Spring 2023 | Vol 36 # 2

Hive Irghts

www.honeycouncil.ca

The Official Magazine of the Canadian Honey Council, The Canadian Beekeeper and The Canadian Honey Packer

$4.95

Dadant

Check out our website! (www.dadant.com) Canadian customers can now order online with all duties, fees, taxes and UPS shipping totaled at order time. No surprises at the border with additional unexpected charges to get your items. We make it easy to place your order and receive your products.

Quality that can't be beat anywhere in the industry

AP23®
Artificial Pollen 23
WINTER PATTIES
WITH HONEY-B-HEALTHY
M0016040PHW
1 CTN - 40 PATTIES

Ask about Quantity Pricing!

AP23®
POLLEN SUPPLEMENT
M0016040PH
AP23 PATTIES
40 LB BOX
M0016040
AP23
40 LB BAG

Premium Smokers

M00926 M00928

Apiguard for Varroa Mite Control
M01480

A Complete Line of Containers

Tools

Assembled Starter Kit
C52201P

M00010

New 2015 Edition of The Hive and the Honey Bee

A complete line of quality woodenware & foundations

Full Line of Honey House Equipment

Little Wonder Hand-Extractor Kits
M00396KIT - Hand
M00403KIT - Power

Many styles from which to choose

Economy Vent Suit
V01260(size)
Suit

WWW.DADANT.COM

51 S. SECOND STREET, HAMILTON IL 62341 • PHONE (217) 847-3324 • FAX (217) 847-3660 • TOLL FREE 1-888-922-1293
• CHICO, CA (877) 332-3268 • FRESNO, CA (877) 432-3268 • PARIS, TX (877) 632-3268 • SIOUX CITY, IA (877) 732-3268 •
• WATERTOWN, WI (877) 232-3268 • ALBION, MI (877) 932-3268 • WAVERLY, NY (877) 532-3268 •
• CHATHAM, VA (800) 220-8325 • FRANKFORT, KY (888) 932-3268 • HIGH SPRINGS, FL (877) 832-3268 •

Hivelights: The official magazine of the Canadian Honey Council, The Canadian Beekeeper and The Canadian Honey Packer.

The Canadian Honey Council (CHC) is the national organization of the Canadian beekeeping industry and Hivelights is the industry's magazine.

In order to receive Hivelights you must be a current member of your provincial association. Non members such as Hobby Beekeepers, Honey Packers, Urban Beekeepers or Canadians with interests in Beekeeping can subscribe to the magazine for a $25.00 subscription fee per year.

International and U. S. subscribers can receive our high quality magazine for a fee of $50 Canadian per year.

Schools, libraries, non beekeepers, university or government personnel can receive Hivelights magazine through special membership as "Friends of Canadian Apiculture" at no charge. Please contact the Hivelights office for more information: geoff@honeycouncil.ca

Hivelights is published quarterly (Spring, Summer, Fall, Winter). Deadline for submissions and adverts are 6 weeks prior to publication (i.e. Dec 15th for the Winter issue). The opinions expressed in the articles printed in Hivelights are those of the authors and do not imply endorsement of the Canadian Honey Council for the promotion of any product, goods or services mentioned unless specifically stated.

Publication Mail Agreement number
43070512
ISSN 1489-730X

Hivelights
PO Box 914, Station T Calgary,
Alberta T2H 2H4
geoff@honeycouncil.ca
www.honeycouncil.ca
(403) 512 2123

Hivelights

Spring 2023 Vol 36 #2

Funded by the Government of Canada | Canada

Cover picture: Honey Bees transfer nectar during the drying process prior to depositing in honey cells.
Photo Credit: Jim Campbell

Table of Contents

Hivelights - The Magazine of the Canadian Honey Council is printed with all natural vegetable based inks. Please recycle this magazine.

2023 Directors • Canadian Honey Council / Conseil Canadien de Miel

Design and Production ..... **Capital Colour**
Advertising enquiries ..... **Geoff Todd**
Publisher ..... **Bunker to Bunker Books Inc.**
Printed in Canada

Canadian Honey Council Report

Rod Scarlett, Executive Director, CHC

It is indeed unfortunate that the American Beekeepers Federation, the American Honey Producers Association and those Canadian operators having an interest in importing American packaged bees are attempting to capitalize on the fear of introducing tropilaelapes mites.

The Canadian Honey Council would much have preferred if the ABF and the AHPA had first contacted the CHC for information regarding status, demand and possible rationale for border opening. The CHC would have appreciated nothing more than to add to a substantive history of working together in a mutually beneficial manner. As it is, the CHC feels it necessary to clarify some issues concerning Canada's permitted importation of package bees, particularly from Australia as well as the threat of the introduction of tropilaelapes mites. With respect, the two issues should have been dealt with separately, but they have unfortunately been intertwined.

The CHC represents every provincial beekeeping organization in Canada and as such, speaks for all beekeepers. The package issue in Canada is divisive, but it is important to note that the interest group calling for the opening of the US border does not represent all commercial operations nor is it even clear they represent a majority of commercial operations. They do, however represent a substantial number of colonies in certain regions of the country and we continue to listen to those from all points of view.

The CHC and the ABF have had a good working relationship. More recently, we have expanded our relationship building to work closer with the American Honey Producers Association. While honey sales, adulterated honey and trans-shipped honey has been a primary concern, stock issues, particularly related to queen sales has also been important. Working with California queen producers, the Canadian Honey Council was able to ease some of their reporting burdens and when "Africanized bees" were found in the quarantine zone, we were quickly able to work with the Canadian Food Inspection Agency based on science and agreed to developed strategies to mitigate the issue. Consequently, imports were resumed in a timely manner.

Last year, Canadian beekeepers from most areas in the country experienced devastating losses and the demand to stock increased dramatically. Calls to open the border to US packages intensified, firstly focusing on receiving packages from the northern California quarantine zone, then expanding to Georgia and now the mainland US. The Canadian Food Inspection Agency put out an open call for additional research to see if there were any changes to the risks that had been identified in a 2013 risk assessment of US packages. Four risks were identified in 2013:

- amitraz resistant mites,
- small hive beetle,
- AFB resistance
- Africanized bees.

The CHC has indicated that if the science supports the decision to open the border, the border should open. However, it is not up to beekeepers or associations to determine if the science is sound, it is up to the experts at CFIA that evaluate the honey bee health status in Canada and the potential bee exporting country. For example, there have been assertions by some Canadian beekeepers that there is amitraz resistance in Canada. Certainly, some "preliminary" work has been done and it suggests that there may be limited emerging resistance in some operations, but no conclusive or scientific evidence has been produced. Moreover, the African bees, AFB resistance and the small hive beetle are issues that must be addressed and mitigated to acceptable levels of risks to the CFIA and Canadian beekeepers.

It may very well be that CFIA decides that a new risk assessment should be conducted, but it will be because of scientific reasons, not political or economic reasons. As for package bees

Year	# of Packages	Total # of Colonies	Year	# of Packages	Total # of Colonies
2008	11,070	570,070	2016	44,997	767,683
2009	11,360	592.120	2017	27,387	790,668
2010	10,622	620,291	2018	31,638	790,023
2011	42,466	637,920	2019	41,339	791,051
2012	33,913	690,037	2020	13,746	764,616
2013	65,066	667,397	2021	8,661	834,262
2014	52,774	696,252	2022	56,737	764,828
2015	55,786	726,008	2023	TBD	

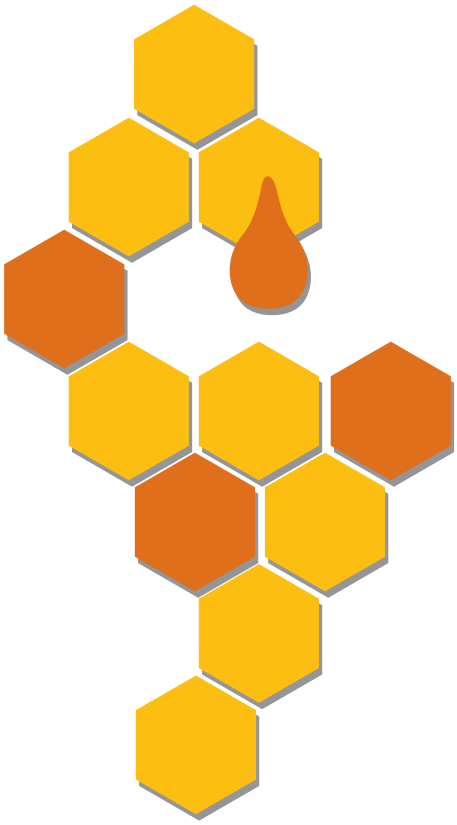
Figure 1.

imported to Canada, Figure 1 on the next page shows the historic numbers.

For many operations, they are producing their own stock and as Covid 19 restrictions proved, domestic production and domestic sustainability are goals we in Canada need to work towards.

For some reason, the Canadians wishing to import US packages decided to introduce the threat of tropilaelapes entering the USA from Canada. Last year about 38,000 packages from Australia came into Canada. Where does Canada get its package bees from in Australia? Australian package bees come from regions of the continent that are isolated by unpassable physical barriers to bees or the human trafficking of bees (4000 km of desert and the Tasman Sea - its a 1000 km by sea from Sydney to Hobart). There is no tropilaelapes in Australia. In addition, New Zealand is just as close or closer to where tropilaelapes is found and it is important to note that the US can import bees from New Zealand (https://www.aphis.usda.gov/aphis/ourfocus/planthealth/import-information/permits/plant-pests/bees/honeybees-other).

A North American concern is justified but it is far more likely that the mite will arrive by ocean liners than it is by packaged bees. The US has 162 ocean freighters arriving every day and a many of those are from China and Japan, two countries much more likely to have unwanted "visitors" aboard. That is why calls in the USA for sentinel hives at port have increased. Canada too needs to step up, but by eliminating the countries we currently import packages and replacing them by US packages is not the answer unless the science warrants it. We need not confuse the opening the border to packages from the US with closing the border for all other imports. This is not a trade issue, and it is always looked at as an animal health risk issue. Even those Canadian commercial operators who want to see the border open should be wary of putting all our eggs in one basket. ■



Regional Reports

Atlantic

Rodney Reid

Hello, I am Rodney Reid, your new CHC Atlantic Director and the president of the Newfoundland and Labrador Beekeeping Association. Of course, I need to thank the outgoing director Chris Lockhart and the other presidents of Atlantic Canada for putting your faith in me to represent you for the upcoming three years.

It's been a busy start to the year with NL hosting the CHC and CAPA annual meeting which coincided with NLBeeCon. Meetings were hosted in St. John's, NL and for anyone who was able to attend, it was great to feel the energy from across the country with representation from coast to coast. Thank you to everyone who participated, were "screeched in", did bee yoga, and spent some time on George Street at a local pub for entertainment. With NL being varroa-free, beekeepers are working hard to keep it that way, and with it brings its challenges, but all the same NL beekeepers are diligent in their efforts to maintain its pest-free status and low disease profile while growing its industry.

Nova Scotia just had its annual workshop which I had the privilege to attend, present and network with fellow Atlantic beekeepers. There is much discussion about the upcoming season, and everyone is optimistic about how things appear after a relatively mild winter. The Atlantic Tech Transfer Team for Apiculture has released a new document titled "Best Management Practices Guide for Honey Bee Pollination of Wild Blueberries in Atlantic Canada", which is a fantastic guide and will contribute to the industry. Maritime beekeepers will be ramping up for blueberry pollination and hopefully, prices remain strong as they were this past year and continue industry growth and opportunities. Hopefully, your hives are coming out of winter strong, and until we meet again, long may your big jib draw.

Québec

Maggie Lamothe Boudreau

Le temps des sucres a démarré ici au Québec et nombreux sont les apiculteurs affairés dans leurs érablières avant le démarrage officiel de la saison apicole. Plusieurs apiculteurs sont nerveux quant à la sortie prochaine de leurs ruches de l'hivernage. Il est certain qu'à la suite d'un hiver où la moyenne de perte canadienne avoisinait les 50%, il est concevable de penser que les apiculteurs concernés sont fébriles par rapport à la sortie de cette année qui pourrait bouleverser leur avenir proche.

Les 4 et 5 mars a eu lieu l'assemblée générale annuelle des Apiculteurs et Apicultrices du Québec (AADQ). Je tiens à féliciter les membres du conseil d'administration élus qui contribueront à l'avancement de plusieurs dossiers importants pour l'apiculture québécoise.

En voici la liste :

- Président : Raphaël Vacher
- 1re vice-présidente : Maggie Lamothe Boudreau
- 2e vice-présidente : Sarah Martineau
- Administrateur et président du comité de la Montérégie : Alexandre Mainville
- Administrateur et président du comité du Nord-Ouest : Gratien Léveillée
- Administrateur et président du comité de la région de Québec : David Lee Desrochers-Croteau
- Administrateur(-trice) et président(e) du comité Mauricie-Estrie-Centre-du-Québec : Steve Michel
- Administratrice et représentante de la relève : Sophie Roy
- Administrateur et représentant de la catégorie « petite échelle » : Julien Levac Joubert

Lors de cette assemblée générale annuelle (AGA), des discussions ont eu lieu concernant une étude réalisée par le Centre d'études sur les coûts de production en agriculture (CECPA). Les résultats ont révélé que les coûts de production des apiculteurs québécois dépassaient les revenus provenant de la vente de leur miel en 2020. Au fil des ans, ces coûts de production de miel au détail ont considérablement augmenté passant de 4,05 $/kg de miel en 1995 à 15,44 $/kg en 2020. Malheureusement, le prix de vente moyen actuel du miel en pot au Québec avoisine 13,66 $/kg en 2022. Cela signifie que 80 % des entreprises types analysées, soit 21 entreprises possédant 50 ruches et plus, n'ont pas été en mesure de payer un salaire à leur exploitant en 2020. L'étude a aussi révélé que les apiculteurs louant leurs ruches pour la pollinisation des champs de petits fruits, tels que les canneberges et les bleuets, n'en tirent pas des revenus suffisants pour couvrir les pertes de rendement en production de miel ainsi que les coûts en temps et en transport associés à cette activité. A ce sujet, un sondage pancanadien concernant la pollinisation vous a été envoyé par le Conseil canadien du miel. Prenez le temps d'aller y répondre afin que nous puissions entreprendre les actions nécessaires dans une optique d'amélioration de la situation actuelle. Pour les détails plus complets de cette étude informez-vous auprès des AADQ.

