BeesCene

SUMMER 2020 | Volume 36 #2

Promoting and Encouraging Beekeeping in British Columbia since 1920

BC Honey Producers' Association

100 YEARS OF BEEKEEPING

To:

Letter from the editors . . .

We haven't started putting together a coronavirus time-capsule, so I'll make the start of one here. We are some of the privileged ones for whom the current situation and restrictions didn't change much in our lives, or create challenges we were unable to meet. We still have our work, some of which was already remote or somewhat solitary, we still have our health and we are safe. I had not been too concerned about the dangers of the virus to ourselves until we nearly lost our neighbour and good friend, who had been traveling with her husband to visit a friend in Belgium in early March. They didn't make it to their destination; instead they were stuck on a cruise ship off the coast of Europe for a time, where they caught the virus, and they were lucky to make it home. She spent about a week in the ICU in a Vancouver hospital, on a ventilator and other life support, and the doctors didn't think she was going to make it. They've been home for a few weeks now and they are still in shock, but at times their new perspective on life is clear. So many others have not been so lucky.

In our family of mostly introverts, being asked to stay home has been a relief in some ways. We are surrounded by wilderness so getting outside has been easy. Fewer commitments has meant more time to do what comes naturally on an individual level, and the kids have had a chance to slow down at a time of year that we usually don't. Spring has been playing out more slowly for them and they are noticing more, and we are all seeing more of ourselves. It was not easy in the beginning for the kids, unable to see their friends, classmates and teachers, all of whom play a bigger role in their lives than I'd realized. Without the distractions, we're slowly learning how to live together a little better, though this is easier with a 7 and 11 year old than it is with younger kids or with teenagers. The girls and I have had some opportunities to connect with colleagues and classmates online via Zoom and other video conferencing platforms, and although it fulfilled a small part of what we've missed, it makes it clear that nothing replaces physical connections with fellow humans.

We have tried a bit of homeschooling before, but not full time, and sometimes not very successfully. It requires discipline and structure which aren't my strengths as a parent. Since we had tried before I knew what to expect, so from early on we've been focusing on what the kids want to learn rather than trying to keep up with work the school sends home. Self-directed learning has been wonderfully surprising and engaging. It's a great way to encourage the natural curiosity of children, and I've been reminded of how often we underestimate kids in general - as a rule, they bring so much to life and learning if we give them the opportunity, and as is their rule, the best discoveries often come about by accident.

A couple of weeks ago I got curious about dandelions, of all things. I had seen a post on social media claiming that dandelions are a poor source of nutrition for bees, and which made a case for cultivating other spring-blooming plants instead. I was mildly offended by this claim, having been for several years now a big fan of the dandelion, so I began looking into it. The first book I go to when I'm wondering about the potential of a flowering plant as bee food is *Plants for Beekeeping in Canada and the Northern USA* by Jane Ramsay, a compilation of information on over 450 plants and their potential as nectar and pollen sources. Her entry on dandelion included the following: "no other nectar source of greater value for honey bees during the short main bloom period", and that the pollen has a good level of protein. We know that honey bees, like humans, depend on a varied diet, and that dandelions are just one part of it - but they are an important one, especially in the spring.

Avery and Emma, the research team.

The accidental learning that came about because of this is due to Jane's having spent time and effort to include the common names used across Canada for all the plants in the book. I had heard some other names for dandelion but had never before heard it referred to as 'dumble d'or', a Newfoundland-ism. I probably wouldn't have been so taken with it if we didn't also happen to be reading the Harry Potter books with our younger daughter throughout our time of isolation. I was quick to share the news with the girls, and we were all suitably amazed - we found it very fitting. Since then we've been trying to find out where the name originated and so far we've learned little, but we aren't finished yet. Jane suggested that the name may be a blend of ancient British and French, and also offered that there were fisherman in NL who hailed from Brittany in the 1600s. She also suggested that perhaps J.K. Rowling used the flower as inspiration for her character, and so we're curious... we plan to write a letter to ask, and will let you know what we find out. ❀

EDITORIAL & ADVERTISING: Heather Sosnowski
12180 Hislop Road, Telkwa, BC V0J 2X1 tel 250-877-3495 email: BeesCene@bchoneyproducers.ca
Additional Editing & Proofing: Ian Bissonnette – hometownhifi@yahoo.com
Graphic Design & Layout: Jill Schick - jillschick23@gmail.com Printer: International Web Express Inc., Coquitlam, BC
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BCHPA CENTRAL EXECUTIVE AND REGIONAL REPRESENTATIVES 2020

PRESIDENT **Kerry Clark**
PO Box 2090, Dawson Creek, BC V1G 4K8
tel 250.782.6646
email: president@bchoneyproducers.ca

1ST VICE-PRESIDENT **Dan Mawson**
1613 West Creston Road, Creston, BC V0G 1G7
tel 250.215.0037
email: secondvicepresident@bchoneyproducers.ca

2ND VICE-PRESIDENT **Jeff Lee**
220 East Placsko Road, Creston, BC V0B 1G5
tel 604.328.5028
email: firstvicepresident@bchoneyproducers.ca

SECRETARY **Michalina Hunter**
Errington BC, V0R1V0tel 604.355.2991
email: secretary@bchoneyproducers.ca

TREASURER **Irene Tiampo**
PO Box 5609 Station B, Victoria, BC V8R 6S4
tel 250.216.7601
email: treasurer@bchoneyproducers.ca

CANADIAN HONEY COUNCIL REP **Stan Reist**
6124 Metral Drive, Nanaimo BC V9T 2L6
tel 250.390.2313
email: chcrepresentative@bchoneyproducers.ca

PRINCE GEORGE **Barry Clark**
18835 Ness Lake Road, Prince George, BC V2K 5L7
tel 250.967.4141
email: barrydouglasclark@gmail.com

CARIBOO **Carole Mahood**
1537 Chimney Valley Rd, Williams Lake, BC V2G 4W6
tel 250.267.9987
email: carole.mahood@gmail.com

WEST KOOTENAYS **Tom Bell**
1960 Pass Creek Road, Castlegar, BC V1N 4S8
tel 250.304.6993
email: bell.tom59@gmail.com

EAST KOOTENAYS **Lance Cuthill**
4300 Wilks Rd, Cranbrook, BC V1C 6S9
tel 250.426.6049
email: lcuthill@gmail.com

METRO VANCOUVER **Allen Garr**
2750 West 14th Ave., Vancouver, BC V6K 2X2
tel 604.736.4184
email: bygarr@telus.net

PEACE RIVER **Kerry Clark**
PO Box 2090, Dawson Creek, BC V1G 4K8
tel 250.782.6646
email: kccsclark@gmail.com

THOMPSON-NICOLA **Murray Willis**
2639 Thompson Drive, Kamloops BC, V2C 4L5
tel 250.377.1214
email: hurrymurray@hotmail.ca

NORTH OKANAGAN **Rick Plantinga**
24-1101 Cameron Ave., Kelowna, BC V1Y 8V7
tel 250.712.9496
email: rhplantinga@telus.net

SOUTH OKANAGAN **Blair Tarves**
208 Ritchie Drive, Cawston, BC V0X 1C2
tel 250.499.2555
email: blairtarves@gmail.com

SOUTH VANCOUVER ISLAND **Paul Petersen**
PO Box 6, Cobble Hill, BC V0R 1L0
tel 259.732.0197
email: redqueenapiaries@yahoo.ca

NORTH VANCOUVER ISLAND
Darwyn Moffatt-Mallett
Errington BC V0R1V0
Tel: 250.616.3070
email: greenbeehoney.bc@gmail.com

SUNSHINE COAST **Allan Cobbin**
2737 Lower Road, Roberts Creek, BC V0N 2W4
tel 604.886.7006
email: alcobbin@telus.net

FRASER VALLEY **Courtney White**
3266 268th Street, Aldergrove, BC V4W 3G6
tel 604.309.1684
email: courtney.leigh.white@gmail.com

TERRACE-SMITHERS **Christine McDonald**
4902 Labelle Ave, Terrace, BC V8G 4M8
tel 250.615.3534
email: rushingriverapiaries@gmail.com

BOONE, HODGSON, WILKINSON TRUST FUND
Christina Rozema
3072 York Road, Campbell River, BC V9H 1A8
tel 250.923.9466
email: virtu1473@gmail.com

EDUCATION **Ian Farber**
3249 Schubert Rd, Kamloops, BC V2B 6Y4
tel 250.579.8518
email: ian_farber@telus.net

ARCHIVES **Ted Hancock**
General Delivery, Dog Creek, BC V0L 1J0
tel 250.440.5689
email: hancock.ted@gmail.com

BEESCENE

BC Honey Producers' Association

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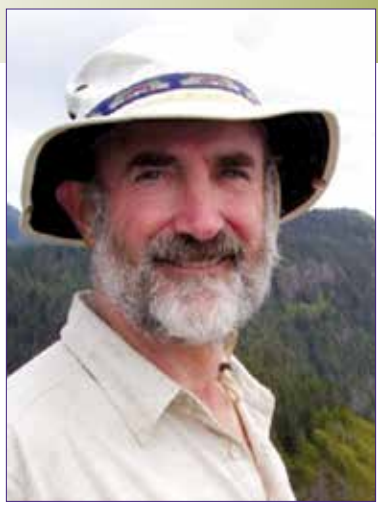
On our cover: Last year, my daughter Missy and I moved two hives to a new yard. Missy found some weeds along the edges of the field there and when taking a selfie, she held it up and put it on each of our heads to make a silly photo. Currently, she is doing her grade 6 Heritage project and the topic is honey bees. Missy says that she likes bees and honey, and the chance to spend time with her pappa. *~ Mikael Kjellström*

From the President



Kerry Clark
BCHPA President

The COVID-19 pandemic has been the main news since our last message (when there was a hint of a possible pandemic). So much has happened in the 3 month meantime: our news has been dominated by the one topic. Public Health instructions have been to mostly stay at home and physically distance ourselves (2 metres) when we are with non-immediate family members for essential purposes like getting groceries.

A summary of the situation in mid-May, for someone reading this in years to come: globally, over 4 million people are reported to have contracted the virus, and over 300,000 have died from the disease, effects of which ranged from minor common cold-like symptoms to severe respiratory effects for 3 to 4 weeks, sometimes resulting in death.

In Canada: about 72,000 are reported as infected as of May 14. 50% of those are the elderly in longterm care facilities, and there were other hotspots like meat processing plants. Over 5,000 have died here (more than reported from China, the supposed origin of the virus) and about 80% of those were in long term care facilities.

In BC, 2,400 cases have been recorded. Of those, about 2,000 have recovered, 140 have died, and authorities have said we will soon be able to relax some of the restrictions, even though they still report a dozen or so new cases per day. In my "Northern Health" region (everything north of 100 Mile House) authorities report about 50 total cases, but not their location (a strategy to ensure that we ALL take precautions). From other sources (and rumour) I hear of cases in Fort St John, and even someone on my street, a young industrial worker who says he had symptoms of a bad cold, stayed home for a few days and recovered. The pandemic is still unfolding and the full effect won't be clear for months, at least.

The feared overwhelming of the health care system didn't happen in Canada, possibly because of reduced transmission resulting from the many precautionary measures: hugely reduced travel, closure of public facilities like restaurants and cancellation of group events (like our March meeting planned for Kamloops). The government response throughout the world during this crisis has varied. My perspective is that the Canadian response has involved high government spending. To paraphrase a past comment: $50 billion here, $50 billion there, and eventually it adds up. Priorities will always be a topic of conversation. It seems a lot is being spent to help the country and we can hope we will bounce back and be able to pay the eventual bills.

Beekeeping, along with other food production was declared an essential service and so continued of course, but has not been unaffected. Larger beekeeping operations who expected to receive packages and queens from the southern hemisphere as well as temporary foreign beekeeping help had to adapt when air transport was cancelled. Air transport of queen bees from California and Hawaii was maintained, but with greatly reduced efficiency. The full effect may not be known for months.

BC beekeepers are both users and producers of replacement bee stock. A lot of extra work went into making accommodations to meet the imposed new situations and I won't try to represent all the perspectives involved. When the risk of infection was considered very low, earlier in the year, your BCHPA board made preparations for our regular Kamloops meeting in March, to the point of finalizing the program for printing. Risk quickly became higher and health consequences were deemed more severe, so we cancelled the in-person meeting and arranged a telephone conference for some business parts of the agenda. Reports and important documents which were presented are still posted on our website. About 40 people were able to sign on to the two hour call on March 27.

Since then, the board has been engaged in considering options for the rest of the year (including our planned 100th Anniversary convention in October). We had an online meeting with BC Agriculture Minister Lana Popham, who continues to be supportive of the beekeeping community. Topics included those related to the pandemic, and priorities of BC beekeepers such as ongoing regulatory improvements, research capacity and the possibility of better technology transfer to keep BC beekeeping at its high level of knowledge and performance.

The Bee BC funding program assessed another round of project proposals from across the province in April. The BCHPA's proposals to establish a hive monitoring network across the province and to explore the options for an online virtual convention in October were approved for funding. Our executive and regional representative teleconference on May 12 confirmed the decision to postpone our in-person educational program until next fall (2021). We will explore options for an Internet-based business meeting and perhaps more. Our primary goal is to avoid triggering health problems among our members and our communities. With Best Wishes and hopes for good health to you and your colonies, bees be with you! ❀

Beelines

News from the Ministry of Agriculture

PAUL VAN WESTENDORP, Manager, BCMA Apiculture Program
paul.vanwestendorp@gov.bc.ca.

COVID-19 and Apiary Program Services

In a period of just a few months, the world has changed….. dramatically! Everything we used to do and take for granted is either no longer done or has to be weighed against health risks. How long all these restrictions and limitations will remain in place is uncertain but it is fortunate that agriculture was declared an essential activity and that beekeeping accommodates the practice of "social / physical distancing".

Under current conditions, the apiary inspection services will remain in place and available to beekeepers but possibly at reduced levels. Inspectors are not obligated to undertake multiple day inspection tours that involve hotels and accessing public places such as gas stations, take-out restaurants and facilities that may pose increased risk of exposure to this coronavirus. Apiary inspectors will continue to visit individual beekeepers where social-distancing will be applied. Laboratory diagnostic services at Abbotsford will remain available.

The program's extension services including field days, beekeeper meetings and in-person beekeeping courses have all been cancelled. Since many prospective beekeepers had signed up for beekeeping courses this spring that were cancelled, we decided to offer the free webinar beekeeping course for a second time this spring. I was surprised that within a span of three weeks, hundreds of people signed up.

I would like to emphasize that the webinar course will never attempt to replace in-person courses offered at the local level in most parts of the British Columbia. In-person instruction with hands-on experience will always be preferable. However since its introduction in 2015, the webinar's purpose has been to connect with people outside the main beekeeping areas of the province who would normally not have access to training opportunities. The Internet has made it possible with people regardless of location. The next webinar beekeeping course is scheduled for February 2021. For more information, visit www.gov.bc.ca/apiculture and select "Courses".

Disruption of Bee Package & Queen Imports

Canadian beekeepers normally import approximately 40,000 packages and 200,000 queens each year. About 25,000 packages from Australia and New Zealand are destined for Western Canada while the remaining 15,000 packages go to Eastern Canada. Over 80% of imported queens are from the US with the majority from California.

COVID-19 caused a major disruption of the importation of bee packages and queens this spring. Within the time span of a few weeks, packages from New Zealand and Australia were no longer available as flights were reduced, cancelled or restrictions were made on livestock shipments. Subsequent discussions among beekeepers and provinces never clearly indicated the actual shortfall of imported packages.

As time wore on, it became clear that the imports were not delayed but cancelled for the 2020 season and alternatives had to be found. For several weeks, different plans and proposals were raised but none were realized. In the meantime, some of BC's larger beekeepers began producing "2-lb equivalent" splits from their wintered colonies to which imported queens from California or Hawaii were added. How many of these BC-raised packages met the overall demand may not be clear but it demonstrated that BC can remain a valuable domestic source of bees for beekeepers of Western Canada. In fact, the availability of bees could be increased further with the wintering of nucs headed by a BC-raised queen from the previous year.

During this period of import disruptions, two significant developments took place that complicated the situation further. We learned that Alberta beekeepers had requested their

provincial government and CFIA to grant them permission to import packages from California. Shortly thereafter, it was reported that Africanized honey bees had been detected in an apiary of 200 Florida colonies near the package and queen producing area of California. The US package import proposal never materialized and the AHB situation in California is under further investigation.

Asian Giant Hornet

The Asian Giant Hornet (AGH) issue continues to demand attention as the season progresses. A number of sticky traps were installed in White Rock where a single specimen had been detected in November 2019. No hornets were caught and in fact, the failure to catch any insects would question the efficacy of the trap and its design. Even with suggested recipes and techniques from Japan where the AGH occurs naturally, the process is one of trial and error.

Catching and eliminating AGH in the spring is particularly valuable because it involves the wintered queens that try to establish a nest. The rare occurrence of AGH in any area in spring make the successful trapping exceedingly difficult. We will be installing a number of modified bottle traps in key locations where the local habitat may be attractive to AGH. To increase the chances of detection, we have contacted numerous beekeepers near the Canada-US border, all the municipalities and the public. Information bulletins and a website have been set up to encourage people to report any hornet sightings.

The Washington State Department of Agriculture (WSDA) has also committed a lot of resources to control and eradicate

AGH. There are concerns that without preventative measures, AGH may spread further south and eventually enter Oregon and California.

We don't know how AGH came to North America but there are some clues. It is safe to assume that AGH arrived by ocean freighter, either through a bulk carrier or container ship. DNA analyses of the Nanaimo find and the Blaine, WA find showed different origins. The Nanaimo AGH originated in Japan while the Blaine AGH came from South Korea. These findings indicate separate introductions over time. A closer examination of the sites where AGH has been detected so far also suggest a strong link to railways. This is further supported by a recent

claim (but NOT verified) of an AGH sighting near the railroad just east of Kamloops. While shipping containers may not be likely means for transporting AGH, shipments of imported vehicles are. Vehicles offer numerous protective spaces where AGH (and other insects) could hide. A closer examination of the inspection and handling procedures of vehicles and similar shipments may be necessary.

The key surveillance period will start in June onward when AGH become easier to detect. As honey bee colonies are a favourite prey, beekeepers are expected to play a key role in the detection and location of AGH nests.

Christine McDonald – Apiary Inspector – Northwest

I would like to introduce Christine McDonald of Terrace as the new Apiary Inspector of Northwest BC. She replaced Phil Brienesse of Smithers who resigned last year. Christine and her family run Rushing River Apiaries, a small commercial beekeeping operation in Terrace (www.rushingriverapiaries.com). With her teaching experience and community involvement, we expect Christine to be an excellent resource in the delivery of apiary inspection and extension services for the beekeepers from Burns Lake to Terrace. Christine can be contacted at 250-615-3534 and christine.e.mcdonald@gov.bc.ca. A work phone number will become available soon.

