. Tests on safety and predation were carried out to: (1) assess the risk of predation of the bee brood by *S. scimitus*, and (2) evaluate the predation potential of *S. scimitus* on phoretic varroa mites. Under laboratory conditions, *S. scimitus* attacked every unprotected bee brood stages with a strong preference for bee eggs. When introduced inside colonies, however, *S. scimitus* does not have negative effects on the survival of the bee brood. Moreover, our observations revealed that *S. scimitus* does not attack varroa mites when they are attached to the body of bees. This study provides evidence that *S. scimitus* does not represent a threat to the bee brood, but also suggests that its effect in varroa control will probably be limited as it does not attack phoretic varroa mites.

PRINCIPAL IVESTIGATOR: Valérie Fournier
COLLABORATION: Pierre Giovenazzo
GRANT PROGRAM: NAPPC (10,000USD) and EAS Foundation (3,000USD)
PROJECT TITLE: Biological control of varroa mites using the predator mite *Stratiolealaps scimitus* (Acari: Laelapidae)
DURATION: 1 year (May 2017 to May 2018)
TOTAL COST: 13 000 USD approx. 17,000$ CND
STATUS: **Done** (MSc student Sabrina Rondeau graduated this summer). **Manuscript submitted (Apidologie); Title:** The use of the predatory mite *Stratiolaelaps scimitus* (Acari: Laelapidae) to control *Varroa destructor* (Acari: Varroidae) in Honey bee colonies in early and late fall.

ABSTRACT: In this study, we investigated the use of the predatory mite *Stratiolaelaps scimitus* for the biological control of the ectoparasitic mite *Varroa destructor*, a major pest of honey bees. Our study aimed to evaluate the effectiveness of *S. scimitus* in controlling varroa populations in early and late fall in comparison with untreated colonies and two currently used organic treatments: Thymovar® and oxalic acid. Performing weekly mite drop monitoring, we first compared the effectiveness of two introduction rates of *S. scimitus* (6,250 or 12,500 mites/colony) during a fall treatment (September) and, as we detected no differences of effectiveness between these, we used the dosage currently recommended by biocontrol suppliers (6,250 mites) in a complementary treatment test (November). Results showed that *S. scimitus* did not succeed in controlling varroa populations in honey bee colonies when introduced neither in early nor in late fall according to current suppliers' recommended rates and application method.

PRINCIPAL IVESTIGATOR: Valérie Fournier
COLLABORATION: Pierre Giovenazzo
GRANT PROGRAM: NSERC and FQRNT MSc scholarships
PROJECT TITLE: Impact of protein supplements on honey bee colonies

DURATION: 2 years (May 2016 to August 2018)
TOTAL COST: 30 000$
STATUS: **Done** (MSc student Marianne Lamontagne-Drolet graduated this summer). **Manuscript under review at JAR**; Title: The Impacts of Two Protein Supplements on Commercial Honey Bee (*Apis mellifera* L.) Colonies.

ABSTRACT: Honey bees (*Apis mellifera* L.) are pollinators of major importance for crop production. In recent years, colony management has become more difficult due to multiple problems such as pesticide exposure, exotic parasites, pathogens and nutritional deficiencies. The latter has incited beekeepers to provide protein supplements to their colonies to make up for the lack of pollen resources in the environment. However, their efficiency varies depending on their composition and the surrounding landscape. In this field study, we provided two different protein supplements (Global Patties® and Ultra Bee®) to colonies with either limited or unlimited access to natural pollen to assess their impacts on various colony and individual bee parameters. We used 50 colonies distributed among three sites in the Montérégie area, in Quebec, Canada. We found that supplemented colonies limited in pollen collection were able to raise the same amount of brood than control colonies. Nurse bees in supplemented colonies also had a higher protein content compared to control bees. However, bees from supplemented colonies displayed shorter lifespan, which casts a doubt on the suitability of these products for honey bee nutrition. The supplement containing natural pollen, Global Patties®, was the most consumed and the most beneficial of the two for the colonies. Finally, colonies from the apiary surrounded by the highest proportion of cultivated land in a 5-km radius performed better toward the end of the season, which could be due to the presence of nutritionally interesting plants specific to the agricultural landscape at that time of the year.

PRINCIPAL IVESTIGATOR: Valérie Fournier
COLLABORATION: Marc Mazerolle (Laval University)
GRANT PROGRAM: FQRNT MSc scholarship
PROJECT TITLE: The effect of urban beekeeping on wild bee communities
DURATION: 2 years (May 2016 to August 2018)
TOTAL COST: 30 000$
STATUS: **Done** (MS student: Frédéric McCune). Manuscript to be submitted this fall.