Le deuxième sujet d'importance abordé concerne la mise en place d'une chambre de coordination et de développement pour l'industrie apicole québécoise dans le but de financer adéquatement la recherche apicole. Lors de l'assemblée, le conseil d'administration a reçu l'approbation de poursuivre la réflexion sur la création de cette entité pour l'industrie apicole, qui a pour but l'équitabilité envers tous les membres et partenaires en favorisant des avancées plus rapide dans le domaine de la recherche.

Si vous avez des questions ou si vous souhaitez vous impliquer dans un sujet particulier dans un objectif commun, n'hésitez pas à communiquer avec l'un(e) des administrateur(trice)s. Il/Elle se fera un plaisir de discuter avec vous.

Sur ce, je souhaite une bonne santé à vos abeilles et à chacun d'entre vous, apiculteurs/trices afin qu'elle soit de même pour vos protégées, les abeilles.

……..

The maple syrup season has started here in Quebec, and many beekeepers are busy in their Maple grove before the official start of the beekeeping season. Although a lot of effort has been put on colonie health last season, several beekeepers are nervous about the upcoming evaluation of the condition of their hives. After a winter where the Canadian average hive loss rate was around 50%, it is conceivable that the concerned beekeepers are apprehensive about this year's spring opening, which could disrupt their near future.

On March 4th and 5th, the Annual General Meeting (AGM) of the Quebec Beekeepers Association (AADQ) took place. I would like to congratulate the elected board members who will contribute to the advancement of several important issues for Quebec beekeeping. Here is the list:

- President: Raphaël Vacher
- 1st Vice-President: Maggie Lamothe Boudreau
- 2nd Vice-President: Sarah Martineau
- Administrator and President of the Montérégie Committee: Alexandre Mainville
- Administrator and President of the Northwest Committee: Gratien Léveillée
- Administrator and President of the Quebec Region Committee: David Lee Desrochers-Croteau
- Administrator(-trice) and President(e) of the Mauricie-Estrie-Centre-du-Québec Committee: Steve Michel
- Administrator and Representative of the agriculture youth: Sophie Roy
- Administrator and Representative of the "small-scale" category: Julien Levac Joubert

Discussions took place at this AGM regarding a study conducted by the Centre for Studies on Production Costs in Agriculture (CECPA). The results revealed that Quebec beekeepers' production costs exceeded the revenue from honey sales in 2020. Over the years, these retail honey production costs have increased considerably, from $4.05/kg of honey in 1995 to $15.44/kg in 2020. Unfortunately, the current average selling price of honey in Quebec is around $13.66/kg in 2022. This means that 80% of the analyzed typical companies, representing 21 companies with 50 hives or more, were unable to pay their operators a salary in 2020. The study also revealed that beekeepers who rent their hives for pollination of small fruit fields, such as cranberries and blueberries, do not generate sufficient revenue to cover losses in honey production yields, as well as the associated costs in time and transportation. In this regard, a pan-Canadian pollination survey has been sent to you by the Canadian Honey Council. Take the time to respond so that we can take the necessary actions to improve the current situation. For more complete details on this study, please contact AADQ.

The second important issue discussed concerns the establishment of a coordination and development chamber for the Quebec beekeeping industry to adequately fund beekeeping research. At the meeting, the board received approval to further reflect on the creation of this entity for the beekeeping industry, which aims for equity towards all members and partners by promoting faster advances in research.

If you have any questions or wish to get involved in a particular issue for a common goal, do not hesitate to contact one of the administrators. They will be happy to discuss with you.

With that, I wish good health to your bees and to each of you, beekeepers, so that it may be the same for your protected ones, the bees.

Ontario

John Van Alten

Spring is slowly making it's way into Ontario. After a warmer than normal February in Southern Ontario, March proved to be cold and snowy.

I have been calling around to see how beekeepers and bees are overwintering. It seems that those operations that had high losses last spring are forecasting favorable overwintering, but some of the operations that did well are seeing high losses this year. One large operation described it this way.

"After several good overwintering outcomes, we are licking our wounds this spring" The good news is that packages seem to be available to replace those losses for the most part. There is some concern about the size of the cluster at this time of year, however that can change when the weather and early pollen start to come together.

It looks like the heavy losses last spring, weren't totally made up last year, but if conditions allow, beekeepers are predicting that the numbers should be back to normal this summer.

The OBA will be holding their spring meeting at the end of March in Burlington. Highlights will include keynote speaker Anicet Deroches of Miel d'Anicet, roll out of the updated Strategic Plan, as well as a tour of a local beekeeping and mead making operation "Backed by Bees".

The OBA is actively sending out funding proposals for research by our tech transfer program. So far there seems to be a hesitation by government to commit to any short or long term funding. It is very discouraging for programs that need to know if funding will be available in order to plan for summer projects.

Manitoba

Osee Podolsky

The Manitoba Beekeepers Association held our 117th Annual Convention and AGM this February. After a long overdue wait it was really nice to see everyone in person and be able to socialize during convention. The turnout was fantastic, we really appreciate everyone who was able to attend and hope those who were unable to attend will be able to do so next year.

This year at the Manitoba Beekeepers Association Convention Rheal Lafreniere was awarded the Willy Baumgartner Memorial Award for his years of service in the beekeeping industry. Rheal was the Provincial Apiarist in Manitoba for nearly 27 years, he is well deserving of this award, for keeping a watchful eye and staying on top of arising issues or concerns in the industry, providing PSA's on new information or treatment recommendations, as we all need his expertise or assistance one time or another.

Spring teased us a little bit in February but with a Colorado low in the forecast it appears as though we spring may not be coming until a bit later in April, until they it'll just be a little bit more hurry up and wait.

Saskatchewan

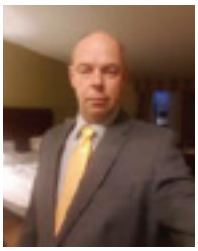
Jake Berg

Three years after the CHC was originally scheduled to attend Food Ex Japan, we were finally able to attend. Food Ex Japan 2023 was very well attended with 73,789 registered visitors. There was definite interest from honey buyers at the show. Although there are still concerns about residues in honey, the CHC will continue to work closely with industry players, including CFI and other countries regulatory agencies on MRL's for residues found in honey. I'd like to thank Kevin Nixon, Jeri Hudson (Bee Maid) and Curtis Miedema for making sure the booth was a success.

It is very unfortunate that some individuals and industry organizations have confused the threat of tropilaelapes as a justifiable reason to unconditionally open the US border for packaged bees to be imported to Canada. These are two very separate issues. Tropilaelapes most definitely is a concern to beekeeping in North America and we should indeed take steps to make sure tropilaelapes does not make its way to North America. CHC will continue to work with other industry organizations like CAPA and CFIA to maintain and develop best management practises as the tropilaelapes risk evolves and changes over time. The US border issue is a completely separate issue and it should be addressed as such. This argument has been going on for 35 years and when the science says it is safe to bring bees in from the mainland United States the border will open, but until that time the border will remain closed. Countries that packaged bees can be imported from would be evaluated by CFIA on an individual basis and not be influenced by risks coming from other jurisdictions.

Although at the time of writing this article it is still very early spring and not many bees have been inspected, the very initial and early accounts sound like winter survival rates have been much better this winter than last. Hopefully this trend will continue. Good luck with the start of your beekeeping season.

Alberta



Ron Greidanus

Lying on my back in my snow covered back yard with my kids, looking up to one of the most dramatic display of Northern lights that I have ever seen in a long time; my mind drifted to what I need to do as the Stock replacement Chair for Canadian Honey Council. It is still way too cold to go out to the bees. I have no idea of what this spring will bring. On my "feel good" check at the beginning of February, I could not find a dead hive – though some I looked at, I know, won't make it. I have my pollen patties in the shop, strips are ready to go into the hives, the Fumagilin is ready to be mixed up – I am just waiting for the favourable forecast to signal the start of the season – its close.

What should I do this year to bring value to the entire beekeeping industry during my tenure as Stock Replacement Committee Chair this year?

I have a plan:

I want to strike a committee that will look at the regulations and red tape associated with importing queens and packages from permitted sources. I am open to suggestions on who should be a part of that committee. Just recently, in Davenport, Tasmania, a Small Hive Beetle was found in a sentinel Hive at the port. It is strongly suspected that this beetle came to the island on a shipment of mangos (despite the name, SHB live on fructose and are opportunistic feeders) In 2020, a hive with AHB was found to exist in the containment zone for queens in California. This hive was determined to be moved in from the southern US to pollinate Almonds. In each of these instances, CFIA's initial reaction is to cancel all import permits. There can be hundreds of thousands of dollars of inventory in the pipeline. I would like to address the vacuum of procedure in place for these inevitabilities and avoid hard decisions that have the potential to permanently injure the industry. With new emerging potential threats on the horizon like Tropaelapse mites, a good 'what if' strategy is more important than ever.

Another project that has been talked about for a long time is to develop some Youtube videos of how to make nucs and breed queens in the different regions of Canada. It would be counter productive to redo work that has already be done. Partnering with beekeepers in each province that have successfully been making queens and nucs, I want to pull together their work and boiling it down into a ten minute video published on Youtube and put a link to the video on the CHC website. The objective here is to develop a reference library for those individuals who want to expand their talents and become more self sufficient. If you want to contribute to this project it would be much appreciated. To finish it, videos need to be recorded and edited and expertise on posting to Youtube – essential!

Winter is over an I have been to AGM's all across Canada. I feel like I could sing Stompin Tom's song, "I've been everywhere." I have been to St. John's NFLD, Saint Hyacinthe QC, Kingston ON, Winnipeg MB, Saskatoon SK, Edmonton AB, and Kamloops BC. The point of my journey is to demonstrably build bridges between the different beekeeping associations of Canada. For too long the different associations have had a very loose collaborative symbiosis. In the light of spring 2022's severe losses, it became apparent that many producers across our nation simply did not feel heard. So I went to listen. There has got to be a better way to work together than majority rule.

I am not sure what my next step will be, but I intend to continue to be an avenue for those who do not feel heard and advocate for them. A hand has five unique, individual fingers. Each finger is strong and can act individually. However, when the five fingers on the hand come together to form a fist, the hand becomes a hammer. I have a few boys who may want to make a living the same way I did. If Canada stays Status Quo, I am not seeing a future in beekeeping for them. But if the hand that is Canada can come together and make the fist, we can put the options in place so that beekeeping can be a way to raise a family for generations to come.

Alberta

Jeremy Olthof

For anyone that doesn't know me I'll start with a quick bio. My wife and I are partnered with Poelman Apiaries and manage around 3500-4000 hives depending on how good I am at killing mites the previous year. Our shop is located near Tees Alberta so logically we went with Tees Bees Inc as our company name.

After serving 6 years on the Alberta Beekeepers Commission board, I termed out and decided to try my hand as the appointed CHC rep.

At the CHC AGM I was appointed as the new tech team liaison along with Rodney Reid from Newfoundland. Our challenge will be to convince the federal government to follow up on the list of recommendations that came from the sustainability roundtable and fund a national tech team. What this looks like will be a tough one to figure out as some provinces just want reliable funding to keep a tech team afloat while others may just want funding for national programs like apivar resistance testing.

▶ pag. 9

GIVE YOUR BEES THE BEST

High Performance Colony Nutrition

Feeding syrup?

Enhance syrup with HiveAlive for proven benefits:

- MORE BEES
- MORE HONEY
- REDUCED OVERWINTER LOSSES
- HEALTHY BEE GUT

Feeding protein?

Feed HiveAlive High Performance Pollen Patties

- Blend of unique seaweed extracts to provide additional nutrients for a superior nutritional profile
- Correct dose of HiveAlive - still the only feed supplement with published data
- Contains 15% real Canadian pollen, 15.5% total protein

Also available: HiveAlive Fondant Patties for overwinter/emergency feeding

Available in Canada from:

Dancing Bee Equipment (ON, MB), BeeMaid Honey (AB, SK, MB), Country Fields Beekeeping Supplies (NS), Urban Bee Supplies (BC), Worker & Hive Bee Supply Inc (AB), West Coast Bee Supply (BC), NBee Gold (NB), Apihex (QC), Propolis etc. (QC), B's Apiaries (ON), B-Ys Honey Farm (ON), Behind the Barn (YT), Cleary Feed & Seed (ON), Cowichan Bee Supplies (BC), Hiverite Inc. (ON), OPH Beekeeping Supplies (ON)

hive alive

The #1 Feed Supplement for Honeybees Worldwide

Fed to millions of colonies worldwide

My jump to the CHC has been a challenging one as I have been a long standing advocate of opening the border to the US while working with the ABC as well as the CBF. I will remain committed to listening to both sides of this argument even as the list of legitimate reasons to keep it closed continues to dwindle. I will also be advocating for more industry collaboration with CAPA, something I think has been sorely lacking for far too long.

I encourage anyone to reach out with your thoughts. I am always open to good debate email or call anytime just don't be offended if I screen your call while I'm at the bees.

British Columbia

Stan Reist

Spring has finally arrived and with it the realization there are lots of dead hives. A lot are from Mites out of control last fall and believe it or not there are some due to being honey bound. That's a condition where the nectar flow was that heavy and fast that the brood nest was overpowered and filled with nectar, leaving no room for the queen to lay and hence no winter bees.

The packages have arrived been distributed some in weather that was not so nice most all are doing well. There were a lot of loose Queens in the packages and there fore dead Queens in the package queens cages, the first batch had no candy left in the cages and the second load had lots of candy in the queen cages. The condition of the packages were excellent, probably the best we have seen.

We had our Semi Annual meeting on the 24th of march weekend, very good turn out in person we even were able to present Ted Handcock with his life membership, long overdue. And I had the privilege of presenting Dr. Peter Awram the Fed Rathjay award from the CHC again well deserved. Peter told us that his father worked with Fred many years ago when he was looking after the CHC. One thing of not is Dianne Dunaway has tendered her resignation as bee inspector for her region. Thank You Diann for your dedication and service, There were also other changes and replacements within the system.

We were supposed to have an instructor's course at the same time as the meeting but that was cancelled due to timing and not enough registrations to make the minimum number of students required to hold the course. Next year book early.

There was a great line up of speakers for the education day. Nathan Wendell from the Sask beekeepers and a presentation on their operation. Dr. Shelley Hover on Nutrition. Randy Oliver by video. And many more.

It was great to finally meet with old friends and beekeepers in person and safe to say all enjoyed the event.

BeeMaid HONEY LIMITED

Investing for a Bright Future

Both Co-ops continue to work in a close partnership by investing in their facilities so that customer and member expectations continue to be met for years to come.

