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Cover picture: BeeTech program underway.

Photo supplied by Rod Scarlett

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Canadian Honey Council Report

It has been a very busy start to the new year highlighted by a successful Bee Tech Conference. With an up-tempo conference schedule and a very diverse trade show, participants seemed to go away quite happy as the conference survey pointed out. I would like to thank members of CAPA who helped facilitate the seminar session as well as the Board of the CHC, beekeepers, and speakers. Everyone was very pleased with the trade show and special thanks go out to Hive World and Bee Maid for their major sponsorships. A particular thanks goes out to Nicole McCormick for working as our technical genius. This was a first for the Canadian Honey Council and CAPA, and it would not have run nearly as well as what it did without the outstanding contribution of Dr. Shelley Hoover. Shelley's attention to detail certainly covered for my far more haphazard organizational skills.

Bee Tech provided a unique opportunity for beekeepers from across Canada to mingle and discuss issues of importance. It also allowed the Board of the CHC to meet with executive members of a newly formed organization representing the views of some commercial beekeepers on mainly the topics of stock replacement and honey issues. As a small industry, I do find this development concerning as bringing more voices to the table on policy issues can create confusion and, in the case of dealing with governments, allows for the avoidance of action when the voices do not align, even in the smallest of ways.

I will say in my years serving the Canadian Honey Council, there has never been a decision or policy reached that was made to the exclusion of commercial beekeeping. In fact, the Board has almost exclusively been comprised of commercial beekeepers who made their living through either honey production or pollination. The old adage that if you put ten commercial beekeepers in a room, you can easily end up with eleven opinions rings true. The important thing, however, is to make sure everyone's voice is heard and taken seriously and I can honestly say that the CHC Board has, and will continue to do just that. Everyone's business model is a little different, and everyone's perspective on how to deal with issues often do not align. That being said, this industry isn't like canola or cattle, we don't have the clout or the opportunity to impact grandiose policy changes, or change consumer opinions, without being aligned with one voice.

I understand, and I think the Board understands that there is a faction of the beekeeping community who are very interested in purchasing US packaged honeybees and I actually commend their organizational skills in that regard. However, and it is a big however, I have not heard an example of any other issue that the CHC has ignored or is not dealing with, that would necessitate the formation of a new organization. Perhaps, we can do a better job in obtaining more views and opinions, and the Board has indicated it will work towards that end. Eventually, decisions need to be made and I will say that with the mix of individuals and perspectives on the current Board, all beekeepers, both commercial and side liners, should be very comfortable that consensus resolutions will take into account everyone's opinions and benefit commercial operations.

Rod Scarlett, Executive Director, CHC

As with every season, I have been hearing mixed reports of overwintering losses across Canada. High losses in one yard and strong numbers in another all within miles of one another. As I am writing this, we have hit a cold snap across the prairies that will certainly have an impact on numbers but hopefully it won't be too bad. Beekeepers across Canada are due for a bumper year.

Regional Reports

Atlantic

Rodney Reid

A fresh new season is upon us for 2024. Spring has arrived and hearing most hives have overwintered well, however spring can bring many challenges as we know. In February, Bee Tech was hosted by CHC in Calgary and Atlantic Canada was well represented from all four provinces. The feedback was that the event was well received and hopefully we can continue this event in the future. A national event provides a great benefit to unify the Canadian beekeeping industry in providing opportunities in networking and knowledge transfer for the sustainability and growth of the industry.

Newfoundland and Labrador (NL) have seen some erratic weather this winter and spring, with unprecedented mild spells, contrasted by record snowfalls on parts of the island. The NL Beekeeping Association has been busy through the winter, planning ways to expand and enhance our association to better support our young but growing industry. With a full board of dedicated members working on different initiatives, we are busy planning our upcoming AGM and Annual Workshop for the first week of June 2024. Networking such as this will help build connections with other provincial beekeeping industries and partners, which will in turn help our varroa-free NL beekeeping industry.

Nova Scotia is coming out of last year's fires, floods, and heavy rains, one can only hope for a better season. They had their AGM and Symposium and have a new Board. For the upcoming year, the Board will be focusing on Livestock Insurance for Beekeepers in the province, increasing the marketability of NS Honey to the public, developing better methods of communication with the membership, such as revamping the website and more. During the 2023 year, the Board worked on the Cost of Production Model to help deliver a tool for the small operator to determine the economic feasibility of expansion. They did this in hope of encouraging more part time, or sideline operators to diversify their operations to help provide Queens, Nucleus Colonies and offer important support to the Wild Blueberry Industry.

New Brunswick is ramping up for pollination season and held their AGM and workshop the first of March which about 150 people in attendance. Spring has little snow and tons of rain so hoping it's a great start to the season. The NB Beekeeping Association (NBBA) has a new president, Nathan Mutch, welcome aboard. A thank you to Chris Lockhart for his service as past president, but he won't be going far and now serves as a director for the association.

Prince Edward Island had a good attendance at their AGM and information day focused on small scale operations to commercial with Ian Steppler virtually. Also queen rearing without grafting with Flecther Colpitts and reports Dr. Andrew Byers from the Atlantic Tech Transfer Team for Apiculture and Provincial Apiarist. PEI beekeepers are getting out to celebrate the Canadian Agriculture Literacy Month with Agriculture In The Classroom, as are other provinces. The opportunity provides beekeepers to share everything bees in elementary classrooms in celebration of Canadian agriculture.

Plans are underway as well for the Atlantic Bee Tour 2024. It is an informative and community building experience in which beekeepers from the Atlantic Provinces are invited to gather at a local beekeeping operation for tours, workshops, and an opportunity to connect with one another. The tour is a biennial beekeeper event and there will be announcements coming with dates details.

Québec

Maggie Lamothe Boudreau

Spring is just beginning, and the winter of 2024 has already revealed various impacts on the survival of bee hives, mixing successes and failures. With an exceptionally mild episode, displaying temperatures between 10 and 20 °C for about fifteen days, some beekeepers anticipated the exit

of their bees from winter facilities. This decision proved to be premature, as a sudden return of the cold, with temperatures dropping between 0 and -15 °C, then required urgent insulation of the hives. Mortality rates vary widely from one region to another, ranging from 10% to 90%. Although the exact causes are difficult to pinpoint, the varroa mite seems to be a predominant factor. Preliminary estimates indicate potential losses close to 35% in Quebec, but the lack of complete snowmelt still delays the precise evaluation of the terrain.

During our annual general meeting, several crucial subjects were discussed. Among the highlights were a slight increase in membership fees for 2025, changes in stance for the small-scale category, a speech by Martin Caron, president of the Union des Producteurs Agricoles du Québec, the presentation of the project for a coordination and development chamber in beekeeping, and discussions on various pollinations for the 2024 season. Documents related to these discussions are accessible in the members' section of our website at [https://www.apiculteursduquebec.com/].

The following administrators were elected to their positions:

- President: Raphaël Vacher
- First Vice-President: Maggie Lamothe Boudreau
- Second Vice-President: Sarah Martineau
- Administrator and President of the Montérégie Committee: Alexandre Mainville
- Administrator and President of the Northwest Committee: Gracien Léveillé
- Administrator and President of the Quebec Region Committee: Guillaume Dion
- Administrator and President of the Mauricie-Estrie-Centre-du-Québec Committee: Samuel Rivard
- Administrator representing young members: to be announced
- Administrator representing the small-scale category: Julien Levac Joubert

The beekeeping information day was a resounding success, gathering nearly 120 participants around the latest advances and perspectives in the field of beekeeping, covering various topics such as Api Blue Max, the humanitarian mission with the Union des Producteurs Agricoles Développement International, honey identification, varroa management, nucleus production, etc.

Our committees, dedicated to key initiatives such as the revision of organic standards and collaboration with the CRSAD for queen breeding, continue to advance the beekeeping industry, both at the Quebec and Canadian levels. We strongly encourage our members to get involved in these collective efforts.

Finally, Beemaid's expansion to Saint-Boniface, Quebec, opens new export prospects for our honey to Asia, showcasing the dynamism of our sector. We welcome them.

I conclude by saying that provincial veterinarians will continue to closely monitor infestations of small hive beetles this year and that if you need more details regarding certain documents or committees, do not hesitate to communicate with the team "Les Apiculteurs et Apicultrices du Québec". I send my best wishes for a successful spring to all beekeepers and their hives.

Le printemps n'en est qu'à ses débuts, et l'hiver 2024 a déjà révélé des impacts divers sur la survie des ruches, mêlant réussites et échecs. Avec un épisode de douceur exceptionnel, affichant des températures entre 10 et 20 °C durant une quinzaine de jours, certains apiculteurs ont anticipé la sortie de leurs abeilles des installations hivernales. Cette décision s'est avérée prématurée, car un retour brutal du froid, avec des températures chutant entre 0 et -15 °C, a ensuite nécessité une isolation urgente des ruches. Les taux de mortalité varient largement d'une région à l'autre, allant de 10 % à 90 %. Bien que les causes exactes soient difficiles à cerner, le varroa semble être un facteur prédominant. Les estimations préliminaires indiquent des pertes potentielles avoisinant les 35 % au Québec, mais l'absence de fonte complète de la neige retarde encore l'évaluation précise du terrain.

Lors de notre assemblée générale annuelle, plusieurs sujets cruciaux ont fait l'objet d'échanges. Parmi les points saillants figuraient une légère augmentation des frais d'adhésion pour 2025, des changements de position pour la catégorie petite échelle, un discours de Martin Caron, président de l'Union des Producteurs Agricoles du Québec, la présentation du projet de chambre de coordination et de développement en apiculture, et des discussions sur diverses pollinisations pour la saison 2024. Les documents relatifs à ces discussions sont accessibles dans la section des membres de notre site web à [https://www.apiculteursduquebec.com/].

Les administrateurs suivants ont été élus à leurs postes :

- Président : Raphaël Vacher
- Première Vice-Présidente : Maggie Lamothe Boudreau
- Deuxième Vice-Présidente : Sarah Martineau
- Administrateur et Président du Comité de la Montérégie : Alexandre Mainville
- Administrateur et Président du Comité du Nord-Ouest : Gracien Léveillé
- Administrateur et Président du Comité de la Région de Québec : Guillaume Dion
- Administrateur et Président du Comité de la Mauricie-Estrie-Centre-du-Québec : Samuel Rivard
- Administrateur représentant relève : à venir
- Administrateur représentant la catégorie petite échelle : Julien Levac Joubert

La journée d'information apicole a été un franc succès, ras-

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semblant près de 120 participants autour des dernières avancées et perspectives dans le domaine de l'apiculture, couvrant des thèmes variés tels que Api Bleu Max, la mission humanitaire avec l'Union des Producteurs Agricoles Développement International, l'identification du miel, la gestion du varroa, la production de nucléis, etc.

Nos comités, dédiés à des initiatives clés telles que la révision des normes biologiques et la collaboration avec le CRSAD pour l'élevage de reines, continuent de faire progresser l'industrie apicole, tant au niveau québécois que canadien. Nous encourageons vivement nos membres à s'impliquer dans ces efforts collectifs.

Enfin, l'expansion de Beemaid à Saint-Boniface, Québec, ouvre de nouvelles perspectives d'exportation de notre miel vers l'Asie, témoignant du dynamisme de notre secteur. Nous leur souhaitons la bienvenue.

Je termine en disant que les vétérinaires provinciaux continueront de surveiller de près les infestations de petits coléoptères des ruches cette année et que si vous avez besoin de plus de détails concernant certains dossiers ou comités, n'hésitez surtout pas à communiquer avec l'équipe « Les Apiculteurs et Apicultrices du Québec ». Je vous adresse mes meilleurs vœux pour un printemps réussi à tous les apiculteurs et leurs ruches.

Ontario

Albert Devries

Ontario like most of the rest of Canada really didn't have much of a winter. The temperatures were mild and snow on the ground was much less than a regular year. Maple trees started blooming in early March in my part of Southwestern Ontario.

It seems it maybe a year of higher than average winter loss. Although I do hear of some beekeepers with very low loses. Late last summer and into the fall areas of Ontario varied from dry to wet. I think if you where in the in between areas and mites were under control. It was a good winter for wintering bees.

Brood rearing has started early this year . I expect mites will be a problem this season. It seems harder each year to keep them under control. Much of the talk when beekeepers get together is about the use of midseason organic acid treatments, and what individual beekeepers have found to work for them.

The OBA board has been working hard trying to get a Tech Transfer Team in place for the up coming season. The process is being done carefully making sure the right people are in place. There is real value to having an effective tech transfer team in place.

I believe it was Tim Wendell at the Bee Tech banquet who said "There is no place I'd rather be then a beeyard in the spring". More and more I feel that optimism and potential as we start in the spring. I wish everyone a great season

Manitoba

Osee Podolsky

I felt it was time for a change of pace, I hung up my hat chairing the Hive Health committee and have now moved to chair the Interprovincial Movement and Transportation committee. With the growing demand for the interprovincial movement of bees across Canada to help recuperate overwinter losses, along with the increased need for pollination services, the streamlining of acquiring the required transportation documents and inspections is becoming evermore important. Coinciding with this is protecting the health and safety of honeybees and the public during transportation. Transport Canada's ELD mandate coupled with more provinces imposing speed limiter laws is growing concern from carriers who truck bees across Canada. From May to October after driving for 13 hours the days are just too long to stop safely with a load of bees on a truck. The bees undergo unnecessary stress while stopped on a truck during daylight hours, this leads to high bee and queen death, along with the public safety risk of someone being stung who may be deathly allergic. Furthermore, federal regulations and provincial regulations are muddy on the exact definition of a "commercial vehicle" and which rules and jurisdiction an out of province farm truck falls under. Specifically, this refers to the federal ELD mandate on commercial vehicles over a registered GVW of 4500kg. I'm hoping I can begin to make headway over the coming months.

Saskatchewan

Jake Berg

As chair of CHC and on behalf of the board, I would like to thank Rod Scarlett and Dr Shelley Hoover for planning and organizing BeeTech, our National conference, that was held in February in Calgary. This conference was a great success, and hopefully the CHC will host similar events in years to come.

At the BeeTech Banquet, two CHC awards were handed out. The Willy Baumgartner Memorial Award was presented to Dr. Rob Curry of Manitoba and the Fred Rathje Memorial Award was presented to Tim Wendell of Saskatchewan. It was a great honour to present Tim this award as he is a long time friend and mentor. I really didn't

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believe we would be able to keep it a secret but we succeeded and Tim was actually speechless for a few moments after receiving the award. It is fantastic that we have another recipient of the Fred Rathje Memorial Award from Saskatchewan. Congratulations to Dr. Rob Curry and Mr. Tim Wendell!!