Vacancy - Apiary Inspector, Vancouver Island South

Current Apiary Inspector David MacDonald indicated that he would like to spend more time on his Salt Spring Island farm and that it has become harder for him to serve the beekeepers of Southern Vancouver Island and the Gulf Islands. I'm very sorry to see David leave as he has provided exemplary inspection and extension services to beekeepers for many years. As all of us move on to other challenges and opportunities, I respect David's decision. This also means a new opportunity has opened for someone to take on the position of Apiary Inspector for this area. For South Vancouver Island beekeepers with extensive experience, good communication skills and a Bee Master certificate that are interested, please contact me by email.

Annual Spring Survey

A mild winter with lots of snowfall in parts of the province has made it impossible to estimate overall wintering results. Some beekeepers have reported excellent survival rates, while others experienced massive losses. Since so many factors play a role in the final outcome of wintering, it remains difficult to predict the outcome for each of BC's regions.

We will be releasing the 2020 spring survey soon. I urge everyone to take 5 minutes and submit their data anonymously. A high participation rate offers greater confidence in final estimates and provide an understanding about the factors that may have contributed to winter losses. The online survey form can be found on the www.gov.bc.ca/apiculture and select "Surveys". ❀

- Paul van Westendorp

bee notes

Broken Hive Tool...A Caution

I was at the Kamloops Field Day last year in June, at Lawrence Bergstrand's apiary, and helped with the demonstrations. The top cover on one hive was sealed tight and I used my hive tool to pry it up. The side of the cover was about 4 inches wide, and there was no proper inner cover, so I really had to push the tool up to loosen the top. I pried the cover off and as I did, I saw my hive tool bend and then heard a huge 'POP'. I looked at my fingers and they were OK, but the tool had snapped in 3 places. Lots of beekeepers saw this happen.

I bought this hook tool in Kamloops for $7.49 plus tax. The vendor said that he orders these direct from China and says that is why they cost $7.49. His store had a whole box of them. ❀

~ Ian Farber, Kamloops, BC

Honey Bees in the Time of Covid-19

Hive of ladies, thousands strong
We still work hard all day long
Stay at home and isolate
Is not the way we regulate
To Trudeau's edict "social distance"
We announce our great resistance
Let us be our natural cluster
Otherwise we start to fluster
Flying mad we may just sting
You'll learn the art of distancing
While we don't mean to be that funny
Please let us bee, to gather honey

~ Terry Huxter, April 2020

Kamloops Beekeepers 2020 Working Calendar

Due to COVID-19 the Kamloops club has not had in person meetings, and we have reduced the price of the 2020 Beekeeping Calendars. The cost is $13, which includes mailing. If you are interested please email Ed Perszon at edperszon@gmail.com to order. They are an excellent resource for beekeeping steps and tips for novice beekeepers and a great memento for experienced members of the Kamloops club! ❀

Vancouver Island Bumblebee ID

A little while ago some neat drawings of bumblebees were posted on a beekeeping social media page and I got curious, so with the help of Michalina Hunter who posted them, we tracked down the artist to find out more. They were drawn by Sandra Gillespie; below are her comments about the drawings and why they were created.

These are some basic body-colour pattern sketches of bumblebees that I drew back when I started as a postdoctoral researcher with Elizabeth Elle at SFU. The goal was to create a quick visual guide for students to use while we were studying bees in the Garry Oaks Ecosystem on Vancouver Island. We were doing observations of pollinator visits to different flowers and needed to ID bumblebees as they were flying in and out of flowers. Everyone had a colour photocopy taped to their clipboard so they could check if they weren't sure.

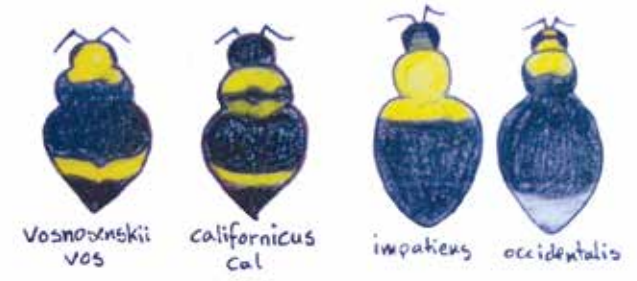
I got interested in bees way back in 2004 (I think!) when I was an undergraduate at SFU. I worked with Elizabeth Elle on some projects in the Garry Oaks and got excited about bee research. That lead me to pursue a PhD studying bumblebees and their pathogens way over in Massachusetts. Once I graduated I did some work in California then got the opportunity to come back full circle and work with Elizabeth in the Garry Oaks again.

I needed a tool to help students quickly ID bees in the field, and we needed something clear and east to read that we could make colour copies of to tape to clipboards. There may have been guides out there at the time, but since I do art as a hobby, it was easy enough (and rather fun) to sketch something custom for us to use rather than searching for something pre-made. The little codes like "mix" for *Bombus mixtus* were used to to quickly record data while we were doing observations. I'm pretty sure I used specimens from past research to create the drawings. Some of the species depicted have really variable colour patterns throughout their range, so the patterns depicted here are the most common on Vancouver Island.

I am still working in pollination; I'm an assistant professor in Biology at the University of the Fraser Valley. I'm conducting research on bumblebee diversity and bumblebee pathogens in the Fraser Valley. I'm also doing some work on pollination issues in agriculture, on cranberry specifically.

Here's a note from Michi that accompanied the post:
Thought I'd share my favourite bumblebee identification guide! I used this when I used to work in the SFU Elle pollination ecology lab for learning to identify bees on the wing. Aside from the two at top right, they show the most common bumblebee species you might see around on Vancouver Island and elsewhere in BC.
A few notes:
- *Bombus vosenesenskii* tends to have especially large queens!
- *B. flavifrons* and *B. mixtus* can have quite a bit of variation in the size and vibrancy of the colour bands, so it can sometimes be hard to ID them without a microscope. *B. mixtus* has black beside orange on the abdomen. *B. flavifrons* tends to have a darker thorax, and a v-shaped dark section at the top of their abdomen.
- *B. flavifrons* has two colour variations, one with orange and one with black. See the two different abdomen halves.
- *B. bifarius* has two light coloured dots near the base of their wings on their thorax (middle body section). They also have a dark version with no orange.
- *B. melanopygus* has a thick section of bright red/orange on their thorax.
- *B. impatiens* in the top row is an east coast species imported to B.C. for greenhouse pollination, but they frequently escape and form wild colonies.
- *B. occidentalis* used to be a very common species here, but now it's rare. This is likely due to a disease that this species picked up from Europe when it was bred for commercial pollination there. I've only ever seen one (I'm pretty sure) in Pemberton.
- Male bumblebees come out later in the season and are often more yellow and fluffy than the females, but this can vary by species. They can be very hard to ID without a microscope for this reason. I hope this helps some folks have fun IDing this season! ❀

Vancouver Island bumblebee species



B.vosnosenskii *B.californicus* *B.impatiens* *B.occidentalis*

B.flavifrous *B.mixtus* *B.bifarius* *B.melanopygus*

Research Review

Sampling the Honey Landscape: How beekeepers around the world are trying to prove their stuff

by Alexandra Nastasa

Alexandra Nastasa

You're at a specialty market browsing stall after stall of honeys, each promising to be more natural and healthy than the last. Maybe some people make up their minds by tasting, but you're more interested in the quality of the source, so you read labels. Acacia honey, 100% pure and premium quality, harvested only a few weeks ago right here in the Lower Mainland. Ironically, the information on that label could be as misleading as *Robinia pseudoacacia* (literally false acacia), the flowering tree the honey is purportedly made from.

Honey quality assessment is a complicated and international problem. Much like with wine, some people don't care about its provenance or calibre while some people devote their lives (and noses) to discerning the differences. And also much like with wine, the definition of quality is elusive but worth a lot of money. This has honey producers turning to scientists for more concrete answers on what it means for a honey to be high-value and how to protect the market from false claims.

One of these scientists is Dr. Mariana Mădaș at the University of Agricultural Sciences and Veterinary Medicine in Cluj-Napoca, Romania. She and her colleagues recently published a review of current tactics used when testing honey quality, then went on to suggest strategies for the future of honey origin authentication (Mădaș et al. 2020). And new strategies are needed. Although most countries and organizations, including the EU where Mădaș is working, have regulations in place around honey quality, the requirements are often vague, frequently costly and time-consuming to test (Bogdanov et al. 1999). Part of the problem lies with the complexity of the honey itself.

Honey is, at its most basic, a sugar syrup, but it's a sugar syrup with distinctive proportions of simple sugars like fructose and glucose, as well as a heady cocktail of trace pollen, honey bee proteins and enzymes, aromatic compounds, floral molecules, acids, vitamins and minerals, not to mention the occasional whiff of hydrogen peroxide (Pavlova et al. 2019, Wright et al. 2018). Each of these elements can vary with hive location, food source and honey processing, and most of them can be artificially adjusted to some degree. That's right, honey adulteration and falsification can happen at every level, from overfeeding honey bees sugar syrup during harvest, to heat-treating (and fundamentally chemically changing) honey to prevent crystallization, to adding flower-specific volatile compounds post-harvest to make the honey smell like it's something it's not (ElMasry et al. 2019, Kružík et al. 2017). Because honey price increases with a change in honey bee species, nectar source, apicultural practices and even region, artificially bulking up your honey volume isn't the only honey fraud to worry about anymore.

Even this relatively simple kind of adulteration is still somewhat of a challenge to catch. There are quite a few techniques currently being used to confirm that honey on the market is 100% real honey, but not all of them are conclusive if used alone and most of them require tedious biochemistry lab work. Bilikova et al. (2015) developed a test for the presence of royal jelly proteins in honey samples, which they found to be a key part of authentic honey and which confer part of its antibiotic properties. Other possible indicators are less proline (the most common amino acid found in honey) or changes in electrical conductivity (Soares et al. 2017), but these already vary so much between pure honeys that they'd make poor diagnostic tests without other data to back them up. A more promising strategy (Geană et al., 2020) already required by many regulatory groups is carbon isotope tracing, where the natural occurrence rate of carbon-13 (a heavier version of the usual carbon-12), in C3 vs. C4 plants is used to check purity. Because honey bees primarily collect nectar from C3 plants (such as fruit-bearing plants and most trees) while most sugar syrups are made from corn or sugar cane (both of which are C4 plants), a carbon-13 ratio closer to C4 plants in a honey sample is suspicious. For added security, the

What's the difference between C3 and C4 plants?

The major difference between C3 and C4 plants is where in the plant carbon dioxide is "fixed", or converted to sugar. Most plants are C3 plants, which go through their entire photosynthetic process in the outer cells of the leaves. Normally, this means that carbon dioxide is allowed into the leaf through pores and fixed in surface level cells by the enzyme rubisco. However, when concentrations of carbon dioxide get low, such as when it is hot and the leaves close their pores to retain water, rubisco can also bind to oxygen gas, which will lead to photorespiration, which eats up sugar molecules the plant has just produced. To avoid this, some plants in hot climates (C4 plants) have adapted to have separate cells where the carbon dioxide is absorbed and fixed. The surface cells still capture carbon dioxide and transport it, but the actual fixing by rubisco is done by bundle sheath cells the next layer down. Having this physical separation allows the plant to better control the concentrations of carbon dioxide and oxygen gas around rubisco and increases its carbon fixing efficiency.

protein part of the honey can be separated and its carbon-13 ratio measured. If the proteins and sugars have similar isotope ratios, it's likely both came from the same bees. If the sugar ratio differs too much, one might suspect some syrup doping has taken place. But even this strategy isn't enough to confirm overall quality or even honesty on the part of the honey producer.

As a specialty product, honey value varies with more than just purity. A honey's history can seriously affect its market value, and there is certainly incentive to advertise a honey as more unique or exotic than it really is. That's why Mădaș and her colleagues are concerned about changing data needs when it comes to confirming that a honey is "authentic". Confirming that a monofloral honey actually comes from the flower advertised or a regional honey was actually produced in that area should be possible with modern, fast technology that spits out lots of data and predictive computer algorithms, but what data is actually valuable and how can it be made more accessible to beekeepers?

The push toward using technologies like chromatography, mass spectrometry, and spectrophotometry is well motivated. These tend to be mostly automated, fast, less destructive, and lend themselves to a "fingerprint" approach rather than a direct comparison, meaning you don't always have to have the ideal honey example on hand. The first, chromatography, separates molecules based on a variety of chemical properties, and can be used (especially in conjunction with mass spectrometry) to identify proteins, aromatics, and just about every other type of compound transferred from flower to honey (Wang et al. 2009, Zhang et al. 2019). The second, mass spectrometry, measures mass. And the third, spectrophotometry, measures colour. Mădaș pushes for spectrophotometry in particular because it doesn't always require the destruction of any honey and the equipment is relatively cheap.

All three of these methods can provide a sort of data profile for a honey sample that can be compared to a database. But even if one has access to the right machines, it's still not clear what should go into the database and where that information will come from. What makes an acacia honey all acacia and how many acacia honeys do we have to test before we can find these common factors? The first question can be better answered by computers, although that doesn't mean it isn't a challenge. Many kinds of predictive algorithms and clustering techniques have been used to characterize honeys from different sources (Soares et al. 2017, Akbari et al. 2020). The most exciting thing, however, is that machine learning, which is particularly well suited to this sort of job, is finally entering the playing field (Noviyanto and Abdulla, 2020) and may be the break needed to upgrade international honey categorization processes.

Even before the databases and categories comes the data collection, and scientists around the world are already contributing. In just the few original research papers used for this article, honeys tested include those from 4 different bee species, over 15 different floral sources, and over 10 countries. Each of these papers has some data, and therefore some insight, into the recurring compounds in honeys of those species, sources, or regions, which when put together could form quite a powerful database. Even rare honeys are being characterized by scientists particularly interested in them, such as the study by Giordano et al. (2018) of *Azara petiolaris* and *Azara integrifolia* honeys in Chile and Moujanni et al.'s (2018) characterization of *Euphorbia resinifera* honey in Morocco. These sorts of incremental studies can help bulk up our honey sorting repertoire and are vital to creating a common repository of data that is both compatible and complete.

Although not every study will prove useful, and quality control is always a balance between specificity and making the barrier to entry reasonable, as the question of what constitutes quality honey becomes more complicated, the way forward is collaboration. That collaboration doesn't end with beekeepers and biochemists, but rather extends to physicists and engineers developing and maintaining standards for the use of new equipment, and computer scientists and statisticians using the data gathered effectively, all across the world. In this way, honey quality is its own microcosm, imitating the needs currently arising in all of science. It turns out getting your honey to match the label is actually pretty hard. ❀

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Bee Research Update from UBC

by Mopelola Akinlaja

It has been an interesting few months since the last update from the Foster lab, needless to say. What started out as minor health advisories evolved into full-blown state of emergencies and now, we are all adjusting to the new way our lives are looking these days.

In the spirit of trying something different the only update I will provide for this issue is that we are all safe and are anticipating being able to get back to work again. A few people from our lab have been able to go out in the field with the bees for some field work and we occasionally get cheerful reminders that the ladies are having a good time in the warm spring weather.

Swarm caught at one of the UBC colonies.
photo by Bradford Vinson

Since we haven't been up to much in the lab, I am going to talk about an interesting paper that I read recently. The experiments described in the paper titled "Honey bee microbiome is stabilized in the presence of propolis", were done as a collaborative effort between the US department of agriculture (USDA-ARS), the Alberta Beekeepers Commission and the Marla Spivak lab at the University of Minnesota.

We know that honey bees collect plant resins and mix them with wax to form propolis, which they use as a hive sealant. While honey bees are not typically known to directly ingest propolis, several studies have attested to the antimicrobial properties of propolis for the benefit of bee health, both in domestic and feral colonies. The honey bee gut has a core community of bacteria (microbiota) comprised of ubiquitous and specialized species, linked to several phenomena that support overall bee health. The microbiota is usually a good place to look at, especially for immunity related experiments.

Mopelola Akinlaja

This article looked in the specific context of the bee microbiota to observe the impact, if any, of propolis. They hypothesized that "the honey bee microbiota has co-evolved to thrive in the presence of propolis" and their goal was to observe how the presence of propolis in bee colonies impacted the structure of the microbiota in the honey bees.

To test this hypothesis, they conducted a study that consisted of two groups of colonies: a treatment group that was propolis-rich through the use of propolis traps that aided the bees in constructing an envelope around the colonies, and a propolis-poor control group that did not contain traps, and as such, only had propolis deposited in the crevices of the boxes.

They marked newly emerged bees in each colony and sampled the marked bees after 7 days for analysis. They extracted and purified DNA from the samples followed by genomic sequencing that allowed them to identify the microbial species present in the different conditions (for the full analysis, refer to the paper).

One of the key things their analysis found was that there were eight bacterial types that were significantly different between the two conditions, four of which were part of the core bacteria. Some were more abundant in the propolis-rich colonies relative to the propolis-poor colonies and vice-versa. Another interesting thing that they found was that the propolis-poor colonies showed greater diversity in terms of the bacterial population, relative to the propolis-rich colonies.

These results indicate that propolis might indeed play a role in regulating the honey bee microbiota in some way. They described some future experiments that are good follow-ups to this study; it will definitely be interesting to see in more detail how propolis is playing a role in regulating the honey bee microbiome. ❀

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Bees, Smoke and Fire

by Lance & Bobby Cuthill

We have had some experiences with our bees, smoke and wildfires here in the Cranbrook area. As recently as last spring our truck caught fire while we were working in our bee yard (an electrical problem). The burning insulation on the wires lit the canopy and the grass under the truck on fire. We always carry 10 L of water and a 5 lb powder type fire extinguisher, and got the fire out but not without $7500 damage to the truck; luckily this was covered by our truck insurance. I shudder to think what could have happened if the gas tank had ignited.

We haven't had our bees on crown land in this area so we're not aware of any regulations or insurance requirements. However, we are most reluctant to light and use a smoker in the extremely, hot and dry field conditions which seem to be the norm from mid-June to late summer here in the East Kootenays, so that has had us looking for alternatives.

First we experimented with aerosol canned smoke which we found to be less than useful. In fact, the bees objected to it and became increasingly more aggressive regardless of the level of usage. As well, the small tins of this canned smoke were costly and didn't seem to last very long. We have now settled on using a light sugar syrup spray (5 to 1 water to sugar). We have found it to work in getting the bees to be less aggressive, but this syrup spraying was much less effective and took a lot more time than a few puffs from a smoker. Adding barbeque liquid smoke flavour to the sugar syrup was no more effective than using the straight water and sugar mix. In addition, it is not a good idea to add things to the syrup which might affect the flavour and safety of the honey.

With regard to bee behaviours in heavy smoke due to wildfires: our bees, at first viewing, appeared to be nectar foraging. After further investigation, they were actually hauling in water. At the hive entrance the bees were fanning; about 1/2 the bees were fanning air into the hive while the other 1/2 were fanning air out of the hive. Every crack and opening was propolized shut including extra propolis on the lids. After extra heaving and prying, the lids were removed, showing hundreds of droplets of water on the tops of the frames. Wiping off these droplets with a kleenex showed them to be loaded with smoke particles. Amazingly, the bees had produced a swamp cooler and an air cleanser. They were cooler and breathing better air than I was on the outside of the hive. Although I'm not positive, I believe nectar foraging had stopped in the heavy smoke.

Just a few of our experiences and thoughts from the East Kootenays. ❀

Smoker Safety Tips

Before starting out to your bee yard, realize that hot weather, dry vegetation and smokers are a dangerous combination. The following are a few safety tips:

Have a fire extinguisher, and check for pressure and expiry.