Alberta Honey Producers Co-Operative – Building Expansion

Construction has begun with an expansion of a total of 39,000 ft2 on the west and south sides of the current building. This expansion will provide more room for honey storage, additional needed space for Bee Supplies and blow molding, as well as providing space required for managing honey totes. Construction should be completed around December 2023.

Manitoba Cooperative Honey Producers – New Building Construction

A new 120,000 ft2 facility will be built at 645 Black Diamond Boulevard in Winnipeg. This new location will be easier to access from the Perimeter Hwy and provide space needed to meet current and future needs of members and customers. All members' honey will now be received at this single location and there should be no need to lease additional off site space for honey storage. The office space will now be spacious enough to now accommodate all staff. Construction should be completed by spring of 2024.

Thank you Members!

The strong support received by the co-operatives' members demonstrates that they believe strongly that the Canadian beekeeping industry will continue to prosper, even through challenging times. By investing in larger and more modern facilities, the organization will be well positioned to continue to play a vital role in the Canadian beekeeping industry and be to compete globally in a growing industry.

Canadian Honey Council Awards 2022-2023

2022 Willie Baumgartner Award Winner – Jean Jones

Jean a apporté, et continue d'apporter, une contribution majeure à la communauté apicole canadienne. Lorsqu'elle a rejoint F.W. Jones & Son Ltd. à la fin des années 70, Jean s'est immédiatement intéressée de près aux produits apicoles. Se rendant d'abord aux congrès en tant que membre d'une équipe, Jean est progressivement devenue le visage de Jones, soutenue par des collègues compétents comme Richard Harris et Laurie Evans. Elle est également devenue une conseillère de confiance pour la famille Craighead. Pendant son séjour chez Jones, Jean a contribué de manière significative au développement de Nouvelles sources de reines et à l'établissement de prix avantageux pour le sirop de sucre.

Les responsabilités de Jean ont considérablement augmenté lorsque la propriété de Jones a changé, ce qui l'a placée au premier plan. Elle a assumé ce nouveau rôle avec enthousiasme et confiance. Au cours des dix dernières années environ, Jean a travaillé avec Joel Laberge à Stanabbey, en étant à nouveau LA personne à contacter pour les fournitures d'abeilles. Dans ce rôle, elle a contribué à faire de Stanabbey une importante source de produits apicoles innovants et de qualité.

Ces réalisations font honneur à Jean en tant que professionnelle, mais Jean en tant que personne est encore plus importante. C'est son enthousiasme personnel et son intérêt sincère pour notre communauté, ses collègues et sa famille qui font de Jean une personne très attachante. En cela, elle n'a pas son pareil.

……..

Jean has made, and continues to make, a major contribution to the Canadian beekeeping community. When she joined F.W. Jones & Son Ltd. in the late seventies, Jean immediately took a keen interest in bee supplies. Initially going to conventions as part of a team, Jean steadily became the face of Jones supported by capable colleagues like Richard Harris and Laurie Evans. She also became a trusted advisor to the Craighead family. While at Jones, Jean contributed significantly to developing new sources of queens and keen pricing for sugar products.

Jean's responsibilities grew considerably when ownership changed at Jones putting her front and center. She handled this new role with warmth and confidence. For the last decade or so, Jean has worked with Joel Laberge at Stanabbey, again being THE go-to-person for bee supplies. In this role, she has helped develop Stanabbey as a major source of innovative and quality beekeeping products.

These accomplishments speak highly of Jean as a professional, but even more important is Jean as a person. It is her personal warmth and genuine interest in our community, her colleagues and her family which most endear Jean to everyone. In this, she has no match.

Maggie Lamothe Boudreau, Raphael Vacher, Jean Jones, Ron Greidanus

2022 Fred Rathje Award winner – Peter Awram

Dr. Peter Awram grew up near Edmonton and in the Peace Country of Alberta in a beekeeping family. He attended the University of British Columbia and received a BSc in Biology with an emphasis on molecular biology in plants. While in postgrad, he was active with the Graduate Student Society and held an elected position. He received a PhD in Microbiology and Immunology from UBC in 1999. Upon completion of this, he did postdoctoral research in vaccines at the University of Auckland in New Zealand before returning to UBC as a Research Associate. During this time, he studied intellectual property law. Changes at the family farm resulted in his returning to that business. A number of years were spent pollinating hybrid canola in southern AB before establishing a full honey production business north of Edmonton. He has since moved his home base to Rosedale, BC and has built his operation up to become the largest beekeeping company in BC. He continues to move between BC and AB, pollinating blueberries in April/May in BC and then moving to the Peace Country to produce honey. His current company is called Worker Bee Honey Company. In the last ten years, Peter has generously volunteered bees and contributed colonies to several research projects to advance bee health.

In 2016, Peter became aware of the extent of food adulteration and the new analytical techniques available for countering fraud. He established a new company that would focus on detecting fraudulent honey called Authentic Food Solutions. This led to the purchase of a research

▶ pag. 13

Stan Reist presents Peter Awram with his award

quality NMR machine with the intent of creating databases that could be used worldwide. Since that time, Peter has worked tirelessly to push for more testing, development of better testing, and adoption of authenticity certification in the honey industry.

2023 Willie Baumgartner award winner - Rheal Lafreniere

Osee Podolsky, Manitoba CHC Director presents 2023 Willie Baumgartner Memorial Award to Rheal Lafreniere, retired Manitoba Provincial Apiarist, at the Manitoba Beekeepers Association Annual Meeting on 24 February 2023.

Rhéal Lafreniere, after completing his Bachelor and Master Degrees in Science from the University of Manitoba, joined Manitoba Agriculture in February 1996 as an Extension Apiarist working with Don Dixon, and in 2003, moved into the Provincial Apiarist position. Rhéal's primary responsibilities were to provide extension and regulatory services to the honey bee and leafcutting bee industries in Manitoba. Rhéal is extremely well respected in the beekeeping industry in Manitoba and Canada for his advisory and leadership skills. Rhéal has been asked to organize and participate in numerous provincial, national and international working groups and conferences on beekeeping and entomology. For example, Rhéal has been involved in organizing 11 national conferences and five international conferences on beekeeping and entomology.

Osee Podolsky presents Rheal Lafreniere with his award

Rhéal has also played a key leadership roles in representing Manitoba's interests in various organizations and boards over his 25 years of service. Rhéal was President of the Canadian Association of Professional Apiculturists (CAPA) from 2010 – 2014 and was part of the CAPA Executive for 18 years. Most recently, Rhéal was a Board Member for the National Bee Diagnostic Centre – Natural Science and Engineering Research Council Technical Advisory Board. Rhéal has been involved as a co-instructor for the Beekeeping for the Hobbyist Course at the University of Manitoba since 1996. In addition to this, he has lectured or co -instructed various courses for the beekeeping and leaf cutting bee industries. Rheal has authored or co authored over 75 articles in his career. In terms of a career high, Rhéal was instrumental in helping to develop and establish import trade of honey bee queens between Canada and Chile. In addition to helping organize six trade missions of Chilean beekeepers to Manitoba, Rhéal has travelled to Chile five times to present at various conferences and work groups to help Chilean beekeepers produce queens that meet the demands and standards of Manitoba's beekeeping industry.

Canadian Association of Provincial Apiculturists (CAPA) Outstanding Service Award

Rheal Lafreniere, retired Provincial Apiarist of Manitoba received the Canadian Association of Provincial Apiculturists (CAPA) Outstanding Service Award at the Manitoba Beekeepers Association annual meeting this past February. Presenting Service award (left to right): Dr. Steve Pernal,Officer-in-charge and Program Lead of Canada's Federal Apiculture Research Program, Agriculture and Agri-Food Canada, Beaverlodge Alberta; Dr. Rob Currie, Professor and Head, Department of Entomology, University of Manitoba; Rheal Lafreniere, Retired Scientific Advisor and Manitoba Provincial Apiarist; Dr. Medhat Nasr, Apiculture Research Scientist, Technology Adaptation Program Lead, Saskatchewan.

Rheal Lafreniere, retired Provincial Apiarist of Manitoba received the Canadian Association of Provincial Apiculturists (CAPA) Outstanding Service Award at the Manitoba Beekeepers Association annual meeting this past February. Presenting Service award (left to right): Dr. Steve Pernal,Officer-in-charge and Program Lead of Canada's Federal Apiculture Research Program, Agriculture and Agri-Food Canada, Beaverlodge Alberta; Dr. Rob Currie, Professor and Head, Department of Entomology, University of Manitoba; Rheal Lafreniere, Retired Scientific Advisor and Manitoba Provincial Apiarist; Dr. Medhat Nasr, Apiculture Research Scientist, Technology Adaptation Program Lead, Saskatchewan.
Photo by Jim Campbell

Food Fraud Annual Report 2020 to 2021

CFIA

Introduction

Food fraud may occur when food is misrepresented, and is an emerging issue around the world. In Canada, it is prohibited to sell food that is falsely labelled or misrepresented, but such labelling may still occur. This impacts buyers economically, by not receiving what they expected, and can also pose health risks if, for example, undeclared allergens or hazardous materials are added to food products.

Addressing food fraud supports consumer confidence that food purchased in Canada is accurately represented and safe to consume. It also helps Canadian businesses compete more fairly in the Canadian and global marketplace.

Honey

Honey with added sugars deceives consumers and creates an unfair playing field for those selling authentic honey. CFIA conducts surveillance activities to detect misrepresentation of honey adulterated with foreign sugars in both domestic and imported honey sold in Canada.

The sampling and testing was similar to the surveillance conducted in 2018 to 2019 and 2019 to 2020.

Report: Enhanced honey authenticity surveillance (2018 to 2019)
Report: Honey authenticity surveillance results (2019 to 2020)

Surveillance overview

CFIA has been conducting enhanced honey authenticity surveillance since 2018. This work has enabled CFIA to identify and take appropriate action on food misrepresented as authentic honey. It has also provided data and intelligence that can be used to better detect the adulteration of honey with foreign sugars (such as sugars derived from sugar cane, corn syrups, rice syrups) in Canada.

CFIA collected and tested 182 honey samples for adulteration with foreign sugars. As in previous years, Stable Isotope Ratio Analysis (SIRA) and Nuclear Magnetic Resonance (NMR) methodologies were both used. SIRA detects adulteration with C4 sugars (such as sugar cane and corn syrups) and NMR detects added C4 sugars as well as C3 sugars (for example, rice syrups).

Directed sampling

CFIA collected 58 samples, mostly from high-risk entities that were found to be non-compliant during the 2018 to 2019 and 2019 to 2020 honey surveillance work. CFIA also conducted sampling based on other risk factors such as history of non-compliance, gaps in preventive controls or unusual trading patterns.

Products represented as containing only honey or blends of honey from multiple sources were sampled. This included honey products such as bulk and honey used for further processing from importers. A small proportion from domestic establishments were also sampled.

Retail survey sampling

CFIA contracted an independent third party to collect 124 honey samples at retailers in various cities across Canada as part of its compliance monitoring of the marketplace. All samples were prepackaged honey sold to consumers at retail. CFIA uses the sample testing results of these monitoring activities to gain a better understanding of the Canadian marketplace and to inform future follow-up activities.

Results

The following results are provided according to sampling type.

Directed sampling

- Of the 58 samples collected, 13 were domestic, 45 were imported
- 43 samples were satisfactory by both SIRA and NMR methods: 74.1% (43/58)
- 15 samples were unsatisfactory by one or both methods: 25.9% (15/58)
- Of the 15 unsatisfactory samples, 13 samples were wholly or partially imported honey from Egypt, Germany, Greece, India, India/Canada blend and Taiwan, and 2 samples were domestic Canadian honey.

Retail survey sampling

- Of the 124 samples, 96 were domestic, 28 were imported
- 118 samples were satisfactory by both SIRA and NMR methods: 95.2% (118/124)
- 6 samples were unsatisfactory by one or both methods: 4.8% (6/124)
- Of the 6 unsatisfactory samples, 3 samples were imported honey from Australia/Brazil blend, Bulgaria/Greece blend, India, and 3 samples were domestic Canadian honey.

The detailed analytical results are available on the Open Government Portal.

Enforcement

As a result of this surveillance, the following amounts of adulterated honey was prevented from entering the Canadian market.

- 142 kg of imported honey was voluntarily destroyed
- 17 800 kg were removed from Canada
- 10 963 cases and 5 barrels were detained

CFIA continues to follow up on cases of non-compliance where necessary.

Pollen sources available to honey bees during wild blueberry pollination in the Maritime region

Annie Bennett1 and Andrew Byers1*
1 Atlantic Tech Transfer Team for Apiculture
**Corresponding author: abennett@perennia.ca*

The paucity of plant species available within modern agricultural ecosystems may be leading to nutritional deficiencies in pollinating honey bees1. Plant variety enhances potential for colonies to access proteins, amino acids, lipids, and vitamins essential for colony health, in the form of pollen[1,2]. Honey bee colonies placed on wild blueberry fields to provide pollination services may not be exposed to sufficient diversity of plant species. In other agricultural monocultures, such as almonds, pollen from the crop species contributes to the honey bee diet[3]. In contrast, honey bees forage primarily on wild blueberry nectar and receive little to no nutritional benefit from wild blueberry pollen[4–8]. Due to this, Canadian beekeepers are cautious to deploy hives for blueberry pollination, despite high demand[9].

In Eastern Canada, further information is required to fully understand the nutritional impact on honey bees of being placed in blueberry fields. Towards this end, the Atlantic Tech Transfer Team for Apiculture (ATTTA) has undertaken an investigation to improve knowledge around honey bee pollen availability during wild blueberry pollination in the Canadian Maritimes.

Pollen was collected from honey bee hives in the Maritime region during the 2020-2022 wild blueberry pollination seasons to gain insight into sources of nutritionally available pollen. Year one samples were pooled to capture a broad overview of forage availability. To identify variation by field, collections in the following years came from individual fields of known sizes and surrounding land use, ranging from six to 556 acres. Simultaneously, in the final year, a typical honey yard was sampled. For all samples, bottom mount pollen traps (Pollen Depot, Port Hope, Ontario) were randomly placed on hives for 24 hours during wild blueberry pollination. The collected pollen was sent to Laboratoire BSL, Rimouski (QC) for preparation and analysis, as per their instructions and accepted protocols[10–13]. Figure 1 shows a cleaned and prepared pollen sample just prior to analysis.