Just a reminder that the online training for apiary workers is now available on the CHC Website; https://honeycouncil.ca/online-training-for-apiary-workers/

The training is available in English, French and Spanish and costs $75 for the full program.

It is still early spring in Saskatchewan so there hasn't been many reports yet on bee mortality over the winter, but from the few I have heard from Saskatchewan, things are looking really good. But I've also heard that the varroa mite counts may be slightly elevated this spring. As spring arrives to your part of the nation, good luck with your bees and happy beekeeping.

Alberta

Ryan Hicks

Hello, my name is Ryan Hicks and I am the newly appointed CHC director from Alberta. Our operation is located in McLennan, a part of the Peace Country in northern Alberta. We are a family run operation running around 10000 hives along with my father, Grant, and brother, Scott. I would like to take a minute to thank Ron Greidanus for his tireless efforts as one of the Alberta directors for the last number of years. He leaves big shoes to fill, and his hard work and dedication were appreciated.

My inaugural meeting with the CHC came in Calgary at BeeTech. The reviews around BeeTech were all positive and it was great to see beekeepers from around the country. One of the best aspects of the event, in my opinion, were the beekeeper panels. We all face the same challenges and opportunities within the industry, and it's nice to see how others deal with the inevitable curveballs, whether it be queen production, nuc production, mite control, bee health, or any number of other issues. Congratulations to Rod for organizing this event, and we look forward to similar events in the future.

In replacing Ron Greidanus as Stock Replacement Committee Chair, I began the process of assembling a committee and hope to meet in the near future to discuss the Tropilaelapse mite, the impending release of the U.S. risk assessment, domestic nuc availability, as well as package availability and timing. Packages have been arriving in Canada for close to a month, and I haven't heard of any issues, so that's a positive. Access to healthy, thriving bees is important and can mean the difference between a rebuilding year having the ability to capitalize on the elusive bumper crop!

We've experienced as warm of a March as I can recall, and guys have had a chance to take a look and see how the bees look coming out of winter. It seems like a bunch of reports in and around the 20% loss coming in, although some are seeing higher. It does seem like the province as whole will be ok, and with the early start some have had, mite treatments and pollen patties are on early. Hopefully things continue in a straight line, and we're looking at big hives in time for honey production!

British Columbia

Jeff Lee

This is my first report for Hivelights. In late January our long-time CHC director, Stan Reist, suffered a stroke and was put out of action. He is well down the recovery road and is making remarkable progress. But as you can imagine, he is unable to carry out his duties as a director. Heather Higo, the president of the B.C. Honey Producers Association, asked me to fill in until Stan is either well enough to resume his duties, or until our board elections in October.

For those of you who do not know me, I have been a board member of the BCHPA since 2014, either as a first or second vice-president. My wife Amanda and I are commercial operators based in Creston, B.C., in the south-east corner of the province. We run between 400 and 600 colonies, and we pack and sell our honey and other hive-related products to about 40 stores under two labels, Honey Bee Zen and Swan Valley Honey. We are CFIA licensed. We have been beekeepers for nearly 15 years. We are both former members of the media world; Amanda was an advertising executive. I was a long-time political and investigative reporter for the Vancouver Sun.

The issues facing beekeepers in British Columbia are likely no different than those facing folks in other provinces; hive health, competency, regulation, access to products, services and medications, and varroa, varroa, varroa. But we're not in the same category as, say, our next-door neighbour, Alberta, which produces 40% of Canada's honey through about 1,600 beekeepers and nearly 300,000 hives. BC accounts for about five per cent of the honey in Canada, but has the largest number of registered beekeepers, at about 4,500, and only about 60,000 hives.

Our varied and broken geography, limited agricultural land base (as compared to the Prairie provinces) and the density of urbanization in the otherwise fertile Fraser Valley around Metro Vancouver accounts for those numbers.

And yet beekeepers in British Columbia have as many issues and concerns as our friends to the east. Here are a few.

We now are, if you accept the pessimistic view of our provincial apiculture division, likely a permanent home to an infestation of small hive beetle. The first few adults were dis-

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covered in 2015 in the Lower Mainland. Last year we had positive finds in at least seven apiaries, including some juveniles. Our province did not institute a limited quarantine until this year. He believes we got this African pest from migratory US beekeepers who brought hives to pollinate the Washington blueberry crop just on the other side of the border.

This is the same route that allowed beetles to invade Ontario, Quebec and eastern provinces. At our recently-concluded spring conference, we were treated to a map that shows that every province except Saskatchewan now has had positive finds of SHB. Saskatchewan has not, in large part because of its rigorous transport and hive inspection regulations.

This spring and summer BC's apiculture division will mount a more robust inspection protocol for areas where hive beetle has been found, and at this writing beekeepers within the quarantine zones are not allowed to move hives or sell nucs until they have been declared beetle-free for at least two weeks.

One of the other major issues affecting BC beekeepers is the significant damage done to the soft tree fruit industry as a result of a mid-January deep freeze. In the preceding month the weather had moderated, and soft fruit trees had started to bud early. The dip in temperatures killed a reported 90 per cent of buds on cherries, peaches, apricots and plums in both the Okanagan and Creston valleys, the province's two primary tree fruit-producing regions. The freeze also killed upwards of 100 per cent of wine grape buds in the Okanagan.

As a result, many orchards have cancelled pollination services with their beekeepers. This is resulting in a loss of hundreds of thousands of dollars in pollination income, both to resident BC beekeepers and to a number of large-scale Alberta and Manitoba operations that support the industry here.

The BCHPA is quantifying the losses and is considering asking the province to include affected BC beekeepers in the disaster recovery funding it is making available to orchardists and wine grape growers.

BC has experienced a relatively mild winter, with below-average snow packs in many regions. This is raising significant concerns about the potential for a drier spring and summer, and the resulting potential for wildfires. Some parts of BC are now experiencing drought conditions, and this does not bode well for agriculture.

In recent years large areas of the province have been razed by fire, affecting honey production. Heavy smoke conditions for weeks at a time have also affected colonies. So beekeepers are justifiably worried about what this year will bring.

One area of concern that BC beekeepers have been focussing on is on stock replacement and production. The BCHPA has been actively promoting the benefits of locally-produced stock, and of trying to get off the imported-package track for most beekeepers. It is also promoting the development of a robust nuc-production industry that can help backfill some of the needs of beekeepers in Alberta and points east.

We know we can't significantly swing the dial at this point, given that Alberta operators import tens of thousands of packages annually to replace winter losses. But we're trying to help reduce the demand for imports and get off this unhealthy merry-go-round.

Look to this column for quarterly updates on what BC beekeepers and the province's deep research community are doing to contribute to Canada's honey industry.

Bee Maid

Marina Oirik

Bee Maid Honey Limited Scholarship and Research

In 2004, the Fiftieth Anniversary Scholarship was created to commemorate the formation of Bee Maid Honey Limited in 1954. The Scholarship recognizes and encourages children and grandchildren of members and staff as they enter post-secondary study. The Scholarships are designed to stimulate the pursuit of excellence by rewarding outstanding achievement. The scholarships are also intended as a process by which young people can bring fresh ideas and attitudes to the Bee Maid family.

Bee Maid Honey Limited is pleased to announce that the winners for the 2024 Fiftieth Anniversary Scholarships are Mya Johnston from Winnipeg, Manitoba and Haley Revega from Sherwood Park, Alberta. Mya is planning to attend the University of Winipeg to pursue a Bachelor of Kinesiology. Haley is registered to start a Bachelor of Science of Engineering at the University of Alberta. Congratulations to them both and we wish them the best of luck in their studies.

The Bee Honey Research fund was established to support research in any area of apiculture, hive health or honey production. A call for proposals was sent out in late 2023 and the committee was pleased to see so many high-quality applications this year. The Bee Maid Honey Research Committee is pleased to announce the following project was selected for funding assistance.

- "Evidence-based AFB risk management for commercial beekeepers in Manitoba" conducted by Dr. Elemir Simko and Dr. Sarah Wood from the University of Saskatchewan.

Canadian National Beekeeping Convention and Tradeshow

On February 9th & 10th, the Canadian Honey Council (CHC) and the Canadian Association of Professional Apiculturists (CAPA) organized the first ever Bee Tech – a Canadian national beekeeping convention and tradeshow. With over 250 registrants, the event brought together researchers, producers, and industry representatives from various parts of Canada and the world. The convention featured a diverse group of over 50 presenters which included 6 panels that engagingly discussed important areas of beekeeping. Presentation topics ranged from honey bee diseases and pests, Tropilaelaps mites, and Varroa mite treatments, to blueberry and canola pollination, honey bee nutrition, honey prices, queen health/production, and stock replacement. The trade show showcased numerous exhibitors and research posters, offering attendees the opportunity to engage with businesses and stay updated on the latest research findings. The banquet on the first night was a sold-out affair that included an entertaining talk from Jamie Macoun and locally crafted drinks using Alberta honey from Fallentimber Meadery and Blindman Brewing. Bee Tech proved to be an excellent platform for networking on a national scale, fostering valuable connections, insightful conversations, and significant learning experiences. Thank you to all the attendees, speakers, and vendors that shared their knowledge and expertise, and to Shelley Hoover and Rod Scarlett for organizing this informative event!

Some highlights from the presentations include:

Keynote Speaker:
Dr. Jeff Pettis
President of Apimondia Research Scientist and Consultant, Pettis and Associates LLC

Beekeeping in a Changing World: Fires, Floods, and Opportunities? – Dr. Pettis opened his presentation by stating that "we learn beekeeping from a mentor, but

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we have to be able to adapt [our learnings] as the world changes". He discussed how climate change has led to unusual weather patterns, such as extreme temperatures, unpredictable rainfall, and escalating natural disasters, all of which directly impact beekeepers and their bees. Additionally, he highlighted some indirect effects of the changing world like reduced honey production and broodless periods, which pose challenges for beekeepers in the long run. Dr. Pettis pointed out that traditional calendar-based beekeeping practices are becoming less reliable due to shifting blooming times caused by climate change. He also explained how research on the effects of rising CO2 levels has shown to have a negative effect on the concentration of protein in pollen changing the plant quality. He stressed that we are not doomed and that beekeepers can adapt by closely monitoring the needs of their bees in this evolving landscape. Most importantly Dr. Pettis touched on the fact that no beekeeper is alone in facing these challenges. He reassured the audience that there are solutions available, such as technological tools like hive scales for nectar monitoring and advancements in bee nutrition to counter changes in plant quality. He concluded by emphasizing that bees are constantly responding to the environment around them, and it is important for beekeepers to then respond to their bees.

Maggie Gill
Regional Bee Inspector for Wales at the National Bee Unit

Tropilaelaps surveillance, distribution, prevention, and management - All the way from Wales, Maggie Gill delivered two highly informative talks. Drawing from her research on the Tropilaelaps mite in Thailand, she shared valuable insights on how beekeepers can effectively monitor the spread of these mites. Maggie showcased an elaborate map tracing the emergence and expansion of Tropilaelaps mites into new geographical regions, noting South Korea's significance due to its lower temperatures than previously believed survivable by the mites. Additionally, she emphasized that the primary transmission route is likely through ports, where the mites can hitch a ride on bees transported by shipping containers and boats. Maggie explored various traditional methods of monitoring, such as the bump method, alcohol shakes, sticky boards, and sugar shakes. Each method was discussed in detail, highlighting the challenges faced when dealing with Tropilaelaps mites. The bump method was disruptive to hives, alcohol washes proved ineffective at separating the mites and sticky boards were not practical due to the mites' size. She concluded that the sugar shake emerged as the most successful monitoring technique, as it was able to accurately represent the number of mites per shake.

National Bee Unit inspections program and Asian hornet prevention – The Asian hornet has been found in the UK, leading regional inspectors to implement an active reporting and tracking system. Maggie explained that with the hornets' spread, more stringent measures were required to prevent their proliferation, as they pose a threat to honey bee colonies. The system relies on public reporting, where public awareness prompts the reporting of possible Asian hornet sightings. Subsequently, the inspection team reviews all reports and, upon confirmation, sets up bait stations in the reported area. Hornets visiting these bait stations are monitored with an app that automatically traces their flight path. By analyzing multiple flight paths and deploying additional bait stations, inspectors can pinpoint the nest location and eliminate it. Interestingly, Maggie mentioned that all nests are collected and examined to determine specific characteristics like lineage and the reproductive stage, aiding in determining if the hornets have established themselves in the UK.

CONGRATULATIONS TO THE CAPA STUDENT MERIT AWARD WINNERS:

Rhonda Thygesen
Berry Sad Bees: Assessing Honey Bee Health Stressors in Highbush Blueberry with Proteomics

Courtney MacInnis
How honey bees respond to infection with Vairimorpha (Nosema) ceranae and Lotmaria passim

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CONGRATULATIONS TO DR. ROB CURRIE

CHC Willie Baumgartner Memorial Award

CAPA Outstanding Service Award

CAPA Honorary Membership

The Manitoba Beekeepers' Association (MBA) would like to nominate Dr. Robert William Currie for the Canadian Honey Council Willy Baumgartner Memorial Award for his outstanding contributions to honey bee research in Manitoba, Canada, and internationally.

Dr. Currie's career started as a provincial student honey bee inspector in the mid 1970's where he developed a keen interest in bees. He went on to obtain graduate degrees at the University of Manitoba and completed post doctoral work at Simon Fraser University. In 1991, he accepted a position as bee researcher at the University of Manitoba and for the last 10 years of his career, served as the Head of the Department of Entomology. Dr. Currie has also held various executive roles with the Canadian Association of Professional Apiculturists.

Dr. Currie's career has revolved around applied research to help improve honey bee health. He continued the work of his predecessors on wintering techniques and fall treatments of diseases and pests to help improve wintering success of healthy colonies. His early work on the biology of varroa helped the industry understand this new mite pest. Dr. Currie's pioneer work on Formic Acid to control varroa mites lead to the development of treatment criteria, and he has been instrumental in improving our understanding of the impact of Nosema on wintering in Canada. Throughout his career, Dr. Currie was involved in collaborative research projects with other researchers while often doing the majority of the field work. Early on in his work, Dr. Currie was involved in determining syrup quality. His development of testing criteria for quality and its effect on the longevity of bees continues to be the standard today, yet he still works diligently to improve that standard through his current field trials.