Have water available for fire extinguishing.

In dry weather, wet down the ground around where you light your smoker.

Use your smoker gently, with fuel that produces little or no sparks.

Set active smokers on an extra metal covered bee hive lid or some other fireproof space.

Consider using a closed metal container for smoker transport.

If your bee yard is on someone else's property, do you have permission to use a smoker?

Review what insurance you carry in case you start a fire.

Never leave active smokers unattended. ❀

Ask the Buzzers...

As the saying goes, if you ask three beekeepers a question you'll get four different answers, so advice should always be carefully considered, especially in terms of location. Always consult experienced, successful beekeepers in your area.

Please send questions and responses to the editor at BeesCene@bcbeekeepers.com.

The questions and answers in this issue were left over from last issue – we ran out of space! We had a few of last fall's education day speakers participate; thanks to all for taking part.

Q: Are there any shortcuts for requeening after the swarming season? What is the acceptance rate of introducing a caged queen cell to a strong colony after the swarming season to replace the old queen?

A: It depends on where you are but I wouldn't requeen after the swarm season which for us is early summer. I would wait til late summer when queens are readily available (August - September) and do it during or after a good flow or feed the colony (better acceptance) giving the queen time to establish a good brood nest for the late flow going into winter.

~ Bruce Little, Vancouver

A: I prefer to make up nucs & re-queen with them. Acceptance rate is virtually 100%. Re-queening with queen cells is more difficult to monitor, but is effective, provided we have good mating weather. *~ Peter Christie, Dawson Creek*

A: In beekeeping shortcuts usually lead to disasters. The accpetance rate of a caged queen cell depends on how it is done and on the temperament of the hive.

~ Mike Campbell, Abbotsford

A: Introducing a mated queen is the fastest way I believe. There are so many ideas/methods on how to introduce queens and queen cells, it is impossible to peg a number for acceptance rate. The strong colony has to know it is queenless. It's best if there are no eggs or larvae present for them to start a queen cell, and the colony needs some time to get acquainted with the new queen before she is released.

~ Barry Clark, Prince George

A: I call this "induced supersedure." During the extremely contentious times leading up to the Canada/US border closure, Dr. Don Peer and others promoted this as a way for us to gain self-sufficiency. Dr. Peer maintained the success rate of requeening with ripe cells in mid-summer was 80%. I received grant money from Saskatchewan Agriculture in the early 80's and tested this procedure. We marked queens in a block of colonies, planted cells in them in early July, wintered them and checked the queens in spring over the course of 3 years. The highest change we got in those three years was 17%, and that change would have included natural supersedure and swarming. I was amazed to find quite a few of the original queens still in place after three years.

~ Steve Clifford, Sunshine Coast

A: Introduce a mated queen to accelerate the process. When requeening this way we remove the old queen a day before introducing the new mated queen. We introduce the new queen alone in a cage with a slow-release candy plug. The colony will chew through the candy to free her in about a day and she will usually get on with her queenly duties right away. We check to ensure she has been released from the cage two days after introduction or as we are able, and then leave things alone for a week or so to let her get established before we will do a more thorough inspection to ensure she is laying well and everything looks as it should.

In our experience, acceptance rate for a caged queen cell is exactly 0-100%. I'd be lying if I said we had tracked our acceptance rate with this method exactly, but I'd have to guess something around 70% success rate this way. Remember the new virgin queen has to stage a coup, and then successfully return from mating flights, and it is often that we won't know if she was rejected or perished while outside the hive. It can be a great way to re-queen the colony if you can't or don't have time to find your old queen, certainly we have done it, but we prefer to ensure the old queen has been removed or killed and dropped back into the hive to increase acceptance rates.

~ Darwyn Moffatt Mallett & Michalina Hunter, Errington

A: This is tricky. Why do bees accept and why do they sometimes refuse over and over a new queen? Atmosphere in the colony created by population demographic and outside environment; still mysteries but I now have many tricks up my sleeve for introductions and what I need to bear in mind. I also leave a caged queen on top of the frames for a while to see the initial reaction of the bees - do they jump on the cage and curl into a stinging position or gently start to explore the mesh and start feeding her? Can you gently brush the bees off the cage or are they attached with an "unkind" ferocity?

A trick from Phil Laflamme I learned a few years back - if you really have no idea of what is going on in a colony introduce a frame with eggs and leave it for 4 to 5 days. Upon return, if they have drawn out queen cells the colony is queenless. If they have not drawn out a queen cell, they have a virgin in there - hence no eggs but a sense of order with the bees explained. Many, many people introduce caged queens into colonies which unknown to the beekeeper have virgins. I would suggest this is one of the most common reasons for failure of acceptance of the bees and frustration for the beekeeper after swarming season. Listen to the bees: do they

seem in order if so why? There must be a queen in there but she is not yet laying. Patience, and knowing your math so you can calculate when changes should be visible. It is an expensive business to keep requeening because you are in a hurry.

Other things to keep in mind: forage availability (need a good flow, so good nectar coming in or feed and spray the bees with sugar syrup as you are introducing). The cage itself - duct tape to prolong the time before she emerges, and come back in a few days to take off tape but leave in the candy so it is another 2 days before emergence from cage. Do not have attendant bees in the cage as that could be another barrier to acceptance. You can merge in a small nuc with their queen and then rearrange things later once the queen has been immersed in big population. Finally the age of bees in the box, do you have the right demographic - should you introduce a frame or two of capped/emerging brood with the cage placed near emerging brood?

~ Julia Common, Delta

A: The best shortcut would be to buy a queen from a certified producer.

~ Steve Mitchell, Duncan

A: In terms of time and effort use queen cells so long as the colony has been 30+ days without a laying queen and as long as the colony is not critical for honey production and there isn't a concern for colony strength for overwintering. Honey yields might be slightly increased if there is no brood to feed. Requeening is probably as challenging as raising queens in terms of investing time and effort.

~ Gerry McKee, Burnaby

A: Make sure the hive you are going to introduce the queen into is queenless. Introducing queens to hives is more successful when there is a flow on. You can simulate this with as little as 250 ml syrup (how much to use depends on what kind of a flow is happening naturally). Smaller population times like spring or in nucs are easier introduction times. It also helps if the field bees are out of the hive. Ideally, you want queens that are not caught too early, banked too long or caged too long. Introduction is more successful without attendants, but you have to weigh the risk of whether you will hurt the queen in removing the attendants. We requeen throughout the season, but the closer to late summer or fall that we get, we change from introducing a caged mated queen to requeening with a nuc. We keep 5 frame nucs on hand, cage the queen, and put the queen with her combs of brood into the hive that we are trying to requeen. Sometimes, we also shake the brood box out a foot or two in front of the hive so that the bees we are trying to requeen have to crawl back in to join the new nuc. I'm not an advocate of requeening with a cell because from what I've seen it rarely works and that is a lot of effort to raise those cells for them to die.

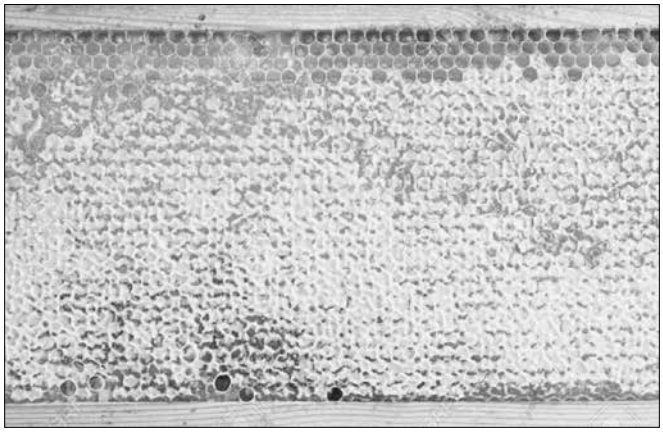
~ Karen Pedersen, Cut Knife, SK

A: Nope, it's all the same. I primarily use queen cells now, but I have battled with introducing hundreds of mated queens each year for years. The trick is to integrate your management in with the natural colony behaviour. To introduce a mated queen, you want the old one gone and you want the hive looking for a new one. Hungry bees are cranky bees so it helps to do this during nectar flow or feeding. I believe in the slow release method (2-3 days) without any disturbance for at least a week. I also believe in good old fashioned LUCK.

~ Ian Steppler, Miami, MB

A: There are no short cuts, but different handling methods are required. Later in summer queens are easy to obtain and cheap, but the introduction process becomes more complicated and the acceptance rate tends to go down as the season progresses. In the spring you may be able to sneak a new queen in. Later acceptance will be increased if the old queen is removed, the hive left queenless for a day or two, and the caged queen released by slow release. A lot of extra bother; if you are really lucky the hive may supercede and save you the trouble.

~ Rick Plantinga, Kelowna



Q: All the books say that there are 7 lbs of honey per deep frame, but when I extract 30 boxes, I average closer to 30 or 40 lbs per box. There are always a couple of light boxes, but in general, are there really 7 lbs of honey per frame?

A: The extraction process does not remove the honey that wets the cell wall, which will account for a considerable amount of the weight, given the surface area involved.

~ Peter Christie

A: 35 lbs is a good average for deeps. *~ Steve Clifford*

A: A standard super usually averages 50 pounds of honey and a medium (Dadant) super averages 30 pounds if the frames are evenly spaced, and providing they are all capped.

~ Joe Lomond, Savona

A: That may be a tad high. I use the number of 6 lbs on a "full" frame when using 10 frames. I believe 7 lbs would be possible on a full frame when using 9 frames per super. It's not often that we walk the edge between maximum storage and introducing the swarming impulse by overcrowding, so it is easy to have frames that are not "full" depending on where the supers lay in the stack. The bees are storing honey in relation to their brood chamber and the expansion and contraction of the future brood chamber, not to help us maximize our returns on the least number of frames. *~ Eric Anderson, Quick*

A: Don't doubt your beekeeping management! Beekeepers like to brag about their productive hives. The same applies to the wild claims about the number of eggs queens lay per day, or the total number of bees in a strong colony at the end of summer. It is important to remember that some beekeepers of Prairie provinces only install 8 frames in their honey supers and allow the frames to become "thick". I suppose it means less manipulation and less frame extraction in the honey house at the end of the season. These "thick" frames can probably top 7 lbs in areas such as the Peace with its legendary crops.

~ Paul van Westendorp, Delta

A: If you run 9 frames per box you can easily get 7 pounds per frame if fully capped. *~ Frank Blom, Kamloops*

A: I weighed some frames last year and I would say my average was 5 to 6 lbs per frame. My heaviest deep frame was almost 8 lbs. Med boxes were average 25 to 30 lbs.

~ Murray Willis, Kamloops

A: Written statements are only a guide as there are many factors affecting the amount of honey in a frame. Factors like weather, sources of nectar, colony strength, time of harvest and so forth affect honey production and yield, including methods of extraction such as separating honey from cappings. Inexperienced beekeepers are often disappointed in not realizing the amount of nectar a young colony needs to build comb on bare foundation. *~ Gerry McKee, Burnaby*

A: During peak honey season it is common for beekeepers in Saskatchewan to have 5 supers on their hives. We usually strip the hives (harvest honey) more than once. At either 9 -10 frames/super with 7 lbs/frame, that particular stripping would have between 315 - 350 lbs. The highest number that I found in a quick check of hive weights on my computer was 300 lbs in one stripping. I don't know where you read 7 lbs/frame, but I think they're wrong. *~ Karen Pedersen*

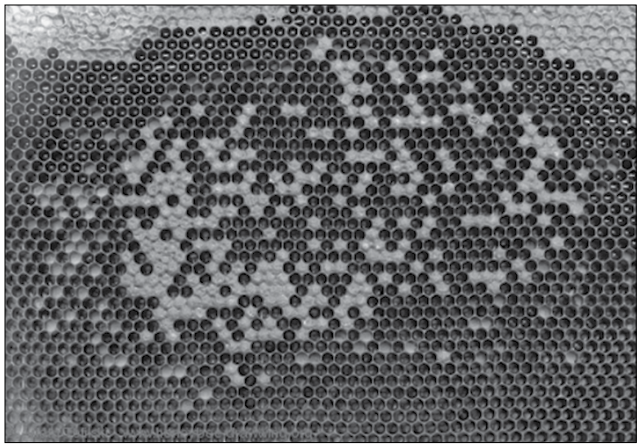
A: Only when chatting with beekeepers in the hallways of a convention or meeting! But in the honey house, we need to consider the tare of the frame also. 7 lbs frames, in a 9 frame box will gross 63 lbs. Typically we average 65-70 lb honey boxes. If a tare of the frame is 2.5 lbs, that leaves 4.5 lbs net, or roughly 40 lbs. And if that is the case, you should be smiling. *~ Ian Steppler*

Q: Why do brood combs turn so dark?

A: Every time a bee is raised in a brood cell, she leaves behind a single cell layer form her cocoon/pupal stage. Over time, the brood cells become darker and smaller. It is recommended that brood frames be removed after five years and replaced with new clean brood frames. Over the years, house-cleaning bees do their best but old dark comb may not only be harder to clean, it may have also absorbed some residues of mite control products that were applied in previous years. The proprietary formulations of Apistan, Apivar and Coumaphos are purposely fat soluble so that they will not end up in honey, but they will migrate into wax. It is good hygienic management practice to get rid of old brood frames and replace them with fresh clean brood frames. *~ Paul van Westendorp*

A: The books call it "travel stain". I always said that's what happens to my bee trucks. *~ Steve Clifford*

A: Every time a bee hatches, a cocoon or pupae skin is left behind, and eventually the dark brood combs become mostly those skins and most of the wax has been removed from them

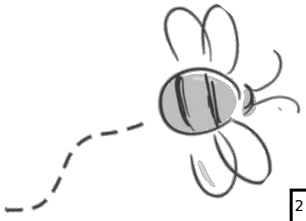


by the bees. It's why melting dark brood combs doesn't yield enough wax to pay for the melting of them. *~ Karen Pedersen*

A: Each time a cell is used to raise a new bee, she leaves behind the last moulted larval skin inside the cell which cannot be removed by the cleaning worker bees and which is dark in colour. There is also a gradual build-up of propolis in and on the wax of the brood comb cells. We all know that older brood comb is stronger and harder than honey comb. Brood comb is also used more that honey comb with another bee cycle every 21 days. There is also much more traffic on brood comb that honey comb. All these factors cause brood comb to strengthen, darken, and for the cells to actually decrease in diameter. Ultimately the queen can no longer get her abdomen into the cells to lay an egg. In a natural situation like a hollow tree, the colony might abscond at this point to new location. The old comb would then be destroyed by other insects thus emptying the cavity which might then be re-occupied by a new swarm at a later time. ❀ *~ Axel Krause*

Wanted:

Fireweed honey samples
for research purposes.
Please contact
Ted Hancock
at hancock.ted@gmail.com



Beekeeper's Puzzle

Across

4. dance indicating nearby nectar source
5. protein source for honey bees
7. act of collecting nectar or pollen
8. hexagonal wax structure made by bees
10. a site where hives are kept
11. defense structure
14. structure for a colony
15. dominant nectar source on Canadian prairies
16. structural material of comb
17. behaviour involved in disease resistance

Down

1. bee which performs many tasks
2. male bee
3. egg layer
5. plant derived adhesive
6. result of over-population
8. large group of bees surrounding queen
9. respiratory system
12. source of sugars used by bees
13. derived from nectar

~ Submitted by Steve and Gail Mitchell. Contact the editor if you would like to be sent the answers.

Canadian Honey Council

Stan Reist,
Canadian Honey Council Rep

It's that time again, where do I start. I guess Covid-19 has turned the world upside down. In January we heard how the California queen producing area was protected and policed to ensure it was kept free of pollinating hives that could jeopardize the production of queens for export. The short version is that an almond orchard changed hands, the new owner got hives from Florida, and one of those hives tested positive for Africanization, which caused permits to export to be pulled. As if Rod Scarlett didn't have enough to do already dealing with the foreign worker issue and charter flights to bring them in. Many phone calls later, and a lot of cooperation, and the whole thing was straightened out. Thanks to Rod and Connie Razman in Ottawa, and officials with California agriculture, exports were restored.

Along with this, flights from NZ were curtailed and that meant no packages were being shipped. There were some early packages that made it through but the later shipments didn't. The queen shipments from Hawaii were no longer being shipped by Air Canada and that also included the queens from California. The queens from California are coming in by UPS and are picked up at a YVR hub. The queens from Hawaii are being brought in to Seattle and are then trucked or couriered to this side of the border, and then Derrick Johnson of the Alberta Honey Producers' Co-op and his wife are picking them up and transporting them back to Alberta. A big thanks to Derrick, his wife and the Co-op.

Getting temporary foreign workers into the country, which a lot of farming operations depend on, has been a big issue. Some of the early ones made it in and then the flights diminished, the embassies closed, passports and clearances were caught in limbo. No people at work to answer phones made it very difficult. The CHC stepped in and Rod was organizing charter flights. The charter airlines wanted the money up front and only were willing to deal with one entity, so the CHC fronted the cost of the charters to make it happen. The first flight was from Nicaragua and also brought 36/40 civilians back to Canada at the request of the embassy. The embassy usually hands out maple syrup samples; they are now requesting honey samples for nifty gifts to promote Canada and as it stands now, there is also a second flight about to take place.

With the loss of packages from NZ, this has created a whole new issue with stock replacement. Alberta is hot on the trail to push for opening the US border to cheap American packages. The last prices I saw, including the exchange rate, are really getting expensive. The losses in Alberta are varied, and to date I have not seen a confirmed number, but they range from 10% to 80% loss. In the last number of years we have conversations around hive losses and the consensus is that it's not if you're going to have a wreck, it's when it's going to hit. This is not something that hasn't been discussed. It's the same as we need more tools to deal with the varroa mite but again, the point that comes up is, "well that's too expensive of a treatment". You can recover the cost of treatments from a live hive but you can't recover anything from a dead one.

The CHC has also requested that all the provinces do a count of nucs and packages that might be available to assist AB in finding replacement stock, and also to give monetary aid for packages, and again Rod working with AAFC in Ottawa. There has also been a request from some BC beekeepers for American packages.

Throughout this whole process Saskatchewan is waiting to get into their hives and see what their losses are. I have heard from some and the losses are not that bad but again, not all the wrappings are off. Saskatchewan is in the position of sitting on a substantial amount of overwintered nucs; if they are not needed then maybe some will find their way to AB.