ABSTRACT: Wild bees provide pollination services and populations are declining. At the same time, urban beekeeping is rapidly gaining popularity. The objectives of this study were to determine to what extent honey bees, urban heat islands, and floral resources affect wild bee communities. We hypothesized that honey bees exert negative impacts, that floral resources favor wild bee communities, and that the influence of urbanization varies across species according to functional traits. We tested these hypotheses with data collected at 25 sites in Montreal, Canada in 2012-2013, where bees were sampled using pan-traps. We investigated community patterns and abundance after accounting for imperfect detection probability. We found mixed effects of urban heat islands across species and positive effects of floral resources, but there was no evidence of competition between wild and honey bees. Our results indicate that cities can allow the coexistence of urban beekeeping and wild bees under moderate hive densities.

Principle Investigator:

Name: Ernesto Guzman
Address: School of Environmental Sciences, University of Guelph, Guelph ON N1G 2W1
Email: eguzman@uoguelph.ca
Fax: (519) 837-0442
Telephone: (519) 824-4120 Ext. 53609

Co-Investigators (including graduate students):

Name: Shane Klassen, Paul Goodwin, Nuria Morfin, Paul Kelly
Address: Same as above
Fax: Same as above
Telephone: Same as above

Name: Les Eccles, Daniel Borges
Address: Ontario Beekeepers Association

Project title: Efficacy and effects on bee health of prebiotics and probiotics used for the control of the parasitic fungus *Nosema ceranae*

Abstract (300 words or less): Alternatives to fumagillin for the control of *Nosema ceranae*, an intestinal parasite of the honey bee, are needed. Fourteen compounds were screened at several doses for their control of *N. ceranae* in caged bees, and three were retested at their predicted optimal dose. Zymosan was the most successful at reducing *N. ceranae* spore numbers. In another study using field colonies, eugenol, a probiotic (*E. faecium*), chitosan and naringenin, were evaluated for their effects on *N. ceranae* and bee health parameters. Eugenol, naringenin and the probiotic reduced *N. ceranae* infections and increased honey production. Chitosan was ineffective. In general, compounds administered in protein patty worked better than in syrup in spring, whereas syrup worked better than patty in fall.

Start Date: April 2016
End Date: August 2018
Total Funding for Project: 125,000.00
Funding Sources: OMAFRA

Appendix 9: CAPA Bylaws

CANADIAN ASSOCIATION OF PROFESSIONAL APICULTURISTS
L'ASSOCIATION CANADIENNE DE PROFESSIONELS DE L'APICULTURE

BYLAWS

Objectives of the Association

1. To promote, develop and maintain good fellowship and cooperation among professional apiculturists (individuals whose work in government, university, or similar professional capacity involve managed bee species)
2. To create a meeting of administrative and research professionals for the purpose of discussing common interests related to bee management and effectively coordinating, where possible, their activities.
3. To aid in the dissemination of information regarding the beekeeping industry in all its forms.
4. To maintain a consultative rapport with the Canadian Honey Council and other organizations concerned with managed bee species.
5. To maintain a rapport with professional in apiculture and related fields in other countries.

ARTICLE I - **Membership**

I (1): Full membership, with voting privileges is open to personnel employed by Canadian Federal and Provincial governments, universities or college, and consultants who are employed in the field of apiculture or other related fields as:

- Federal apiculturist
- Provincial apiculturist
- Full-time or part time extension apiculturist
- Full-time or part time teaching and/or research apiculturist
- Full-time or part-time apiary inspectors or bee disease / pest inspection staff
- Full-time or part-time apicultural technicians or technicians associated with personnel or projects involving managed bee species
- Full-time or part time professionals in any other capacity whose work involves managed bee Species

I (2): Non-voting, associate membership in the association may, upon receipt of application, be granted to persons who are:

- Part or full-time graduate students involved in projects involving managed bee species
- Seasonal and / or casual apicultural technicians or technicians associated with personnel or projects involving managed bee species
- Seasonal and / or casual apiary or bee disease / pest inspection staff
- Representatives of appropriate programs within federal government agencies such as Agriculture and Agri-Food Canada, the Canadian Food Inspection Agency and the Pest Management Regulatory Agency
- The representative of the Canadian Honey council and a representative of any other organizations concerned with managed bee species.
- Members of the American Association of Professional Apiculturists
- Members of the Apiary Inspectors of America.

I (3): Membership or associate membership may be extended to persons other than those defined in Clauses I and II upon ratification by a majority of the membership.

I (4): The privileges of membership in the Association shall terminate when a current member resigns or retires from the position which established his/her eligibility.
I (5): Membership fees shall be prescribed by the members in general meeting.
I (6): Every member shall receive a copy of the bylaws annually.
I (7): Privileges of membership shall be restricted to those holding current membership.
I (8): The decision to grant life memberships, honorary memberships, and awards of merit shall be made by a 75% majority of the members present at the general meeting.

ARTICLE II - General Meeting

II (1): The annual meeting shall be held at a time and place designated by the executive.
II (2): The secretary shall send all members a notice of a general meeting sixty (60) days in advance of the date of such a meeting unless a majority of the members waive the sixty day requirement.
II (3): A quorum of a duly called general meeting shall be ten (10) members.
II (4): Attendance at the Association's meeting shall be limited to members and guests invited by the executive.
II (5): Minutes of the general meeting shall, when printed, be of a confidential nature and permission to use the information presented must be obtained from the executive.