Dr. Currie has written and contributed to 84 peer reviewed articles and was the major contributor to the chapter of Wintering in the updated version of the "Hive and the Honey Bee". He also contributed to the writing of "Beekeeping in Western Canada" as well as the CAPA Honey Bee Diseases & Pests manual. Throughout his career, Dr. Currie has taught the U of M "Beekeeping for the Hobbyist" course which has trained hundreds of new beekeepers and has guest lectured at various beekeeping courses throughout the country and internationally.

Dr. Currie has presented at countless Provincial and Regional Association conferences as well as internationally, and has long been an advisor to the Manitoba Beekeepers Association.

The MBA board fully recognizes the importance of Dr. Currie's influence on beekeeping in Manitoba and across Canada, and considers him well deserving of this award from the Canadian Honey Council.

Nominated by Manitoba MBA Board of Directors

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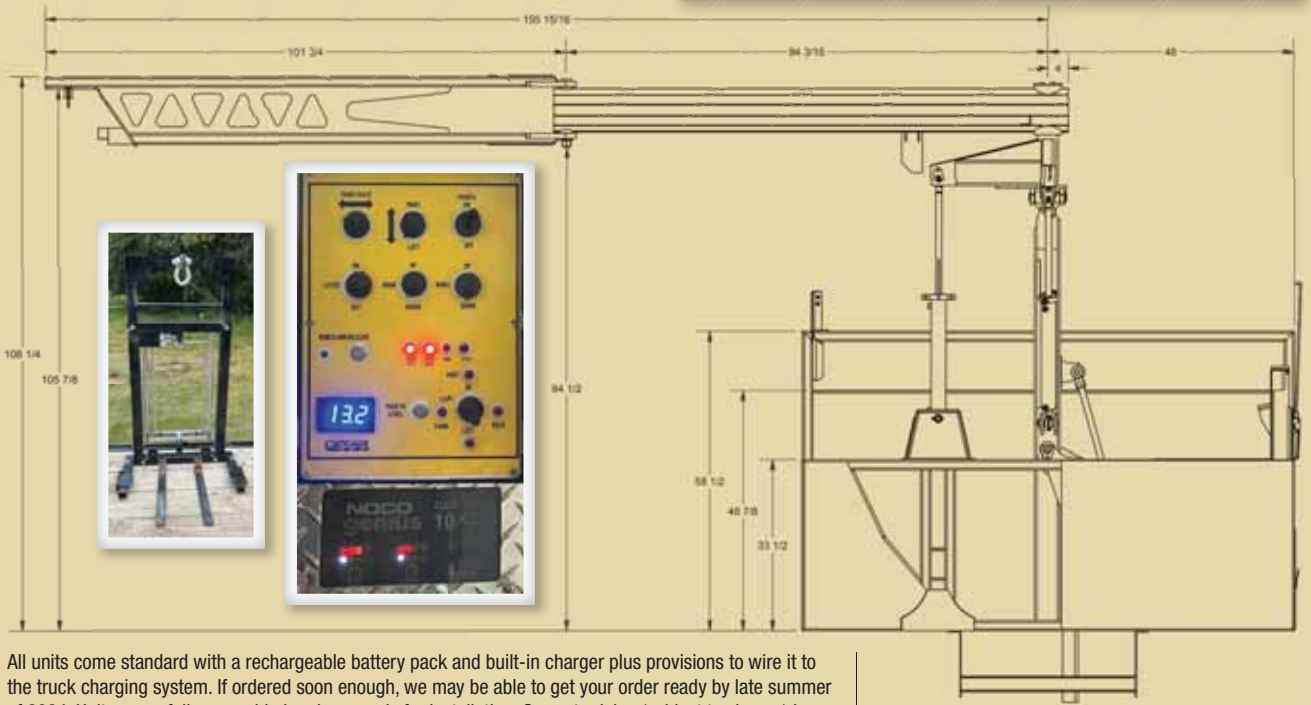

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CONGRATULATIONS TO TIM WENDELL

CHC Fred Rathje Memorial Award

Throughout his long and successful beekeeping career, Tim has been dedicated to improving the beekeeping industry. He has always graciously volunteered his time and efforts to serve beekeeping in Saskatchewan and beyond.

Tim has always been generous, sharing ideas and experiences with other beekeepers. With his ample experiences and fearless willingness to try new things, he has vast amounts of knowledge to share. He has spent many hours in meetings, giving presentations and in person passing on the successful ideas and techniques to help other beekeepers. This knowledge has helped to ensure a progressive, positive industry in Saskatchewan and beyond.

Tim has also been a very active member of the Saskatchewan Beekeepers Association (SBA). He was president for 8 of the 14 years that he spent on the SBA board of directors. During his time on the SBA, he was a driving force behind changes in the industry. He was instrumental in addressing many challenges the beekeeping industry faced over the years. These challenges include optimizing business risk programs like the Net Income Stabilization Account (NISA) to make the program work for beekeepers, representing Saskatchewan on national committees and working groups like importing queens from the United States, and so much more.

Honey bee research has always been near and dear to Tim. He has donated money, time, effort, bees and equipment; however, while he was president, Tim realized that more was needed, and what was needed was a commission. Tim led the initiative but worked with many others to establish the Saskatchewan Beekeepers Development Commission (SBDC). The main goals of the commission are to better support promotion of the industry and research. The legacy of this commission has been vast, enhanced support of many research programs, establishing the Saskatchewan Tech Adaptation Team to work directly on applied research projects, and more have all been offshoots from the implementation of the SBDC.

The achievements highlighted in the nomination are just the tip of the iceberg. Tim has had a long history of service to the bee industry. He has volunteered endless amounts of time, effort, and resources for the betterment of beekeeping in Canada. Tim is an excellent candidate and is very deserving of the Fred Rathje Memorial Award.

Nominated by Stan Reist

Canadian Association of Professional Apiculturists

Statement on Honey Bee Wintering Losses in Canada For 2023

Prepared by CAPA National Survey Committee and Provincial Apiarists (in alphabetical order): Gabrielle Claing (co-chair), Sabrina Ellsworth, Julie Ferland (chair), Maria Janser, Melanie Kempers, Paul Kozak, Chris Maund, Cameron Menzies, Derek Micholson, Nuria Morfin, Samantha Muirhead, Medhat Nasr, Steve Pernal, Jason Sproule, Paul van Westendorp and Geoff Wilson

SUMMARY

The Canadian Association of Professional Apiculturists (CAPA) and Provincial Apiarists coordinated the annual honey bee wintering loss report for 2022-2023. As in previous years, the survey consisted of harmonized questions based on the national beekeeping industry, with Provincial Apiarists collecting survey data across all provinces. Respondents collectively wintered 370,722 honey bee colonies across Canada, representing 48% of all colonies operated in the country during 2022-2023. The national winter loss, including non-viable bee colonies, was 32.2% with provincial losses ranging from 11.7% to 46.2%. The national colony loss reported in 2023 is higher than the average of annual losses reported between 2007-2022 (27.0%). The higher-than-normal winter loss in 2021-2022 resulted in 52 548 or 6.4% fewer colonies operated by beekeepers during 2022-2023 than the previous year. Despite these recent losses, Statistics Canada reports that the total national colony count increased by 30% from 2007 to 2022, through the hard work and expense of beekeepers replacing dead or weak colonies.

Each province ranked the top four suspected causes of colony losses as reported by respondents. The reported causes were fairly consistent this year. In 2022-23, impacts from varroa and associated viruses, weak colonies in the fall, starvation and weather/climate were the most cited factors for winter loss across the country.

Beekeepers also responded to questions about the management of four serious parasites and pathogens to beekeeping: Varroa destructor, Nosema spp., American Foulbrood (Paenibacillus larvae) and European Foulbrood (Melissococcus plutonius). Beekeepers in most provinces reported that they monitored for varroa mites, however a large proportion of beekeepers in some provinces neglected to do so, depending upon the time of the year. The most reported varroa treatments were: amitraz, formic or oxalic acid treatments in early season; formic or oxalic acid in mid-season; and oxalic acid, formic acid or amitraz at the end of the season. Canadian beekeepers treated their colonies to manage the risk of nosemosis, as well as American foulbrood and European foulbrood. Across the country, registered antibiotics were the most commonly used treatments, with methods and timing of applications varying among provinces.

Provincial Apiarists, technology-transfer personnel, and researchers have been working with beekeepers across Canada to encourage them to monitor for honey bee pests, especially varroa mites, brood diseases, and nosema, and to adopt recommended integrated pest management practices to keep these pests under control. CAPA members continue to collaborate through working groups encompassing diverse stakeholders to educate, develop and improve management options for beekeepers to keep healthy bees, and manage winter losses in Canada.

Disclaimer and Credits: Survey data were supplied by Provincial Apiarists (listed in Appendix A). Data were then compiled, further analyzed and an initial draft of this report written by Geoff Wilson, Gabrielle Claing, Julie Ferland, Medhat Nasr and Maria Janser, with subsequent review by the CAPA National Survey Committee.

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INTRODUCTION

For over a decade, many countries, including Canada, have surveyed beekeepers and reported overwintering mortality rates of honey bee colonies and management practices used for varroa mites, nosema, American foulbrood and more recently, European foulbrood. The Canadian Association of Professional Apiculturists (CAPA) has worked with the Provincial Apiarists on surveying beekeepers for winter losses of honey bee colonies and possible causes of bee mortality in Canada since 2007. The objective of this national report is to consolidate provincial honey bee data across the country based on information collected through harmonized survey questions. The possible causes of winter loss, as reported by beekeepers, and information on pest surveillance and control are collated herein. The survey responses aid in identifying gaps in current management systems, developing strategies to mitigate colony losses, and provide guidance for improving bee health, biosecurity practices, and industry sustainability.

METHODOLOGY

In 2023, the Provincial Apiarists and the CAPA National Survey Committee members reviewed the questions used in the 2022 survey and made necessary revisions. Examples of these revisions include the addition of new treatments or strategies for beekeepers to manage pests and diseases as they are developed over the years, and adjustments to the questions regarding foulbrood and use of antibiotics. The result was an updated harmonized set of questions that was used in the 2023 survey (Appendix B). These questions took into account the large diversity of beekeeping industry profiles, management practices and seasonal activities within each province. Some provinces also included supplementary regional questions in their provincial questionnaire. The results of these regional questions are not included in this report but are discussed in the text. Further questions about results from a specific province may be accessed by contacting the Provincial Apiarist of the province in question (Appendix A).

Beekeepers that owned and operated a specified minimum number of colonies (Table 1) were included in the survey. The survey reported data from full-sized producing honey bee colonies that were wintered in Canada, but not nucleus colonies. Thus, the information gathered provides a valid assessment of honey bee losses and commercial management practices.

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

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

The colony loss and management questionnaire as provided to producers using various methods of delivery including mail, email, online and a telephone survey; the method of delivery varied by jurisdiction (Table 1). In each province, data were collected, summarized and analyzed by the Provincial Apiarist. All reported provincial results were then analyzed and summarized at the national level. The national percent winter loss was calculated as follows:

$$\text{Percentage Winter Loss} = \left(\frac{\text{Sum of the estimated total colony losses per province in spring 2023}}{\text{Sum of total colonies in operation in each province for 2022}}\right) x\ 100$$

RESULTS

Response rates and global mortality

Throughout Canada, a total of 520 beekeepers responded to the 2023 survey. These respondents represented 40% of all the surveyed beekeepers. Respondents operated 48% of all registered colonies that were operated in all provinces in the 2022 season. The rate of participation and number of colonies continues to represent a substantial proportion of the commercial beekeeping industry in Canada.

The survey delivery methods, size of beekeeping operations and response rate of beekeepers for each province are presented in **Table 1**. It is important to note that the total number of colonies operated in a province reported by this survey may vary slightly from Statistics Canada's official numbers. In some provinces, the data collection periods for the provincial database and the Statistics Canada report are at different times of year.

Survey results showed that the national level of wintering loss, including non-viable colonies, was 32.2% with individual provinces ranging from 11.7% to 46.2%. The overall winter loss for 2022-2023 was 13.3% lower than the 2021-2022 loss at 45.5% which was the highest winter loss rate for this survey in the history of this survey. The level of winter loss varied from

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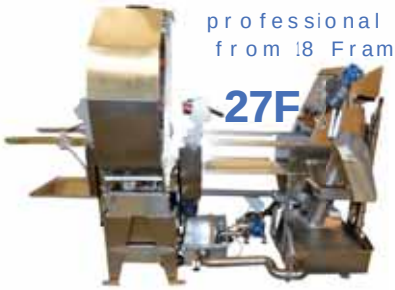

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Table 1. Survey parameters and honey bee colony mortality (2022-2023) by province

Province	Total number of colonies operated in 2022	Estimated number of colonies lost based on the estimated provincial winter loss	Type of data collection	Number of beekeepers targeted by survey	Number of respondents (% of participation)	Minimal size of beekeeping operations targeted by survey (# of colonies)	Number of respondents' colonies that were wintered in fall 2022	Number of respondents' colonies that were alive and viable in spring 2023	Percentage of surveyed colonies as a proportion of the total number of colonies in the province	Provincial Winter Loss including Non-viable Colonies
Newfoundland and Labrador	473	55	Email	70	25 (36%)	1	223	197	47%	11.7%
Prince Edward Island	6 000	2 772	Email	50	24 (48%)	1	4 702	2 529	78%	46.2%
Nova Scotia	28 670	4 473	Online	46	20 (43%)	50	18 349	15 479	64%	15.6%
New Brunswick	13 406	3 244	Email, telephone	29	21 (72%)	50	10 328	7 833	77%	24.2%
Quebec	57 892	9 436	Online	129	77 (60%)	50	34 016	28 461	59%	16.3%
Ontario	102 562	36 615	Online, telephone	208	74 (36%)	50	35 304	22 690	34%	35.7%
Manitoba	103 841	31 152	Email, online	173	67 (39%)	50	49 599	34 718	48%	30.0%
Saskatchewan	102 000	29 376	Online	124	64 (52%)	50	31 879	22 686	31%	28.8%
Alberta	286 534	111 748	Online	169	78 (46%)	100	171 342	104 529	60%	39.0%
British Columbia	64 000	17 408	Online	312	70 (22%)	20	14 980	10 899	23%	27.2%
Canada	765 378	246 279		1 310	520 (40%)		370 722	250 021	48%	32.2%[1]

[1] This number is the total loss calculated over all colonies in Canada.

province to province, and among beekeeping operations within each province. In general, all provinces reported lower mortality in 2022-2023 than the previous year, the exception being Nova Scotia and New Brunswick who reported slightly higher mortalities compared to the previous year. Prince Edward Island and Alberta reported the highest winter losses in 2023 (46.2% and 39.0%, respectively), with weak colonies in the fall and varroa and associated viruses, respectively, cited as the most frequent causes of colony mortality in those provinces. The lowest reported winter loss in 2023 was by Newfoundland and Labrador (11.7%), where varroa mites have not been reported.