The CHC has been promoting stock production, better overwintering and interprovincial movement of bees in the past few years. The aim is to have a standard framework that can be used in all provinces to facilitate trade within Canada, and to move stock with a high degree of confidence so that when situations arise, they might not be so difficult to deal with. One conversation we had amongst representatives was queen rearing courses in Spanish, to facilitate the production of queens by foreign workers in Canadian operations, and reduce the dependence on queen imports. The more we keep importing the better the chances of getting a gift that we really don't want. ❀

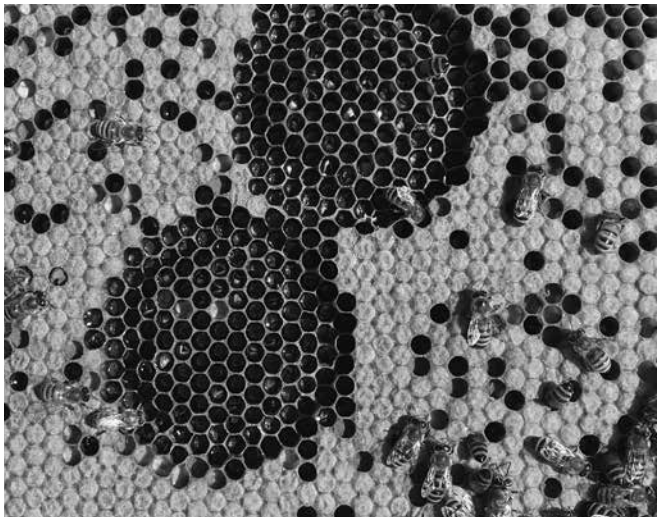
Bee BC Projects

Instrumental Insemination - Darwyn Moffatt-Mallett

My partner Michalina and I began hobby beekeeping in the Squamish Valley in 2014, and we have grown our little business we call Green Bee Honey into a small scale honey and queen business. We have focused on supporting native pollinators alongside our beekeeping operation, and raising honey bee queens that are adapted to our local climate and resistant to pests and disease. In late 2019 we moved to a property in Errington on Vancouver Island, and our bees came with us.

Raising queens has been my interest from the beginning of my beekeeping adventures - the first year I caught a swarm I began raising queens by cutting strips of cells with freshly laid eggs (easy because I had only a top bar hive without foundation) and wax-gluing them on a cell bar. I taught myself to graft the following year, and learned about some neat ways to improve efficiencies for small scale queen rearing. I built incubators for finishing cells out of old fridges so that I could graft every 6 days, and researched and tried different arrangements for queenright starter/finisher colonies so I didn't have to keep shaking bees into a starter. It didn't take very long until we latched onto the idea that locally adapted stock is important.

For the past two years we have been invited to contribute to a bee improvement breeding program on Bowen Island initiated by Dr. Leonard Foster of UBC and his team, alongside other much more experienced local bee breeders. This project primarily focused on selecting for hygienic behaviour, and contributors used standardized liquid nitrogen 'freeze-kill' field assays to score our colonies' ability to remove the dead brood. Top performing colonies from each beekeeper were further tested in the Michael Smith labs at UBC using Mass Spectrometry, to detect the presence of proteins associated with hygienic behaviour. The combined top scoring colonies were selected for drone and queen rearing, to be transported to isolated mating yards on Bowen Island.



Results from some of the field hygienic testing.

Virgin queens mate in the air with multiple partners and store sperm for fertilizing their eggs for their entire lives. A well-mated queen may have partnered with as many as 20 drones from random nearby colonies, which can make breeding queens for specific traits extremely difficult. Drone flooding a mating yard by adding many drones from selected colonies to the area, or moving mating colonies and selected drone producing colonies to isolated areas are effective methods of breeding honey bees but cannot absolutely ensure that queens have mated with the intended partners. To be certain of the intended mating partners, queens can also be instrumentally mated, or inseminated, using specialized equipment. Instrumentally inseminating queens can accelerate selection in a breeding program by allowing the beekeeper to hand pick the drones from selected colonies for semen collection and subsequent insemination of virgins also raised from selected colonies.

Drone mothership on Bowen Island.

Since we began to be interested in breeding honey bees I have wondered about instrumental insemination of queens, although I don't think I really ever expected I would have the opportunity to learn the technique. When we began contributing to the project on Bowen we learned a great deal from the other breeders about the organization and background work that goes into breeding honey bees, and how difficult it can be to achieve isolation from other colonies that could be harbouring unintended drones that may mate with selected queens. I wondered if instrumental insemination might make it easier to achieve our breeding goals, or to provide additional queens on top of those we could produce already with the project. In

the 2019 season I applied for support from the Bee BC funding stream to learn and incorporate instrumental insemination (I.I.) to our breeding efforts at home and for the Bowen Island breeding project. I reached out to Susan Cobey inquiring about training, and managed to sneak into one of her later-season I.I. courses at her home apiary on Whidbey Island, WA.

Sue Cobey showing off the laying pattern from some of her I.I. queens during our course.

The grant covered part of the costs, and I am very grateful for the opportunity to train in this specialized field from one of the best. The course was three days, and much more than I could have hoped for - there was a fascinating bit of history and some theory to go over, and then for the most part it was all hands-on training. I absolutely loved it.

I do remember laughing to myself for thinking that instrumental insemination would simplify things for us...there are a lot of very tricky elements that require careful planning and execution, as well as good eyesight and dexterity. Oh, and practice, which we don't have nearly as much time for when 8+ months of the year aren't all that great for queen work. Sue is an excellent and patient teacher, and coached us through some common roadblocks and pathways to success. I was thrilled that the queens I inseminated in Sue's home lab had the marbled spermathecae indicative of quality mating, and lived (well...until Sue dissected them to examine their spermatheca to see if we were successful a few days after the course).

Dissected spermathecae, poorly inseminated on the left, (opaque, paler) virgin in the middle (clear) and well inseminated on the right (nicely marbled, creamy).

Collecting quality drone semen (or germplasm) was tricky until I got the hang of it. It is very easily contaminated and the tip of the syringe must not become clogged with the mucus that the germplasm rests on. Some folks seem to really struggle with this part of the process. If the drones are not the right age or mood they may not give you much for germplasm, or if they are in especially too good of a mood (haha) they may express themselves a little too violently when stimulated and an audible 'pop' is heard as the germplasm sample is ruined from contamination. If anyone had told me when I started beekeeping that in a few years I would be sitting for hours in front of a microscope with some 'mood-lighting' and smooth jazz, manually stimulating drones so that I could collect their semen, I'd have had a pretty good laugh.

In Sue's teaching lab at her home apiary. My station on the left.

The view through my microscope with a virgin queen about to be inseminated.

There were other challenges: if stored too long in holding cages the drones can become 'poopy' as they haven't had a chance to fly, defecation during collection makes sterile technique difficult, and the whole process becomes stinky and gross. I came away from the course with a renewed appreciation for the importance of abundant, quality drones. I'm confident in saying that the drones are as big a factor as the queens when it comes to I.I., and likely more difficult to coordinate well.

I spent time trying to emulate some of the equipment Sue uses once I got home from the course. I needed drone holding cages; larger queen cages to allow the newly inseminated queens space to 'run', which helps with sperm migration to the spermatheca; more push in cages - new for I.I. queen introduction; the numbered discs for marking our I.I. queens, and so on.

These are the cages I contructed following Sue's design, long and thin to allow the inseminated queens space to run.

While the bulk of the queen rearing season was over by the time I was home from the I.I. course, I was still able to get a couple more rounds of practice in last year at home before the season came to a close. Setting up at home on the kitchen table was a little different than in Sue's bee lab of course. Although I was able to inseminate and store a good number of queens in the larger mesh cages, introducing them to colonies and getting them to begin laying is a whole other chapter that we only had time to cover in theory during the course. I managed to get a few of the queens laying before winter, which felt like quite a success, and I am really looking forward to this queen rearing season so I can set up the equipment and continue to practice. I hope to be able to assist in future research projects requiring the use of this technique.

All set up for havesting drone germplasm on our kitchen table at our rental in Squamish (sorry again to our old roommates).

I would like to extend special thanks to Leonard Foster for his support and encouragement of this application and project. Many thanks also to Heather Higo, Nancy Leonard, Ian Kennard, and Bradford Vinson for their many contributions to this project (drones, queens, and otherwise).

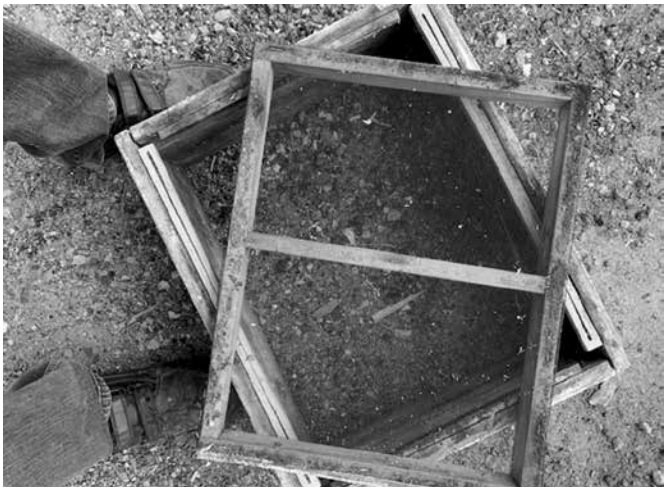
Evaluation of Control Measures for High Humidity in Hives

- Michael Campbell
in partnership with Kwantlen Polytechnic University, Emma's Acres

This project is looking at the use of various absorbent materials in pillow boxes to determine their effectiveness in controlling moisture buildups and temperature control in overwintering hives. Data loggers were placed in 12 hives to record temperature and humidity all winter long and they were placed on the inner covers under the pillow boxes, and all of the hives were evaluated for survivability.

Data logger.

The process we followed was to screw 1"x 2" frames covered with vinyl screening to create a false bottom for a shallow box, for the top of each hive. Then each was filled with a different absorbent material: shredded paper, fir shavings, pine shavings, or sawdust from the table saw. This created our pillow box. Some of the hives were fitted with 1 inch rigid insulation on top of the pillow box. The data loggers, protected by vinyl netting, were placed on the top of the inner



Insert covered in window screen.

covers of roughly equal single box hives, and each pillow box was weighed and placed on top of the inner cover. We found that the bees did not propolize the risers or the pillow boxes so we secured the whole hive with baling twine to prevent wind damage. All pillow boxes were weighed in late October when they were put on the hives and again in late April when they came off.

We normally use a bit of dry sugar on top of the inner covers to provide an insurance supply of food in late winter, but were unable to do this as it would interfere with the data loggers. So we opted to instead install a second shallow box under the inner cover and fill it with a mixture of sugar baked with organic apple cider vinegar (7 oz. of apple cider vinegar were mixed with ten pounds of white sugar, and baked for one hour at 200°F). This created a very dry crumbly mass that covered the frames and left a small air space below the inner cover. The use of the baked dry sugar produced an unexpected surprise – the bees seemed to prefer it even to honey, so several of the hives had to have the sugar replenished part way through the winter. I am also curious if the apple cider vinegar has had any effect on either mite or *Nosema* levels. I suspect the sugar cake acted as a powerful absorbent and I wonder if it also acted against *Nosema* and mites because both were non-existent in any of the hives in the spring.

Pillow box filled with shavings.

Sugar cake.

So far we have not analyzed the data from the data loggers but there does not appear to be a significant difference in the weights of the pillow boxes attributable to their absorptive medium. There are some hopeful results: we had no accumulations of water in any of the hives and only two hives died during the winter - both had been badly damaged by wasps in the fall and had small populations which could not maintain the heat when we had a cold snap. All other hives in the study survived to spring and appeared to be from acceptable to strong in strength. ❀

These projects are supported by the Bee BC program; delivered by the Investment Agriculture Foundation of BC, with funding from the Government of British Columbia.

funding provided by:

Investment Agriculture Foundation of British Columbia

BRITISH COLUMBIA

Spring Beekeeping Tips from the Central Cariboo Club's Education Committee

As we prepare for the arrival of nucs and queens, our club's Education Committee offers some helpful hints as well as timely University of Guelph Honey Bee Research Centre YouTube links.

Apiary Site Selection and Set-up: https://youtu.be/rhGPVFupkzA

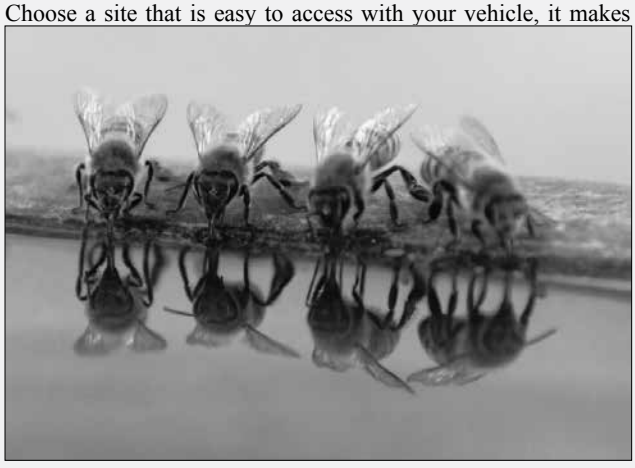
Does your apiary site have enough nectar and pollen sources available nearby? What is your elevation? How many neighbours around you have bees? Bees have a flight radius of about 4 - 6 kms to forage, but long flights take a lot of energy!

If possible, hive entrances should face south or southeast. Bees thrive with morning sunshine on their hives.

Place your hives far enough away from an open water source so that you don't have problems with them flooding after a heavy rainfall or in the spring when the snow melts. Make sure the hives stay dry, moisture can be worse than heavy frost. Avoid hollows where the cold sinks down; air circulation is desirable.

Bees need water. If your apiary site does not have a natural water source like a creek or lake near by, it is best to provide some water. The bees need to be able to drink without getting washed away. Provide a shallow dish or birdbath with rocks in it for them to land on, or a wooden board or branch on top floating on the water, etc.

Choose a site that is easy to access with your vehicle, it makes



moving equipment so much more convenient. Full honey supers or other equipment can weigh a lot, and your back will appreciate you planning your site well!

An electric fence needs multiple strands (4 to 5) of wire, and a battery with at least 5000V to keep predators out. Bears are resourceful and will try to climb up trees or other obstacles to get over the fence or will dig under. Build your fence an arm's length away from the hives to prohibit bears from reaching in to topple hives. Plus it gives you enough room to easily move around the hives, move equipment, etc. Use a fence tester instrument to confirm it is working properly. Keep vegetation from touching the fence.

Nuc Transportation & Installation:
https://www.youtube.com/watch?v=5mOXm1DChyI

Keep the box upright during transport, do not let frames bounce and accidentally kill the queen. The frames should be perpendicular to the side of your vehicle, lengthwise to minimize movement.

Bees in transport containers tend to overheat easily because the boxes are often quite full with bees and the entrance is screened off. It's a challenge for them to move air through the frames to control the temperature.

It's best to install the nuc into your hive equipment on the same day or the day following arrival. Feed with syrup, 1 part sugar : 1 part water, until the colony is strong enough to forage for themselves. This promotes wax building and helps the worker bees concentrate on brood care. The bees will stop consuming the syrup if they don't need it anymore.

Only use white sugar, not brown! Brown sugar is very difficult for bees to digest.

Pollen provides the protein needed to raise brood; seeing foragers bring in pollen is a good sign. It usually means that the queen is laying and new brood is being reared.

When you move the frames from the nuc box into your brood

chamber (super) place them in the centre positions and arrange the empty frames on the outside.

Drawing out wax takes a lot of time, resources and work. 1 part of wax requires 7 parts of lost honey production.

Getting your first hive(s) is very exciting but try to not look into your colonies more than once a week. By disturbing them too often you risk accidentally killing the queen.

Queen Care & Introduction & Splitting Hives - Requeening: https://youtu.be/uBfTecAg2RQ

Splitting Hives: https://www.youtube.com/watch?v=FwGWN0AyoFg&feature=youtube

While transporting the queen, it is important to be careful to keep her out of direct sunlight to avoid overheating or cooling her down too much. Temperature changes can impact her fecundity.

If the queen is not getting introduced into her new colony the same day, keep the cage at room temperature away from direct light. Apply a few, drops of room temperature water to the cage screen twice a day and be sure the candy plug is underneath to ensure the queen and attendants don't perish.

Tape the plug. Insert the queen in a queenless unit. After she has been in her new home for 2 to 3 days, remove the tape. Two days later see if the bees have released her from the cage by eating through the plug. If not, you can release her yourself.

The Univ. of Guelph gives several hive splitting options, well worth watching this series!

When to Expand Your Hive - Supering A Hive: https://youtu.be/F38kxYcYMTM

You need to add a second brood super when you see bees covering the tops of 8 – 9 frames and multiple frames of brood are present. Avoid adding a super too early! Too much room makes it more difficult to control the temperature inside the hive and the brood might get too cold and die.

It is helpful to move one or two frames of brood up into the centre of the added super to entice the bees to move up as well, and to start drawing out more foundation.

After this second super has foundation drawn out, the bees are filling about 8 – 9 frames again and multiple frames of brood are present, you can add your first honey super.

Some new colonies might not get to this point in their first year. This is not a bad sign, a lot of factors are coming together like weather, availability of resources, colony size, etc. and drawing out wax takes time and work.

If your decision is to use a queen excluder it is often more successful to wait until your second year when the foundation is already drawn out. The bees might not be drawing it out fast enough and might start storing a lot of the honey in the brood boxes instead, which takes away room for the queen to lay into.

Special thanks to our club Education Committee for putting this together, Katharina Koppe & Jennifer Stirling look forward to organizing field days and other learning opportunities when COVID-19 restrictions allow. ❀

A Unique Opportunity

Unique books on beekeeping from Doug McCutcheon's library; Doug has retired from beekeeping and has offered his collection to the BCHPA. Below is a list of the books and their market value. They are for sale now at the fair market price and any remaining will be placed in the silent auction at a future BCHPA meeting. Please contact Ian Farber to purchase (shipping not included): ian_farber@telus.net.

Bees and Beekeeping by Roger A. Morse, 1980, hardcover,..... **$10**
Honeybees and Wax, an Experimental Natural History by H.R. Hepburn, 1986, hardcover, ...**$50**
Some Important Operations in Bee Management by Johansson and Johansson, 1978, ... **$10**
American Honey Plants by Frank C. Pellet, 1977, hardcover, ...**$15**
Honey and Pollen Flora (Australina) by Alan Clemson, 1985, ...**$150**
ABC & XYZ of Bee Culture by A.I. Root, 1975, hardcover, ...**$15**
Bee Chats, Tips and Gadgets by P.F. Thurber, 1986, ...**$10**
Manual of Beekeeping by E. B. Wedmore, 1979, hardcover, ...**$10**
The Biology of the Honey Bee by Mark Winston, 1987, hardcover, signed, ...**$20**
The Varroa Handbook, Biology and Control by Mobus, B and Connor, L, 1988, ...**$5**
The Hive and the Honey Bee by R.A. Grout, 1963, hardcover,.... **$10** (2)
The Life of the Honey Bee by M. Maeterlinck, 1954, ...**$15** (2)
A Living from Bees by F.C. Pellet, 1st ed. 1947,..... **$15**
Beekeeping by E.F. Phillips, 1947, ...**$10**
The Behaviour and Social Life of Honeybees by R. Ribbands, 1st ed. 1953, ...**$25**
Amateur Beekeeping by E.L. Seachrist, 1st ed. 1955, hardcover, ...**$15**
The Introduction of Queen Honey Bees by L.E. Snelgrove, 1st ed. 1940, hardcover, ...**$40**
Swarming, It's Control and Prevention by L.E. Snelgrove, 1956, hardcover, ...**$50**
Honey: A Comprehensive Survey by E. Crane, 1st ed. signed, 1979, hardcover, ...**$300**
Bees and Beekeeping by E. Crane, 1st ed. 1990, ...**$300**
First Lessons in Beekeeping by C.P. Dadant, 1994,..... **$10**
Anatomy and Dissection of the Honey Bee by H.A. Dade, 1977, ...**$25** (2)
Crop Pollination by Bees by K. Delaplane, 1st ed. 2000, hardcover, ...**$150**
Pheromones of Social Bees by J.B. Free, 1st ed. 1987, ...**$25**
Dadant System of Beekeeping by C.P. Dadant, 1st ed. 1920, ...**$50**
The Hive and the Honey Bee by C.P. Dadant, 1927, ...**$15**
A Thousand Answers to Beekeeping Questions by C.C. Miller, 1st ed. 1917, ...**$20**
Beekeeping by E.F. Phillips, 1st ed. 1915, hardcover, ...**$25**
Bees and How to Keep Them by F.L. Sladen, 1st ed. 1916, ...**$25**

CLIPS FROM THE PAST

History of the Hoffman Self-Spacing Frame

by Ted Hancock

The first movable frame beehive was patented by L. L. Langstroth on October 5, 1852. As most beekeepers know, Langstroth's hive design was based on the bee space, which is a gap or space ranging from 1/4 to 3/8 of an inch. Bees maintain bee spaces as travel routes within the hive, so do not block them with wax or propolis.