ARTICLE III - Finances

III (1): The fiscal year of the Association shall be from January 01 to December 31 of the calendar year.
III (2): All monies and securities held by the Association shall be in the name of the Canadian Association of Professional Apiculturists.
III (3): All money transactions made by the Association shall be made by cheque signed by the Treasurer and the President.
III(4): If required, a member of the executive (Vice-President, Secretary, or Past-President) will be chosen to act as Designate by the executive to have signing authority on behalf of the President.

ARTICLE IV - Officers of the Association

IV(1): The members shall, at the general meeting, through personal attendance or virtual attendance via electronic means (e.g. telephone, video conferencing), elect a President, Vice-President, Secretary, and Treasurer and appoint the Past-President into the executive. The executive may in turn appoint other officers and committee members as may be required.
IV (2): All officers shall be elected for a two year term of office and no officer shall serve more than two consecutive terms in the same office position.
IV (3): The president shall preside over all meetings of the Association and shall be ex-officio, a member of all committees.
IV (4): The vice-president shall perform the duties of the president in his/her absence or inability to act.
IV (5): The secretary shall:

1. Record the minutes of all meetings of the Association and distribute copies of these minutes to the membership sometime during the sixty (60) days following a meeting, and,
2. Send information and notices of motions and meetings etc. to the membership as required, and,
3. Maintain an up-to-date membership list, and,
4. Make arrangements to hold an annual general meeting, and other Association business.

IV (6): The Treasurer shall:

1. Look after all financial matters (including collection of annual fees from each member) of the Association and maintain accurate financial records.

IV (6): The Past-President shall be that person who has most recently completed a term of Association President. Should the offices of the President and Vice-President both become vacant, the Past-President

shall fill the office of President until an election can be held.

ARTICLE V - Amendments of Bylaws

V(1): Bylaws may be amended only by a recognized quorum at a general meeting and all members must be notified by the secretary of any proposed changes in the thirty (30) days in advance of the meeting date.

The foregoing are the Bylaws of the Canadian Association of Professional Apiculturists as amended at an annual general meeting held in Saskatoon Saskatchewan, at the Radisson Hotel, December 1 2015.

Appendix 10: CAPA Membership list

Full and Associate members:

First name	Last Name	Member	Adress		Phone number	E-mail
Rasol	Bahreini	Full	Pest Surveillance Branch Crop Diversification Centre North 17507 Fort Road	Edmonton,Alberta,T5Y 6H3	(780) 638-3995	rassol.bahreini@gov.ab.ca
Elena	Battle	Full	RR2 Site 2, Comp 44	Wembley,Alberta,T0H 3S0	(587) 297-8735	elenabattle@gmail.com
Martine	Bernier	Full	CRSAD 120-A chemin du Roy	Deschambault,Quebec,G0A 1S0	(418) 286-3353 #272 (418) 572-9089 (cell)	bernier.martine@hotmail.com
Miriam	Bixby	Associate	2129 Sanddowne Rd.	Victoria,British Columbia,V8R 3J2	(604) 808-1472	miriambixby@gmail.com
Daniel	Borges	Full	108 Waterloo St.	Kitchener,Ontario,N2H 3V6	(519) 580-5052	dan.borges@ontariobee.com
Madeleine	Chagnon	Full	Université du Québec à Montréal 60 basse-Double	Saint-Jude,Quebec,J0H 1P0	(450)792-2227 (450) 771-7925	madeleine.chagnon@gmail.com
Anna	Chernyshova	Associate	: 93 Knightshade Drive	Toronto,Ontario,L4J 8Z6	(416) 650-1414	achernys@uwo.ca
Sheilla	Colla	Full	Faculty of Envirionmental Studies 4700 Keele Street	Toronto,Ontario,M0J 1P3	phone???	srcolla@yorku.ca

Fletcher	Colpitts	Full	188 Baseline Rd	Glenvale,New Brunswick,E4Z 2Z5	(506) 756-8203 (506) 461-5645 cell	Fletcher.Colpitts@gnb.ca
Megan	Colwell	Associate	University of Manitoba 214-12 Dafoe Road	Winnipeg,Manitoba,R3T 2N2	(902) 880-6419	meganjcolwell@gmail.com
Candice	Coombs	Associate	9731 92nd Ave	Grande Prairie,Alberta ,T8H0V4	(780) 357-7737	candice.ecoombs@gmail.com
Phil	Craft	Associate	PO Box 259	Wilmore,Kentucky, USA,40390	(859) 338-7237	philcraftbeekeeping@windstream.net
Rob	Currie	Full	12 Dafoe Road 214 Animal Science / Entomology Bldg Dept. of Entomology University of Manitoba	Winnipeg,Manitoba,R3T 2N2	(204) 474-6022 (office) (204) 474-7628	rob.currie@umanitoba.ca
Chris	Cutler	Full	Dept. of Environmental Sciences Dalhousie University Agricultural College PO Box 550	Truro,Nova Scotia,B2N 5E3	(902) 896-2471	chris.cutler@dal.ca
Suresh	Desai	Associate	12 Dafoe Rd, 218 Animal Sci Bldg Department of Entomology University of Manitoba	Winnipeg,Manitoba,R3T 2N2	(204) 474-9439 (204) 474-7628	beesuresh@gmail.com
Kelsey	Ducsharm	Full	176 Elmira Rd N	Guelph,Ontario,N1K 1Y7	(519) 836-3609 (work) (519) 731-2543 (cell)	kelsey.ducsharm@ontariobee.com