[Note: Ontario had one result (a high loss from one large commercial beekeeper) that had a major impact on the overall final winterloss for Ontario. Without this one response Ontario's winterloss statistic would be 16.7%. However, based on the established methodology the final winterloss statistic is 35.7% for Ontario.]

For detailed information about the winter losses in each province, please contact the office of the Provincial Apiarist directly (see contact information in **Appendix A**).

Overwintering methods

Overall, 72% of the colonies owned by respondents were wintered outdoors in fall 2022, with remaining colonies (28%) wintered indoors (**Table 2**). The highest percentage of colonies wintered indoors was in Nova Scotia (65%) and Manitoba (60%), followed by Quebec (58%) and Ontario (49%), whereas Prince Edward Island had no colonies wintered indoors.

Nationally, the mortality rate was the same, 32.5%, for colonies wintered outdoors or indoors. The mortality rates for each province are presented in **Table 3**. Contributing factors as cited by beekeepers

Beekeepers were asked to rank possible contributing factors to colony mortality. These responses are summarized in **Table 4**. When all causes in the top 4 are compiled regardless of their ranks, impacts from varroa and associated viruses, weak colonies in the fall, starvation and weather/climate were considered the most important factors for winter loss across the country in 2023.

Varroa and associated viruses was reported as one of the top four contributing factors to winter colony loss in eight provinces. While varroa mites and their

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Table 2. Overwintering method by province as cited by the respondents of the 2022-2023 winter loss survey

Province	Outdoors		Indoors	
	Number of colonies	Percent (%)	Number of colonies	Percent (%)
NFL	213	96	10	4
PEI	4 702	100	0	0
NS	6 373	35	11 976	65
NB	5 674	55	4 654	45
QC	14 134	42	19 882	58
ON	17 988	51	17 316	49
MB	19 965	40	29 634	60
SK	30 166	95	1 713	5
AB	153 134	89	18 208	11
BC	14 653	98	237	2
Canada	267 002	72	103 630	28

Table 3. Indoor and outdoor wintering mortality as cited by the respondents of the 2022-2023 winter loss survey

Province	Outdoors			Indoors		
	Total number of colonies in fall 2022	Total number of viable colonies in spring 2023	Percent of losses of colonies (%)	Total number of colonies in fall 2022	Total number of viable colonies in spring 2023	Percent losses of colonies (%)
NFL	213	191	10	10	4	60
PEI	4 702	2 529	46	0	0	
NS	6 373	5 295	17	11 976	10 184	15
NB	5 674	4 466	21	4 654	3 367	28
QC	14 134	11 184	21	19 882	17 277	13
ON	17 988	14 976	17	17 316	7 714	55
MB	19 965	14 804	26	29 634	19 914	33
SK	30 166	21 818	28	1 713	868	49
AB	153 134	94 143	39	18 208	10 386	43
BC	14 653	10 697	27	237	216	9
Canada	267 002	180 103	32.5	103 630	69 930	32.5

impact on honey bee health are still a serious issue for Canadian beekeepers, survey results indicate that many beekeepers are monitoring and treating for varroa using multiple treatments per year. Unfortunately, some individual producers monitored and treated for varroa too late, by then, varroa levels were already at levels where damage to the colony had occurred. This results in wintering bees being less healthy from the impacts of varroa and associated viruses. Monitoring varroa mite levels is becoming increasingly important especially as environmental factors such as climate and weather can impact colony growth as well as the efficacy of miticides used by beekeepers. Moreover, the emergence of resistance to Apivar® impacts the efficacy of this product. With less efficacy, the ability of mite populations to rebound back to damaging levels is increased. In addition, reinfestation of varroa mites from neighbouring beekeeping operations may also occur after a treatment has been applied. Therefore, monitoring varroa levels frequently, before and after treatment, testing for Apivar® resistance, selecting suitable effective treatments and verifying treatment efficacy are all necessary elements of an effective management strategy for this economically important pest.

Weak colonies in the fall were also among the top four reported contributing factors to winter losses in eight provinces. While there can be many causes for weak colonies (e.g., lack of nutrition and late establishment of colonies), poor queens can result in weakened colonies prior to winter, leading to an insufficient number of bees to survive. Poor queens were also commonly reported as a top four contributing factor to winter losses. If a queen becomes infertile or dies during the winter, the colony will also perish as there is no opportunity for the beekeeper to replace the queen or for the colony to naturally re-queen itself. Poor and failing queens may be the result of many factors including: inadequate rearing conditions, poor mating weather, reduced sperm viability, queen age, diseases or exposure to pesticides within the hive or from the environment (Amiri et al., 2017; Pettis et al., 2004; Pettis et al., 2016; Williams et al., 2015).

Unpredictable weather during the late summer of 2022, and winter and early spring of 2023 was most commonly cited as the first cause of winter losses across Canada. In the prairie provinces (Manitoba, Saskatchewan and Alberta), dry weather during the summer resulted in an early end to the honey and pollen flows possibly resulting in lack of nutrition for the development of wintering bees. During the winter, cold temperatures across the country had the potential to negatively affect wintering colonies. Additionally, colony build-up was hindered by a cold spring in some regions that caused surviving colonies to dwindle, greatly increasing the number of non-viable colonies.

Starvation was reported as a cause of winter mortality by beekeepers in some regions in Canada. Starvation can result from the inability of bees in weak colonies to store enough food during the fall, the inability of bees to move to resources within the hive during winter, the rapid consumption of stored food because of early brood production or insufficient feed provided by the beekeeper in the fall or spring. During 2022-23, starvation may also have been associated with increased consumption of stored honey or sugar syrup during the extended cold weather in the spring of 2023 in some areas.

Some beekeepers reported that they did not know why their colonies perished, although this answer was not identified among the top four causes for losses among most provinces. Inability to identify a possible cause for colony mortality may be associated with lack of applying best management practices including monitoring for pests, diseases and other general colony health parameters during the season, or a multitude of underlying problems that cannot be identified without the assistance from specialists.

Reported top causes of winter loss for operations exceeding 25% mortality are presented in Table 5. Poor queens, impacts from varroa and associated viruses, weather/climate, and weak colonies in the fall were equally cited as the top contributor to winter loss in operations with greater than 25% loss. Overall, there

was more variability in reported causes of winter loss among provinces for these operations, than those reported in **Table 4**.

Integrated Pest Management

Table 4. Top four ranked possible causes of honey bee colony mortality by province, as cited by beekeepers who responded to the 2022-2023 winter loss survey

Province	Ranked 1st the most	Ranked 2nd the most	Ranked 3rd the most	Ranked 4th the most
NL[a]	Weather/Climate	Weak colonies in the fall	Starvation	Poor queens
PEI	Weak colonies in the fall	Varroa and associated viruses	Weather/Climate	Starvation
NS	Weak colonies in the fall	Starvation	Weather/climate	Don't know
NB	Weather/Climate	Starvation	Don't know	Varroa and associated viruses
QC	Varroa and associated viruses	Poor Queens	Weak colonies in the fall	Starvation
ON	Varroa and associated viruses	Starvation	Weak colonies in the fall	Other
MB	Poor queens	Starvation	Weak colonies in the fall	Varroa and associated viruses
SK	Weather/Climate	Poor queens	Weak colonies in the fall	Varroa and associated viruses
AB	Varroa and associated viruses	Poor queens	Weather/climate	Nosema
BC	Weather/Climate	Weak colonies in the fall	Varroa and associated viruses	Poor queens

Varroa mites have not been reported in Newfoundland and Labrador.

Integrated Pest Management (IPM) has become widely used to maintain healthy honey bees. To successfully manage bee health, beekeepers must identify and monitor pests and diseases to take timely action in accordance with approved methods. This survey focused on asking beekeepers questions about their management of four serious threats that may impact bee health, survivorship and productivity (**Appendix B**).

Varroa monitoring

The varroa mite continues to be considered by beekeepers and apicultural specialists as one of the main causes of honey bee colony mortality.

During the 2022 beekeeping season, a large proportion of surveyed beekeepers monitored varroa mite infestations at least once a year, with some monitoring more than three times per year (**Table 6**). Alcohol washes, sugar shakes or ether rolls using 300 bees per colony was the preferred method of detection in all provinces except Quebec, where beekeepers favoured the use of sticky boards. The frequency of use for the alcohol wash technique ranged from 48% in Québec to 82% in Manitoba. The frequency of use for the sticky board method ranged from 3% in Saskatchewan to 67% in Quebec. Some beekeepers used both sticky boards and alcohol wash methods to evaluate levels of mites.

Table 5. Top four ranked possible causes of bee colony mortality by province, as cited by beekeepers who reported greater than 25% losses in the 2022-2023 winter loss survey

Province	Ranked 1st the most	Ranked 2nd the most	Ranked 3rd the most	Ranked 4th the most
NL[a]	Weather	Starvation	Weak colonies in the fall	Poor queens
PEI	Weak colonies in the fall	Varroa and associated Viruses	Weather/Climate	Starvation
NS	Other (shrews)	Poor queens	Weak colonies in the fall	Don't know
NB	Weather/Climate	Starvation	Don't know	Poor queens
QC	Varroa and associated viruses	Other	Don't know	Weak colonies in the fall
ON	Poor queens	Weather	Starvation	Varroa and associated viruses
MB	Poor queens	Nosema	Varroa and associated viruses	Weak colonies in the fall
SK	Weather/climate	Varroa and associated viruses	Poor queens	Weak colonies in the fall
AB	Varroa and associated viruses	Weather/climate	Poor queens	Nosema
BC	Don't know	Don't know	Don't know	Don't know

[a] Varroa mites have not been reported in Newfoundland and Labrador.

Table 6. Varroa monitoring methods as cited by the respondents of the 2022-2023 winter loss survey

Province	Beekeepers screening for varroa mites (%)				
	Technique		Frequency		
	Mite fall/sticky boards	Alcohol wash (or sugar shake/Ether roll)	Once a year	Twice a year	Three times a year
NL[a]	NA[b]	NA	NA	NA	NA
PEI	6	59	12	18	29
NS	20	55	20	20	25
NB	38	62	76	43	29
QC	67	48	14	19	39
ON	15	81	14	21	49
MB	16	82	84	70	33
SK	3	73	76	52	26
AB	32	79	18	37	40
BC	23	77	ND[c]	ND	ND

[a] Varroa mites have not been reported in Newfoundland and Labrador.
[b] NA: not applicable.
[c] ND: no data.

Table 7. Percentage of Beekeepers monitoring for varroa mites according to the time of year as cited by the respondents of the 2022-2023 winter loss survey

Province	Beginning of beekeeping season	Mid beekeeping season	End of beekeeping season
NL[a]	NA[b]	NA	NA
PEI	49	53	35
NS	25	60	40
NB	19	52	43
QC	59	57	51
ON	75	49	78
MB	78	45	81
SK	47	28	63
AB	76	45	91
BC	82	23	37

[a] Varroa mites have not been reported in Newfoundland and Labrador.
[b] NA: not applicable.

The timing of sampling is important. Sampling prior to treatment windows can inform beekeepers as to whether treatments are needed, while sampling after treatments determines whether applications were efficacious. The percentage of beekeepers that always sampled before treatment varied from 25% in Nova Scotia to 64% in Alberta, while beekeepers that never sampled before treatment varied from 13% in Quebec to 36% in Prince Edward Island (**Table 8**). The percentage of beekeepers that always tested after treatment applications varied from 20% in Nova Scotia to 55% in Alberta, while beekeepers that never tested post treatment varied from 14% in Alberta to 58% in Prince Edward Island (**Table 8**).

These results demonstrate that many Canadian beekeepers recognize the value of monitoring for varroa. Nevertheless, the desired goal is to have **all beekeepers regularly monitor** for varroa populations throughout the beekeeping season, particularly prior to treatment application windows, as well as after treatment to verify efficacy. Such sampling will ensure

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Table 8. Beekeepers monitoring before and after treatment (%) as cited by the respondents of the 2022-2023 winter loss survey

Province	Always before treatment	Sometimes before treatment	Never before treatment	Always after treatment	Sometimes after treatment	Never after treatment
NL[a]	NA[b]	NA	NA	NA	NA	NA
PEI	29	35	36	24	18	58
NS	25	40	35	20	30	50
NB	29	43	28	24	33	43
QC	50	37	13	24	27	49
ON	NA	NA	NA	NA	NA	NA
MB	43	37	20	31	40	29
SK	44	30	26	39	27	34
AB	64	22	14	55	31	14
BC	ND	ND	ND	ND	ND	ND

[a] Varroa mites have not been reported in Newfoundland and Labrador.
[b] NA: not applicable.
[c] ND: no data.

optimal timing of treatments and selection of the most effective treatment options for varroa control. While education and extension programs delivered to Canadian beekeepers have facilitated the adoption of recommended practices for managing varroa, ongoing innovation and improvement must continue.

Varroa control

In Canada, there are a variety of registered miticides available to beekeepers for mite control. Beekeepers are encouraged to use the most effective miticide that suits their region, season and operation. Beekeepers are also encouraged to rotate miticides to prevent the development of resistance to these products. In the current survey of bee winter losses, beekeepers were asked "what chemical treatment was used for varroa control during the 2022 season". Beekeeper's responses are summarized in Table 9. Rankings were compiled per treatment, but also per active ingredient. Since multiple commercially available treatments may use the same active ingredient, rankings may differ between treatment and active ingredient.