When bees build comb in the wild, the distance between their honey combs is approximately 3/8 of an inch. This means the distance from the centre of one comb to the centre of another is 1 3/8 inches, although this can vary. Langstroth's hive was designed to have the frames spaced 1 3/8 inches, centre to centre.

Like frames today, the frames in Langstroth's hive had a top bar, two end bars, and a bottom bar. The top bar was 1 inch wide, while the end bars and bottom bar were 7/8 inches wide. Obviously, these frames would not leave room for the bee space between the combs if they were pushed tight together, as this would only leave 1 inch centre to centre. So Langstroth left it up to beekeepers to manually space the frames 3/8 of an inch apart.

Needless to say, beekeepers who first adopted Langstroth's hive had difficulty keeping the frames spaced at the correct distance. One beekeeper from the 1850s, R. L. Taylor, complained the frames in Langstroth's hive were too loose, calling it a "rattle-trap hive". However, the opportunity to space frames at variable distances may have given some advantages (see the following editorial from the American Bee Journal, August 1925):

The Spacing Of Combs

We have often given the argument that the spacing of combs is of great importance in the prevention of swarming. The popular spacing from center to center is 1⅜ inches; we make the spacing of combs in the Dadant system 1½ inches. Now comes a Mr. Noblet, in "Apiculture Francaise" for June, with the statement that, for the past six years, he has used the spacing of 42 millimeters, or 1⅝ inches, between combs, from center to center. He claims the following advantages:

1. Better wintering, as the bees thicken the top of the combs above the brood to fill them with honey, thus getting more honey above the cluster and also a larger cluster.
2. Better spring conditions because the group can keep the brood warmer.
3. More ease in manipulations because the combs are more easily taken out.
4. Control of swarming, as out of 60 colonies with the wide spacing, he did not get a single swarm in 5 years, while with 8 colonies of the same size with the narrower spacing he had two swarms each season. He uses Dadant hives exclusively.

In the same magazine, a retired school teacher, J. Voinchet, testifies that his bees have helped him to earn enough to make up for his limited pension of 100 francs per month, so that he lives comfortably. He states that at the age of 28, he suffered from sciatica and cured it by causing the bees to sting him on the suffering leg, so that he has never suffered from it since. He says, also, that he has cured himself from gastritis and laryngitis, in his older years, by the use of honey in the natural condition and in milk, and in the shape of metheglin in place of acid wines, with which his stomach did not agree.

Julius Hoffman is credited with designing an end bar that automatically spaced the frames at the recommended distance. "Hoffman was born in October 1838 at Grottkau, Silesia, now named Grodkow which is now part of Poland. At the age of 24 in 1862 Julius Hoffman emigrated to London, then four years later to New York, moving again in 1873 to the small village of Fort Plain in NY state." (from Dave Cushman's blog).

It was in Fort Plain that Hoffman perfected his self-spacing frame. The top 3 1⁄2 inches of the Hoffman end-bar were 1 3/8 inches wide, thus automatically spacing the frames at the proper distance when each frame was snug against it's neighbour. This new style of frame was not quick to be adopted; see an editorial from the May 1925 ABJ below:

"Langstroth" vs. "Hoffman" Hives and Frames

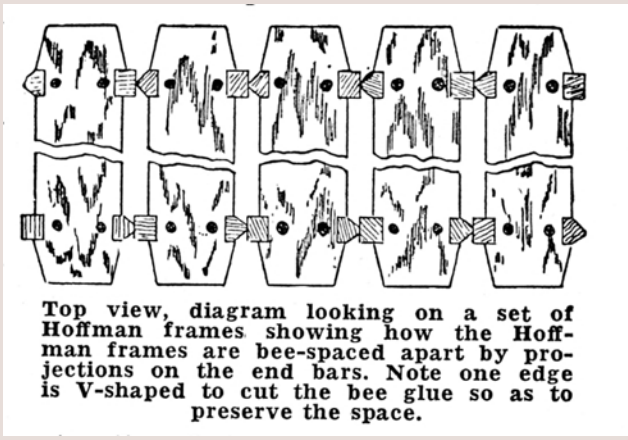
There appears to be some confusion in the minds of many beekeepers concerning the above names.

There is no such thing as a Hoffman hive and, although many people and some manufacturers offer Hoffman frames for sale, when they mean Langstroth frames with Hoffman spacing shoulders, it should be understood that the name of Hoffman was applied to the self-spacing feature of the frames, whether of Langstroth size or of other sizes.

We might say also that all hanging frames are really Langstroth frames, for Langstroth invented the principle of the hanging frame and did not use the Hoffman spacing shoulder, for the very good reason that it was not yet invented when Mr. Langstroth offered his patent hive. You may make frames of any size whatever; if they have the Hoffman shoulders to space them automatically, they are Hoffman frames. But there is no such thing anywhere as a Hoffman hive.

The Hoffman frame was not popular with the practical beekeepers of the old days, because, before the invention of comb foundation, it was often necessary to change the spacing of combs slightly, when they were handled and not put back in the original order, owing to slight waves in them which interfered with the travel of the bees. But at the present day, with combs built on foundation and nearly always straight as a board, the advantages of Hoffman shoulders for spacing the frames is made more prominent, for with them beginners cannot make the mistake of putting too few or too many combs in a hive body. It is quite probable that the Hoffman idea has come to stay.

The well-known beekeeping equipment manufacturer A.I. Root began using Hoffman's design during the 1890s, and the frames grew in popularity. Root's original Hoffman end bar did not have two square shoulders on the end bars as is seen with today's frames. Instead, one shoulder was tapered so that it formed a knife edge or wedge. The purpose of this was threefold: it was thought that a wedge meeting a flat surface would trap fewer bees, that bees would not glue the end bars with propolis with this configuration, and that the knife edge would cut through any propolis that was present when the frames were pressed together, thus maintaining the proper bee space.



Top view, diagram looking on a set of Hoffman frames showing how the Hoffman frames are bee-spaced apart by projections on the end bars. Note one edge is V-shaped to cut the bee glue so as to preserve the space.

Figure from page 65 of *ABC and XYZ of Bee Culture*, 1945 edition showing the knife edge shoulders of the Hoffman frame from above.

During the "Hoffman knife edge" era, it was important that the frames be assembled so that a knife edge always met a flat edge. Otherwise, a knife edge would meet a knife edge. When this occurred it allowed the two knife edges to slide past each other, whereupon they would be fastened together with propolis.

A.I. Root's catalogue stipulated that the proper configuration for frame assembly was to have the knife edge on the right side of the end bar when viewing the frame from its end. This guaranteed that all frames would be identical so that a knife edge always met a flat edge. The trouble was, not all beekeepers followed this advice when assembling frames so the beekeeping industry soon had a huge mishmash of frame configurations. It also gradually became clear that the knife edge did not achieve any of the goals (less propolis, less trapping of bees, cutting through the propolis) that it had been designed for.

In the August 1925 edition of the American Bee Journal, Allen Latham wrote a long article outlining the many problems with the knife edge design of the Hoffman self-spacing end bar. Latham dramatically likened the "knife edge" design to an epic burden beekeepers were forced to carry, just like Sinbad the sailor in "*Old Man of the Sea*." Latham concluded:

> "Oh! Will someone kindly tell me why manufactures will go to the expense and trouble of making that knife edge when it is only a snare and a delusion? Why make it when the square edge is better in every way? With the square edge no one can nail up a frame wrongly if he wishes to do so....Many will cry out against doing away with the knife edge. If they do, it will be because of ignorance. They will find that two square edges will collect less than half as much beeglue as will one square and one knife. And when it comes to cleaning off beeglue, the square edge needs but one scrape of the knife or hive tool , whereas the knife edge needs at least two. If we ever find a use for beeglue, I advise beekeepers to use two knife edges, and I will warrant that their annual output of beeglue will be trebled."

Latham received support for his opinions from J. P. Hodgson of New Westminster, British Columbia, by way of a letter published in the November 1925 edition of ABJ. Hodgson was the primary manufacturer of beekeeping equipment in BC at that time.

The Hoffman Frame Again

We were pleased to read Allen Latham's criticism of the Hoffman frame, in August issue.

Three years ago we started to make these frames without the knife edge, and the beekeepers found fault with our frame for that reason. One man was so provoked that he returned the whole shipment, and several others complained that they had to go over all their frames and point the edge of the end bar. We doubtless lost many sales that season because the beekeepers were not used to seeing our style of end bar.

But now these frames have become so universal in this part of the country that we never have anyone ask for an end bar with the edge pointed.

Mr. Latham seems to put the blame for the knife edge on the manufacturers, but I am sure they would rather leave it square, as it would save them one operation. They try to make the frame the way the beekeeper wants it.

Another thing they used to insist on here (and some do yet), is a top bar seven-eighths of an inch thick. The standard here is to have the top bar ends cut away to leave five-sixteenths of an inch where it rests in the hive. This end is the weakest part of the top bar and we cannot see what is gained by having the rest of the bar seven-eighths thick. We make ours three-quarters of an inch thick and in many cases this gives another row of cells in the frame.

But we are surprised to find that, although the price is lower, comparatively few buy the frames with the plain end bars and use staples to space them.

J. P. Hodgson, British Columbia.

It is clear from Hodgson's letter that the "Hoffman knife edge" stopped being manufactured in BC during the 1920s. So if you still have one of these frames in your hives, it might be time to replace it.

Frames made by a variety of manufactures, each employing the Hoffman end bar. From left to right, ancient wooden frame, Ed Martens frame, Pierco frame, Acorn Bee frame, old wooden frame. (The Martens frame was a two piece plastic frame. When assembling, a sheet of foundation was placed between the two halves before snapping them together. These frames were invented and manufactured during the 1970s by Ed Martens of La Crete, Alberta.)

The Hoffman end bar (without the knife edge) has survived the test of time and is still seen in most hives today. It works well at automatically spacing ten frames in a honey super or brood chamber. However, some beekeepers now run nine frames in their brood chambers, with spacing of 1 5/8 inches between centres.

Nine frames in the brood chamber of a modern commercial apiary, with metal frame spacers.

This spacing allows faster frame manipulation with less risk of accidentally rolling the queen. In nine-frame hives, the Hoffman end bar has become an unused artifact from a previous time. ❀

An Old Beekeeper Goes Back to School Part 7: Computer Labs

by Ron Miksha

When I was a kid, I thought ecologists spent their days frolicking through meadows with butterfly nets. Then I learned that an ecologist is lucky if they get to spend a month a year doing field work. The rest of the time is mostly lab work (specimen preparation and examination) and statistical analysis. Ecology is much more about statistics than butterfly nets. This is often a disappointment to students who arrive on campus expecting to observe moose through binoculars. Instead, they end up in a "computer lab".

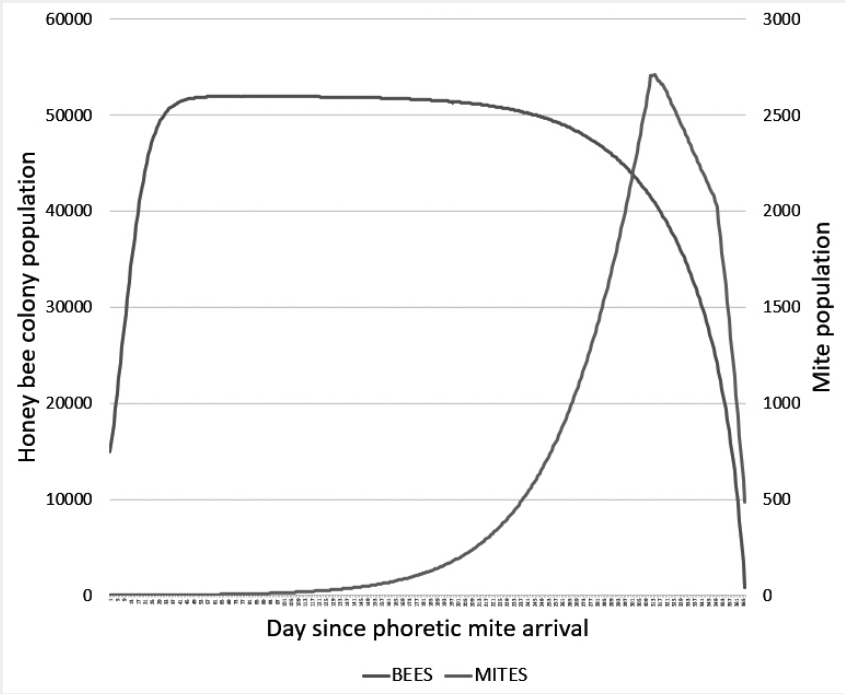
My campus duties since returning to school as a Masters student have included running computer labs for ecology courses. I taught third and fourth year students who faced rooms filled with chalkboards, projectors, screens, and at least forty computers. For some ecology students, statistics is a nightmare. But at least two years of biological statistics is required to get an ecology degree. It's hard, but I had only three students drop the courses.

Ecological statistical theory was taught by professors or lecturers three times a week. Students had to learn complicated maths – testing whether they could trust apparent trends were not accidents of data, but represented real discoveries. Knowing which statistical tools to apply is an art that develops with practice. Students learned to look at data and results and ask "How do we know this is true?" They were learning to be skeptics with math skills. Once a week, those students would show up in the computer lab and I'd help them learn to write computer code and solve real ecology problems. Here's an example:

Entomologists are interested in the dynamics of native bee abundance in the aspen parkland of central Alberta. They agree to compare bee abundance between aspen groves and the adjacent grasslands; however, they differ in the factors that they consider to be most influential in the increase in bee abundance during spring. One group hypothesizes that daily variation in abundance primarily reflects the ambient temperature; another group expects that the primary influence is time of the season. To test these hypotheses, they collect a single dataset, using daily counts of bees captured by Malaise traps placed in a different location during each of 49 consecutive days beginning May 1st.

The ecology students were given resulting data – daily temperature and the number of bees caught each afternoon in the trees and in the field. From that, they had to write computer code to analyze the data and statistically show whether the date the insects were trapped is more important than the temperature. They were also asked which area seemed best (trees or field) for bees and they needed to statistically show how certain they were of their results. They had to describe the distribution of the bee numbers (hint: they are not normally distributed like a bell-curve) and they had to figure out how to parse the results. As I said earlier, this is fourth-year work. It's just as important to get the right answer as it is to be able to mathematically defend your results.

Another day, I asked students to design a model of how long it would take an untreated colony of honey bees to die from varroa. I gave them reproduction rates for the bees and mites, death rates (natural mortality as well as mite-induced), and spread rates. Initial numbers were a single mite and 15,000 honey bees. I set up the numbers so the students could observe rapid bee colony growth, slow mite build-up, then the population crash. They had to answer a few questions and turn in charts of mite and honey bee population dynamics. Most of their graphs looked something like this:



This was a great exercise for the students. They learned a bit about population modeling and parasites. I even gave them a short lecture about honey bees and mites. As part of their assignment, I gave them a few short-answer questions. Here's an example: "Based on your model, do you agree with beekeepers who claim that they didn't have any mites until shortly before their colony died? Why or why not? (2 points)"

An even more interesting question was this: "Based on your model and the given parameters, can you suggest some methods to prevent colony death? (2 points)" Here are some of the ideas that the students came up with:

1) In order to prevent colony death, we can try to slow down mite growth rate. Spreading some sort of pesticide that does not harm the bees or the environment, or making conditions less ideal for the mites, such as playing around with the temperature, could help with reducing their growth rate.
2) In order to prevent colony death, the most effective way would be to take preventative measures against the infestation of mites.
3) Primarily, beekeepers need to be diligent in inspecting their colony for mites. Noticing the mites early would allow beekeepers to apply miticides with enough time to save the colony.
4) To prevent colony death, it is important to undergo extensive measures to prevent any colonization or invasion of mites to any honey bee colony. This could be achieved through chemical protective coating of the bees. A biogenetic approach to this problem could consist of identifying bees with resistance towards diseases transferred by mites, and growing a population of bees with this genotype. However these methods are costly and must be monitored.
5) Since mites are difficult to detect, preventative measures should be taken. One method would be to place covers on all entrances to the beehive, with holes just small enough for bees to squeeze through. The holes should be coated with anti-mite chemical so if the bees are carrying any mites back to the hive, they come into contact with the chemical and are killed upon entrance.

I had 40 more students with 40 more thoughtful ideas. Some solutions, adapted a bit, might be useful. But that wasn't the point, of course. I wanted these students to learn how to approach a problem, understand the impact, and look for innovative solutions. They did OK. ❀

Ron Miksha is an MSc candidate researching bee ecology at the University of Calgary. He has been a commercial beekeeper but now keeps two hives behind his house in Calgary. He can be contacted through his blog, badbeekeepingblog.com.

BCHPA Certified Instructors

The BCHPA Certified Instructors Committee is accepting applications for a third member to replace Lance Cuthill who is retiring from the committee this year. The successful applicant will work primarily with Ian Farber and Axel Krause on the ongoing development and biannual presentation of the Certified Instructors course.
In their application, candidates should indicate the following:

1. their length of active and ongoing BCHPA membership
2. the year the applicant successfully completed the Certified Instructors Course
3. the number of Introductory Beekeeping courses they have taught as a BCHPA certified instructor
4. their current number of bee hives and the number of years keeping bees, including average number of colonies for these years
5. any relevant formal teachers' training and/or experience working with students
6. any other relevant information the applicant feels will support their application, which may or may not include references. As well, applicants may also include a written summary of their reasons for wanting to be a part of the Certified Instructor program.

The Certified Instructor Committee will compile a short list of candidates who will be invited to an interview by Skype, Zoom, or conference call at the end of this year in accordance with COVID-19 restrictions in place at that time.