Claude	Dufour	Associate	639 Rue Morin	Levis,Quebec,G6C 1M3	(418) 833-3083 (418) 999-2358	claude_dufour@videotron.ca
Diane	Dunaway	Full	BC Ministry of Agriculture 5914 Soda Ck MacAlister Road	Williams Lake,British Columbia,V2G 5A5	(250) 297-6399	beecheck@dunawayranch.com
Les	Eccles	Full	Ontario Beekeepers Association Technology Transfer Program Suite 185, 5420 Hwy 6 N Orchard Park Office	Guelph,Ontario,N1H 6J2	(519) 836-3609	les.eccles@ontariobee.com
Murray	Fear	Full	200 Potter Street	Winham,Ontario,N0G 2W0	(519) 820-3483	murray.fear@ontario.ca
Julie	Ferland	Full	Ministère de l'Agriculture, des Pêcheries et de l'Alimentation 200, chemin Sainte-Foy 11 e étage	Québec,Quebec,G1R 4X6	(418) 380-2100 ext 2067	Julie.ferland2@mapaq.gouv.qc.ca
Leonard	Foster	Full	Centre for High-Throughput Biology 2125 East Mall Dept. of Biochemistry & Molecular Biology University of British Columbia	Vancouver,British Columbia,V6T 1Z4	(604) 822-8311	foster@chibi.ubc.ca

Valérie	Fournier	Full	Centre de recherche en horticulture Universite Laval 2480, boul. Hochelaga	Québec,Quebec,G1V 0A6	(418) 656-2131 poste 4629	valerie.fournier@fsaa.ulaval.ca
Wendy	Gilson	Full	BC Ministry of Agriculture Black horse Apiary 2757 Penrith St. Box 792	Cumberland,British Columbia,V0R1S0	(250) 882-2852	wendigilson@yahoo.ca
Pierre	Giovenazzo	Full	Département de biologie, Pavillon Vachon Faculté des sciences et de génie Université Laval	Québec,Quebec,G1V 0A6	(418) 656-2131 #8081 (418) 656-2043 (418) 953-4941	pierre.giovenazzo@bio.ulaval.ca
Melissa	Girard	Full	1426 route 138	Neuville,Quebec,G0A 2R0	(418) 909-0877	melissa.girard.apiculture@hotmail.com
Kathleen	Glasgow	Associate	Perennia Food and Agriculture 199 Bernia MacDonald Dr	Bible Hill,Nova Scotia,B6L 2H5	(902) 305-1393	kdglasgow@dal.ca
Angela	Gradish	Full	School of Environnemental Sciences University of Guelph	Guelph,Ontario,N1G 2W1	(519) 824- 4120 ext 58810	agradish@uoguelph.ca
Marta	Guarna	Full	Beaverlodge Research Farm PO box 29	Beaverlodge,Alberta,T0H 0C0	(778) 228-9831	marta.guarna@agr.gc.ca
Ernesto	Guzman	Full	School of Environmental Sciences University of Guelph	Guelph,Ontario,N1G 2W1	(519) 824-4120 #53609 (519) 836-8897	eguzman@uoguelph.ca

Brent	Halsall	Associate	7328 Stone School Rd.	Greely,Ontario,K4P 1M3	(613) 447-4479	brent.halsall@ontario.ca
Mollah Md.	Hamiduzzaman	Full	School of Environmental Sciences University of Guelph 50 Stone Road E	Guelph,Ontario,N1G 2W1	(519) 824-4120 #54372	mhamiduz@uoguelph.ca
Brock A	Harpur	Associate	Biology Dept. York University 355 Lumbers Bldg. room 208 4700 Keele street	Toronto,Ontario,M3J 1P3	(416) 931-3712	b.harpur@gmail.com
Lloyd	Harris	Full	2839 Lakeview Ave	Regina,Saskatchewan,	(306) 058-4956 (306) 537-4532	Lharris@agview.sasktelmail.com
Heather	Higo	Full	Dept of Biochemistry and Molecular Biology University of British Columbia 2125 East Mall	Vancouver,British Columbia,V6T 1Z4	(604) 532-6904	heather.higo@gmail.com
Shelley	Hoover	Full	Lethbridge Research Centre 100-5401 1 Ave South	Lethbridge,Alberta,T1J 4V6	(587) 220-3775 (403) 381-5116	Shelley.hoover@gov.ab.ca
Émile	Houle	Full	CRSAD 120 A Chemin du Roy	Deschambault,Quebec,G0A 1S0	(418) 286-3353 #227 (418) 286-3597	emile.houle@crsad.qc.ca
Abdullah	Ibrahim	Full	AAFC Research Farm Box 29	Beaverlodge,Alberta,T0H 0C0	(780) 354-5130 phone (587) 343-5378 cell	abdullah.ibrahim@canada.ca
Jeff	Kearns	Full	Government of Alberta 1031 12A St S	Lethbridge,Alberta,T1K 1R5	(403) 317-2174 (587) 220-4456	jeff.kearns@gov.ab.ca jkearnstansport@gmail.com