In the spring of 2022, the percentage of beekeepers who treated with chemical methods ranged from 43% to 99% in provinces where the mite is present. New Brunswick had the lowest percentage of beekeepers (respondents) who treated for varroa in the spring (43%) (fall treatments are more common in this province, see Table 11.) For Canadian beekeepers who did treat in the spring, the main miticide used for spring varroa control was Apivar® (active ingredient: amitraz). The second most common treatment was formic acid in various forms, followed by oxalic acid (**Table 9**). However, in Ontario, formic acid as an active ingredient (when all forms of treatments are added together) was more widely used than amitraz or oxalic acid in the Spring. From 11% to 48% of beekeepers have started to use an in-season treatment for varroa control. The number of products that can be used while honey supers are in place are limited to ensure honey quality, the primary control products are FormicPro, other formic acid applications and oxalic acid (**Table 10**). In fall of 2022, most Canadian beekeepers (71% to 99% depending on province) treated their colonies for varroa.

The main miticides used at this time of the year were oxalic acid, formic acid and Apivar® (**Table 11**). It was noted that some beekeepers used Apivar® twice in the same year in 2022, once in spring and again in fall. In some provinces, a greater number of beekeepers have started to combine Apivar® with formic or oxalic acid during the fall for keeping control of mite populations.

Few beekeepers used Apistan® (a synthetic miticide with the active ingredient tau-fluvalinate) or Checkmite+® (a synthetic miticide with the active ingredient coumaphos). Beekeepers may be wary of

Table 9: Varroa control methods and compounds used at the beginning of the season as cited by the respondents of the 2022-2023 winter loss survey

Province	% of Beekeepers who treated	Main treatment methods[a]	Main active ingredients
NL[b]	NA[c]	NA	NA
PEI	65	Apivar (amitraz), Formic Pro (formic acid), 65% Formic acid - 40mL multiple applications	Amitraz, Formic acid
NS	85	Apivar (amitraz), Apistan (fluvalinate), Oxalic acid - sublimation	Amitraz, Flumethrin, Oxalic acid
NB	43	Formic Pro (formic acid), Apivar (amitraz), Oxalic acid - sublimation	Formic acid, Amitraz, Oxalic acid
QC	99	65% Formic acid - 40mL multiple applications, Apivar (amitraz), tie between : Oxalic acid - sublimation and OA drip)	Formic acid, Oxalic acid, Amitraz
ON	84	Apivar (amitraz), Oxalic acid - sublimation, Formic Pro (formic acid)	Formic acid, Amitraz, Oxalic acid
MB	97	Apivar (amitraz), Oxalic acid - sublimation, Oxalic acid - drip	Amitraz, Oxalic acid, Formic acid
SK	97	Apivar (amitraz), Oxalic acid - sublimation, Apistan (fluvalinate)	Amitraz, Oxalic acid, Fluvalinate
AB	87	Apivar (amitraz), Oxalic acid - sublimation, 65% Formic acid - 40mL multiple applications	Amitraz, Oxalic acid, Formic acid
BC	48	Oxalic acid - sublimation, 65% Formic acid - 40mL multiple applications, Apivar (amitraz)	Oxalic acid, Formic acid, Amitraz

[a] Treatments and active ingredients listed from most used to least used.
[b] There are not any reports of the varroa mite from Newfoundland and Labrador.
[c] NA: not applicable.

Table 10: Varroa treatment methods and compounds used mid season (honeyflow) as cited by the respondents of the 2022-2023 winter loss survey

Province	% of Beekeepers who treated	Main treatment methods[a]	Main active ingredients
NL[b]	NA[c]	NA	NA
PEI	35	65% Formic acid - 40mL multiple applications, Formic pro (formic acid), Apivar (amitraz)	Formic acid, Formic acid, Amitraz
NS	20	Formic pro (formic acid), 65% Formic acid - 40L multiple applications	Formic acid
NB	33	Oxalic acid - sublimation, Apivar (amitraz), Formic Pro (formic acid)	Oxalic acid, Amitraz, Formic acid
QC	46	65% Formic acid - 40mL multiple applications, Formic Pro (formic acid), Oxalic acid - drip	Formic acid, Oxalic acid
ON	48	Formic Pro (formic acid), Other, MAQS (formic acid)	Formic acid, Oxalic acid
MB	15	65% Formic acid - 40mL multiple applications, Formic Pro (formic acid), Apivar (amitraz)	Formic acid, Amitraz, Oxalic acid
SK	11	Formic Pro (formic acid), 65% Formic acid - 40mL multiple applications	Formic acid
AB	21	Other, 65% Formic acid - 40mL multiple applications, Oxalic acid - sublimation	Oxalic acid, Formic acid
BC	ND[d]	ND	Formic acid, Amitraz, Oxalic acid

[a] Treatments and active ingredients listed from most used to least used.
[b] Varroa mites have not been reported in Newfoundland and Labrador.
[c] NA: not applicable.
[d] ND: no data.

Table 11: Varroa control methods and compounds used at the end of the season as cited by the respondents of the 2022-2023 winter loss survey

Province	% of Beekeepers who treated	Main treatment methods[a]	Main active ingredients
NL[b]	NA[c]	NA	NA
PEI	71	Oxalic acid - sublimation, Apivar (amitraz), Oxalic acid - drip	Oxalic acid, Amitraz, Formic acid
NS	75	Oxalic acid - sublimation, Formic Pro (formic acid), Oxalic acid (drip)	Oxalic acid, Formic acid, Oxalic acid
NB	95	Apivar (amitraz), Oxalic acid - sublimation), Bayvarol (flumethrin)	Amitraz, Oxalic acid, Flumethrin
QC	73	65% Formic acid - 40mL multiple applications, Oxalic acid - sublimation, Thymovar (thymol)	Formic acid, Oxalic acid, Thymol (w/or w/o other essential oils)
ON	99	Oxalic acid - sublimation, Apivar (amitraz), Formic Pro (formic acid)	Oxalic acid, Amitraz, Formic acid
MB	99	Oxalic acid - sublimation, Apivar (amitraz), Thymovar (thymol)	Oxalic acid, Formic acid, Amitraz
SK	76	Oxalic acid - sublimation, Apivar (amitraz), 65% Formic acid 40mL multiple treatments	Oxalic acid, Amitraz, Formic acid
AB	97	Oxalic acid - sublimation, 65% Formic acid - 40mL multiple treatments, Apivar (amitraz)	Oxalic acid, Formic acid, Amitraz
BC	ND[d]	Oxalic acid - sublimation, Apivar (amitraz), Formic Pro (formic acid)	Oxalic acid, Amitraz, Formic acid

[a] Treatments and active ingredients listed from most used to least used.
[b] Varroa mites have not been reported in Newfoundland and Labrador.
[c] NA: not applicable.
[d] ND: no data.

these products because of previously reported resistance to these active ingredients in Canada. Bayvarol® (a synthetic miticide with the active ingredient flumethrin) was also rarely used; there have been concerns and reports from beekeepers about the limitations in the efficacy of this product, which have been confirmed by research projects in Canadian provinces (Currie et al., 2010; Morfin et al., 2022; Olmstead et al., 2019). Thymovar® (a miticide with the active ingredient thymol) was also reported used in some provinces.

Figure 1 summarizes miticide application according

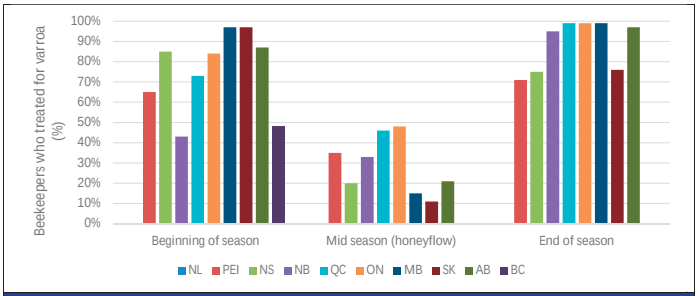

Figure 1. Percentages of beekeepers treating for varroa throughout the season as cited by the respondents of the 2022-2023 winter loss survey

to the season throughout Canada. Although almost every beekeeper treats at the end of the season in most provinces, and many do at the beginning of the season, treatments during honey flow are scarce. However, in some provinces where honey flows occur late into the season, such as Ontario or Quebec, it is necessary to suppress mite levels before the end of the season. Treatments applied mid-season must be labelled for use during honeyflow or be applied only on colonies that are not producing honey to be collected (i.e.: nuclei). Some beekeepers who only receive revenue from pollination do not produce surplus honey.

Once again, these surveys show that Apivar® is one of the most used miticides for treating varroa in Canada. Because of the repeated use of Apivar®, it is only a matter of time before the development of resistance to this miticide. Findings of decreased efficacy have been documented in some provinces. It is becoming increasingly important that beekeepers become aware of the principles associated with resistance development and the importance of monitoring the efficacy of all treatments, in particular Apivar®. This will help to mitigate abrupt and widespread failures of treatments before mites cause irreparable damage to bees. Beekeepers are also encouraged to incorporate resistance management practices such as using appropriate thresholds for treatment, following label instructions, never leaving treatments in the hive beyond the appropriate treatment period or reusing chemical strips, and alternating miticides with different modes of action in their varroa treatment programs. In addition, having a wide suite of legally registered treatments with different functional activities and methods of application available to beekeepers is critical for maintaining a sustainable successful integrated varroa management strategy in Canada.

Nosemosis management practices

Nosema is a fungal parasite that infects honey bees. *Nosema ceranae* has gradually replaced Nosema apis to become the most frequently found nosema species in Canada (Copley et al., 2012; Emsen et al., 2016). The role of *N. ceranae* affecting honey bee colony survival during winter may vary by climatic region and bee populations in Canada. Several studies from central Canada have demonstrated that *N. ceranae* did not impact winter mortality, however the parasite was found to potentially impact the development of honey bee colonies in early spring (Emsen *et al.*, 2016; Emsen *et al.*, 2020; Guzman *et al.*, 2010). Recently, a study from the Canadian Prairies (Punko 2021; Punko *et al.*, 2021) has found that Nosema can increase colony mortality. The impact of Nosema was not cited by Canadian beekeepers in this survey as a possible cause of colony mortality during the 2022-2023 winter loss survey, apart from Manitoba and Alberta operations reporting greater than 25% losses.

In the survey, beekeepers reported the use of fumagillin for the treatment of nosemosis in spring and/or in fall of 2022 (**Table 12**). The percentage of beekeepers that reported using this antibiotic varied widely from province to province. Beekeepers were

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Table 12. Antibiotic (fumagillin) and alternative treatments usage (% of beekeepers) for nosemosis as cited by the respondents of the 2022-2023 winter loss survey

Province	Beginning of season			End of season		
	Fumagillin	Other product	Main alternative products	Fumagillin	Other product	Main alternative products
NL	0	0	NA[c]	0	0	NA
PEI	0	0	NA	0	0	NA
NS	0	0	NA	25	5	Hive Alive
NB	11	0	None	24	0	None
QC	0	37	Commercial nutritional supplement, Apple cider vinegar	0	40	Apple cider vinegar, Commercial nutritional supplement
ON	5	3	ND[d]	5	0	NA
MB	25	7	Honey Bee Healthy, Tie between: Nosi-Vet, Complete Bee, Probiotic	21	13	Honey Bee Healthy, Nosi-Vet, Tie between: Hive Alive, Super DFM, Wormwood solution, Probiotic
SK	27	13	ND	30	9	ND
AB	38	3	Pro Health, Bee Optimum, Bee Vital	60	3	Pro Health, Bee Optimum, Bee Vital
BC	13	18	ND	21	0	NA

[c] NA: not applicable.
[d] ND: no data.

also asked to report all alternative treatments that they used during the spring or the fall to control nosemosis. Fumagilin-B® is the only product registered by Health Canada for nosema treatment. Any other products mentioned by beekeepers are not currently registered for the treatment of this disease, though some are marketed and used as general promoters of honey bee health. It is also worth noting that there are some regions of Canada where Fumagilin-B® is not used by most beekeepers. This may be due to the recent research in Canada clarifying the regional impacts of nosema on winterloss (Desai & Currie, 2016). Overall, nosemosis is still an issue impacting bee health and further research is required to understand its role in colony population build up, honey production and colony loss throughout Canada.

American and European foulbrood management practices

American foulbrood (AFB) is a bacterial disease of brood caused by Paenibacillus larvae. AFB is considered endemic in Canada. It is also of great concern to beekeepers as active infections may result in large-scale loss of honey bees and equipment and can spread within regions if proper steps are not taken to eliminate infective honey bee colonies and equipment. In recent years, some beekeepers have reported an increasing impact of and difficulty controlling European foulbrood (EFB) in their operation, a bacterial brood disease caused by *Melissococcus plutonius.* Oxytetracycline, although typically used as a treatment for AFB, has started to be used to treat signs of EFB outbreaks. Oxytetracycline, tylosin and lincomycin are antibiotics registered for treating AFB in Canada. Oxytetracycline is the only labeled treatment for EFB. The pattern of use for these antibiotics, as reported by beekeepers, is presented in **Table 13** and **14**.

Oxytetracycline was more frequently used by beekeepers in spring and fall than other treatments. Provincial recommendations on antibiotic use (e.g., metaphylactic vs therapeutic) vary. Beekeepers using antibiotics in the presence of signs of disease ranged from 0 to 100% for both AFB and EFB depending on the province (**Table 15**).

Table 13. Antibiotic treatments for American foulbrood (oxytetracycline, tylosin and lincomycin) at the beginning of the season as cited by the respondents of the 2022-2023 winter loss survey

Province	Use of foulbrood treatments (% of respondents) at the beginning of season			
	Oxytetracycline*	Tylosin*	Lincomycin*	No Treatment
NL	0	0	0	100
PEI	6	0	0	94
NS	15	0	0	85
NB	62	0	0	38
QC	7	0	0	93
ON	56	0	0	38
MB	36	0	0	64
SK	30	0	0	70
AB	36	1	0	63
BC	7	1	0	92

*These categories are not mutually exclusive, therefore the total may be greater than 100.

Table 14. Antibiotic treatments for American foulbrood (oxytetracycline, tylosin and lincomycin) at the end of the season as cited by the respondents of the 2022-2023 winter loss survey

Province	Use of foulbrood treatments (% of respondents) at the end of season			
	Oxytetracycline*	Tylosin*	Lincomycin*	No Treatment
NL	0	0	0	100
PEI	12	0	0	88
NS	10	0	0	90
NB	19	0	0	81
QC	0	0	0	100
ON	58	0	0	44
MB	27	3	0	70
SK	37	5	0	58
AB	29	6	0	65
BC	7	3	0	90

*These categories are not mutually exclusive, therefore the total may be greater than 100.