Please email your application to:
a.krause@telus.net by December 1, 2020

Club Contacts

BCHPA BRANCHES

BC Bee Breeders Branch
4880 Wells Road, Grand Forks, BC V0H 1H5
Elizabeth Huxter president@bcbeebreeders.ca 250-442-5204

Burnaby Beekeepers Branch
990 Cliff Avenue, Burnaby, BC V5A 2J5
Janice Bobic burnabybeekeepers@telus.net 604-298-6164

Central Cariboo Branch
Box 825, 150 Mile House BC, V0K 2G0
John Hoyrup hilltop4@telus.net

Kamloops Branch
1062 Fleetwood Court, Kamloops, BC, V2B 8J4
Ed Zurawell ezclocks@gmail.com

Langley Branch
34701 Mila St., Abbotsford, BC, V2S 4Z7
Elaine Garry langleybeeclub@gmail.com 604-852-2272

North Okanagan Branch
3910 25th Avenue, Vernon, BC, V1T 1P4
Keith Rae K_S_Rae@hotmail.com 250-540-0227

Prince George Branch
77633 Toombs Drive, Prince George, BC V2K 4Z5
Sandy Ramsay sramsay@netbistro.com 250-562-1653

West Kootenay Branch
431 Rosedale Road, Castlegar, BC, V1N 4L3
Axel Krause a.krause@telus.net 250-608-7397

BCHPA AFFILIATED SOCIETIES

Capital Region Beekeepers Association
Box 43033, Victoria, BC V8X 3G2
Bill Fosdick
president@capitalregionbeekeepers.ca 250-216-7761

Comox Valley Beekeepers Association
5411 Wildwood Road, Courtenay, BC V9J 1P5
Jennifer Dilfer jenn.dilfer@hotmail.com 250-703-2669

Richmond Beekeepers Association
c/o Richmond Nature Park, 11851 Westminster Hwy,
Richmond BC V6X 1B4
Alan Wong president@richmondbeekeepers.ca

OTHER BEE- RELATED ORGANIZATIONS

BC Peace Beekeepers
P.O. Box 2090, Dawson Creek, BC V1G 4K8
Kerry Clark kccsclark@gmail.com 250-782-6646

Clearwater Bee Club
Ray Harms rbharms11@gmail.com 250-674-2331

Cowichan Beekeepers Society
2375 Koksilah Rd, Duncan, BC V9L 6M5
Ian Low cowichanbeekeepers@gmail.com 250-709-1661

East Kootenay Beekeepers
4300 Wilks Road, Cranbrook, BC V1C 6S9
Lance Cuthill lcuthill@gmail.com 250-426-6049

Nanaimo Division Beekeepers Club
925 St. David Street, Nanaimo, BC V9S 2H8
Peter Lange nanaimobeekeepers@gmail.com 250-753-0554

North Fraser (Maple Ridge) Beekeepers Association
Sandra Milton NorthFraserBeeClub@hotmail.com

North Shore Beekeepers
Lianne Shyry twobeesapiary@gmail.com

Oceanside Hive: A Beekeepers Collective
Don Fowler
pinebug@gmail.com 250-710-9517
Oceanside Hive on Facebook

Quesnel Beekeepers Association
Patti Lalande
pdlalande@shaw.ca 250-747-2557

Robson Valley Beekeepers
Lyn Smith lyns3jrts@hotmail.com 250-569-7808

Salt Spring Island Honey Beekeepers
Kelly Johnson owlchemist3@gmail.com
Salt Spring Island Honey Bee Keepers on Facebook

Shuswap Beekeepers Club
1040 8th Ave. NE, Salmon Arm, BC V1E 4A4
Greg Keesey gkeesey@gmail.com 250-309-0718
Shuswap Beekeepers Association on Facebook

Smithers Beekeepers Association
Tom Smith
smithersbeekeepers@gmail.com

South Okanagan Beekeepers Association
Margret Purcell
margiep221@gmail.com 250-488-2410

Sea to Sky Beekeepers
seatoskybeekeepers@gmail.com

Strathcona Beekeepers
Vancouver
Bruce Little strathconabee@gmail.com

Sunshine Coast Beekeepers Association
2137 Lower Road, Roberts Creek, BC V0N 2W4
Sally Burke sally.burke8@gmail.com 604-886-4863

Chilliwack Beekeeping Community
Laura Cameron - Delisle
chilliwackbeekeepers@gmail.com 604-703-0341

Stuart Nechako Bee Club
Box 595, Vanderhoof, BC V0J 3A0
Jon Aebischer sweet02@telus.net 250-567-5037

Surrey Beekeepers Association
2071 174th Street, Surrey, BC, V3S 9Z8
Thomas Schmitz
bees@surreybeeclub.ca 604-785-3403

Please contact the Editor with any changes.

The BeesCene Proust Questionnaire

Stephanie Taylor, Bee Inspector for the North Okanagan/Shuswap Region

Tell us a little about you?
I like bees, birds, baking, and juggling. And beaches.

How long have you been a bee inspector?
I began the inspector job last March. It's been good! It's a great way to connect with beekeepers of all different backgrounds. It's encouraging to find that there isn't much disease in the area. I think the highlight of inspecting may be when I hear someone say that that they monitor for mites, treat when needed, do thorough brood nest checks, and cycle comb regularly; it's music to my inspector ears. There are also some stunning bee yards throughout my region.

Hive tool of choice?
I prefer the J-hook tool.

Favourite honey?
My favourite honey is a native New Zealand bush blend - specifically a Kamahi - Rewarewa blend. In Canada, creamed clover.

How and when did you get started with bees?
I got started in bees in New Zealand while I was over there to work on farms. I was introduced by a family friend, then spent a couple of weeks at a farm owned by a family of beekeepers. I fell in love with beekeeping pretty quickly!

How many hives are you running?
I am running 4 hives, soon to be a few more after splits.

What is the main nectar source in your area?
We get a lot of wildflower honey in the Okanagan. It's kind of hard to tell exactly what nectar it's made up of - I know I can't. We get clover, dandelion, a little fireweed, and lots from all kinds of wildflowers.

Smoker fuel used?
I use burlap, sometimes pine needles, and occasionally cow patties.

Best sting remedy?
I'm really lucky when it comes to stings, but if it's a really nasty one, I might put some honey on it - once I'm away from the bees.

Preferred method of swarm control?
To prevent swarming I give the bees more room to store food and for the queen to lay. Or make a split. Depends how much equipment I've got on hand!

Do you run 9 or 10 frames in your brood chamber?
10 frames in the brood chamber!

Do you use queen excluders? Yes.

Best tip received or to pass along?
Stay humble in your beekeeping career. Bees and their environment are always changing and no two seasons will be the same. ❀

Stephanie's Tips for Dealing with Wasps

Getting traps out in the early spring to kill off lots of queens helps. It of course saves you from dealing with hundreds of thousands of their offspring later in the season. Be sure to get entrance reducers on in the mid- late summer before large amounts of wasps can take advantage of a wide open entrance.

Be really careful when pouring sugar syrup to not spill, as it will attract wasps.

Seal off any holes or cracks that might act as extra entrances for wasps.

Keep fewer strong colonies vs. more small or medium size/strength colonies.

Keep wasp traps in action throughout the season nearby your yard.

Keep your yard clean and tidy and try to remove things that could make a good home for wasps.

Do not open feed frames of honey/sugar syrup (not only for wasp prevention, but also to prevent the spread of disease and intense robbing at certain times of the year). ❀

Beekeepers find sweet support through the BC Land Matching Program

by Darcy Smith and Azja Jone Martin of Young Agrarians. BC, a farmer to farmer resource network for new and young farmers

There are over 55,000 colonies of bees in British Columbia, and each of these colonies needs a home base. Beekeepers across the province have reached out to the BC Land Matching Program (BCLMP) as they search for secure access to land for their bee yards.

The BCLMP has supported 73 matches on over 900 acres across the province since launching in Metro Vancouver in 2016 and expanding province-wide in the summer of 2018. Seven matches have helped apiculture operations find land. Land matchers have worked with beekeepers who offer pollination services to other farmers and need a home base to overwinter bees, as well as beekeepers who focus on honey production and market gardeners with hives as part of their diversified operation.

The BCLMP provides land matching and business support services to new and established farmers looking for land to start or grow their farm business, as well as landowners interested in finding someone to farm their land. The benefits of land matching are hands-on support services to new farmers and landowners to better evaluate opportunities, access resources, and ultimately find a land match partner. The program aims to address a lack of affordable farmland as a significant barrier for young and new farmers entering the agricultural industry.

Beekeepers have unique land access needs: while hives take up a relatively small footprint, bees must forage over a large area searching for nectar and pollen. Commercial beekeepers will often have multiple bee yards in a region, rather than one single property. Land matchers offer personalized support for each land seeker's situation, and work with farmers to identify land opportunities - both on ALR and non-ALR land - that may be a good fit. For beekeepers, that can involve finding a location with ample forage opportunities, road access for a truck, space to store equipment, adequate fencing and more.

Once a match has been made, land matchers can support with developing agreements. While the small footprint and today's pro-pollinator attitude means the idea of bees appeals to many landowners, hosting bees holds different considerations than leasing to a vegetable farmer. Land matchers can facilitate negotiations with landowners to discuss topics such as when the beekeeper can access bee yards, who is responsible for paying for and maintaining fencing, insurance, utilities, compensation, and more. Sometimes, this process can be as simple as adapting the agreement templates beekeepers are using with other landowners, providing education to the landowner, and helping the parties address liability questions.

Beekeepers Corbin and Jess of Prior Street Bees were matched to land in Metchosin on Southern Vancouver Island in early 2019 as they looked to consolidate their operation, which up until then had been spread over eight residential

properties in the Victoria area. Finding a secure location for their hives was important to Jess and Corbin as they had experienced the unpredictable nature of working with many landowners with diverse needs and expectations, and the high amount of stress and work that went into managing hives across multiple sites.

Prior Street Bees had also encountered landowners who were unwilling to negotiate an agreement with clearly outlined expectations. They were grateful to have the BCLMP, which provided a third-party land matcher to find landowners

Corbin and Jess.
- photo Prior Street Bees

who are willing to work with beekeepers, and help them define a clear agreement. Bees, for all their popularity, are living creatures and with that comes a certain level of unpredictability. Corbin noted that farmer landowners are more likely to understand the nature of bees and their behaviour, and manage their expectations accordingly.

"It feels supported, and brings two willing parties together rather than just reaching out to a random farm," Corbin reflects on working with a land matcher.

In the case of the farm Corbin and Jess were matched to, the landowners recognized the value of having bees present on site for pollination, and the exchange felt fair and valuable to both parties.

- photo Prior Street Bees

"Many landowners would otherwise pay to have bees brought in so it is a big benefit to them to lease to beekeepers," says Corbin.

The Metro Vancouver / Fraser Valley region is home to the majority of BC's bee colonies. Kristen Penhall, a graduate of Kwantlen Polytechnic University's Farm School program, runs a market garden and keeps bees on a ¼ acre of land in Langley. She met her land partner through the farm school program, and a land matcher helped the pair negotiate their agreement.

"The land matcher made this experience really wonderful, and I felt more comfortable," Kristen says. "I think one of the benefits of the program being so thorough is that you can really establish you being on the same page as the landowner."

It was important to Kristen that no chemicals were being used on the property that are harmful to pollinators, and that the landowner understood that bees can have a mind of their own and have to be treated with respect. Kristen is thrilled at how well things have gone for her farm, Naturally Good Vibes, on her leased property.

Kristen showing off her hives
- photo Naturally Good Vibes

"Now, a few years into my lease, I am slowly expanding my apiary onto the back field where my landowner and I plan on planting low maintenance trees and plants that are good for all types of bees," Kristen says. "It's really wonderful to have someone who cares about honey bees and native bee species as they are at a critical point for their populations."

The BC Honey Producers' Association group insurance plan is a favourite referral for beekeepers and has provided great peace of mind to both beekeepers and landowners supported through the BCLMP.

Land matchers love being able to help beekeepers achieve secure access to land to start or expand their businesses, and to help farmland owners enjoy the benefits of bees on their land - from increased pollination to a very local honey supply. Farmers and beekeepers, get in touch to start a conversation about leasing land for your operation! Landowners, reach out to the BCLMP to help a farmer access land, whether you have hundreds of acres of farmland, or a small urban plot.

Two bees eating honey.
- photo Naturally Good Vibes

Send an email to land@youngagrarians.org and a land matcher will get in touch to learn more about your needs and vision, and help you get on your way to making a match. There are so many farmers, growers and beekeepers looking for spaces to produce food across the province, and your land might just be the perfect fit.

For more information about the BCLMP, please visit youngagrarians.org/land. ❀

The B.C. Land Matching Program is funded by the Province of British Columbia, with support from Columbia Basin Trust, Cowichan Valley Regional District, Real Estate Foundation of B.C., Bullitt Foundation, and Patagonia.

BCHPA Semi-Annual Business Day Teleconference Minutes - March 27, 2020

Call to Order & Welcome Kerry Clark
Remembrance of members passing in the last year. There have been a number of tributes in the BeesCene. All members, please let us know of other passings that we may not be aware of.

Approval of Agenda: Additions, deletions, approval, adoption?

Approval of Minutes of March Meeting: Adopted as distributed.

Business Arising from the Minutes
New Business
Executive Reports
President, Kerry Clark: see agenda for items covered.

First Vice President, Dan Mawson: see written report on website. Highlights:

Prince George 2019 Wrap-up:
- Attendance was a bit lower than expected (200 budgeted – 165 actual)
- Good Trade Show involvement and Sponsorships higher than expected
- Auctions raised
- Feedback was extremely positive - Over rating 4.3/5
- First time working with Club under our new model – challenges & successes
- Delayed financial statement & host club payment
- PG Branch 10% of Revenue compensation was $5100.00
- Thank you again to the PG club for hosting us and serving the association.

Kamloops Semi-Annual 2020:
- Meeting cancelled due to COVID-19.
- All Hotel charges waived with no penalty
- Will apply our $1000 deposit to 2021 meeting.
- Speaker flights were all refunded.
- Ordered apparel (T-shirts, Hoodies and BB caps) which will be sold online and at our Abbotsford meeting if that goes ahead.
- Refunding in process, some PayPal fees will be incurred.
- Brandon Hopkins, Albert Robertson, Leonard Foster and Jamie Macdonald (semi annual speakers) all agreed to speak at the fall conference.

Abbotsford AGM 2020
- Continue to work with the Langley Club – team lead by Elaine Garry
- Plans in a holding pattern for right now until the progress of COVID-19 is determined
- We have until end of April (180 days from event) to negotiate new Hotel Contract terms
- Eight Speakers Confirmed: Randy Oliver, Marla Spivak, Dewey Caron, Mike Palmer, Brandon Hopkins, Albert Roberson, Leonard Foster, Ali McAfee, Jamie MacDonald. Two Speakers also waiting to be confirmed: Bob Cary of Kona Queens, Andony Melathopoulos.

Second Vice President, Jeff Lee: unavailable due to health issues.

Treasurer, Irene Tiampo: 502 paid members so far for 2020. The financial report is for Aug 1-Feb 29. This year will be a challenging year. Education days are proving good for finances. Irene is halfway through issuing refunds for Kamloops. See financial statement on the website for more details. We remain in very good shape financially.

Secretary, Michalina Hunter: Thank you for electing me in Prince George. We're working on moving some BCHPA files online to reduce admin and confusion.

Canadian Honey Council Rep, Stan Reist: See written report on website.
- CHC is taking lead on flights from a few countries for temporary foreign workers (TFW). If anyone has TFW that need to be brought in, we need names, cities, and that their paperwork has been approved.
- We have a new council now, new appointments for certain positions.
- Working with BC gov't to ascertain how many packages we lack for pollination, queens, etc. due to flight cancellations. We will probably send out a survey to BCHPA members on this. Likely over 50,000 packages have had flights cancelled in Canada. Need to solve within 3 weeks.
- Still working on interprovincial movement of bees, this would help us replace stock within Canada and reply less on importation. We spend approx. 11M per year on imported stock.
- Other committees working on food safety, pollination, honey, organics and hive health.

Boone Hodgson Wilkinson Fund, Christina Rozema: No report available.

BCHPA Website, Dan Mawson: see written report on website. Highlights:
- We've put additional resources on website during this time.
- Have upgraded server package to premium to increase speed and security.
- Getting over 5000 views a month.
- We're looking at other ways to communicate with membership, perhaps videoconferencing.
- Working on adding latest editions of BeesCene, develop an index and search system for video, add local club registration options into annual registrations.

BeesCene, Heather Sosnowski: see written report on website. Highlights:
- Advertising remains good.

- Might create a larger issue for summer, will know better in April what is needed to accommodate information from semi annual teleconference.
- We welcome ideas from membership on what you'd like to see, as always!
- Looking into sustainably managed forest or recycled paper for printing.

Archives Ted Hancock: No report available.

Committee and Task Force Reports
Research projects allocated 2019 funding, Heather Higo: see written report on website.

Highlights:
Bee health in blueberry pollination:
- Final analysis is being done, including protein supplements
- Progress from second year: a) collection of samples from colonies
- Confirmed that more colonies had EFB symptoms in the group pollinating blueberries
- Lab analysis of pathogens including Nosema spp., Melissococcus plutonius and Varroa
- Provided diseased samples to NBDC and our collaborators in SK, who determined that an atypical, highly virulent strain of M. plutonius is present in colonies pollinating BC blueberries
- Initiated chemical analysis of honey and bee bread
- Samples are undergoing multi-residue analysis of several fungicides, insecticides and herbicides, including those known to be used on blueberry crops in BC
- Plan for this upcoming year is to complete pathogen and residue analysis, data compilation and evaluation, as well as communicating results and recommendations

Honey authentication:
- Proceeding under Dr Leonard Foster and Peter Awram
- Finalized conditions for testing
- Different models for analyzing data to maximize sensitivity in development
- Other funding from NSERC to do a market assessment of the industry and to formalize testing process.
- Objective to extend method to diagnostic labs or perhaps use it as basis for commercialization

Novel treatment for varroa:
- Looks promising, but will be a number of years before we have a new product.
- With funding from the BCHPA and NSERC we purchased 20 nucleus colonies, used in field trial of new compound with acaricidal activity against varroa mites.
- Field trial in Langley – 10 treatment colonies, 10 control (empty release device)
- After 28 days treatments removed, all colonies received Apivar treatment
- Results show that during first 7 days the number of mites dropped from the treated colonies was significantly higher (at 99% probability level) than the number of mites dropped from the control colonies
- At two weeks, no significant difference between treatments and controls, and after that, the controls showed significantly

higher numbers of mites dropped than the treatment
- What this tells us – the new compound caused a mite drop right after installation. The compound also prevented the exponential growth of the mite population (the "mite bloom") in the treatments
- Mite reproduction was significantly lower in the colonies treated with the new compound than in the controls
- Chemical analyses of samples taken (to monitor levels of the compound in the gas phase, on the wax, in honey and on the bees) are underway

Atypical foulbrood disease in BC:
- Found in SE BC and blueberry project
- A form of foulbrood with atypical field symptoms has repeatedly been reported from the southeast regions of BC. NBDC has collected and received samples and is working to isolate, culture and characterize bacterial strain, and compare them to reference samples; match has not yet been identified, more work on this is required

Quality assessment of BC queen bees:
- Liz Huxter and BC Bee Breeders - sperm viability and ovary mass examined in queens from some breeders
- Project goal is to document the reproductive qualities (sperm viability, using an advanced technique) of queen stock reared and handled in BC
- BC produced queens (55 total) were shipped via ground transportation from seven producers to UBC in the summer of 2019; additional two shipments from Edmonton to UBC via air freight, these were the controls (standard industry practice) and came from Hawaii and California
- All shipments had two temperature data loggers to record the temp. every 10 minutes
- Dr Ali McAfee and Abbi Chapman analyzed the queens for sperm viability, sperm count and ovary mass
- Sperm viability and sperm counts were similar for the controls and local queens. The queens' ovary mass however, was larger (statistically significant) in the local queens vs the imported ones
- The biological significance of the difference has not yet been determined

Funding has been renewed for research projects over the next year ($25,000) and another $25,000 next March.