As seen in Table 1, there was a mean of 9.4 different pollen sources identified from traps on wild blueberry fields across all three years, ranging from four to 14 per sample and totaling 33 pollen sources across the sample set (n=7). Comparatively, the honey yard sample included 11 pollen sources. Alsike clover, buttercup/crowfoot, the grass and cereal family, and sorrel were the most frequently identified plants, being present in five out of the seven pollen traps. Figure 2 represents pollen sources by abundance identified in three select samples. Field one was surrounded by forest and reflected the lowest variety of pollen. Field two, surrounded by residential area, wetland, and agriculture, reflected the greatest variety.

Our results indicate that all wild blueberry fields are unique in pollen availability. The land use surrounding each field will impact accessible forage for honey bees providing pollination services. Each field in this study revealed a distinct pollen profile with no ubiquitous pollen source identified across all samples. This suggests that a wild blueberry field, in itself, does not support a discrete ecosystem, but rather each field is impacted by the local ecology. From the perspective of pollen availability, nutrition on wild blueberry fields is not predetermined and individual fields must be independently assessed in consideration of honey bee health.

In all landscapes where honey bees forage, including during pollination services, it is valuable to develop a pollen profile due to the implications for honey bee health. Foraging ranges should provide protein-rich, poly-floral diets to improve colony resistance to stressors including pesticide pressure, viruses, Varroa mites, and *Vairimorpha* infections[14,15]. Nutrient deficiencies, due to an insufficient pollen diet, negatively impact development of larvae and worker bees, creating repercussions for the entire colony[1,16,17].

Field one is an example of a nutrient poor foraging field, exhibiting inadequate variety and low-quality pollen. Cyperaceae (Sedge Family), a

▶ pag. 13

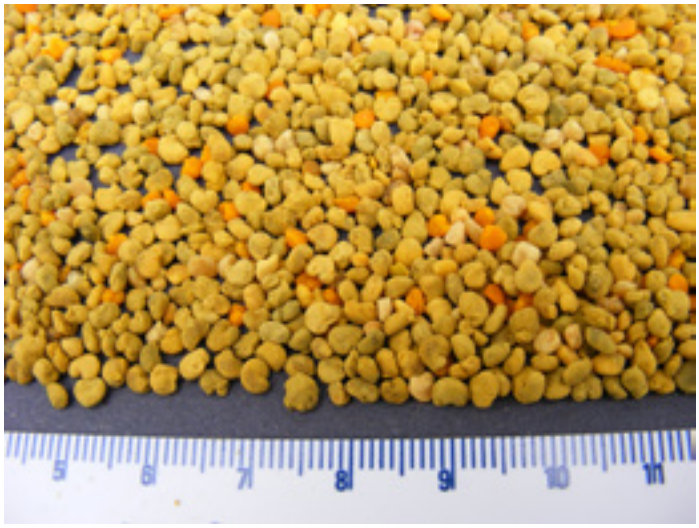


Figure 1. Field 3 pollen sample along a ruler marked in centimeters. (photo credit: Johanne Parent)

Frequency	Pollen Source (Common Name)
5	Alsike Clover; Buttercup / Crowfoot; Grass and Cereals Family; Sorrel
4	Dandelion / Hawkweed; Raspberry, Blackberry, Bramble cf.*
3	Fruit trees; Pine; Red Clover; Sedge
2	Folded grains; Goldenrod / Joy-Pye Weed / Aster; Pink Family; Strawberry
1	Alder; Alder-leaved Buckthorn; Bitter Wintercress; Choke Cherry; Elder; Holly / Mountain-holly, Catberry; Honeysuckle / Snowberry; Lilac / Privet; Lily Family / Iris Family; Lupine; Meadow-sweet (cf.); Mountain Ash; Rose; Silver Maple; Spruce; Undetermined; Undifferentiated; Viburnum, Pimbina; Wild Red Cherry

Table 1. All pollen sources identified from pollen traps placed in wild blueberry fields from 2020-2022. Frequency refers to the number of samples which contained each identified pollen source ranging from common (seen in five samples) to rare (seen in one sample). This is also reflected visually in the color gradient, where increasing lightness reflects less common pollen sources. Undifferentiated refers to a plant family with grains that cannot be separated into genera or types. Indeterminant refers to unidentifiable pollen. *cf. = *confer*, looks like

wind-pollinated family characteristically low in protein[18], comprised 94% of the pollen collected from this field. Pine pollen, another 5% of the sample, is protein deficient as well, with a crude protein content around 7%[19]. These results suggest that honey bees would not receive balanced pollen nutrition in this setting.

Honey bees are discerning foragers when presented with pollen sources of varying quality[20–22]. An additional trial field, represented in figure 3, may demonstrate how preference impacts on pollen profile. Field four, approximately six acres surrounded by agriculture and forest, had comparatively low pollen variety with only seven sources identified. Pine pollen represented a tiny proportion, but the dominant pollen source was *Prunus virginiana*. *Prunus* pollen has protein content around 25%[23]. In this case, honey bees may be able to compensate for low plant variety through preferential foraging and, as a result, access higher quality pollen. Furthermore in all 2020 samples, *Rubus*, a protein-rich pollen source[14], was the dominant pollen identified.

Diverse landscapes can support poly-floral diets for bees. Field two had the greatest diversity of surrounding land use and revealed the greatest variety of pollen sources, as seen in figure 2. The sample included ornamental plants, such as lilac, suggesting that deliberate planting of forage, as in the case of pollinator strips, could positively influence honey bee diet. The distance that honey bees travel to access pollen should also be considered as the energy costs of long distance foraging could negatively impact colony health[5].

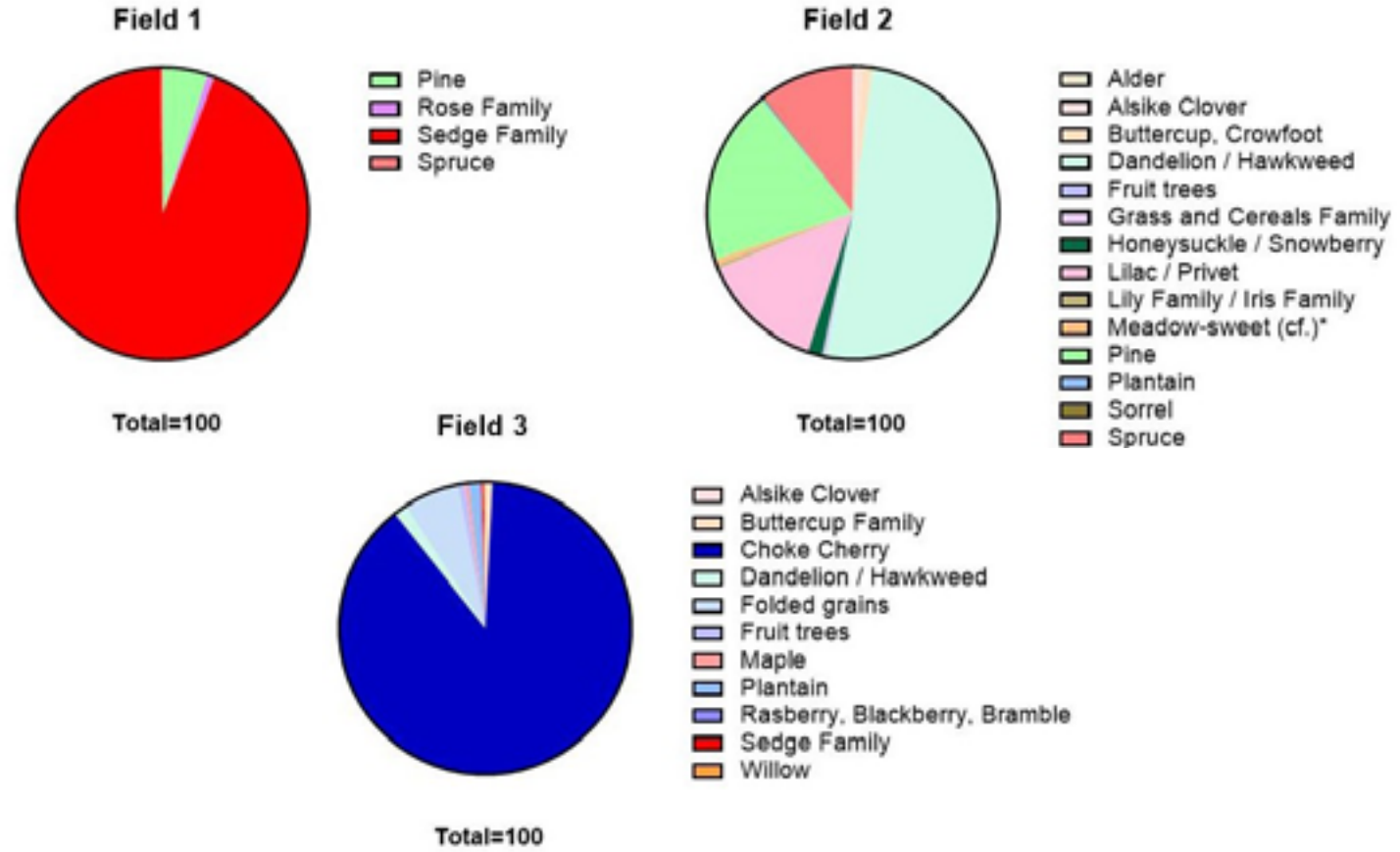


Figure 2. Field 1 was the largest field sampled and reflected the least variety of pollen sources. Field 2 was the second largest field, approximately 127 acres, and reflected the greatest variety of sources. Field 3 represents pollen sources identified from a typical honey yard.

Figure 3. Pollen sources identified in field 4, a six-acre wild blueberry field surrounded by agriculture and forest.

There is no archetypal pollen profile for a wild blueberry field during the time honey bees are present for pollination. Assessments of honey bee colonies providing pollination services on wild blueberry fields, conducted by ATTTA and other researchers, continuously revealed different assemblages of pollen varieties[5,6,8]. As such, forage availability must be evaluated on an individual field basis.

Pollen traps on honey bee colonies present a useful research tool to determine plant resources available to pollinators. This evaluation of forage quality can then guide management actions in support of pollinator health. One such action could be the creation of forage strips around fields which have been identified as having low-quality plant diversity. This would benefit both native and managed pollinators.

Beekeepers have reported that colony health, when returning from blueberry pollination, is impacted negatively. Evidence that colonies experience nutrient deficiencies during wild blueberry pollination[5,8] has been suggested as a factor leading to this ill-health. Our research does not support this suggested 'blueberry syndrome' as being caused singularly by poor nutrition due to inadequate pollen. Many of our research fields showed bees foraging across a distinct and varied range of plant species. As with most syndromes the likely cause is multifactorial and more investigation into all potential stressors of honey bees when used for pollination services is necessary.

Acknowledgements

Thank you to the beekeepers and wild blueberry producers who allowed us access to their colonies and fields to support this work. We thank to Johanne Parent (Laboratoire BSL) for pollen identification services. The authors would also like to recognize the additional members of ATTTA who contributed to data collection and project setup.

References

1. Brodschneider R, Crailsheim K. Nutrition and health in honey bees. *Apidologie*. 2010;41(3):278-294. doi:10.1051/apido/2010012

2. Donkersley P, Rhodes G, Pickup RW, et al. Nutritional composition of honey bee food stores vary with floral composition. *Oecologia*. 2017;185(4):749-761. doi:10.1007/s00442-017-3968-3

3. Bezerra da Silva Santos KC, Frost E, Samnegård U, Saunders ME, Rader R. Pollen collection by honey bee hives in almond orchards indicate diverse diets. *Basic Appl Ecol*. 2022;64:68-78. doi:10.1016/j.baae.2022.07.006

4. Bobiwash K, Uriel Y, Elle E. Pollen Foraging Differences Among Three Managed Pollinators in the Highbush Blueberry (Vaccinium corymbosum) Agroecosystem. *J Econ Entomol*. 2018;111(1):26-32. doi:10.1093/jee/tox344

5. Girard M, Chagnon M, Fournier V. Pollen diversity collected by honey bees in the vicinity of *Vaccinium* spp. crops and its importance for colony development 1 This article is part of a Special Issue entitled "Pollination biology research in Canada: Perspectives on a mutualism at different scales". *Botany*. 2012;90(7):545-555. doi:10.1139/b2012-049

6. Colwell MJ, Williams GR, Evans RC, Shutler D. Honey bee-collected pollen in agro-ecosystems reveals diet diversity, diet quality, and pesticide exposure. *Ecol Evol*. 2017;7(18):7243-7253. doi:10.1002/ece3.3178

7. Javorek SK, Mackenzie KE, Vander Kloet SP. Comparative Pollination Effectiveness Among Bees (Hymenoptera: Apoidea) on Lowbush Blueberry (Ericaceae: *Vaccinium angustifolium*). *Ann Entomol Soc Am*. 2002;95(3):345-351. doi:10.1603/0013-8746(2002)095[0345:CPEABH]2.0.CO;2

8. Dufour C, Fournier V, Giovenazzo P. Diversity and nutritional value of pollen harvested by honey bee (Hymenoptera: Apidae) colonies during lowbush blueberry and cranberry (Ericaceae) pollination. *Can Entomol*. 2020;152(5):622-645. doi:10.4039/tce.2020.29

9. Bixby M, Polinsky M, Foster LJ, Guarna MM. Exploring The Gap in Blueberry Pollination: Honey Bee Colony Shortage and Limited Pollination. *Hivelights*. 2022;35(5).

10. Barth OM, et al. Evaluation of the botanical origin of commercial dry bee pollen load batches using pollen analysis : a proposal for technical standardization. *Acad Bras Ciênc*. 2010;82(4):893-902.

11. Louveaux J, Maurizio A, Vorwohl G. Commission international de botanique apicole de l'U.I.S.B. Les méthodes de la mélissopalynologie. *Apidologie*. 1970;1(2):211-227.