Table 15. Beekeepers who treated and saw signs of foulbrood

Province	Use of foulbrood treatments (% of respondents)		
	Treated and saw signs of AFB in 2022	Treated and saw signs of EFB in 2022	Treated and were unsure if they saw foulbrood in 2022
NL	ND[a]	ND	ND
PEI	50	100	0
NS	0	20	5
NB	0	0	0
QC	27	80	0
ON	0	3	1
MB	1	3	4
SK	0	16	0
AB	100	91	33
BC	ND	ND	ND

[a] ND: no data.

Honey Bee Winter Loss and Population in Canada Since 2007

Reported winter loss has been variable from year to year in Canada since the beginning of these annual surveys in 2007. This year, the reported winter mortality averaged 32.2%. This is higher than the long-term suggested baseline/ threshold for winter losses of 15%. In fact, since the beginning of this survey in 2007, this suggested acceptable level of loss has never been attained. As can be seen in Figure 2, national

winter losses were highest in 2022, 2008 and 2009 which ranged from 45.5% to 33.9%. From 2007 to 2023, national winter losses ranged from 15.3% to 45.5%, averaging 27%. In spite of these loses, between 2007 and 2021 Statistics Canada reports showed that total number of colonies in Canada increased by 30%. Beekeepers must be vigilant and practice integrated pest

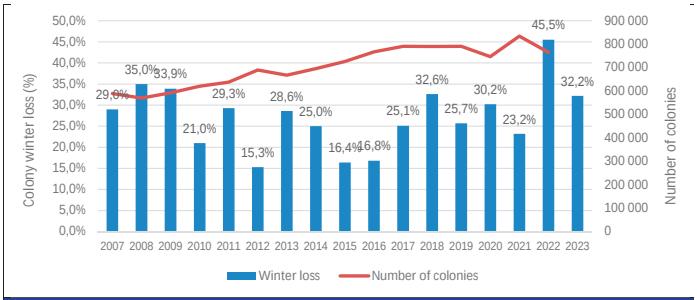

Figure 2. Summary of bee colony numbers and bee losses in Canada from 2007-2023 (based on data as reported by Stats Canada). *Note that the number of colonies as reported by Stats Canada is not available for the current year.*

management (IPM) for serious pests endemic to the honey bee population in Canada (e.g. varroa mites). A changing climate must be considered due to impacts on bee growth, varroa population development, treatment type and frequency of application. Beekeepers must also consider nutrition, and pesticide exposure within hives and from the environment as well as the added challenge of the economics of beekeeping which include variable honey prices and increasing costs of production. Individual beekeepers experiencing high winter losses face considerable expenses replacing dead colonies. These increased expenses greatly affect profitability and productivity and can put some beekeeping operations at risk of insolvency. Moreover, this survey and report do not take into account mid-season losses of honey bee colonies or queens that beekeepers may be experiencing throughout the beekeeping season. Nevertheless, the Canadian beekeeping industry has been resilient and able to grow, as proven by the overall increase in the number of bee colonies since 2007 (Figure 2) despite the difficulties faced every winter. While provincial estimates demonstrate regional trends in winter loss, within each province the results vary among regions and beekeeping operations. While there are operations that have been highly successful, there is a real risk of losing large proportions of colonies in Canada, and continued vigilance is required to maintain bee health and profitable beekeeping operations.

Although responses to this annual survey provide evidence that many beekeepers are using recommended practices for monitoring and managing honey bee pests and diseases, there are always opportunities for improvements. As such, the detailed management data from beekeepers summarised in this report has been used by some apiary and extension programs to focus on education, training, and communication efforts to beekeepers on improvement of management for honey bee pests. Up till now the focus has been for an open-ended approach to have beekeepers access training and education based on their own needs and determination. Further strategies may be considered to ensure that larger proportions of beekeepers are truly participating and using education and training resources.

It would appear that stress caused by parasites in combination with other stressors warrant further study to provide alternative management practices for maintaining honey bee health. At this time, beekeepers have a limited number of products to control varroa, and all of these options have their limitations. New options are important to mitigate the risk of developing resistance. Currently, the only product registered for the treatment of nosema is fumagillin. If resistance develops to the primary treatment for varroa (e.g., Apivar®) or to nosema (i.e. fumagillin), beekeepers could experience even greater and likely extreme difficulties keeping their bees alive. Ultimately, beekeepers will need more effective and additional options (miticides, antibiotics and non-chemical management options) in their "tool box" if they are to continue effective integrated pest management (IPM) strategies to maintain healthy bees.

Further Work

CAPA members continue to work closely with industry stakeholders and provincial working groups to address bee health and industry economics. Members of CAPA and Provincial Apiarists have also been involved in conducting surveillance programs at the provincial levels and across the country to monitor the status of bee health including emerging pests. CAPA members, the Provincial Apiarists, and Technology Transfer Programs are involved in conducting outreach and extension programs to promote IPM and biosecurity practices to beekeepers. Researchers within CAPA are active in evaluating alternative control options for varroa mites and nosema and developing genetic stocks more tolerant to pests which will enhance IPM practices and address honey bee health sustainability.

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Fisher Branch (MB)

Interlake Honey Producers

PO Box 328, Fisher Branch, MB R0C 0Z0

Interlake Honey Producers Ltd. has the following positions:

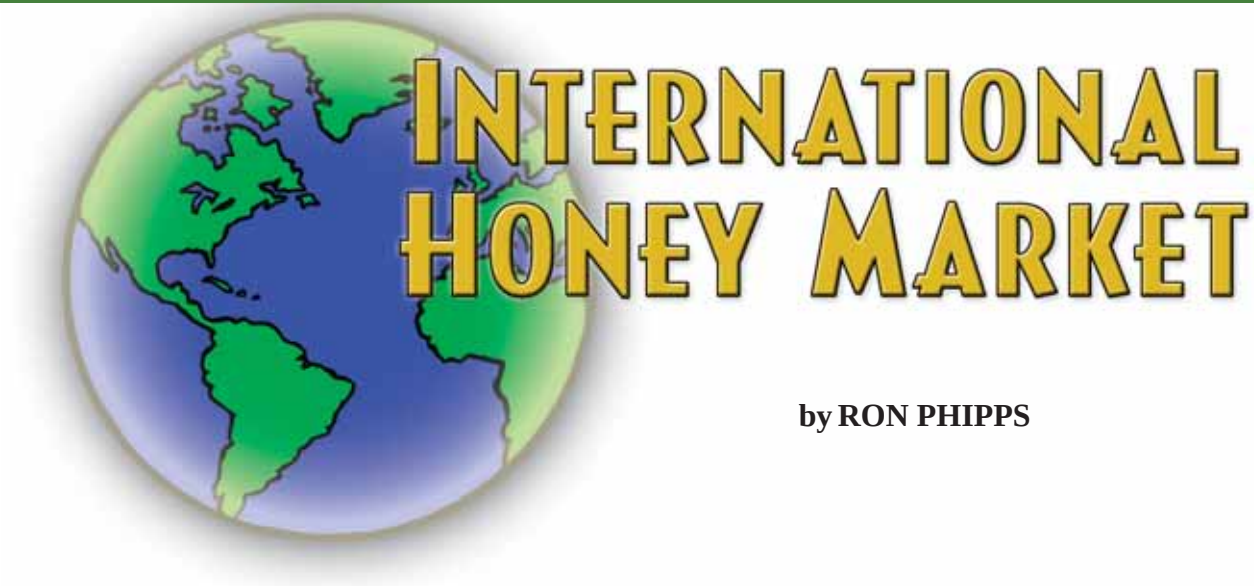
Apiary Technician 5 Positions Available

Required for the 2024 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 – November 6th.

Wages: $15.50-$19.00/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, bee yard maintenance, 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



by RON PHIPPS

Introduction

In June of 2023, there were international discussions about forming an Alliance for Authenticity which would address food fraud in general and economically motivated adulteration in honey in particular. In November, the word of the year for 2023 was chosen to be "Authenticity." The quest for authenticity has become an international quest which directly bears upon the survival of beekeepers in America and many other honey producing countries.

After May 2021, the initial phase of the antidumping filing in the U.S., there was a fleeting increase in prices to beekeepers. The low antidumping rates determined for Indian honey, plus the failure to impose critical circumstances for India, resulted in a huge surge of imports in 2022 from all countries (426 million pounds total) and a modest increase in import prices ($1.59/lb. average for all countries not including New Zealand), which has completely dissipated in 2023, resulting in a frozen market. Large volume contracts at very low prices have consistently been offered for shipments very far into the future. The old adage, "Don't speculate and sell until honey is in the barrel," has been totally ignored due to the artificiality of a market in which multiple modes of adulteration have been employed and ineffective modes of detecting adulteration have been utilized.

U.S. and imported honey prices

U.S. extra white clover honey is being bid at $1.85/lb. in January 2024. The average honey price reported by U.S. beekeepers for 2022 was $2.96/lb. (NASS statistics), so this represents a decline of 37.5% in 12 months. Other prices of $1.70-1.90/lb. for U.S. and $1.35-1.40/lb. for Canadian have been circulating in the market.

The most up-to-date price trends for U.S. domestic and imported honey from the major countries of export are shown in Charts 1 and 2.

Chart 1 shows a steep plunge in prices for Dakota White beginning in 2023. Imported honey prices also fell.

This plunge is associated with an enormous surge in quantities; for example, imports from India for November 2023 were 18.8 million pounds at an average import price of $0.71/lb. for that month only.

This means India is now exporting at prices comparable to the time preceding the filing of the antidumping petition. In 2020 the average Indian import price was $0.63/lb. The price increased as the antidumping filing was announced. Indian import prices averaged $0.92/lb. in 2021. But that temporary relatively modest increase has completely eroded and is vanishing. American imports of Indian honey in October were 13,576,248 lbs., but the volume in November was 18,809,271 lbs. (which would annualize at 225.7 million lbs.) at a price of $0.71/lb. The devastation of low prices combined with surging quantities has frozen the market for both domestic honey and honey from other foreign sources. It is creating a panic among exporters and importers as the Department of Commerce engages in its determination of whether to maintain, increase or dramatically increase antidumping duty rates while it conducts administrative reviews.

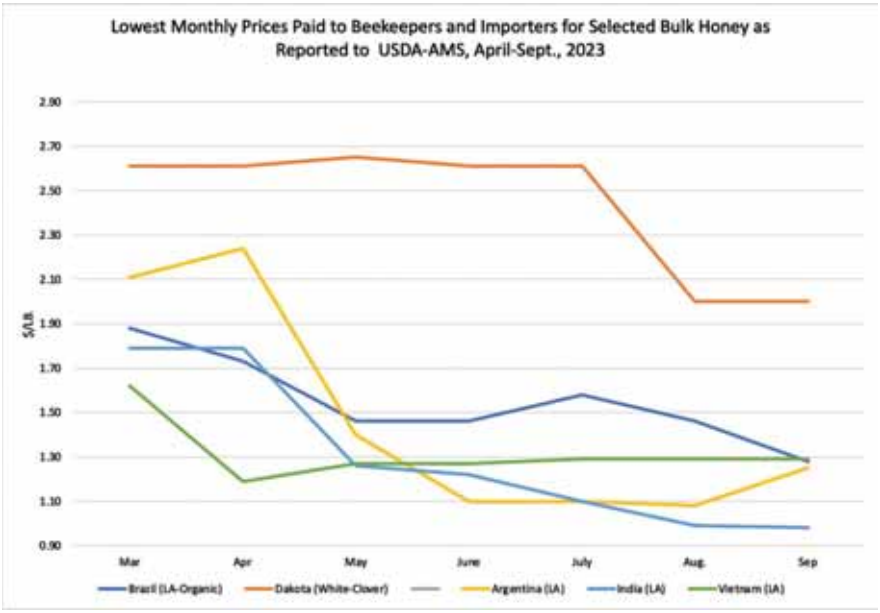


Chart 1

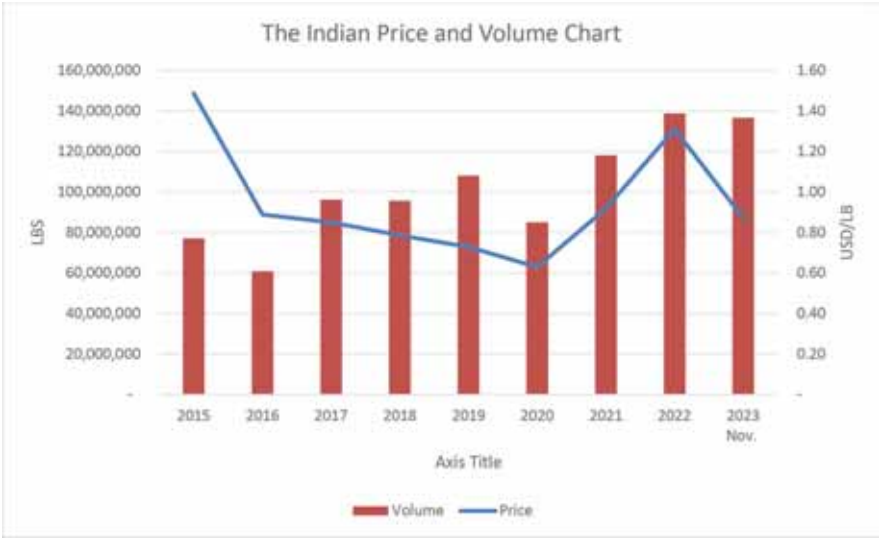


Chart 2 *US Imports of Indian Honey 2015-Nov. 2023 Price and Pounds. Source: U.S. Bureau of Census Data*

U.S. imports from Canada averaged $2.27/lb. in November, 2023. White prices were down to $1.35/lb. by January. Adulterated honey can be produced at minimal cost, allowing those who participate in the collusion to sell at virtually any price and still make profits. There are profits for adulterators and, as one international writer described it, austerity for beekeepers.

Prices for imported organic honey declined dramatically from $1.81/lb. in 2021 to $1.46/lb. in 2023, and volumes from India increased in 2023. There are very romantic tales from India of rock climbers and monkeys scaling steep cliffs to harvest virgin organic honey. But closer to reality is the observation of many factories utilizing Chinese resin technology which can remove antibiotics and residues, offensive aromas and dark colors, to create the deceptive appearance but not the reality of authentic organic Indian honey.

Dr. Daberkow comments that nearly all honey prices presented have been falling since March 2023. Domestic Dakota prices fell over 20%, and the low prices for Indian honey fell over 45% in 60 months.