Bee BC: BCHPA applications
Kerry Clark: see written report on website. Highlights:
- Program managed by Investment Agriculture Foundation, BCHPA has no influence over selection of projects. 42 projects total since 2018, total $178,000. Next round is under consideration.
- Last year BCHPA received funding to help distribute results through posters and on website.
- We applied this year to help disseminate results of projects again, and another project to electronically monitor hives throughout BC.

Environment/Green Initiative Task Force Diane Dunaway: Received excellent notes from Sarah Red-Laird on greening conferences, will forward and keep working on this.

Education Committee Ian Farber: No report available.

Note from Young Agrarians re: land leasing for bees, Tessa Wetherill: see written report on website, and article in this issue.

Provincial Apiculture Program, Paul van Westendorp:
- Wintering info: a big range from 8% to over 60%. Too early to make conclusions now on losses and causes.
- Inspection services: scheduled as normal, although inspectors can't attend any indoor meetings. Up to their discretion re inspections, following social distancing protocols. 2 new

inspectors in South Okanagan and Terrace.
- Asian Giant Hornet: difficult to locate. Most activities are related to public and beekeepers observing along Zero Ave in Fraser Valley (White Rock and US border). May locate a nest in urban setting in White Rock soon. Nanaimo situation is different - there are beekeepers self organizing a grassroots effort to monitor and eradicate.
- Bee BC: Paul scores applications and forwards to panel. Not based on location or applicant. Next round should be assessed by Apr 15.
- Importation of packages and queens: can we get more flights in from southern hemisphere? What will costs be? Can BC beekeepers supply demand for bees, and on par with queens from HI or Cali?

Technology Transfer Teams, Heather Higo: see written report on website. Highlights:
- All provinces have a TTT except BC. AB started one in 2019, has already done a lot, eg. testing, IPM workshops, queen rearing, research projects, etc.
- BC TTT could provide real time sampling for pests and diseases to improve management for beekeepers of all sizes, monitoring for treatment resistance in mites, provide people on hand for research projects, workshops on IPM, queen rearing and advanced management workshops, advice to urban beekeepers, training webinars for management in remote areas.
- Need to look into funding possibilities: Ministry of Agriculture, BCHPA, federal or provincial grants, and berry industry would be options.

Land classification as farm - BC Assessment, Kerry Clark: Appeal to property assessment review board to see if properties not in ALR that are leased by a beekeeper would qualify for farm tax status. This appeal was a major undertaking over months. There is a 25 page decision in Dec 2019.
- We asked BC assessment for a written summary to give everyone clarity for future cases so we don't need to go through expensive appeals again. They would not supply that, only a phone call. However, in almost all cases, land was classified as a farm.
- Related topic: eligibility of income from pollination to help qualify for farm classification. This income is excluded because it is service income, but stud services is an exception that is eligible, so pollination could be similar. We could prepare a proposal to BC Assessment, but it seems there may be few or no beekeepers who are limited in their business by this issue. We also don't have time or resources for this.
- Paul has recommended that pollination be accepted as income, he will continue to do so.

BCHPA Challenges, Opportunities, Priorities and Choices 2020: see written report online. Highlights:
- We are introducing a few new topics now: Pandemic, table officers succession planning, different models of BCHPA operation e.g video conferencing, and possibility of a paid ED or similar.
- Pandemic will likely continue until Oct. Possibility for an online AGM?
- Table officer succession planning: bylaws call for a new president and CHC rep. Kerry has served full terms, so there must be a new president. Kerry intends to serve as past president. Stan has indicated he would accept a nomination to continue. Irene, treasurer, is not up for election, but possibility to decrease the financial responsibilities so it's not so onerous - perhaps looking for another volunteer.
- We may need bylaw amendments for virtual meetings and definition of the bylaw concerning "deficit".
- Different models of BCHPA operation: possibility to hold AGM in Kamloops each year, and to rotate semi-annuals around province each year. Also, possibility of having a paid ED, since BCHPA operations have become quite large.
- Priorities: We could do an online survey to determine member priorities.

Meeting adjourned at 11:40. ❀

British Columbia Bee Breeders Association

Armstrong Apiaries
James Macdonald
Armstrong
250-308-8219
jamesmacdonald@telus.net
Q N

Ashcroft Honey
Joe & Marguerite Lomond
Savona
250-373-2540 250-457-7193
marglomond@gmail.com
Q N, bee supplies

Barry's Bees
Barry Denluck
North Pender Island
bdenluck@dencor.ca
Q N

Bear Creek Honey
Mart & Rita van Herk
Chilliwack
604-845-1807
vanherk@telus.net
N

Brenda's Bees
Brenda Jager
Gabriola Island
250-755-5834
bzbees@telus.net
Q N P

Campbell's Gold
Mike and Judy Campbell
Abbotsford
jwcampbell@campbellsgold.com
604-856-2125
Q N

Emily Huxter
Armstrong
emilyhuxter@gmail.com
250-309-5408
Q N

Flying Dutchman
Stan and Cheryl Reist
Nanaimo
flydutch@telus.net
250-390-2313
Q N P

Green Bee Honey
Michalina Hunter
& Darwyn Moffatt-Mallett
Errington
250-616-3070
greenbeehoney.bc@gmail.com
Q N C

Heather Higo
Langley
heather.higo@gmail.com
604-532-6904
Q

Heather Meadows Honey Farm
Ian Bissonnette
Telkwa
250-877-3495
hometownhifi@yahoo.com
C

Honey Bee Zen Apiaries
Jeff Lee and Amanda Goodman Lee
Creston
250-866-6861
info@honeybeezen.com
Q N

Howe Sound Honey and Bees
Ian Kennard
Bowen Island
604-947-9518
icken@shaw.ca
Q N

Jinglepot Apiaries
Sol Nowitz
Nanaimo
250-753-9619
jinglepotapiaries@telus.net
Q N P

Kettle Valley Queens
Elizabeth and Terry Huxter
Grand Forks
lizandterry@gmail.com
250-442-5204
Q N

Pure Agriculture
Brad Cook
Victoria
250-818-8763
b.cook@pureagriculture.ca
Q N P

Red Queen Apiaries
Paul Petersen
Mill Bay
250-732-0197
redqueenqpiaries@yahoo.ca
Q N P

Rod Jo Moody Apiaries
Rodney & Jo Moody
Cowichan Bay
rodjo@telus.net
250-743-1939
Q

Silver Star Apiaries
Richard Springborn
Vernon
rlspringborn@gmail.com
250-379-2567
N

Similkameen Apiaries
Blair and Cheryl Tarves
Cawston
250-499-2555
blairtarves@gmail.com
Q N

Six Legs Good Apiaries
Deborah Tin Tun & Liam Brownrigg
Vancouver
604-817-2349
6legsgood@gmail.com
Q N

Sunnyside Apiary
Nancy Leonard
Bowen Island
nancyhasbees@gmail.com
604-947-2240
Q N

Sweet Nechako Honey
Jon & Susan Aebischer
Vanderhoof
250-567-5037
sweet02@telus.net
Q N

Wild Island Honey Bees
David Macdonald
Salt Spring Island
250-653-9999
dmacdonad@telus.net
Q N Colonies

Wildwood Queens
Donna Moseanko
Powell River
604-344-0622
donna@wildwoodqueens.com
Q N

Yin Yang 4 Bees Apiaries
Daniel Chiang
Burnaby
604-377-7562
yinyang4bees@gmail.com
Q N

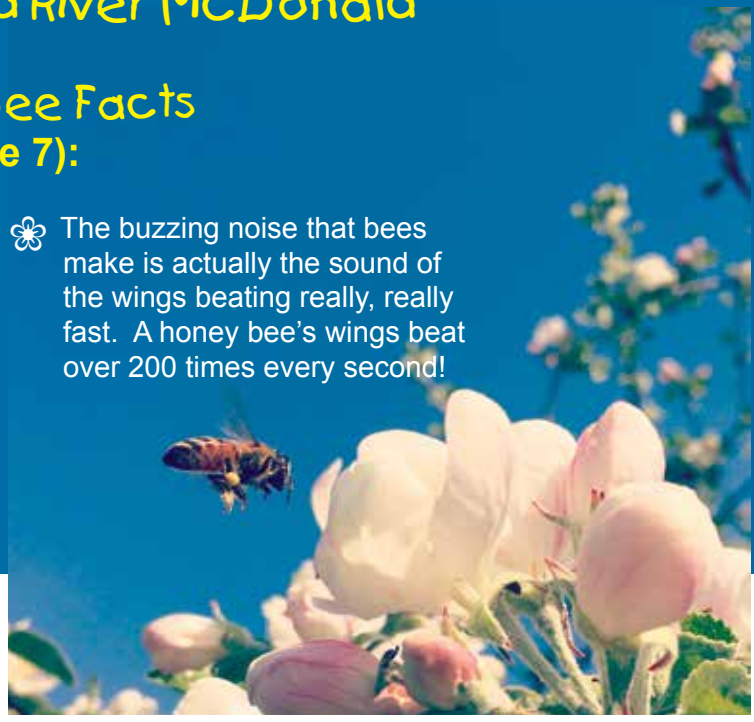
- **B = Bulk Bees**
- **C = Queen Cells**
- **Q = Queens**
- **N = Nucs**
- **P = Packages**
- **S = Shook Swarm**

The Kids' Bee Pages

with Rush and River McDonald

The Three Coolest Bee Facts
According to River (age 7):

- The buzzing noise that bees make is actually the sound of the wings beating really, really fast. A honey bee's wings beat over 200 times every second!



- Bees don't have noses, but they can smell with their antennae. Their sense of smell is much better than ours.

Art Gallery

Viggo Soby, age 11, Telkwa

Teanna Leggett, age 13, Chetwynd

Can you spot the drone?

- Boy bees don't have stingers so you can pick them up and play with them in your bare hands. You know they are boys because they have huge eyes and round bums.

Our Favourite Bee Jokes

What do you call a bee who can't make up her mind? *A maybe*

Why do bees stay inside the hive in winter? *Swarm*

What's more impressive than a talking llama? *A spelling bee*

The Three Best Ways to Eat HoneyAccording to Rush (age 4):

- In a peanut butter and honey sandwich
- On ice cream
- Straight out of the beehive and you get to chew up the wax like bubble gum

Paris DeLeenheer, age 7, Prince George

Calysta Meletis-McDowell, age 7, Prince George

Rush and River manning the Honey Shack.

Interview with Rush and River

When did you get bees?
River: On the day that I was supposed to get a little brother. The bees were on time, but Rush was late.
Rush: I dunno. I think I've always had bees.

What's your favourite job when you help with the bees?
River: Tasting the honey to make sure it's not poisonous.
Rush: Yeah, that's the best job in the whole world.

What is a funny thing that has happened while you were working with the bees?
River: The bees swarmed into our apple tree and mommy had to go climb the tree to get them.
Rush: When daddy got a bee in his pants.

What could people learn from bees?
River: To dance more when they are happy.
Rush: I wish people could learn to have wings!

What's your favourite flower that bees like?
River: Dandelions.
Rush: Yeah, daddy-lions.

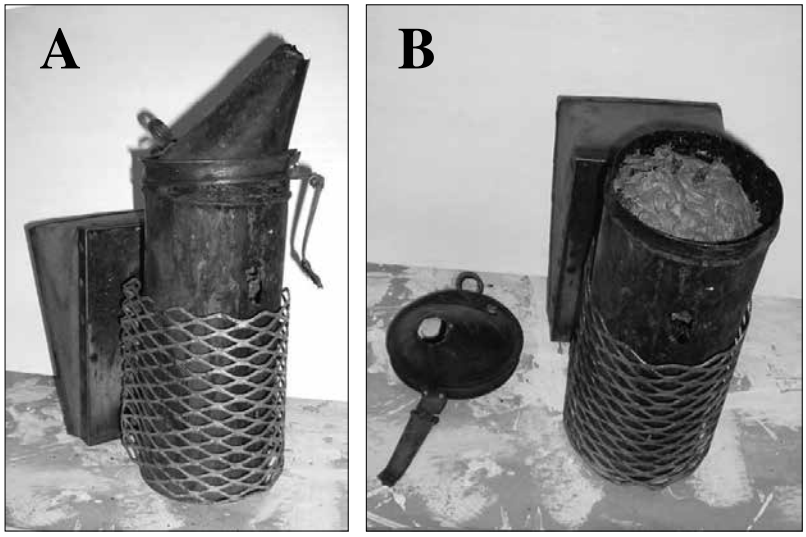
If you were a bee, what kind of bee would you be?
River: I would be a nurse bee because I like to be a helper and I wouldn't have to sting people.
Rush: I would be a guard bee so I could fight wasps! ❀

Tavis, Christine , Rush and River McDonald

About the authors: Rush and River McDonald are from Terrace, BC. They help out with their family's beekeeping business, Rushing River Apiaries, which their parents Christine and Tavis started a few years ago when Rush was born. They are truly a family-run business, each bringing different skills to the mix; Rush is the hive smoker and River is the queen bee spotter. Christine is also our new bee inspector for Northwest BC. Thank you to Christine, Rush and River for helping to put these pages together!

Wasps in My Smoker

by Lance Cuthill



At first glance at pictures A and B, a couple of questions might come to mind: "Doesn't this guy ever use his smoker?" and, "Why on earth would wasps choose to make their home in a smoker?" The first question I can answer while the second one leaves me totally mystified.

As you might guess, this smoker has seen better days and has produced smoke for more hours than I can remember. I've been keeping bees for about 40 years; this was my second smoker since I started beekeeping. The first one was too small; worked well, but not long enough with more hives.

While out in the bee yard early last year, a hefty pull on the stuck lid resulted in my tearing the hinge completely out of the smoker (note the hole and disconnected lid in picture B). Having bought a new smoker, stored in with the Introductory Beekeeping course materials, "old faithful" was left on a stump in the bee yard and put out of mind.

I paid no more attention to it until sometime in late August. While loading honey supers for extraction I decided not to leave behind any litter, like my old, broken smoker. I picked it up, set in the back of the canopied truck, closed the canopy and came home. One always expects a few honey bees but the canopy windows were full of wasps. The immediate false assumption was that these wasps must have set up a nest in one of the honey supers. Nope, I soon realized that they were in the smoker. ❀

Delta Honey Farms Forage for Pollinators

by Steve Bayley

My friend Mike Munro and I started an apiary together in 2013, and then our company, Delta Honey Farms, in 2014, with the idea to build an apiary specializing in commercial pollination. Mike introduced me to beekeeping 15 years ago. I was always curious, but never pursued it until this introduction, and the rest as they say is history. Mike has been keeping bees for 18 years, and in 2014 we both got our Bee Master certificate. In 2015 we pollinated our first crop, and since that time we have grown to include local and imported queens, summer and winter feeds, nuc sales and specialty equipment. Focusing on our customers ever changing needs and adapting to our ever changing environment has given us a greater appreciation for the overwhelming environmental pressure our bees live with every day. Our pollination customers' needs have remained the same except for flowering times every year is different.

Mike Munro and Steve Bayley of Delta Honey Farms

Mike knew a farmer that needed pollination so that's how we started. We both had outside jobs at first; Mike only does bees now, and I still work a little on the side, but with everything we do we easily make a living just doing bees.

Import queens were a problem early this year as commercial passenger flights were halted, but this issue has been rectified by cargo carriers who are filling this niche as they are flying freight everywhere. We also produce local queens for our own use every year; it depends on our need.

In Delta we have very little forage for our bees, and a long period of dearth in the summer. As our company grows and the colonies increase, we have begun to realize that we need to find better ways to provide food for our bees in order to keep them healthy. One of the big local farmers we supply bees to for pollination started to use a pollinator blend of seeds on a field following the harvest of early crops. This was used in replacement of regular cover crops that the farmers use to replenish the soil.

It was at that time we approached the farmer and asked if we could put our bees on that land. Most commercial beekeepers move their bees up to the Peace River country in order to make honey and keep their bees healthy. We choose not to do that as we want to keep our bees in Delta year round. As a result of our bees being on these pollinator fields they do really well and are healthier; these new cover crops have made a big difference. These fields also provide a major benefit for native pollinating insects - this was the main reason the farmer began to use the blend on his fields.

Moving forward we plan to be involved in identifying more areas where we can help to plant more fields this way, and we have applied for a grant that would assist with getting machinery to help with planting. Our goal is to work with more local farmers and other acreage owners that might see this as not only a benefit to us, but to the native insects as well. Moving forward, we are looking to acquire a tractor and implements to help with the tilling work before planting. ❀

25 acres of pollinator mix, Delta, BC.

A field of Dutch white clover. Putting them on this forage after cranberry pollination, in July, was like sending them to the hospital..they just exploded.

A summer forage yard, after pollination.

Regional Reports

West Kootenays
~ Tom Bell

February and March continued the trend of relatively mild winter temperatures - many folks are reporting good winter survival and a good start to the spring. April was cool, almost cold at times, and build up was likely slowed by a few days.

The Covid-19 situation affected bee operations here as well. The Selkirk College beginner's course was cancelled after the first session, no club meetings or functions, and the loss of both packages and some queen sources. Beekeepers and suppliers seem to be working through this as there has been an increase in the number of nuc suppliers locally and in the numbers of nucs. With limited personal contact, the club Facebook site has worked well for communication between members, the sharing of supplier information, and has seen an uptick in new and old keepers asking questions and looking for help. We are an adaptive group and listening to and watching the hives this spring has been a welcome respite from everything else going on.

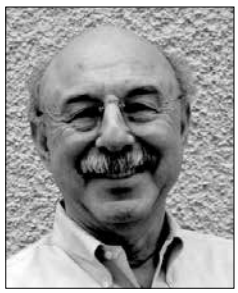
North Vancouver Island
~ Darwyn Moffatt-Mallett

Hello again from Errington on Vancouver Island. I am writing towards the end of the deadline for submission of this report, and the weather has really taken a turn for the better. Following a pretty mild and early spring we've had a real mixed bag, weather-wise, around here. The bees were off to the races in February and early March, and then temperatures dropped and we were lighting the wood stove in the evenings again (and I'm sure the bees were wishing they had their own little fires). A week ago we were battered with hail large enough to rip through the tender leaves of young greens in the garden, and the nights for the past few weeks have certainly been chilly, some with frost. But all of that changed over the last week or so, with temperatures soaring up to 25 during the day.

This is such a happy time in the bee yard. We have been watching pollen come in like crazy, and many of the brood nests are even getting a little choked up with pollen - something sure to encourage swarms. Locally, we are getting more reports of swarming, and I am expecting this will be a pretty wild swarm season - get those traps out!