12. Louveaux J, Maurizio A, Vorwohl G. Methods of Melissopalynology. *Bee World*. 1978;59(4):139-157.

13. Von Der Ohe W, Persano Oddo L, Piana ML, Morlot M, Martin P. Harmonized methods of melissopalynology. *Apidologie*. 2004;35(Suppl. 1):S18-S25. doi:10.1051/apido:2004050

14. Di Pasquale G, Salignon M, Le Conte Y, et al. Influence of Pollen Nutrition on Honey Bee Health: Do Pollen Quality and Diversity Matter? Zeil J, ed. *PLoS ONE*. 2013;8(8):e72016. doi:10.1371/journal.pone.0072016

15. Huang Z. Pollen nutrition affects honey bee stress resistance. *Terr Arthropod Rev*. 2012;5(2):175-189. doi:10.1163/187498312X639568

16. Pernal SF, Currie RW. Pollen quality of fresh and 1-year-old single pollen diets for worker honey bees (Apis mellifera L.). *Apidologie*. 2000;31(3):387-409. doi:10.1051/apido:2000130

17. Filipiak M, Kuszewska K, Asselman M, et al. Ecological stoichiometry of the honeybee: Pollen diversity and adequate species composition are needed to mitigate limitations imposed on the growth and development of bees by pollen quality. Jadhao SB, ed. *PLOS ONE*. 2017;12(8):e0183236. doi:10.1371/journal.pone.0183236

18. Vrabie V, Derjanschi V, Ciochina V. Biochemical Features of Protein Nutrition of Honey Bees. *Sci Pap Ser Anim Sci*. 2020;LXIII(1):6.

19. Somerville D. Fat Bees Skinny Bees - a manual on honey bee nutrition for beekeepers. Published online 2005.

20. Ghosh S, Jeon H, Jung C. Foraging behaviour and preference of pollen sources by honey bee (Apis mellifera) relative to protein contents. *J Ecol Environ*. 2020;44(1):4. doi:10.1186/s41610-020-0149-9

21. Cook SM, Awmack CS, Murray DA, Williams IH. Are honey bees' foraging preferences affected by pollen amino acid composition? *Ecol Entomol*. Published online September 18, 2003. doi:https://doi.org/10.1046/j.1365-2311.2003.00548.x

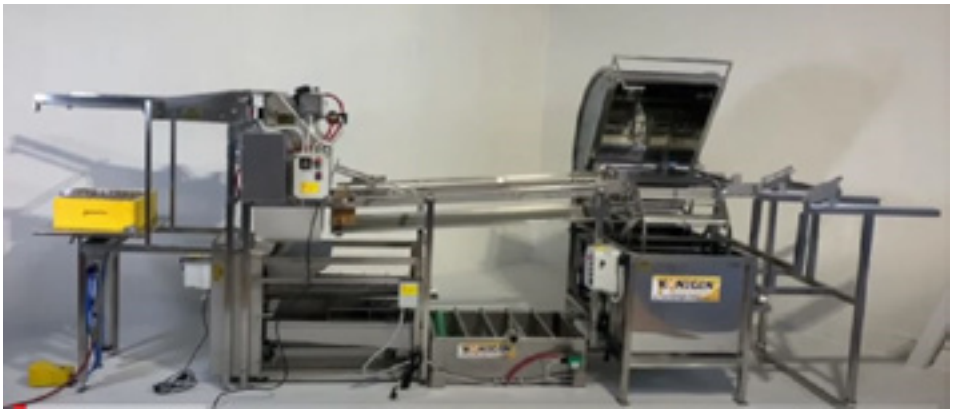
22. Hendriksma HP, Shafir S. Honey bee foragers balance colony nutritional deficiencies. *Behav Ecol Sociobiol*. 2016;70:509-517. doi:https://doi.org/10.1007/s00265-016-2067-5

23. Liolios V, Chrysoula T, Dimou M, et al. Ranking pollen from bee plants according to their protein contribution to honey bees. *J Apic Res*. Published online May 2016:13. doi:10.1080/00218839.2016.1173353

Königin have been producing a wide variety of stainless steel honey extractors in Hungary for the last 15 years and are on the European, UK, Middle East, North-African, and Australian markets.

The products are innovative, reliable, easy to use, meets the highest European manufacturing standards and competitively priced. We are confident that the machines exceed the expectations of both professional and hobbyist/small scale beekeepers. Machines available includes a broad range of honey, wax and pollen handling machines, among others:

- Tangential, auto-rotate, radial and horizontal extractors
- Automatic uncappers and capping tables
- Capping spinners and presses, and wax melters
- Sumps and pumps
- Pollen and Honey dryers
- Creamers and bottling tanks
- Queen incubators



Some machines to highlight:

- **Professional honey extractor line includes:** hydraulic deboxer, automated uncapper, capping press, sump, hydraulic frame pusher, horizontal extractor, honey pump and in-and-out feed tables. Get a full professional extractor line for about the same price as a horizontal extractor only by a North American brand and know that you can rely on it for many years.
- **Auto-rotate extractor:** frames are placed in individual baskets for tangential extraction. The programmable controller spins the frame baskets in one direction, stops, turns the baskets to the other side and accelerates until the allotted time has elapsed. No need to lift out and rotate the frames. A real time

- **Capping Spinner and Wax Melter:** a great 2-in-1 machine. Spin the capping to separate the honey and wax OR use both the heating and spinning function to melt comb wax.
- **Capping Press:** Fits right under an automated uncapping machine. Using a screw press mechanism, it continuously separates cappings into honey and dry wax. Maximizes honey and wax yield while saving a lot of time.

- **Fuzore:** Continuously separates wax and honey and outputs honey and melted wax in one step. Fits right under an automated uncapping machine. It has two digitally controlled heat zones: bottom heat zone for honey at 34 degree Celsius and top heat zone melts wax at 74 degree Celsius. As cappings fall into the machine from the uncapper, honey quickly passes through the upper heat zone without damage. Drain melted wax from top and clean honey from bottom.

Shipping across Canada.

4 year Warranty.

Sale and Service.

www.healingbees.ca **healingbees13@gmail.com** **Tel: 778-888-5785**

Microbial Myths

True or False? If microbes don't colonize, they aren't effective.

It's true that some beneficial microbes, such as Lactobacilli in probiotics, are aimed at replenishing native bacteria that colonize (or continue to populate) the gut. However, many bacteria have demonstrated their ability to impart positive effects even though they are transient and do not remain in the digestive tract or the rectum for extended periods.

You may have wondered why probiotics for humans are often recommended daily. This is because beneficial microbes that do not colonize the gut need to be replenished. Even bacteria that do colonize the gut face overwhelming circumstances that often disrupt their natural balance. For example, when honey bees face several environmental stressors such as transportation, dearth, supplemental feeding, pathogens, parasites, exposure to toxins and antibiotics, these all negatively impact a flourishing microbiome.

When good bacteria are diminished, it leaves holes or gaps for harmful bacteria to move in. Imagine your honey bee's gut is a big neighborhood; we want our society to have plenty of helpful neighbors that shield our community when hard times come. Unfortunately, when environmental stressors come along, some of the helpful neighbors (bacteria) will die or dwindle in numbers until they can no longer take up residence like they used to. When this happens, it leaves a hole or a gap, like a vacant house. That empty space is an opportunity for pathogens to take up residence. This is why it's crucial before, during, and after stressful times like pollination, when your bees face a deluge of stressful circumstances, that their gut's microbiome is fortified with good neighbors (bacteria) to help them get through the tough time ahead.

Protecting queens against viral infections

Final report of work supported by the Canadian Bee Research Fund

Applicants: Alison McAfee and Leonard Foster
Collaborators: Abigail Chapman and David Tarpy

Background

'Poor queens' is one of the most frequently reported causes of colony losses in Canada, but beekeepers have few concrete tools to directly support queen health. Surveys of failing and healthy queens in BC show that failing queens have high viral loads, and that heavily infected queens have smaller ovaries.[1,2] Recent research in workers has shown that short periods of heat stress allow them to clear viral infections faster than untreated workers,[3] but this concept has not been tested in queens. Here we investigated heat-shock as a potential low-cost method of protecting queens against viral infections and tested its efficacy in a laboratory infection challenge.

Our overarching goal is to apply this approach to unmated queens, which do not yet contain sperm that can be damaged by heat stress, in order to protect them against virus exposure during mating and early in life. In 2021, we received funds from the Canadian Bee Research Fund to investigate this topic. Due to problems with queen production in 2021, we had a limited sample size which we reconciled in 2022. Here we report the results from trials in both years.

Methods

In 2021, We first tested how long the heat-shock response lasts in five-day-old unmated queens and workers. We already know from previously studies that heat-shock proteins Pl(2)el and HSP70 are upregulated 2 d after an acute heat treatment,[4] but longer time points have not been tested. Here, unmated queens and workers (all 4 d post-emergence) reared from the same colony were subject to a heat exposure of 4 h at 42 °C and 60% relative humidity. After 1 d, we sampled n = 3 control queens and n = 9 heat-shocked queens, along with n = 3 control workers and n = 9 heat-shocked workers. After 4 d, we sampled a further n = 5 heat-shocked and n = 5 control queens, and n = 5 heat-shocked and n = 7 control workers (these were conducted in two separate experiments, hence the difference in available sample sizes). We then used shot-gun proteomics to identify and quantify heat-shock proteins relative to the queens in the control group, which were held at 34 °C (n = 10 queens and n = 10 workers).

Next, in a proof-of-concept experiment, we tested whether heat treatment of unmated queens could prevent a subsequent viral infection. To do this, we heat-treated queens as described above (n = 11 heat-shocked and n = 11 control), then two days post-treatment, we inoculated both heat-treated and control queens with a fixed dose of purified Israeli acute paralysis virus (IAPV). We originally proposed to evaluate the protective effect of heat-shocking queens for different lengths of time (between 1 and 4 h), but given our difficulty producing sufficient healthy queens, we opted to test only the 4 h exposure, which we predicted would have the strongest protective effect.

To conduct the infections, queens were briefly anesthetized to immobilize them (~5 min exposure to carbon dioxide). Then, a microinjector was used to deposit 5 nL of 1:500 diluted IAPV solution (stock concentration: 28,900 copies/µl) into all queens (heat-shocked and control) between the second and third abdominal tergites. IAPV is highly infectious, which is why a low dose was necessary. Two days post-infection, queens were sacrificed and their tissue was frozen for viral analysis by RT-qPCR. We repeated this experiment in the summer of 2022 in order to improve our replication (using an additional n = 14 heat-shocked and n = 13 control queens). In the 2022 experiment, we also tested an uninfected control group for IAPV in order to confirm the lack of a background infection of other viruses, and tested all queens for existing deformed wing virus, black queen cell virus, and sacbrood virus infections.

Results

Proteomic analysis of heat-shocked queens and workers shows that two key heat-shock proteins, Pl(2)el and HSP-70 cognate 4 are indeed significantly elevated relative to control samples for worker samples (Figure 1a; two-way ANOVA). For queen samples, Pl(2)el was significantly upregulated after 1 and 4 h, but not HSP70 cognate 4 (Figure 1b). This indicates that the worker and queen heat-shock responses are different. Both proteins have been implicated in the honey bee antiviral response previously.[3]

In our investigation of the protective effect of heat-shock treatments against viruses, we found that the infection levels were highly variable amongst queens (Figure 3). This was disappointing, as we chose the microinjection method in order to have fine control over inoculation dose. We suspect that the group of queens with very low-level infections (below 10,000 copies per bee) were due to needle clogs, which are difficult to ascertain while injecting since there is no visual cue of the fluid being emitted inside the bee. Infections this low are not easily distinguishable from noise with the RT-qPCR technique used, and we therefore treated them as outliers, excluding them from subsequent analyses. On the filtered dataset, we found that the control queens had a marginally, but not significantly, higher viral load compared to the heat-shocked queens. This trend is in the predicted direction, but does not reach the threshold for significance.

▶ pag. 25

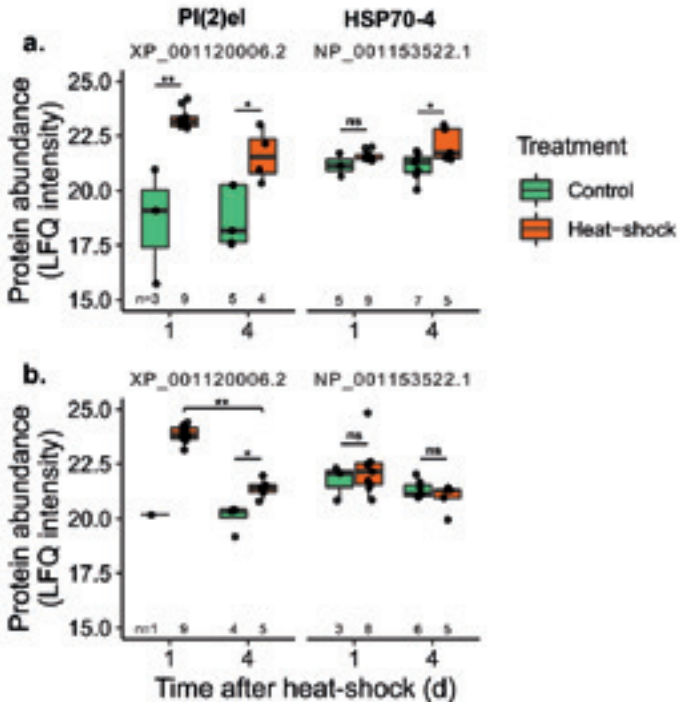


Figure 1. Heat-shock protein expression in a) workers and b) queens. NCBI accessions are shown. We were not able to quantify each protein in every sample, and the resulting sample sizes are shown at the bottom of the graphs. ** $p < 0.001$; * $p < 0.05$ (two-way ANOVA).

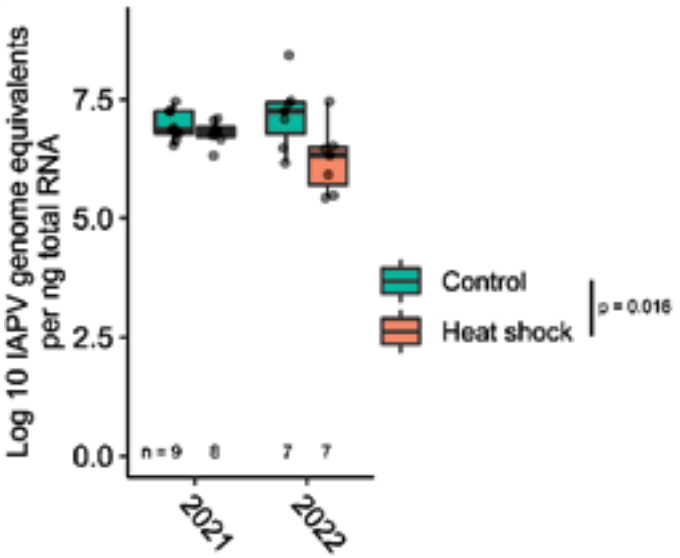


Figure 3. IAPV infection levels across years. We combined data from years 2021 and 2022 and analyzed them in a single statistical test (two-way ANOVA with treatment and year as fixed effects). For both datasets, queens exhibiting low level infections (0 - 10,000 copies, or log(copies) < 4) were excluded as this likely indicates an ineffective injection. Data are expressed per ng of RNA in order to compare findings between years. Final sample sizes after filtering are shown at the bottom of the plot, for a total of n = 16 control and n = 15 heat-shocked queens.