Paul	Kelly	Full	School of Environmental Sciences University of Guelph	Guelph,Ontario,N1G 2W1	(519) 836-8897	pgkelly@uoguelph.ca
Melanie	Kempers	Full	Ontario Beekeepers' Association Research Office Orchard Park Office Centre 5420 Hwy 6 North	Guelph,Ontario,N1H 6J2	(519) 836-3609	mel.kempers@ontariobee.com
Karen	Kennedy	Full	Forestry & Agrifoods Agency Fortis Bldg. P.O. Box 2006	Corner Brook,Newfoundland,A2H 6J8	(709) 637-2662	KarenKennedy@gov.nl.ca
Clement	Kent	Full	York University 212B Lumbers, 4700 Keele St.	Toronto,Ontario,M3J 1P3	(416) 736-2100 (647) 667-5801	clementfkent@gmail.com
Shane	Klassen	Associate	700 Mersea rd 12	Wheatley,Ontario ,N0P2P0	(519) 551-0414	sklassen@uoguelph.ca
Paul	Kozak	Full	Ontario Ministry of Agriculture & Food & Ministry of Rural Affairs 1 Stone Road West	Guelph,Ontario,N1G 4Y2	(519) 826-3595	paul.kozak@ontario.ca hipaulkozak@yahoo.com
Axel	Krause	Full	BC Ministry of Agriculture / Apiculture 431 Rosedale Road	Castlegar,British Columbia,V1N 4L3	(250) 608-7397	a.krause@telus.net
Rhéal	Lafrenière	Full	Manitoba Agriculture 204 - 545 University Crescent	Winnipeg,Manitoba,R3T 5S6	(204) 945-4825 (204) 945-4327	Rheal.Lafreniere@gov.mb.ca

Marianne	Lamontagne-Drolet	Associate	University of Laval 2480 blvd Hochelaga	Québec,Quebec,G1V 0A6	(418) 802-9901	marianneld@hotmail.com
Anne	Leboeuf	Full	MAPAQ 683 rue Gringras	Québec,Quebec,G1X 3T5	(418) 473-7290 (481) 977-8349	anne.leboeuf@mapaq.gouv.qc.ca
David	Macdonald	Full	B.C. Ministry of Agriculture 237 south Ridge Dr.	Salt Spring Island,British Columbia,V8K 1Y9	(250) 538-8481 (250) 653-9999	islandapiaryinspector@telus.net
Scott	MacFarlane	Associate	977 North Napan Road	Napan,New Brunswick,E1N 5E5	(506) 773-3848	Scott.d.macfarlane@hotmail.com
Courtney	MacInnis	Associate	CW 312 Biological Sciences building University of Alberta	Edmonton,Alberta,T6G 2E9	(780) 901-2322	cmacinni@ualberta.ca
Kenna	MacKenzie	Full	AAFC Research Centre PO Box 5000, 4200 Hwy 97	Summerland,British Columbia,V0H 1Z0	(250) 494-6358 (250) 494-6515	mackenziek@agr.gc.ca
Georges	Martin	Full	CRSAD 120-A Chemin du Roy	Deschambault,Quebec,G0A 1S0	(418) 286-3353 #272	georges.martin@gmail.com
Jamie Lee	Martin	Full	National Bee Diagnostics Lab 1 Research Rd.	Beaverlodge,Alberta,T0H 0C0	(780)-357-7731	JLMartin@gprc.ca

Christopher	Maund	Full	Crop Sector Development New Brunswick Department of Agriculture Hugh John Flemming Complex / 1350 Regent Street / P.O. Box 6000	Fredericton,New Brunswick,E3B 5H1	(506) 453-3477 (506) 453-7978 fax	chris.maund@gnb.ca
Alison	McAfee	Associate	University of British Columbia 111-2170 West 44th Ave	Vancouver,British Columbia,V6M 2G3	(778) 995-2151	alison.mcafee@alumni.ubc.ca alison.n.mcafee@gmail.com
Robyn	McCallum	Full	Perennia Food and Agriculture Inc. 199Dr Bernie MacDonald Dr	Bible Hill,Nova Scotia,B6L 2H5	(902) 896-0277 ext 234	rmcallum@perennia.ca
Igor	Medici	Full	Western College of Veterinary Medicine, 52 Campus Dr, Department of Veterinary Pathology, room 2718	Saskatoon, Saskatchewan, S7N5B4	306 9662638	igor.mattos@usask.ca
Adony	Melathopoulos	Associate	Department of Horticulture Oregon State University 4017 Agricultural and Life Science Building	Corvallis,Oregon, USA,97331-7304	(541)-737-3139 (541) 737-3479 fax	andony.melathopoulos@oregonstate.edu