Dramatic imported honey price changes and the antidumping administrative review

There are reports of a panic among some exporters and importers since late 2023, as an aggressive U.S. government Administrative Review was underway to determine whether the preliminary antidumping rates were correctly calculated with accurate and adequate information regarding cost of production, or whether the information provided was misleading. The approach of the Department of Commerce (DOC) toward each respondent country is very different, with complicated questionnaires going to Argentina but not to India.

This is an ominous time for exporters and importers as the collapse of honey prices is occurring at a time when global food inflation has created international political unrest. The antidumping rates may be increased — even dramatically increased — and the difference between the preliminary and the final rates for the first period of administrative review could be high. Increases in the antidumping rate for some, and imposition of additional retroactively increased assessments, could dramatically change the landscape of the international honey market.

In December 2023 and January 2024, there was a concerted and desperate effort to maintain the low antidumping rates that the DOC had assessed. The steep plunge in imported honey prices documented in this report makes maintaining those low rates even more improbable. Beekeepers, through a series of efforts, have conveyed that their survival as the guardians of global pollinators has a decisive and huge impact on global food security, global food prices and ecological sustainability.

The Masters of Market Manipulation have created a situation such that the collapse of pricing is most likely to increase the antidumping duty rates, including the possibility of retroactive imposition of the differential between the estimated and the actual rates.

The DOC announced:

> *On September 8, the Government of Vietnam filed an official request that Commerce consider it a market economy citing the country's economic reforms made in recent years. … The Department of Commerce will carefully review the information submitted by the Government of Vietnam concerning its market reforms, and will complete a review as expeditiously as possible, in accordance with U.S. law. Commerce has 270 days to complete this review, which includes a public comment period before a determination is made.*

A decision should be made by June 2024 which will affect all exports from Vietnam under antidumping orders, including honey. This decision will clearly be influenced by geopolitical and macroeconomic considerations, including China's economic and political aggressiveness.

In November 2023, the U.S. International Trade Commission (ITC) upheld its critical circumstances finding on Vietnamese honey imports, with the effect that antidumping duties may be assessed retroactively. Preliminary antidumping duties were assessed beginning in August 2021 at high rates. The court's decision stated:

> *[R]aw honey imports from Vietnam from all Vietnamese producers/exporters are subject to Commerce's affirmative critical circumstances determination. These imports increased from 48.0 million pounds in the pre-petition period to 87.9 million pounds in the post-petition period, an increase of 83.2 percent. The 87.9 million pounds of subject imports in the post-petition period are equivalent to 19.1 percent of apparent U.S. consumption in the interim 2021 period. The volume of subject imports from Vietnam in four of the six months of the post-petition period (July, August, September, and October 2021) significantly exceeded the volume of subject imports from Vietnam recorded in any prior month of the POI. In addition, subject imports from Vietnam increased rapidly in each of the first four months of the post-petition period, reversing a downward trend from December 2020 to April 2021.*

China was the largest honey exporter to the world in 2021. The EU reported a 12% decline in Chinese

honey prices in 2023, to $0.69/lb. In contrast, Argentina's exports to Europe averaged $1.27/lb. in 2023.

If there are not limitations put on quantities of imports and floors on prices of imports, as happened during the China antidumping case in the 1990s, the consequences to beekeepers and the industries that depend on pollination services will be grave. As the history of the Suspension Agreement of the China antidumping case shows, the increases in antidumping rates were circumvented by manipulation of the values of the imported honey. For example, if the duty rates went up by 50% but the declared prices went down by 50%, the collapse of prices would not be addressed.

Canadian beekeepers in late 2023 were reviewing proposals for initiating their own antidumping order, as imported honey volumes were seen to be contributing to a collapse of Canadian honey prices.

Contradictions between global honey production and adverse conditions

The general situation in the world reveals a contradiction between adverse conditions for the production of honey and an inexplicable rise in the quantity of "honey" circulating internationally. Large quantities are traded at low prices. In the November International Honey Market report we showed charts revealing the terrible heat waves, droughts and floods that have plagued the world's largest exporter of "honey," China, and the world's largest exporter to the U.S., India.

The UN in India reported:

> *The mean temperature over Asia for 2022 was the second or third warmest on record and was about 0.72°C above the 1991–2020 average. The 1991–2020 average was itself about 1.68°C above the WMO 1961–1990 reference period for climate change. Drought affected many parts of the region, reducing water availability. The economic losses in 2022 as a result of the drought in China, for example, were estimated to exceed US$ 7.6 billion.*

Availability of water for bees and for the crops that they pollinate is critical. We previously reported the reduction of acreage for almonds in California due to water scarcity and the precipitous decline of the water table.

The presence of *Tropilaelaps* mites in Asia was documented and aroused concern. (See Chart 3.) The mites have long been present in China and U.S. beekeepers were alerted to the possibility that they could affect colonies in the U.S.

Productivity per hive

According to the National Agricultural Statistics Service (NASS) reports from the past several years, U.S. honey production declined by 15%, with reported volumes of 147,000,000 lbs. in 2020 and 125,000,000 lbs. in 2022. The number of colonies declined slightly from 2.7 to 2.6 million over 3 years. Productivity per hive declined from 54 to 47 lbs./hive.

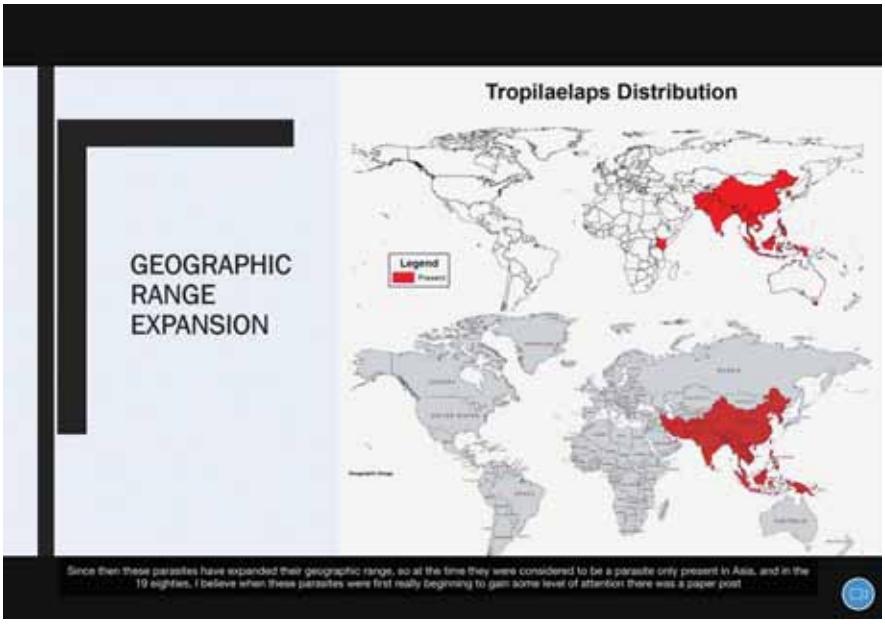


Chart 3

A recent report, published in the American Honey Producers Association (AHPA) newsletter, indicated that "honey yields in the U.S. have been declining since the 1990s, with honey producers and scientists unsure why this happened, but a new study by Penn State researchers has uncovered clues to the mystery of the missing honey. … The scientists accumulated data from the past 5 decades throughout the U.S … and found that the changes in honey yields over time were connected to 'herbicide applications and land use changes which result in fewer conservation programs which support pollinators.'" Annual weather anomalies have also contributed to changes in yields. The use of herbicides and severe climate events underlie the loss of productivity. "Studies reveal that in both warm and cold regions' honey yields are increased when the soil conditions are healthy." Gabriella Quinlan, the lead author from the National Science Foundation, found that climate became increasingly tied to honey yields in all the data after 1992.

Two to three decades ago, American honey producers experienced yields in some areas of 150-200 lbs./colony. In special areas such as Alberta, Canada, those yields could be 300-400 lbs./colony. The contemporary research underscores the anomaly which we pointed out in previous reports between increased honey exports and declining conditions for honey production throughout the world.

This should be understood in a global context as well. The Indian Express reported in April 2021 regarding honey productivity and letters being written by Indian beekeepers to authorities regarding use of hybrid seeds and lack of forage for bees:

> *While farmers of Punjab have been fighting for respectable prices for their crops at Delhi's borders for the past over four months, bee keepers of the state are fighting another battle for several years now. The yield of honey per colony has gone down manifold around 2-3 times. The reason, according to them, is that flowers of hybrid seed crops like sarson (mustard), sunflower, and berseem (fodder) etc., do not carry much nectar, because of which they are facing heavy losses.*
>
> *Beekeepers have been writing to the Punjab government as well as Punjab Agriculture University*

(PAU), Ludhiana, to address this issue by developing varieties which carry good amounts of nectar too. They also blamed decreasing area under flowering crops.

Argentina

Since honey crops in North America have not commenced, this report will mention only Argentina which is experiencing macroeconomic and geopolitical changes that are symbolic of larger international contradictions and conflicts.

The Argentine political and economic situation has attracted world interest. Argentina has been plagued by enormous national debt, debt to China and the IMF, and inflation. The preceding government negotiated debt relief with China which involved new investments and new ownership of strategic resources. The recent political campaign in Argentina resulted in the victory of Javier Milei, who put forward an agenda of curtailment of growing economic dependency on China. Control of Argentine resources by Chinese government investors and organizations is expected to be reduced.

Because Argentina is a large producer of authentic honey from floral sources which are preferred by U.S. consumers, it plays a significant role in U.S. imports. As this report is being written, major producing areas are benefitting from ample rains, caused by the winter-spring El Nino phenomenon. The honey crop is expected to be better than in recent years. Argentina exported 89,838,000 lbs. to the U.S. in the first 11 months of 2023.

Argentine honey exporters are also protesting the antidumping rates assessed by the U.S. Department of Commerce. Whether those rates remain stable, increase or decrease will obviously have a significant effect. That effect will be greatly influenced by any changes in rates assessed on Indian honey. The impact involves "comparative advantage."

Developments for the Alliance for Authenticity

The Alliance for Authenticity recognizes that honey adulteration is an international problem, which is being addressed by the UN FAO, the European Commission, the U.S. government, and the governments of many importing and exporting countries. The Alliance is seeking to create a multi-layer and international coalition which will include global beekeepers, honest packers and importers, retailers, trade associations, consumer rights protection organizations, agricultural industries (such as almond, blueberry and cranberry producers), environmental groups, independent academic scientists, and government laboratories. In December 2023, there were discussions at the AHPA, and at UCLA's interdisciplinary forum hosted by Prof. Michael Roberts and Prof. Janet Tomiyama.

Experts have estimated that if additional scientific methodology had been used in the European 2023 honey study, the percentage of products suspicious of adulteration would be higher than reported.

A recent report indicated that 91% of U.S. honey at retail in the U.S. was pure and unadulterated. Samples were primarily of honey labeled as Product of USA. However, 59% of samples indicated adulteration in products that were not exclusively American honey. Furthermore the method of assessment was a test designed for bio-engineered inexpensive sweeteners. The problems with that test are twofold: 1) the database is very small and frozen and 2) it ignores the use of modes of adulteration such as harvesting immature honey and the use of resin technology.

China is well known as the epicenter of the development of modes of food fraud. That food fraud has not only been criticized internationally but also domestically within China. Of growing concern is the fact that the Chinese government is taking a very aggressive stance and wants to play a decisive role in standards governing international food. Such a role is inconsistent with China's behavior in the food sphere.

During the AHPA's annual meeting there was a vigorous discussion of how some trade organizations are potentially engaged in violations of antitrust and commercial disparagement laws. Restrictions on free trade violate U.S. antitrust law. Various beekeepers and packers described how those violations on antitrust law were imposed on businesses. Recently a jury ruled against the National Association of Realtors, determining that the group had colluded to keep commissions artificially high to the detriment of home buyers, and assessing multimillions in penalties.

It is interesting that on Mount Rushmore there are carvings of four Presidents — Washington, Lincoln, Jefferson and Theodore Roosevelt. Roosevelt's position among these heroes of American democracy is partly a result of his establishment of the Food and Drug Administation, with its mandate for protecting the purity and safety of the American food and drug supply, 2) his establishment of antitrust law to prevent private monopolies from setting prices and/or standards, and 3) his landmark initiative to protect the environment and set aside National Parks for the public such as Yosemite, Yellowstone, Glacier National Park, the Grand Canyon, the Great Smoky Mountains, etc.

All three fundamental national priorities promoted by President Roosevelt are integrated in protecting the pollinators and their guardians. The pollinators are essential to global food security and ecological sustainability. Teddy Roosevelt's enormous contributions to these issues is symbolic. His former "summer White House" in Oyster Bay is now a popular restaurant appropriately named "Wild Honey."

These developments only supplement the increased international scrutiny against adulteration of honey. That scrutiny includes ongoing lawsuits before the federal court in California's Central Valley involving alleged violation of RICO statutes. There has been an increased number of meetings in the U.K. and EU to discuss issues of honey authenticity, such as the Honey Authenticity Network. Germany, France, Romania, Croatia, Spain and Hungary are also mobilizing in the quest for achieving honey authenticity and responding to the information released by the European Commission in early 2023. Collaboration between the European Commission and other governments is being developed.

It is well known that China is the largest exporter of "honey" in the world, with 343,824,000 lbs. valued at $277,000,000 exported in 2022. China is a large country with many beekeepers and a great diversity of botanical sources that are capable of producing high-quality honey, including clover, linden, milkweed, alfalfa and acacia. In 2023 there were reports claiming that China makes more money per capita from its "honey" exports than any other country.