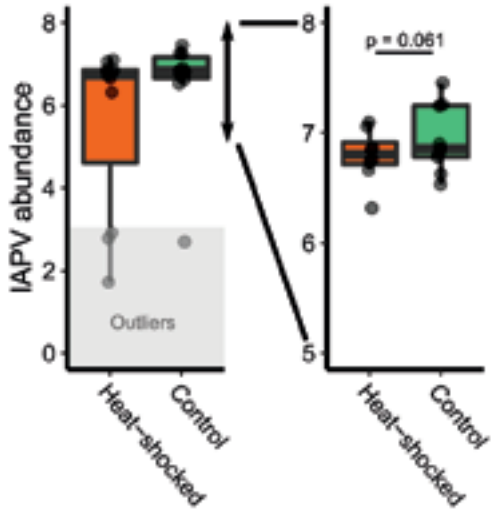


Figure 2. IAPV infection levels in heat-treated and control queens. The y axis units are log10 IAPV copies. In the second panel, the y axis is recalled to more clearly view the distribution of data points.

We see a similar trend in the 2022 trial. We again noted a number of apparent failed injections, with three queens displaying virus levels below 10,000 copies per bee (when all other samples were > 100,000 copies per bee). In six queens IAPV was not detected at all. We excluded these samples from the analysis, but it indicates a worrying inconsistency of inoculation. Despite this, analyzing the 2021 and 2022 data together (two-way ANOVA with treatment and year as fixed effects), we see a significant reduction in viral loads for heat-shocked queens relative to the controls (Figure 3). Across all samples, this equates to an overall heat-treatment reduction in viral load by 78%. Although promising, we would like to improve our injection methods to eliminate the outliers observed, as we cannot be entirely sure that this is not natural variation in the queens' resistance to infection.

Conclusion and future directions

We have demonstrated that at least one antiviral heat-shock protein remains upregulated in queens up to four days after receiving a heat treatment, and we determined that heat treatment is a promising method for combatting viral infections in the laboratory. As the proof of principle experiments in the laboratory are so far promising, we plan to expand on this work in the coming years with some more detailed experimentation and possibly field trials. Our priority will be to improve upon our inoculation methods and complete the proposed time-course study to determine the potential efficacy window (i.e., the duration which, after a heat treatment, the queen remains protected from a subsequent infection). We also plan to validate these results in the laboratory using other viruses before seeking funds to support a field trial.

References

1 Chapman, A. et al. Cryptic costs of viral infection in a model social insect. Scientific Reports. 12: 15857. doi:https://doi.org/10.1038/s41598-022-20330-4 (2022).

2 McAfee, A., Chapman, A., Pettis, J. S., Foster, L. J. & Tarpy, D. R. Trade-offs between sperm viability and immune protein expression in honey bee queens (Apis mellifera). Commun Biol 4, 48, doi:10.1038/s42003-020-01586-w (2021).

3 McMenamin, A. J., Daughenbaugh, K. F. & Flenniken, M. L. The Heat Shock Response in the Western Honey Bee (Apis mellifera) is Antiviral. Viruses 12, doi:10.3390/v12020245 (2020).

4 McAfee, A. et al. Vulnerability of honey bee queens to heat-induced loss of fertility. Nature Sustainability. 3: 367-76. doi: https://doi.org/10.1038/s41893-020-0493-x (2020).

EVENTS

African Regional Apimondia Symposium
Durban, South Africa | 20 – 24 March 2023

Africa is set to host the 3rd Apimondia Africa Regional Symposium at the ICC in Durban, South Africa from 21 – 24 March 2023, an event that is promising to be uniquely exciting, educational, engaging and ground-breaking given the topics lined up on the program.

Apimondia symposia are meant to bring stakeholders from beekeepers, equipment manufacturers, scientists / academia, policymakers, development partners to honey processors / traders under one roof to exchange information, ideas and experiences on how to develop the apiculture sector within the respective regions. Despite Apimondia having been formed in 1893, Africa has only seen 2 regional symposia hosted in Arusha, Tanzania (November 2014) and Addis Ababa (December 2018), a situation that has left stakeholders with few opportunities to come together and engage in information-sharing.

World Bee Day

20 May 2023 we shall celebrate the World Bee Day of the United Nations and Apimondia. World Bee Day is observed on 20 May each year to draw attention to the essential role bees and other pollinators play in keeping people and the planet healthy. It provides an opportunity for governments, organizations, civil society and concerned citizens everywhere to promote actions that will protect and enhance pollinators and their habitats, improve their abundance and diversity, and support the sustainable development of beekeeping.

World Bee Day shines a light on the habitat of pollinators to improve the conditions for their survival so that bees and other pollinators may thrive.

48th Apicultural Congress, Santiago, Chile 4 - 8 September 2023
48th APIMONDIA | International Apicultural Congress (apimondia2023.com)

Apimondia is the International Organization of Beekeeping Associations that brings together scientists, specialists and beekeepers from around the world and in 2023 Chile will host this international event.

The setting for this congress is Santiago, the capital of Chile, with the snow-capped Andes mountains as a backdrop. Technical tours will take you to nearby beekeeping operations and the chance to visit world class bodegas to taste Chilean wines. During the Apimondia Congress you can meet old friends and make new ones as you tour the ApiEXPO and take in the latest science and beekeeping ideas.

UPDATES FROM APIMONDIA

Million-strong pesticides petition delivered to EU Parliament. A million-strong petition to ban synthetic pesticides was received by the European Parliament on 24 January 2023. The 'Save bees and farmers towards a bee-friendly agriculture for a healthy environment' petition was formally presented to parliament's environment and agricultural committees in a four-hour hearing in Brussels.

The 'Save the bees and Farmers' initiative, of which Apimondia is also a partner, collected over a million signatures for this European Citizen Initiative. It is the 7th official European Citizens Initiative (ECI), a direct democracy tool created by the Treaty of Lisbon. The European Commission says the ECI, along with an earlier pesticide ECI by some of the same organisers, inspired it to propose Europe's first legally binding pesticide cuts by 50%. It has also tabled a Nature Restoration Law. Both proposals are now under serious threat from special interests groups, ECI organisers warned the hearing yesterday. Pesticide residues are the highest food safety concern for Europeans, according to recent official polling.

Watch a video of the Official Hearing of the Save Bees and Farmer European Citizens Initiative and read more on the Pesticide Action Network website.

Facebook: apimondiafederation | Instagram: @Apimondiabees | Twitter: @apimondia

Field Trials of a New Acaricidal Compound Against *Varroa destructor* in Honey Bee Colonies

Project Leads

Dr. Steve Pernal - Agriculture and Agri-Food Canada
Steve.Pernal@agr.gc.ca (PI)
Dr. Erika Plettner - Simon Fraser University plettner@sfu.ca (Co-PI)

Personnel

Dr. Olav Rueppell – Collaborator, University of Alberta
Robert Lu: M.Sc. Student, University of Alberta

Project Description

We have discovered a new acaricide, 1-allyloxy-4-propoxybenzene (code: 3c{3,6}), with strong acaricidal activity against *Varroa destructor*, having no appreciable toxicity towards bees or vertebrate animals. This compound has been tested extensively in the laboratory and in previous field trials in British Columbia and Alberta, during 2019 and 2021.

The current project is designed to generate additional data towards product registration under field-realistic conditions and further fine-tune release devices and application methods. These trials will also allow the collection of wax and honey samples to determine residual levels of compound 3c{3,6} after applications in the fall and spring.

Progress Towards Goals

In 2022, two parallel experiments were conducted over two differing time frames: one in the lower mainland of BC over the summer, and another in Beaverlodge, AB during the fall. Aside from temporal differences, both experiments used identical parameters and had the same total duration (12 weeks).

Robert Lu reprised his role conducting the experiment in Alberta, co-supervised by Dr. Steve Pernal and Dr. Olav Rueppell. Assisting Robert was AAFC technician Abdullah Ibrahim along with summer students Eva-Marie Smith, Natalia Clermont and Erik Forsberg. Field work in BC was carried out by Jorge MacIas-Samano from the lab of Dr. Erika Plettner, with the assistance of Carolyn Essaunce, Heather Higo, Julia Common, Nuria Morfin, Tim Wang, Abigail Chapman and Laura Chapman.

In 2022, in addition to increasing the amount of compound 3c{3,6} applied to treated colonies (8 g/colony in 2022 vs. 4 g/colony in 2021), we also evaluated two new applicator designs. Forty colonies were used in each test location, which were separated into 5 treatment groups, each with 8 replicate hives:

A. 3c{3,6} cardboard applicator – 8 g with 1.2 g glycerol, administered using three treated cardboard strips (24.0 cm L × 5.0 W × 0.3 thick) hanging between brood frames.
B. Control cardboard applicator - Cardboard release device identical to the 3c{3,6}-treated applicator, but treated only with solvent and 1.2 g glycerol.
C. 3c{3,6} wood applicator – 8 g with 1.2 g glycerol, administered using three treated wood slats (24.0 cm L × 5.0 W × 0.5 thick) hanging between brood frames.
D. Control wood applicator - Wooden release device identical to the 3c{3,6}-treated applicator, but treated only with solvent and 1.2 g glycerol.
E. Thymovar – One 15 g wafer per colony, with wafers being replaced at the 21-day mark of the 42-day treatment period, in accordance with manufacturer guidelines.

All 40 experimental colonies per location were placed in the same apiary and were equalized in terms of brood, food stores (pollen and honey) and varroa infestation rate. The colonies in Beaverlodge were derived from New Zealand package bees headed with Olivarez Carniolan queens, and inoculated with mites collected from local hives. Colonies whose queens that did not survive the initial colony buildup were requeened with local stock. Colonies in BC were a combination of surviving of overwintered singles with Carniolan queens and new Australian package bees requeened with local stock. Experimental colonies were managed in single brood chambers attached to a screened bottom board with a sliding drawer for ease of sticky board installation/replacement. The Beaverlodge experiment started with colonies having an average phoretic mite density of 4.07 ± 0.65 %, while in the Fraser Valley phoretic mite loads were 2.58 ± 0.31 % prior to the treatment phase.

Adult bee and brood population assessments were conducted on experimental days 0 (13 Sept - AB; 14 Jul - BC) and 42 (25 Oct - AB; 24 Aug- BC). All treatment applicators (3c{3,6} and thymovar) were removed on experimental day 42 and replaced with Apivar strips, which remained in place until the end of the experiment (6 Dec- AB; 6 Oct - BC). This was done to kill remaining mites in colonies post-treatment, to enable the calculation of treatment efficacies. Mite mortality was tracked and evaluated by counting dead mites on sticky boards placed below the screened bottom boards. Fresh boards were exchanged with existing boards at predetermined intervals. Alcohol washes were also taken on experimental days 0, 42, and 84 to determine phoretic mite loads. Numbers of mites within capped cells, and their reproductive rates, were evaluated by uncapping 100 sealed brood cells per colony, performed on day 0 and prior to day 42. Finally, before colonies were wintered, cluster sizes were scored from the top of each colony.

Five rounds of Porapak columns were also placed on the bottom boards of 3c{3,6}-treated colonies on experimental days 0, 7, 21, 42 and 56. Previous Porapaks were removed when subsequent Porapaks were placed, and were refrigerated for storage until analyzed. Porapak absorbs organic volatiles, and so allows for determination of airborne 3c{3,6} vapour concentrations during, and following, the treatment phase.

Data pertaining to the full experiment will be presented in detail within our March 2023 report. The data collected this year indicates the efficacy of 3c{3,6} delivered from both treatment applicators to be comparable to that of Thymovar. Additionally, both applicators performed significantly better in terms of mite population reduction in all metrics compared to the control applicators. 3c{3,6} residue analysis will be performed on wax and honey samples collected at the end of the treatment phase, alongside samples to be collected in the summer of 2023.

Update: Identification of *Melisococcus plutonius* in hive matrices to understand European foulbrood disease transmission and reoccurrence.

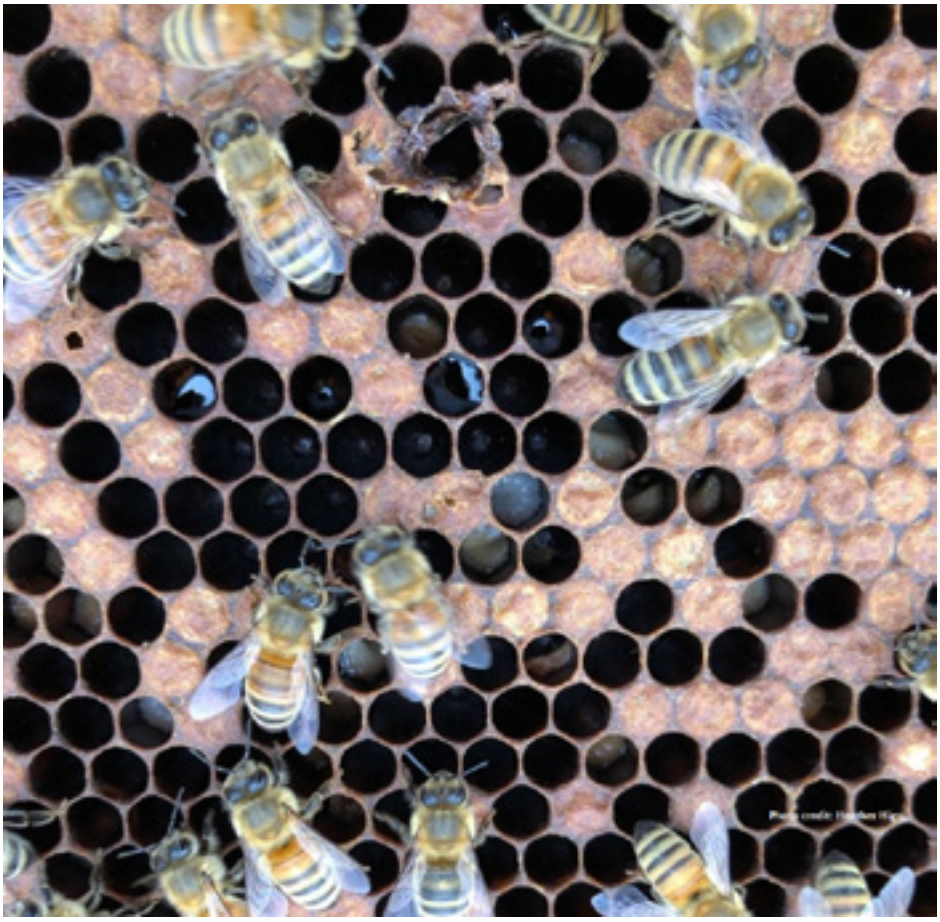
Nuria Morfin[1], Igor Moshynskyy[2], Sarah C. Wood[2], Midhun S. Jose[2], Elemir Simko[2], Heather Higo[3], Marta Guarna[4]

1. BC Technology Transfer Program, The British Columbia Honey Producers' Association; nuriamorfin@ttp-bchpa.ca
2. Department of Veterinary Pathology, Western College of Veterinary Medicine, University of Saskatchewan; midhun.jose@usask.ca, elemir.simko@usask.ca, sarah.wood@usask.ca, igor.moshynskyy@usask.ca
3. The British Columbia Honey Producers' Association; heather.higo@gmail.com
4. Agriculture and Agri-Food Canada; marta.guarna@agr.gc.ca

European Foulbrood (EFB) is an infectious disease caused by the non-spore-forming bacterium *Melissococcus plutonius*, which infects 1–2-day old honey bee (*Apis mellifera* L.) larvae [1]. The infected larvae die rapidly after acquiring the infection by ingestion; the bacteria proliferate in the larvae's gut [1]. The diseased larvae are characterized by a yellow or brown coloration, and they appear twisted within their cell [1]. *Melisococcus plutonius* can remain viable in brood cell walls and larvae faeces for years [2]. The transmission within the infected colony is through the fecal-oral route, mainly by worker bees feeding and cleaning diseased larvae [2]. Additionally, *M. plutonius* can be spread between colonies through robbing and drifting behaviours [3]. At a colony level, EFB is characterized by a non-uniform brood pattern and a foul smell when the infection is severe and a co-infection with secondary bacteria occurs [4].