Beekeepers and clubs in our area have been respecting the social distancing guidelines, and meetings have been postponed or moved to platforms like Zoom, with relatively few issues that I can tell. The bees don't seem to know there's a pandemic, and in our own yard we have begun the queen rearing season and making splits to try and keep our bees out of the trees. We will be placing cells into nucs for mating in the next week, and looking forward to seeing the first mated queens return and begin to lay.

We have traps out for Asian Giant Hornet and yellowjacket queens, but so far have just been finding YJ queens foraging or stuck in the greenhouse. I have lost count of them this year, but only a few of them have managed to escape with their lives. I dearly hope we never see one of those Asian Giant Hornets. I have not heard of any such sightings yet, and since the press got hold of the 'murder hornet' handle, we know there are many more folks keeping watch for these would be invaders. This one has almost been as good as the flow hive in terms of folks reaching out: 'have you seen this!?'



Metro Vancouver
~ Allen Garr

Spring is here in the Lower Mainland. Blooms are everywhere and, amidst mostly sunny days, hive populations that made it through winter are steadily building.

For just a nanosecond in the news cycle relentlessly consumed by COVID-19, beekeeping, of all arcane human activities, swarmed its way into the lineup of national television and radio newscasts and into the front sections of our national newspapers. It even caught the eye of cartoonists, giving them a brief respite from the morbid task of reflecting on the global pandemic.

And what as all the fuss about? Well, *Vespa madarinia*, the Asian giant hornet. Not news to us in these parts after its presence was discovered on Vancouver Island near Nanaimo, and across the border in Washington State last year. But bring it back again, refer to it as a 'murder hornet' and stop the presses, we have a hot story.

These thumb-sized critters can wipe out a honey bee hive in the briefest of time by decapitating one worker after another then feasting on the bodies. And that grizzly image does, after all, feed into the narrative that has captured public attention and created genuine concern for years now that honey bees, these tiny creatures that have enabled an explosion in industrial agricultural activity, continue to be threatened. Just add it to the list of varroa mites, pesticides, *Nosema*, small hive beetle, Africanized bees, climate change, cell phone towers... well maybe not cell phone towers. But you get the idea.

It would take a week before some experts weighed in to say there was "minimal risk 'murder hornets' will spread of from B.C.", while others would "dismiss the buzz" as hardly being serious at all. In fact, at least in the short term it is COVID-19 and the limitations it has placed on human activities that is proving most disruptive to beekeeping.

As early as this past February, when the prospect of spreading the virus interrupted air travel, beekeepers and their suppliers expecting packages and queens from New Zealand and Australia found out that they were out of luck. No air cargo was being delivered here. New stock to help

them to cover winter losses or to expand their colonies would not be coming in. It prompted the usual suspects to once again demand that the southern border be opened up to the importation of packages from the US so that they could fulfill their pollination contracts, and there was also the usual pushback from those historically opposed the practice because of the diseases that might accompany those bees.

Meanwhile, the whole notion of "social distancing" to avoid the virus from spreading has affected how bee clubs operate. Face to face meetings have been replaced by Zoom meetings. That technology is being used by everyone from politicians to boards of directors to, well, beekeeping clubs in Langley, Richmond and elsewhere.

Retail outlets, including West Coast Bee Supplies and Urban Bee Supplies, now ask that you order by phone and pay by credit card before coming in, briefly, to pick up your orders. Urban Bee Supplies also cancelled their planned courses in beekeeping. Hard to have social distance while leaning into a hive or examining a frame. Most affected are new beekeepers who still have lots to learn.

There may be some light at the end of this tunnel, as Delta beekeeper and instructor Julia Common says she is avoiding online training but figures that by June she can have hands-on field days even with social distancing. Happy beekeeping!

South Vancouver Island
~ Paul Petersen

Spring, what a glorious time of the year, regardless where you live. Nature being such a complicated system makes it a pleasure to be a part. This year we seem to have an overabundance of mason bees. They are building their little mud nests filled with their cocoons. I find them this year everywhere, even in the woodpile.

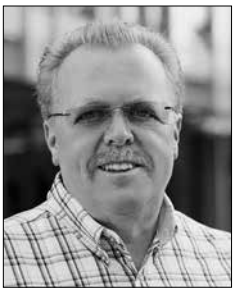
The bees are building nicely and we were even able to get some early queens in mid-April. The weather was so nice that it gave us a nectar flow from maple. This is truly an amazing honey. It tastes like maple syrup, does not stay on the shelf very long and fetches premium prices.

Nuc sales have been thru the roof, as many of you experienced difficulty in getting packages from offshore due to the sudden lockdown. If I hear that word again I think I will throw up and then go out and buy toilet paper. Those of us that sell nucs and queens have had to ramp up production and it's just amazing what the bees will do for you in the spring, that they refuse to do at other times of the year. There seems to be a certain frenzy at this time of the year.

Unfortunately, many clubs have not been able to attend to their members' needs in terms of training. Some, like mine, have carried out Zoom meetings, which seems to be an app that was made for these times.

I have had this virus, and I almost would not had have known, but the loss of smell and taste was really distinctive. In all, it was gone in three days, as is the case with at least 50% of those who get it, with some not knowing they have had it.

When I was kid we had bees. Now we are beekeepers, but we are resilient and this crisis too will pass. Let's keep the faith and bee kind. Besides, now that we are all at home it gives that much more time with the bees, so it could be worse.



Thompson-Nicola
~ Murray Willis

Well here we are in May of 2020. This spring has been a bit of a blur so far with everything that has been happening. When the airlines shut down our first thoughts were, where will we get queens this year? I am sure most of us had splits planned and some pre-sold. There was a sense of panic here in the Interior as not only would there be no queens, but above average losses were being reported.

A huge Thanks to everyone at Beemaid that went above and beyond to get us all queens. My loss was 80% this past winter; up until now I thought I was a good beekeeper. Mother Nature gave us some challenges, as we had unstable temperatures that went up and down like a yo-yo. I have talked to a lot of other beekeepers in the area and higher than average losses is quite common. It is interesting how some didn't have any losses, but that was at higher elevations and up the North Thompson river.

It seems the main reason suspected for losses in this area was the cold snap that we got in the first week of January; it went from -2 to -18 in a few hours. We are now well into spring, and swarm season is next along with the possibility of Asian giant hornets.

There are lots of flowers here in Kamloops for the bees to feed on, and we are looking forward to things being somewhat normal so we can maybe sneak a field day or two in, as all have been cancelled so far. I hope everyone has a good summer of beekeeping and a good honey harvest. One thing this past few months has taught me is to work harder at being self-sustainable beekeeper; get together with a few local beekeepers and make it happen. Happy Beekeeping!

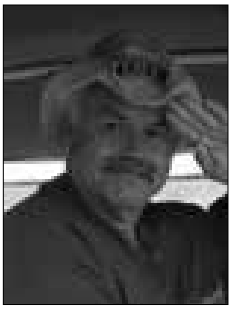
Fraser Valley
~ Courtney White

Hello everyone! We have had a great spring here in the Fraser Valley (despite Covid-19). After an excellent stretch of warm weather, overwintered colonies are ready to rock...and swarm! Overall, colonies are in good shape and we're looking forward to a great season. Bees moved into blueberry pollination right on schedule for the first week of May. So far, I haven't heard of any major shortages of bees for blueberry pollination due to Covid-19.

The local beekeeping community is keeping in touch online and holding monthly meetings via Zoom. The clubs (Chilliwack, Langley, Richmond and Surrey) have been in coordination with each other and sharing meeting links so that everyone can participate from home. There have been similar attendance numbers to in-person meetings, plus no commute to worry about. Rumour has it that Lana Popham participated in the Chilliwack club's last Zoom meeting, so that's pretty cool.

However, not everything can be done online and it will be nice to get back to "normal" and see all of our beekeeping friends in person. It's been a real shame to cancel field

days and hands-on learning opportunities, especially for new beekeepers. Hopefully by the next issue things will have improved. For now, let's take care and enjoy solitary beekeeping.



Prince George
~ Barry Clark

From deep in social isolation here on the farm, my report: spring has sprung (finally) and everyone is getting into their bees or what's left of them. Winter hung around long past the official start of spring, and well into April. The first pollen (from willows) started showing up in mid-April. Folks were posting pictures of the same time last year, and a world of difference. We are a month behind!

We have spring weather now, so it's time to move on. Predicting winter survival is not an exact science, more like a trip to the casino. Some folks did OK this winter, but most didn't. Losses were significant around Prince George and Vanderhoof, but I am told folks in the Robson Valley did better. When the spring survey comes out from the Ministry of Agriculture, be sure to respond, so there is an accurate account of winter losses.

Covid-19 has thrown a curve ball at all aspects of life on the planet, and beekeepers are no exception. We can't get together in person for field days, meetings, courses, etc. A few courses were held in our area before the lockdown, and now we are figuring out how to do the field portion of the courses in a safe manner.

The Robson Valley beekeepers have created a monthly newsletter to share with their members. It is a very unique and informative way to stay connected, pass on timely tips, and share in the joy of beekeeping. Nice work, Robson Valley club! Projects and events planned for the summer of 2020 in the Prince George area = NONE. This may change, but probably not.

Bee Inspections are deemed an essential service, so if you are lonely and would like a second opinion on how your bees are doing, if you are planning to sell nucs, used equipment, or move your bees outside of your bee district, give your local bee inspector a call.

Stay healthy, and look after your bees.

Northwest
~ Christine Mcdonald

First there was the run on toilet paper and now the 'murder hornet' hysteria, and for once, beekeepers seem like the sanest segment of society. For many of us, our bees were the only things behaving normally this spring, and we welcomed their build-up of activity to distract us from all that's going on in the world.

While there have been reports of colony losses in the Northwest, there do not seem to be any more than usual for this area. The demand for nucs, on the other had, has far outstripped the local supply and many are looking to points further east and south to get their bees. Many of those looking

for nucs are new to beekeeping and are setting up backyard hives for the first time.

Although several planned courses and workshops had to be cancelled locally due to the restrictions on social gatherings, many new-bees took advantage of the free webinar hosted by Paul van Westendorp, as well as other great learning opportunities through different organizations that were shared to the Highway 16 Beekeepers Facebook page.

Because our spring comes a little later in the North, many of us rely on queens from the US to build our nucs. There was some anxiety and confusion over whether we would be able to source our queens given the current border restrictions, but we are relieved that they have been arriving on time, and the bees are building up beautifully with the warm weather we have been enjoying recently. For now, we continue to connect virtually and look forward to catching up with one another in person once we are allowed.

Cariboo
~ Carole Mahood

As I write this, the first crop of dandelions is in full bloom in my little valley just south of Williams Lake. The bees are steadily bringing in pollen and nectar and don't care that the world has changed around them thanks to COVID-19. From brief socially distanced grocery store conversations with club members (the only place we run into each other these days) overall winter survival was a mixed bag this year – some reporting zero losses, and some reporting losing 50-60% of their colonies.

Early to mid-March brought worries of sugar availability for spring feeding in the Cariboo as local grocery stores sold out of baking products as fast as they could stock their shelves. Luckily for us, a fairly cool spring kept the bees hanging out in their hives a little longer than usual and by the time feeding was necessary, sugar was more readily available, though still a little tricky to track down at times.

Our club has cancelled all field days through the end of June at this point, and it's still uncertain whether the rest of the planned field days over the summer will go ahead. Nuc pickup day at the Hoyrups will be a much different event than in the past, with new club members being handed a well thought out 'how-to' instruction sheet with their order rather than the hands-on nuc installation demo of previous years.

Only time (and our illustrious Dr. Bonnie Henry) will tell when we can resume normal club activities. In the meantime, the bees will carry on and we will too – six feet apart.

East Kootenays
~ Lance Cuthill

Finally, spring has decided to arrive here in the East Kootenays. From early reports, winter losses have been in the 40% range. With our bees, we've had an unusual loss from starvation. In spite of leaving our usual, heavy supply of stores we

found that some hives starved. The most likely reasons we can guess at are: the winter was long with some really cold temperature fluctuations, and we had some unusually strong populations in the lost hives. Did they eat more than in other years because of so many bees? Varroa levels were very low going into winter.

With Airlines not transporting live honey bees, beekeepers were left with little or no option for replacing old queens or making up splits. The East Kootenay beekeepers were most grateful to Derrick at BeeMaid in Alberta who, with great personal inconvenience, agreed to meet Bobby and me in Golden to provide us with queens for both the East and West Kootenays. Thank You Derrick!

This spring's offering of our annual BCHPA Introductory Beekeeping course saw 8 people receiving their certificates with an average exam mark of 84%. What made this class a little different was the fact that most of the students had already gotten into bees previously. A lot of sharing as well as instruction took place. Now with Covid-19, we are wondering just how to hold the required hands-on field day. We've been thinking about having two at a time show up 2 hours apart so we can maintain the usual "social distancing". One good thing about Covid-19 and beekeeping is that we've had lots of time to look after our bees. However, we are still looking forward to giving our grandkids a real vs a virtual hug.

North Okanagan
~ Richard Plantinga

We are experiencing spring a bit later than usual. As of May 15, pollination is in full swing. Some cherries are done, and other fruit trees such as apples and pears are in their glory. Unfortunately, some cherries suffered frost damage just as the blossoms were emerging, so no pollination is needed for them this year.

There is uncertainty with the fruit crops. Will there be foreign worker farm labour for picking and in packing lines? What happens if there is an outbreak and the facility needs to be shut down? Even if the fruit gets picked and packed, will there be commercial flights to transport it to market for fruits with a short shelf life? With the way Covid-19 has affected the global economy, how much demand will there be for BC produce?

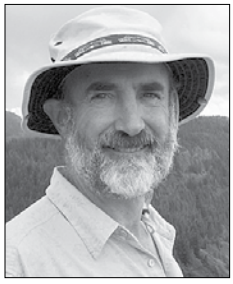
As often happens, there is wide variation in the causes and number of winter losses. A few beekeepers had complete losses. Most had an average of about 15% loss and a few are just as confused about the reason for very low losses. A major contributing factor seems to have been the drawn-out cool weather through the winter and early spring, which did not allow cleansing flying days and repositioning of the cluster resulting in starvation. The usual culprits such as mite damage and queen failure were also factors and led to dwindling, chilling and starvation. Many hives superceded in September following mite treatment and showed up as queenless or drone layers in the spring.

There seems to be an unusual number of early supercedure and swarm attempts. The success of these efforts seems doomed as the cold nights and cooler wet days in April caused a late start to local raised queens. Club members are

busy helping out chasing and preventing swarms, and some members have started grafting queen cells. Demand for nucs and queens is high, and wasp traps are out to snag the early yellowjacket queens when possible. We have also been pestered by the media about the impact of "murder" hornets. We are keeping an eye out and hoping we don't find any.

The College apiary project continues to progress but has been hampered by the Covid-19 restrictions. Our North Okanagan Beekeepers Facebook page continues to grow with over 250 participants. Some interesting topics are discussed, mostly by local beekeepers but also many from other areas and from other countries.

The Armstrong fair has been cancelled, with BC group activity being shut down until the end of August. There was the possibility that large events could still proceed in September, the issue is that a big part of the fair is the Midway and Rodeo. With the summer being shut down for these events it was not feasible for them to rehire, insure, train, and do all the safety certification for one main event and a couple of smaller events in September.



Peace
~ Kerry Clark

MAY in the Peace region: we MAY get ice on the puddles, plus after over 16 hours of sunshine, temperatures over 25° C by the afternoon. If you drive, you MAY use the heater in the morning and the air conditioner in the bright sun at 3 PM. Honey bee colonies MAY dwindle and chill if they're small and trying to incubate (to 33° C) a patch of brood through a cold spell, or if the cluster is healthy and has been thrifty with their stored honey, the population MAY be big enough to collect enough nutritious willow pollen to fill whole frame sides of pollen from willow. We MAY see dandelions in bloom in warmer south-facing spots. This year you MAY have seen farmers combining last year's canola, knocked down by snow in October, on the same day (or even later) that the same farmer is seeding this year's hoped-for crop. The winter hasn't been brutal: only a few days of -40 lows, but the spring hasn't been great for bees, with colder than average March and April. Still, the higher-latitude sun hours give an aMAYzing transition. Tiny Calliope hummingbird males arrived on time May 5, claimed their territories and waited for females to arrive about May 11. Poplar buds across the landscape change the view from brown to a cheery green in 2 or 3 days. 2020 has given us lots of time at home to observe and notice the beauty around us. MAY bees be with you.

Sunshine Coast
~ Allan Cobbin

Our overwintering results were varied, with several club members losing all their colonies and others with no losses. There were a variety of reasons given for the losses: a large predation of wasps in the late fall, high mite exposures, insufficient honey storage,

an average rather than an exceptional young vigorous queen, bees becoming nutritionally stressed, and of course overall inattentive checking (aka poor beekeeping). Most members did provide the usual preventative measures, provided sufficient food, treated with formic acid in the fall and oxalic acid in December and January, and some members wrapped their colonies but as noted, our results were quite varied.

At our February meeting, Rob Haines agreed to purchase packages (from New Zealand) as he has done for many years for those members interested and made arrangements for 24 packages which were provided and distributed in early March. Rob reports that these packages were "the best I've seen in several years." Grafts are underway and he will prepare some nucs for new members as requested. Some maple honey has been noted as coming in and of course pollen is currently plentiful.

Our colonies at the Botanical Gardens unfortunately did not survive the winter and there are no current plans to replace them. Also because of the current virus concerns we have no plans to arrange for local elementary school students to visit this site as they have done for the past several years.

We have several new members who are most eager to get started with their new hobby and these will be monitored by some of our more experienced beekeepers. Both old and new members are eagerly looking forward to getting together when we can but in the meantime are keeping our social distances and avoiding any unnecessary contacts. Most of all we should remember that it was some wise man who said: "Happiness is contagious and we should all be carriers!!"

The best, as always, from the Sunshine Coast. ❀

Classifieds

NUCS FOR SALE: Strong 4-frame nucs, full depth or Dadant. These are B.C. raised bees and queens. Nucs and queens available May thru September. Contact Blair and Cheryl Tarves, Similkameen Apiaries. **(250) 499-2555**.

NUCS FOR SALE: Strong 5-frame nucs with young, locally raised queens. Available mid-May to the end of August. Contact Marty Van Herk, Bear Creek Honey, **604-845-1807** or email **vanherk@telus.net**.

DEALERS WANTED: Interested in being a local equipment dealer for Dadant? Inquire at **dadant@dadant.com.**

WILDWOOD QUEENS AND NUCS: West Coast raised Queens available March-Sept. Queens can be mailed through the postal service when needed. Great for the backyard beekeeper! Overwintered Nucs available starting mid May. Limited supply, order early. Pollination services available for local farms. Contact Donna Moseanko, Powell River: donna.moseanko@gmail.com or call **604-344-0622**.

FOR SALE: Maxant 10-20 frame extractor, Jasco pump. Contact Bruce at **250-497-7018**. Kaleden, BC.

Northern California Italian and Carniolan Queens. Call or email Nicole for pricing and availability. **530-532-4302** or **nicole@buzzsbees.com** Visit our website for more information www.buzzsbees.com.

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