Cameron	Menzies	Full	Jones Building, 5th Floor 11 Kent Street	Charlottetown,Pince Edward Island,C1A 7N8	902-314-0816	crmenzies@gov.pe.ca
Derek	Micholson	Associate	704 Beresford Ave	Winnipeg,Manitoba, R3L 1J8	(204) 997-6793	Derek.michelson@gmail.com
Ana	Montero-Castaño	Full	School of Environmental Sciences, University of Guelph 50 Stone Road E.	Guelph,Ontario,N1G 2W1	226 962 5899	ana.montero.castano@gmail.com
Lora	Morandin	Associate	1212 Juno St	Victoria,British Columbia,V9A 5K1	(250) 889-8194	lm@pollinator.org
Nuria	Morfin-Ramirez	Full	OMAFRA 6 Bagot St	Guelph,Ontario,N1H 5S9	(519) 403-8250 (519) 760-3289	nmorfinr@uoguelph.ca
Samantha	Muirhead	Full	Crop Diversification Centre North 17507 Fort Rd.	Edmonton,Alberta,T5Y 6H3	(780) 415-2309 F (780) 422-6096	Sam.muirhead@gov.ab.ca
Emma	Mullen	Full	University of Guelph 50 Stone Road East	Guelph,Ontario,N1G 2W1	(519) 824-4120	emullen@alumni.uwo.ca
Medhat	Nasr	Full	Crop Diversification Centre North Crop Research & Extension Division Alberta Agriculture and Rural Development 17507 Fort Road	Edmonton,Alberta,T5Y 6H3	(780) 415-2314 (780) 422-6096	medhat.nasr@gov.ab.ca

Hannah	Neil	Full	Saskatchewan Technology Adaptation Team 235 10th Street East, Unit #302	Prince Albert,Saskatchewan,S6V 0Z1	(343) 540-9008	hannah.mae.neil91@gmail.com
Mylee	Nordin	Associate	School of Environmental & Horticulture Studies Niagara College – Niagara on the Lake Campus 135 Taylor Road, SS#4	Niagara on the Lake,Ontario, L0S 1J0	(906) 641-2252 ext 4407	mnordin@niagaracollege.ca
Timothy	Olchowy	Full	University of Calgary 11877 - 85 Street NW	Calgary,Alberta,T3C 1J3	(403) 210 6911	timothy.olchowy@ucalgary.ca
Sawyer	Olmstead	Associate	Dalhousie University ATTTA 2996 Miners Bass River Road	Londonderry,Nova Scotia,B0M 1M0	(902) 890-7631	sw829379@dal.ca
David	Ostermann	Full	MAFRD 204 - 545 University Crescent	Winnipeg,Manitoba,R3T 5S6	(204) 945-3861 (204) 945-4327	david.ostermann@gov.mb.ca
Lynae	Ovinge	Full	Alberta Agriculture & Rural Development 100-5410 1 Ave South	Lethbridge,Alberta,T1J 4V6	(587) 987-7534	lynae.ovinge@gov.ab.ca
Stephen	Page	Full	Agriculture and Agri-Food Canada 1341 Baseline Road	Ottawa,Ontario,K1A 0L2	(613) 773-0265	stephen.page@canada.ca
Alexandra	Panasiuk	Full	Alberta Agriculture and Forestry PO Box 4045	Spruce Grove,Alberta,T7X 3B2	(780) 289-8555	Alexandra.panasiuk@gov.ab.ca

Graham	Parsons	Full	Saskatchewan Agriculture RR5 Site 26 Comp 13	Prince Albert,Saskatchewan,S6V 5R3	(306) 953-2773 (306) 221-4970	graham.parsons@gov.sk.ca grayhamparsons@gmail.com
Michael	Peirson	Full	AAFC Research Station Box 29	Beaverlodge,Alberta,T0H 0C0	(780) 354-5122 phone (780) 354-5150 fax	Michael.peirson@canada.ca
Stephen	Pernal	Full	AAFC Beaverlodge Research Farm Box 29	Beaverlodge,Alberta,T0H 0C0	(780) 354-5135 (780) 354-5150	Steve.Pernal@canada.ca
Zoe	Rempel	Full	Bee Research Lab University of Manitoba 1-115 Scott Street	Winnipeg,Manitoba,R3L 0K9	(204) 619-3688	zdlremp@gmail.com
Sabrina	Rondeau	Associate	5225 avenue des generation, #17	Québec,Quebec,G6X 2G6	(819) 691-7959	sabrina.rondeau.1@ulaval.ca
Andrée	Rousseau	Full	Centre de recherche en sciences animales de Deschambault (CRSAD) 120-A, chemin du Roy	Deschambault,Quebec,G0A 1S0	(418) 286-3353 ext 272 (581) 991-5566	Andree.rousseau@crsad.qc.ca
Rob	Rupert	Full	49 Ray Blvd	Thunder Bay,Ontario,P7B 4C2	(807) 621-1745	Rob.rupert@ontario.ca
Olivier	Samson-Robert	Full	Centre de recherche en innovation des végétaux (criv) 2480 boul, Hochelaga Universite Laval	Québec,Quebec,G1V 0A6	(819) 347-9900 (418) 656-2131	Olivier.samson-robert.1@ulaval.ca