The development of clinical signs of EFB has been linked to stress factors, including changes in nutrition; an association between EFB outbreaks and pollination of blueberries has been reported [5]. The treatment options for EFB are limited, although oxytetracycline is allowed Canada, its use is restricted to early spring and late fall to prevent honey contamination [6]. Additionally, the potential development of antibiotic resistant bacteria is an ongoing concern for international health authorities [7]. Control methods to prevent the spread of EFB include burning contaminated frames and hives, and using the 'shook swarm' method, in which bees are removed from contaminated frames and placed onto new equipment [8].

EFB can remain as a covert infection, possibly due to mechanical contamination of honeycomb, facilitating subsequent outbreaks [4]. Additionally, beekeeping practices, such as the exchange of beekeeping equipment between operations has been pointed as a risky practice for the spread of the disease [4]. However, the identification of potential fomites (i.e. contaminated objects that can transfer infectious agents) responsible for the transmission of EFB within and between beekeeping operations is not well documented. The potential of spreading brood diseases through honeycomb is a growing concern, particularly in regions where EFB is endemic and causing increasing economic distress for beekeepers [9]. Therefore, preventing the spread of EFB between operations should be a high priority to control the disease. The identification of potential fomites is a first step towards prescribing advice on biosafety practices that could help prevent the spread of EFB between beekeeping operations, as has been done for other highly transmissible diseases in other types of animal production systems [10].



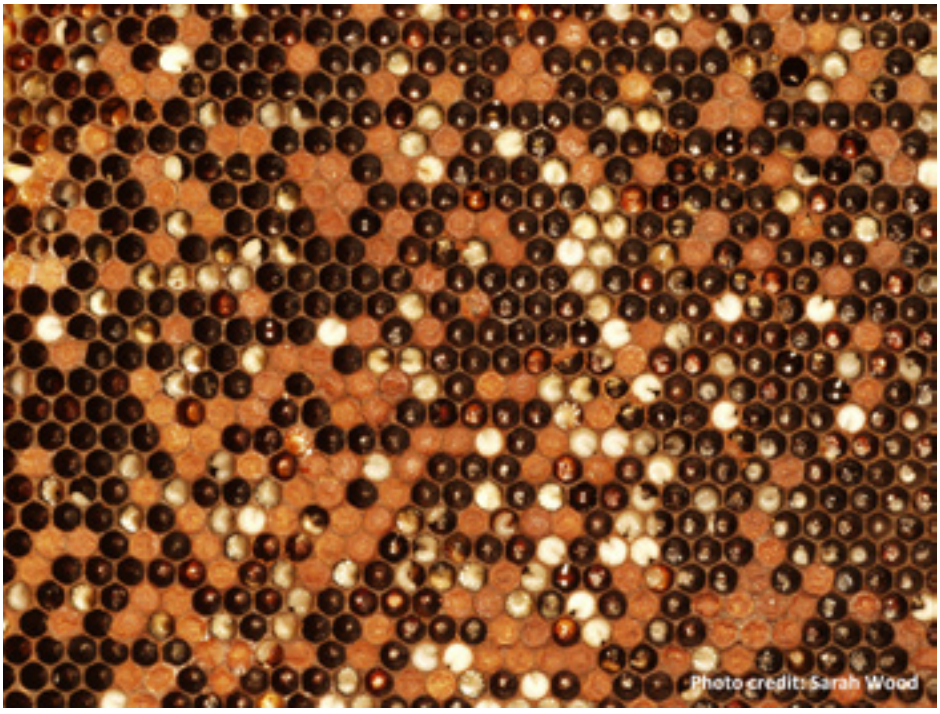


Figure 1a and b. Frames with larvae showing signs of EFB (Photo credit: Heather Higo and Sarah Wood).

To assess the potential role of fomites in the transmission of EFB, 23 frames with nectar and pollen from honey bee colonies of two different beekeeping operations were collected in the Lower Mainland of British Columbia in the summer of 2022. Prior to the collection of frames, the colonies were used for blueberry pollination. Additionally, samples of larvae with visual signs of EFB were sampled (19 in total). *M. plutonius* was cultured from the swabs using KSBHI agar [11], and the cultured bacteria were later used for molecular identification using real time PCR (qPCR) [8]. Eighty four percent of the larvae with clinical signs of EFB were positive to both laboratory analyses: bacterial culture and qPCR. In addition, a technique to isolate *M. plutonius* from the hive matrices, including beeswax, nectar, and pollen is under development; successful identification of *M. pluntonius* with qPCR in samples of beeswax, honey, and pollen was achieved, and three positive cultures from beeswax were recorded. The confirmation of presence of *M. plutonius* in fomites will inform the design of future projects to study the transmissibility of *M. plutonius*, and later inform the development of biosafety practices to prevent the spread of EFB, such as targeting sanitation strategies to fomites with the highest risk of disease transmission.

Acknowledgement

This research was partly funded by The Canadian Bee Research Fund to MMG – AAFC J-002912. We gratefully acknowledge the financial support of the B.C. Ministry of Agriculture and Food to the BC Technology Transfer Program. We also thank the participating beekeepers for their valuable contribution.

References

1. Forsgren, E. (2010). European foulbrood in honey bees. Journal of Invertebrate Pathology, 103, S5-S9.

2. Forsgren, E. et al. (2013). Standard methods for European foulbrood research. Journal of Apicultural Research, 52(1), 1-14.

3. McKee, B.A. et al. (2004). The transmission of European foulbrood (*Melissococcus plutonius*) to artificially reared honey bee larvae (*Apis mellifera*). Journal of Apicultural Research, 43(3), 93-100.

4. Vidal-Naquet, N. (2015). Honeybee Veterinary Medicine: Apis mellifera L. 5M Publishing.

5. Olmstead, S. et al. (2019). Evaluating the effect of feeding pollen substitute to honey bee colonies destined for wild blueberry pollination in Colchester County, Nova Scotia. Nova Scotia. Available from https://www.perennia.ca/wp-content/uploads/2019/10/ATTTA-FactSheet-Oct-2019.pdf [accessed on 17 February 2020].

6. Pernal, S.F. & Clay, H. (2013). Honey bee diseases and pests, 3rd Edition. Canadian Association of Professional Apiculturists, Beaverlodge, AB, Canada 68 pp.

Figure 2. Colony morphology of *M. plutonius*. The bacteria were cultured in KSBHI agar.

7. Chang, Q. et al. (2015). Antibiotics in agriculture and the risk to human health: how worried should we be?. Evolutionary Applications, 8(3), 240-247.

8. Budge, G.E. et al. (2010). The occurrence of *Melissococcus plutonius* in healthy colonies of *Apis mellifera* and the efficacy of European foulbrood control measures. Journal of Invertebrate Pathology, 105(2), 164-170.

9. Gregoris, A. et al. (2020) European foulbrood may affect availability of honey bee colonies in pollination-deficient blueberry farms. Entomology 2020, 68th Annual Meeting of the Entomological Society of America, virtual meeting. 11-25 November 2020.

10. Karus, A. et al. (2018). Biosafety and biosecurity manual. EMU DSpace. Available from https://dspace.emu.ee/xmlui/handle/10492/5453?locale-attribute=en [accessed on November 20, 2021].

11. Arai, R. et al.. (2012). Diversity of *Melissococcus plutonius* from honeybee larvae in Japan and experimental reproduction of European foulbrood with cultured atypical isolates. PloS one, 7(3), e33708.

Attention All Beekeepers: Send us your honey samples

Once again we, Leonard Foster (UBC) and Peter Awram (True Honey Buzz), are looking for more honey samples to use for our Authentic Canadian Honey Database

Do you have honey lot sample jars from previous years that you have no use for anymore? The honey is all sold and the lot samples are just sitting gathering dust?

With the help of the Canadian Honey Council it is our hope to generate methods to help stop fraud in the honey industry.

We are particularly interested in sets of samples from throughout the year and an approximate location of where they are from.

These samples will be used to examine the accuracy of the database for identifying real life commercial honey. They represent what beekeepers actually sell and it is vital that we are able to show that the database clearly identifies what is being sold as authentic.

For more information contact Peter Awram at info@truehoney.buzz
10609 McGrath Road, Rosedale, BC V0X1X2

TRUE HONEY BUZZ
KEEPING HONEY REAL

UBC THE UNIVERSITY OF BRITISH COLUMBIA

Interlake Honey Producers Ltd. PO Box 328, Fisher Branch, MB R0C 0Z0 has the following positions:
Apiary Technician 5 Positions Available. Required for the 2023 honey season.
Seasonal, full time, days, evenings and some Saturdays. Work is mostly outdoors, so must be able to work under hot conditions. The job starts April 1st – July 1st. End Date: Sept 10th – October 31st. Wages: $14.00-$17.00/hour. Minimum 2 years experience preferred. Performance and/or production bonus may be available. Duties include but not limited to, feed and care for honey bees, replacement of hives and production of nucs, moving hives, supering hives, detect and report hive health and apply correct disease cures and/or controls, keep field and/or production records, harvest honey, working on extracting line, cleaning extracting equipment and honey house, raise queens, assemble and maintenance of bee equipment, drive and maintain vehicles, other duties as assigned. Work is very physically demanding, with long days and heavy lifting. The job is located 2 hours north of Winnipeg in the RM of Fisher NE 33-23-1W in Fisher Branch, MB. Send resume by mail to Box 328 Fisher Branch, MB R0C 0Z0 or email anita@ifsltd.ca

FOR SALE: NATURAL BEESWAX FOUNDATION USING YOUR WAX OR OURS
Contact: Bill Ferguson,
Ferguson Apiaries, Hensall, ON
Tel: 519 236-4979
Email: ferga@hay.net

Thinking "Outside" of the Hive

R. Gagne, EET CFE NADEP and Eduard Unger, Beekeeper

Products obtained from honey beehives, such as honey, bee bread, bee venom, bee pollen, propolis, and royal jelly have seen significant growth in the past few years. Part of this may be due to the pandemic and the desire for natural cures, and another is that Hollywood has begun to publish the effect of products from the Bee in cosmetic and naturopathic supplements. Furthermore, in recent years we have seen the fast application of bee products in both traditional and modern medicine. Currently, many studies are targeted toward investigating directed health benefits and pharmacological properties of bee products due to their efficacies, leading to the increasing development of nutraceuticals and functional food from these products. The concept of functional food refers to food that can promote better physiological or psychological health compared to traditional remediated and nutritional food. These effects positively contribute toward excellent health maintenance, well-being, and reduced chronic illness.

In Canada, Apitherapy specialized centers such as the Apitherapy and Wellness Center in Niagara, have created a clinical focus for both the clinical treatment of a myriad of conditions as well as the development of customized bee products packed for specific medical diagnosis. (Apitherapy (Apis is a Latin word that means bee) is the practice of using bee products such as honey, pollen, propolis, royal jelly, and bee venom for disease prevention or treatment.). Naturopath doctors and other holistic nutritional supplement-based entities are also strong users of the additional bee product mix.

"In today's market it is of utmost importance for the beekeeper to expand their product mix to incorporate all viable products from the hive and to take advantage of the additional revenue streams and the health benefits they present within their community"

R. Gagne, Clinical Researcher, BY's Apitherapy Wellness Center

NATURES FIRST AID KIT: PRODUCTS CREATED NATURALLY FROM HONEYBEES

HONEY

Regular consumption of honey containing pollen helps to reduce allergic reactions ('hay fever') to these pollens. Recent research on allergic diseases appears to support this belief. Today honey is increasingly recognised for its healing and anti-bacterial properties when taken orally, or applied as a treatment for wounds and burns. Honey has a number of constituents and properties that can result in healing properties. These include its acidity, enzymic activity, hydrogen peroxide and high osmotic potential. One of the enzymes present in honey is glucose oxidase. This enzyme is produced by the bees' hypopharyngeal (head) glands. When honey is diluted, the enzyme is activated and oxidises glucose to generate gluconic acid and hydrogen peroxide. The high osmotic potential of honey is due to its high sugar concentration: this means that it has an osmotic effect, which can lead to the breakdown of bacterial membranes, thus inhibiting microbial growth. Honey can be also put to use in healing skin and drying out wounds: its anti-bacterial properties and physical composition, maintaining moist conditions and allowing oxygen to pass, is good for preventing infections, reducing inflammation and promoting rapid healing.

Honey is also known as a supersaturated sugar solution. Natural honey is composed of 82.4% carbohydrates, 38.5% fructose, 31% glucose, 12.9% other sugars, 17.1% water, 0.5% protein, organic acids, multimineral, amino acids, vitamins, phenols, and a myriad of other minor compounds. In addition, honey consists of minor amounts of bioactive components, including phenolic acid, flavonoid, and α-tocopherol. Honey constituents with health benefits include phenolic acids, flavonoids, ascorbic acid, proteins, carotenoids, and certain enzymes, such as glucose oxidase and catalase.