There is a story of a Chinese honey exporting group that visited French beekeepers. The French complained that the market is so weak that they can't produce and sell honey without losing money in competition with

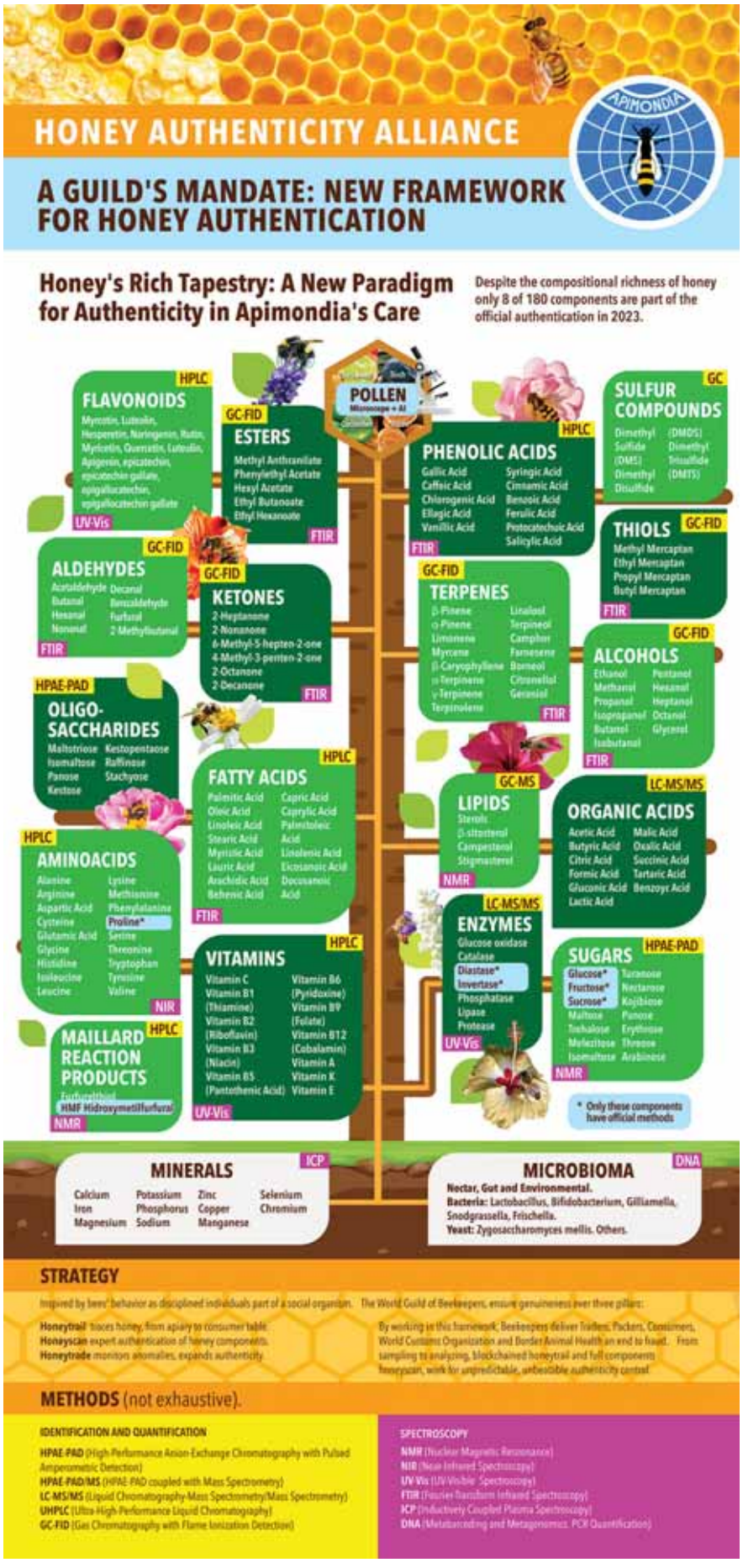
China. The Chinese response was, "The problem is you don't know how to make honey in the modern way. We can make large quantities and make large profits, even with current prices." The underlying reality is that this is because China is not exporting genuine honey. They have become the epicenter of food fraud and honey adulteration — including extraction of immature honey, utilization of factory dehydrated honey, blending bioengineered sweeteners, subjecting dark, contaminated and/or unpalatable honey to resin technology (which is illegal per the FDA for any product marketed as honey), and apparatus for illegal feeding of bees during the production period. It has become crystal clear that industries in which there is widespread and sophisticated adulteration or corrupt practices cannot effectively police themselves.

A fresh, modern approach with enhanced traceability and more comprehensive tools for detecting adulteration

The scientific analysis of authenticity must take into account the considerable complexity and diversity of the chemical profiles of the world's commercially traded honey. That means the analysis must take into account all of the variables which affect the diverse chemical nature of authentic honey. The search for one parameter or a few variables is inadequate. An enhanced traceability system must be integrated with multiple types of sophisticated scientific analyses. That enhanced traceability takes into consideration the variables which cause the diverse chemical profiles and whose detection requires multiple sophisticated analytic technologies. Only contemporary "medicine men" advocate one or two methodologies and one or two variables.

Modern computerization allows producers and blenders of honey to create independent databases which take into account geographic origin, weather conditions, elevation, time of the year, floral source(s), and blend formulas. The profiles of Nuclear Magnetic Resonance (NMR) discern parameters, and other tools can assess whether the chemical and physical profiles conform to the variables described in an enhanced traceability system. Artificial Intelligence (AI) can make this task much easier, more comprehensive and more accurate.

Governments and independent academic laboratories provide the



independence and integrity needed to accomplish this task. Integrating more comprehensive traceability systems, more comprehensive analyses of chemical profiles and modern computerization, including AI, provides the systems which must be administered with integrity and independence. The fundamental facts are that the chemistry of honey is very complex and that chemistry is created by multiple variables. Current analytic techniques do not take into account those variables.

Obviously private, for-profit laboratories have an important and essential role. But those laboratories cannot be the standard-makers nor those who ordain methodologies. We need a scientifically advanced laboratory to set the templates and methodologies for assessing adulteration. Academic laboratories in conjunction with government laboratories must set the criteria for assessing authenticity. Legislatures establish the laws, the police seek the violations of those laws, and judiciary systems impose the penalties for the violations. A similar tripartite arrangement is logical and imperative for the international honey industry if integrity is to be restored and consumers faithfully served with authentic foods.

As a result of recent meetings in various European governments, those who are championing authentic honey are recognizing they cannot rely only upon private, for-profit laboratories. What is considered a marker for adulteration and what is ignored often reflect the commercial interests of those who are prescribing the test and the parameters being tested. As Joel Schiro, leader of the French beekeepers's organization, indicated in a response to the JRC Technical Report on honey, often those who seem to be victims of adulteration are participants and economic beneficiaries of the sale of "fake" honey.

The finding that 46% of honey sampled in Europe by the JRC in 2022 was suspected of adulteration is eliciting more attention to honey adulteration in Europe:

"On average, honey imported into Europe costs 2.17 euros per kilo while sugar syrups made from rice cost between 0.40 and 0.60 euros per kilo," explains Foodwatch, which reveals that if beekeepers and the resellers, who work according to the rules of the art, are generally victims of this fraudulent honey trafficking, "it happens that they are sometimes accomplices." Neither packers, trade associations, exporters, importers nor for-profit labs — history teaches us — can set the testing modalities, the parameters studied nor the interpretation provided regarding authoritatively and independently.

There is an old accounting joke. The boss asks various candidates a simple mathematical question. All candidates answer correctly except one. The one who gets the job answers the boss: "Whatever you want it to be." In philosophy this is called the "fallacy of misplaced concreteness," whereby from a totality of facts, the only facts cited are those which serve other objectives than those of Truth and Justice. There is a book by a mathematician whose title is "Lying with Statistics." New approaches are needed to ensure objectivity and impartiality in assessing adulteration.

The collapse of honey prices is occurring as income for pollination is being reduced (a major topic at the December convention of the AHPA) due to reduction of acreage of almond orchards. Even if that reduction of acreage is reversed, it takes years for newly planted orchards to become productive. The crisis is serious.

Beekeepers have for the past decade been faced with simultaneous decreases in productivity and increases in the costs of production and transportation. The cheap — if not dumped — prices for some imported honey have been devastating to the overall beekeeping communities in North America and Europe. If all the inexpensive traded honey were authentic, the entire global beekeeping community would have long been bankrupt.

Creative marketing

The growing international quest for authenticity in honey ultimately is less about denouncing and more about transforming. Prof. Michael Roberts of UCLA's Resnick Institute is considering how to create models so that illicit modes of production are replaced by proper modes, leading to the demise of adulteration and the emergence of authentic honey in all its charm and diversity. We will fully comment about this later.

From the wine industry we can learn how to promote intrinsic qualities of diverse types of honey, the beauty of production and the diverse modes of consumption. From the tea industry we can learn how to increase consumption, qualities and prices by promoting health benefits of honey. Recently we saw a report about honey and its health benefits relative to preventing or slowing the progress of Alzheimer's and other forms of dementia. Compounds in honey, including phytochemicals and antioxidants, have been shown to be beneficial for prevention or slowing the disease, which is plaguing a growing number of people in the world.

During the first international symposium on honey and health there were papers presented which indicated the effect of honey consumption on the brain in animal studies. One study showed a significant reduction in anxiety. There are other significant health benefits. The main point which must be said is that those health benefits depend upon the chemical components of authentic honey and their biochemical activities. That is, adulterated honey lacks those health benefits, which may be influenced by the botanical and geographic origin of the honey.

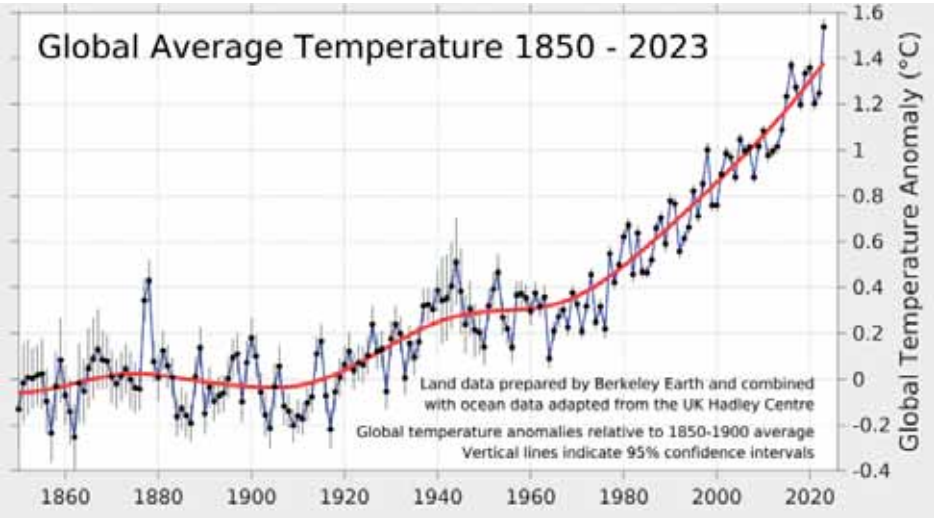
In attractive specialty shops in high mountain towns in Provence, France, a stunning array of honey from different floral sources and regions is displayed. In Starbucks coffeehouses, paintings and photos showing coffee growing regions and their geography are prominently displayed. Dirk Olsen, of Olsen Honey Farm, Oregon, is a master of the production of high-quality, diverse honeys such as raspberry, blueberry, meadow and fireweed. Adee Honey Farms has introduced a new label for their magnificent South Dakota white clover which utilizes the concept of authenticity. This is a positive perspective which should help the industry.

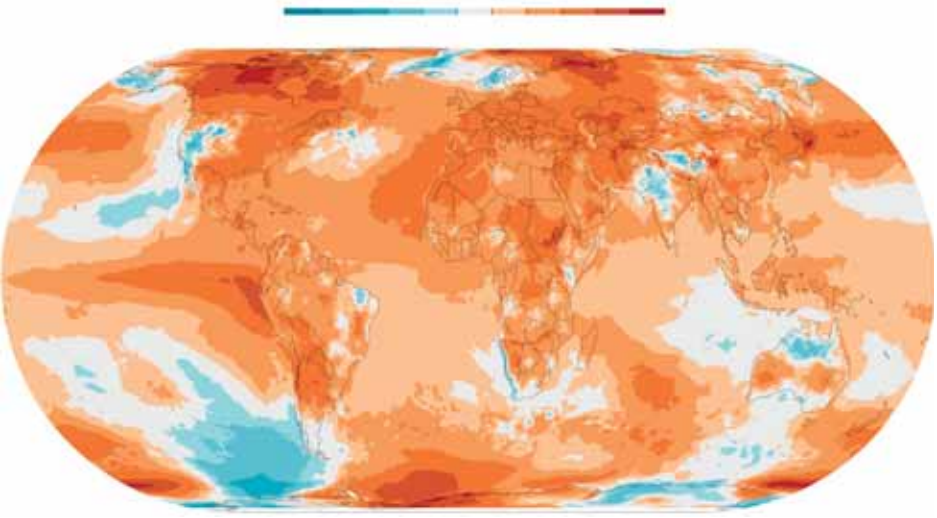
Conclusion

Honey fraud has an oversized impact upon global agriculture and ecology. But it is one of many spheres of food fraud bringing inordinate profits for the fraudsters but concurrently terrible harm to others. On January 19, the front page of The New York Times had an article titled "Kona Coffee Lawsuit: How Science helped Farmers Look for Counterfeit Coffee Beans." The article cites a class action lawsuit which resulted in settlements of $41 million following accusation of food fraud and mislabeling. The plaintiffs successfully argued that the products were fake and far too cheap to be authentic. The U.S. Supreme Court previously ruled that "if you are harmed by false labeling you can bring a case for damages." The labeling fraud was confirmed by James Ehleringer, a biologist at the University of Utah who ran the chemical analysis. "After comparative studies, Dr. Ehleringer's team found several chemical ratios which indicated mislabeling." Professor Rebecca Tushnet of Harvard confirmed the result. Independent science is successfully intervening in the battle for authenticity in the global food supply.

In recent discussions with Federico Berrón of the Honey Authenticity Network, Federico commented after an extensive trip to Europe, "Beekeepers feel powerless. Their sense of their own power and dignity must be restored so that the current tragedy can be transformed into a triumph." As Dr. Stan Daberkow's economic analysis reveals, the general trend has been for retail prices to go up, and honey packers' prices to retailers to go up, but packers' prices to beekeepers and importers' prices to exporters and on to local beekeepers to go down. During the past decade and more, the contradiction between the appearance of surges of production of "honey" and the concomitant deterioration of the conditions needed to produce honey have put stress on beekeepers as never before. The facts lead to the inescapable conclusion that there has been a loss of authenticity and purity of that which has been marketed as "honey."

Ron Phipps is Vice President of the Beekeeping Economy Commission of Apimondia, Founder and President of CPNA International, Ltd., Organizer of Vivaldi Festival, Summer 2023 at Planting Fields Arboretum, and presented "The Cosmology of an Infinite, Open and Integrated Universe" in July 2023, at the Institute of Philosophy in Munich, Germany.





Global Temperatures 2023 – Indicators of drought and extreme weather
Where temperatures were colder or hotter than the 1990-2000 baseline averages

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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 13,000 managing over 810,000 colonies.