Cynthia	Scott-Dupree	Full	School of Environmental Sciences University of Guelph 50 Stone Road East	Guelph,Ontario,N1G 2W1	(519) 824-4120 x 52477 (519) 837-0442	cscottdu@uoguelph.ca
Alexandra	Sebastien	Associate	Micheal Smith Laboratories University of British Columbia 436-2125 East Mall	Vancouver,British Columbia,V6T 1Z4	(604) 822-6552	alexandra.sebastien12@gmail.com
Elemir	Simko	Full	52 Campus Dr Western College of Veterinary Medicine University of Saskatchewan	Saskatoon,Saskatchewan,S7N 5B4	(306) 966-7307	elemir.simko@usask.ca
Tracey	Smith	Full	11127 75 Ave	Edmonton,Alberta,T6G 0H1	(780) 436-5792 (780) 802-4073	northcookinglake@gmail.com
Renata	Soares Borba	Full	UBC/Beaverlodge Research Farm Agriculture and Agrifood Canada Box 29	Beaverlodge,Alberta,T0H 0C0	(780) 354-5135	renata.borba@canada.ca
Jason	Sproule	Full	Nova Scotia Dept. Agriculture Harlow Institute Box 890	Truro,Nova Scotia,B2N 5G6	(902) 890-1565	jason.sproule@novascotia.ca
Glyn	Stephens	Full	18160 93 Ave.	Edmonton,Alberta,T5T 1Y1	(587) 938-7474	glynstephens@outlook.com

Janet	Tam	Associate	Ontario Beekeepers'Association Research Office Orchard Park Office Centre 5420 Hwy 6 North	Guelph,Ontario,N1H 6J2	(519) 836-3609	shrewless@yahoo.com
Graham	Thompson	Full	Western University Department of Biology 1151 Richmond Rd North	London,Ontario,N6A 5B7	(519) 661-2111	graham.thompson@uwo.ca
Daniel	Thurston	Full	Suite 185, 5420 Hwy 6 N, West Door C	Guelph,Ontario,N1H 6J2	(519) 836-3609 (705) 879-5778	Daniel.thurston@ontariobee.com
Nicolas	Tremblay	Full	120-A Chemin du Roy	Deschambault,Quebec,G0A 1S0	(418) 286-3353 ext 224 (418) 806-1311 cell	conseilsapi@crsad.qc.ca AND conseilsapi@hotmail.com
Nadia	Tsvetkov	Full	York University 4700 Keele Street	Toronto,Ontario,M3J 1P3	(647) 833-7191	nadiats@yorku.ca
Paul	van Westendorp	Full	BC Ministry of Agriculture 1767 Angus Campbell Road	Abbotsford,British Columbia,V3G 2M3	(604) 556-3129 (604) 556-3015 (fax)	vanwestendorp@telus.net paul.vanwestendorp@gov.bc.ca
Bradford	Vinson	Full	UBC Bee Lab 1006-1845 Comox Street	Vancouver,British Columbia,V6G 1R1	(604)353-3895	faereifuego@gmail.com
Geoff	Williams	Associate	Department of Entomology and Plant Pathology	Auburn,Alabama, USA,36849	(334) 844-5068 (334) 329-8202 (mobile)	williams@auburn.edu

Geoff	Wilson	Full	Saskatchewan Agriculture Box 3003, 800 Central Avenue	Prince Albert,Saskatchewan,S6V 6G1	(306) 953-2304 (306) 953-2440	geoff.wilson@gov.sk.ca
Mark	Winston	Full	Morris J. Wosk Centre for Dialogue Simon Fraser University, Harbour Centre 3309 – 515 W. Hastings St.	Vancouver,British Columbia,V5B 5K3	(778) 782-7894 (778) 782-7892	winston@sfu.ca
Victoria	Wojick	Associate			phone???	vw@POLLINATORS.ORG
Patricia	Wolf Veiga	Full	National Bee Diagnostic Centre 1 Research Road, PO Box 1118	Beaverlodge,Alberta,T0H 0C0	(780) 357-7736 (780) 933-2454	PWolfVeiga@GPRC.ab.ca
Sarah	Wood	Associate	Department of Veterinary Pathology Western College of Veterinary Medicine 1622-52 Campus Drive	Saskatoon,Saskatchewan,S7N 5B4		sarah.wood@usask.ca
Daryl	Wright	Full	326 Belvedere Street	Winnipeg,Manitoba,R3J 2H3	(204) 229-9343	d.l.wright@shaw.ca
Amro	Zayed	Full	Department of Biology York University 4700 Keele Street	Toronto,Ontario,M3J 1P3	(416) 736-2100 x 20213	zayed@yorku.ca
Jennifer	Zechel	Full	University of Guelph Animal Health Laboratories 419 Gordon St Bldg 89	Guelph,Ontario,N1G 2W1	(519) 824-4120	jlz3@CASE.EDU