BEESWAX

In the past beeswax was used in medicine, mainly as a carrier for other ingredients, and in salves and poultices. Today beeswax is used extensively in the pharmaceutical and cosmetics industries in ointments, skin creams and pills. Within the field of alternative medicine, beeswax is once again forming part of various medicines. There are some claims that it has antibiotic properties, and can be used in the treatment of arthritis and nasal inflammations.

POLLEN (BEE BREAD)

Pollen is certainly very important in the nutrition of honeybees, and there are documented claims for the nutritional value of pollen as being one of the most complete foods in nature. It certainly has all the right ingredients, containing around 30 percent protein and including all the amino acids essential for human diets, a

full spectrum of vitamins and minerals, trace elements, hormone precursors, carbohydrates and fatty acids. It is possible that pollen provides valuable trace elements to supplement deficient diets. Pollen has been documented as providing increased energy, fights exhaustion and depression, and ensures resistance against colds and flu.

PROPOLIS

Propolis contains the gums and resins bees collect from plants, and in many cases these compounds are the plants' own response to injury, or otherwise protecting the plants from predators and pathogens. It is therefore not surprising that propolis has anti-fungal, anti-inflammation and anti-bacterial properties.

Propolis is generally known as the "bee glue", which is a generic name that refers to the resinous substance accumulated by the bees from different types of plants. The word "propolis" is derived from Greek to mean defense for "pro" and city or community for "polis", or the beehive, in other words. Propolis functions in sealing holes and cracks and for the reconstruction of the beehive. It is also used for smoothing the inner surface of the beehive, retaining the hive's internal temperature (35° C), preventing weathering and invasion by predators. Furthermore, propolis hardens the cell wall and contributes to an aseptic internal environment. Propolis generally becomes soft and sticky upon heating. It also possesses a pleasant smell. Propolis and its extracts have numerous applications in treating various diseases due to its antiseptic, anti-inflammatory, antioxidant, antibacterial, antimycotic, antifungal, antiulcer, anticancer, and immunomodulatory properties.

"It is important for today's beekeeper to take advantage of everything the hive has to offer and for this reason we have developed educational classes to assist beekeepers to collect and extract the therapeutic properties from the hive. With our Apitherapy Wellness Centre we take this to the next stage and offer therapeutic services utilizing the advantages of bee venom to bee air and sound therapy for conditions ranging from Cancer and Lyme disease to PTSD. We have made it our mission to help other beekeepers stay current and to assist with the health and well being of the community we live in." Eduard Unger, Beekeeper and therapy specialist at BY's Apitherapy Wellness Centre in Niagara.

ROYAL JELLY

Worker bees and queen bees start life as identical eggs laid by the parent queen. Whether an egg develops into a worker bee or a queen bee is determined by the way it is fed. Queen bee larvae are fed with copious amounts of royal jelly, and subsequently adult queen bees differ in many respects from adult worker bees: the queen alone is fertile, will mate and will lay eggs very prolifically. She will live much longer than her sister worker bees. Royal jelly is therefore a potent food as far as developing honeybees are concerned. People credit royal jelly with remarkable therapeutic advantages for humans and other animals too. Royal jelly is a concentrated source of many nutrients, including all the B vitamins, as well as vitamins A, C, D and E and essential fatty acids. Royal jelly, a white and viscous jelly-like substance, is a form of hypopharyngeal and mandibular gland secretion from the worker bees. It is also known as a "superfood" that is solely consumed by the queen bee. Royal jelly is also fed to the honeybee larvae upon hatching and helps to nurture the brood. It is the exclusive nutriment offered to the immature young larvae in their first 2-3 days of maturation besides being used as a food specifically for the queen bee throughout her entire life cycle. Royalactin is the main compound in royal jelly that allows the morphological change of a larva into the queen bee. This superfood is the main reason for the longevity of the queen bee compared to the other bees. Royal jelly is widely used as a dietary nutritional complex to help combat various chronic health conditions. Furthermore, it is one of the profitable remedies for human beings in both traditional and modern medicine. Many pharmacological activities such as antibacterial, antitumor, antiallergy, anti inflammatory, and immunomodulatory effects have also been attributed to it.

BEE VENOM

This is primary a form of therapy using live bees, applied directly to the patient. Bee stings are beneficial for the treatment of rheumatoid arthritis as well as other diagnosis involving joint pain and swelling. Venom therapy is also claimed beneficial for the relief of pain from tendon injuries, repetitive strain injury and other muscle injuries. Bee venom cream and drops are also by products that are used internationally.

Venom is a complex mixture of proteins and amino acids, enzymes, sugars and lipids. One polypeptide, melittin, is a major component of venom, and in humans it has the effect of stimulating the adrenal cortex (part of the adrenal gland) to release cortisol, a hormone associated with reducing inflammations and healing responses. This may also in part explain venom's apparent success in easing inflammatory ailments and it's significant healing effects in relation to cancer. Bee venom is used especially in musculoskeletal problems seen in some neurological (MS, ALS, Parkinson's Disease etc) and rheumatic disorders (RA, Ankylosing Spondylitis etc.) and muscular conditions such as myalgia, fibromyalgia, arthralgia and neuralgia. New studies prove bee venom effectiveness in both cancer and Lyme disease.

BEE AIR THERAPY

Beehive air therapy is recognized as a potential remedy for treating asthma, bronchitis, lung fibrosis, and respiratory tract infections. In recent studies, 56 volatile compounds were identified from beehive air and its individual components and categorized into fatty acids, alcohols, aldehydes, esters, ether, hydrocarbons, phenol, ketones, nitrogenous compounds, and terpenes. The abundance of n-caprylic acid, cinnamaldehyde, geranic acid, decanal, limonene, eugenol, benzaldehyde, nonanoic acid, nonanal, β-linalool, caryophyllene, α-humulene, cinnamaldehyde, limonene, eugenol, and benzaldehyde were closely related to their anti-inflammatory, anti-asthmatic and antimicrobial actions. Taken together, this information could support the validity of beehive air aromatherapy for the treatment of respiratory tract disorders such as asthma, bronchitis, and lung fibrosis.

BEE SOUND THERAPY

Bee sound therapy has been well documented in various scientifically validated publications citing the The Humming Effect (2017) by Jonathan and Andi Goldman. Documented benefits include:

A. Increased oxygen in cells
B. Lowered blood pressure and heart rate

C. Increased lymphatic circulation
D. Increased levels of melatonin
E. Reduced levels of stress-related hormones
F. Release of endorphins
G. Release of oxytocin
H. Increased levels of nitric oxide

Increasing nitric oxide is of interest during flu season because numerous experiments show that it opens nasal passages and enhances our immune, cardiovascular and respiratory systems. It dilates our blood vessels, increases blood flow and lowers blood pressure, greatly reducing stress and has been used in assisting those with anxiety and depression in combination with other bee products.

IN SUMMARY

The educated consumer desires to have access to naturally derived and locally sourced products for everything from natural personal care products, including lip balms, eye makeup products, face cosmetics, lip colour products, baby products to therapeutic supplements and even direct therapy. The ability for a beekeeper to expand into a full spectrum of bee products is greater than ever and shows promise of growth over the coming years.

The Bee Product market is expected to make a significant growth in the years ahead. Bee products have a strong nutritional content and play a major role in maintaining good health. Bee Products Market was valued at around USD 10450.62 million in 2021 & estimated to reach USD 13477.00381 by 2028. Bee Products Market is likely to grow at compounded annual growth rate (CAGR) of 5.7% between 2022 to 2028. (Bee Products Market by Product Type (Propolis, Honey) by Application (Food Industry, Cosmetic Industry, Pharmaceutical Industry) by Industry Analysis, Volume, Share, Growth, Challenges, Trends and Forecast 2019-2027 Report Code: PSMR- PSMR-007027)

Bees are part of the biodiversity on which we all depend for our survival. As we know, honey bees are among the most numerous and efficient pollinator species in the world, but the products derived from the honey bee and the hive have the potential to help us maintain and enjoy a healthy life ahead. As experts in the beekeeping community it behooves us to explore all that the bee has to offer.

Eduard Unger is a 30 year veteran of beekeeping in the Niagara area and the founder of the Apitherapy and Wellness Center in Niagara, R. Gagne is an author and clinical researcher working at BY's Apitherapy Wellness Center in Niagara To learn more on Apitherapy and therapeutic product research visit www.apitherapywellnesscenter.com.

References

1. P. C. Molan, "The role of honey in the management of wounds," Journal of Wound Care, vol. 8, no. 8, pp. 415–418, 1999.

2. P. V. Rao, K. T. Krishnan, N. Salleh, and S. H. Gan, "Biological and therapeutic effects of honey produced by honey bees and stingless bees: a comparative review," Revista Brasileira de Farmacognosia, vol. 26, no. 5, pp. 657–664, 2016.

3. P. M. Fratellone, F. Tsimis, and G. Fratellone, "Apitherapy products for medicinal use," Journal of Alternative and Complementary Medicine, vol. 22, no. 2, pp. 1020–1022, 2016.

4. Ajibola, "Physico-Chemical and Physiological Values of Honey and Its Importance as a Functional Food," International Journal of Food Sciences and Nutrition, vol. 2, no. 6, pp. 1–9, 2015.

5. J. M. Alvarez-Suarez, S. Tulipani, S. Romandini, E. Bertoli, and M. Battino, "Contribution of honey in nutrition and human health: a review," Mediterranean Journal of Nutrition and Metabolism, vol. 3, no. 1, pp. 15–23, 2010.

6. S. Castaldo and F. Capasso, "Propolis, an old remedy used in modern medicine," Fitoterapia, vol. 73, Supplement 1, pp. S1–S6, 2002.

7. Shehu, S. Ismail, M. A. K. Rohin, A. Harun, A. A. Aziz, and M. Haque, "Antifungal properties of Malaysian Tualang honey and stingless bee propolis against Candida albicans and Cryptococcus neoformans," Journal of Applied Pharmaceutical Science, vol. 6, no. 2, pp. 044–050, 2016.

8. Buttstedt, R. F. Moritz, and S. Erler, "More than royal food-major royal jelly protein genes in sexuals and workers of the honeybee Apis mellifera," Frontiers in Zoology, vol. 10, no. 1, p. 1, 2013.

9. M. Kamakura, "Royalactin induces queen differentiation in honeybees," Nature, vol. 473, no. 7348, pp. 478–483, 2011.

10. F. Ferreres, C. García-Viguera, F. Tomás-Lorente, and F. A. Tomás-Barberán, "Hesperetin: a marker of the floral origin of citrus honey," Journal of the Science of Food and Agriculture, vol. 61, no. 1, pp. 121–123, 1993.

11. M. Moniruzzaman, M. Khalil, S. Sulaiman, and S. Gan, "Advances in the analytical methods for determining the antioxidant properties of honey: a review," African Journal of Traditional, Complementary and Alternative Medicines, vol. 9, no. 1, pp. 36–42, 2012.

12. Gómez-Caravaca, M. Gómez-Romero, D. Arráez-Román, A. Segura-Carretero, and A. Fernández-Gutiérrez, "Advances in the analysis of phenolic compounds in products derived from bees," Journal of Pharmaceutical and Biomedical Analysis, vol. 41, no. 4, pp. 1220–1234, 2006.

13. S. Huang, C.-P. Zhang, K. Wang, G. Q. Li, and F.-L. Hu, "Recent advances in the chemical composition of propolis," Molecules, vol. 19, no. 12, pp. 19610–19632, 2014.

14. Billingham, M.E.; Morley, J.; Hanson, J.M.; Shipolini, R.A.; Vernon, C.A. Letter: An anti-inflammatory peptide from bee venom. Nature 1973, 245, 163–164.

15. Walker, E.W. Bees' stings and rheumatism. Br. Med. J. 1908, 2, 1056–1060. 3. Choi, M.S.; Park, S.; Choi, T.; Lee, G.; Haam, K.K.; Hong, M.C.; Min, B.I.; Bae, H. Bee venom ameliorates ovalbumin induced allergic asthma via modulating CD4+CD25+ regulatory T cells in mice. Cytokine 2013, 61, 256–265.

16. Lee, J.-D.; Park, H.-J.; Chae, Y.; Lim, S. An overview of bee venom acupuncture in the treatment of arthritis. Evid. Based Complement. Altern. Med. 2005, 2, 79–84. 5. Son, D.J.; Lee, J.W.; Lee, Y.H.; Song, H.S.; Lee, C.K.; Hong, J.T.

Bees need both protein and carbohydrate for good build-up and large honey crops.

Feed protein patties in spring to ensure colony health, maximum build-up and maximum production

Be ready this spring. Save time, money, hassle and mess.

Call now and order

Ready-Made Pollen Patties

made to *your* specifications

Global is faster, better and cheaper than your other options.
Order one of our standard formulas using yeast, soy, pollen*, sugar and Latshaw's vitamin & mineral supplement or request your own recipe and patty size.

We'll supply all the ingredients, or use our supplies you provide.

Call Mike at 1-866-948-6084 today

or email *Mike@globalpatties.com*

Global Patties can be delivered in boxes or on pallets

Visit us at www.globalpatties.com

*Pollen in our formula is irradiated by Iotron for prevention of bee disease

BJ SHERRIFF

EST. 1968

PROUDLY CRAFTED IN BRITAIN

Specialist makers of fine quality beekeeping apparel

Trusted for over 48 years to deliver a range of robust and reliable safety work wear designed to last and last. Handcrafted in Cornwall, a BJ Sherriff is the only beesuit you'll ever need.

Canadian Stockists

Alberta Honey Producers Co-op Limited
Alberta
ccaines@beemaid.com
001-780-962-5573

Countryfields Beekeeping Supplies
Nova Scotia
timpurdy@countryfields.ca
001-902-576-3079

Flying Dutchman
British Columbia
flydutch@telus.net
001-250-390-2313

Propolis
Quebec
defrance@propolis-etc.ca
001-450-772-2637

Publication Agreement # 43070512

The Canadian Honey Council is the national association of beekeepers representing apiculturists across Canada. The CHC provides a forum where producers, packers, professionals, provincial associations and officials from different levels of government can talk and recommend action in the best interests of the Canadian honey bee industry. Currently, the CHC membership consists of representatives of provincial associations with the total number of beekeepers at approximately 10,000 managing over 750,000 colonies.