Honorary member:

Claude	Boucher	Honourary	980, 81e rue	St-Georges,Quebec,G5Y 6Z1	(418) 227-4313	caillouxcb@hotmail.com
Kerry	Clark	Honourary	PO Box 2090	Dawson Creek,British Columbia,V1G 4K8	(250) 782-6646	kccsclark@gmail.com
Heather	Clay	Honourary	7925 Wilson-Jackson Rd	Vernon,British Columbia,V1B 3N5	(250) 275-4701	Heather@polargold.ca
Don	Dixon	Honourary	4635 Rebeck Rd.	Narol,Manitoba,R1C 0C6	(204) 668-8847	don.dixon@shaw.ca
John	Gates	Honourary	1262 Round Lake Rd.	Armstrong,British Columbia,V0E 1B5	(250) 546-6212	johngates@telus.net
Don	Gray	Honourary	RR# 1	Portland,Ontario,K0G 1V0		
John	Gruszka	Honourary			(306) 953-2790 (306) 953-2440	john.gruszka@gmail.com
Chris	Jordan	Honourary				cjordan402@gmail.com
Doug	McCutcheon	Honourary	2525 Phillips St.	Armstrong,British Columbia,V0E 1B1	(250) 546-0070 (205) 546-9870	

Doug	McRory	Honourary	187 Dawn Avenue	Guelph,Ontario,N1G 5J9	(519) 823-8191	dougmcrory@gmail.com
Joanne	Moran	Honourary			(902) 679-8998 (902) 679-6062	joannemoran@ns.sympatico.ca
Don	Nelson	Honourary	913 5th Ave	Beaverlodge,Alberta,T0H 0C0	(780) 354-8612 (780) 354-8171	dbnelson@telus.net
Gard	Otis	Honourary	School of Environmental Sciences University of Guelph	Guelph,Ontario,N1G 2W1	(519) 824-4170 x52478 (519) 837-0442	gotis@uoguelph.ca
Kenn	Tuckey	Honourary	3211-42A Ave	Edmonton,Alberta,T6T 1E3	(780) 440-3420 (780) 554-9138	kenn.tuckey@gmail.com

Appendix 11: 2018/19 AGM Photos

CAPA 2018/19 AGM Members Photo

Rhéal Lafrenière reading the nomination letter for the 2018 Outstanding Service Award awarded to Dr. Medhat Nasr.

Dr. Medhat Nasr receiving the 2018 Outstanding Service Award from Rhéal Lafrenière (*back*) and CAPA President Dr. Shelley Hoover.

Photo: Dr. Medhat Nasr and Rhéal Lafrenière

Photo: Dr. Medhat Nasr, Rhéal Lafrenière (*back*), Dr. Shelley Hoover *(back*).

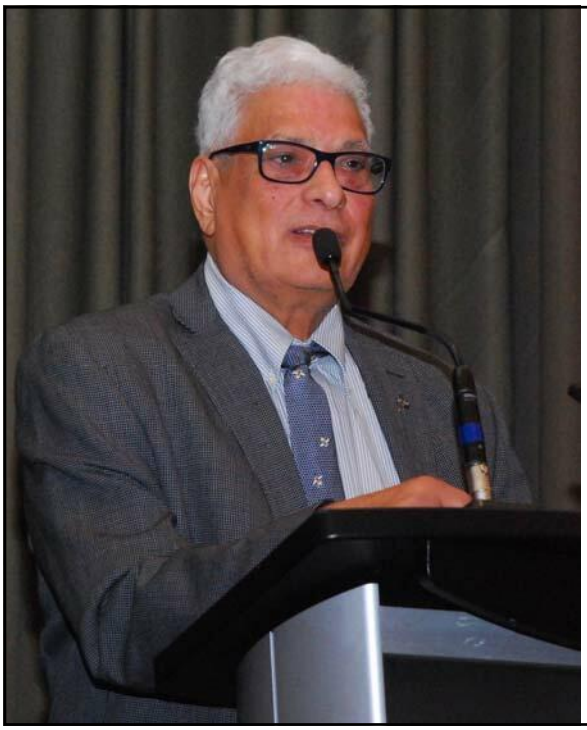

Photo: Dr. Medhat Nasr.

Ph. D student Nadia Tsvetkov receiving the 2018 CAPA Student Merit Award from CAPA President Dr. Shelley Hoover.