

Covid - 19 and the CHC



Native Irish Black Bees



The Queen Castle

The Benefits of Elderberry

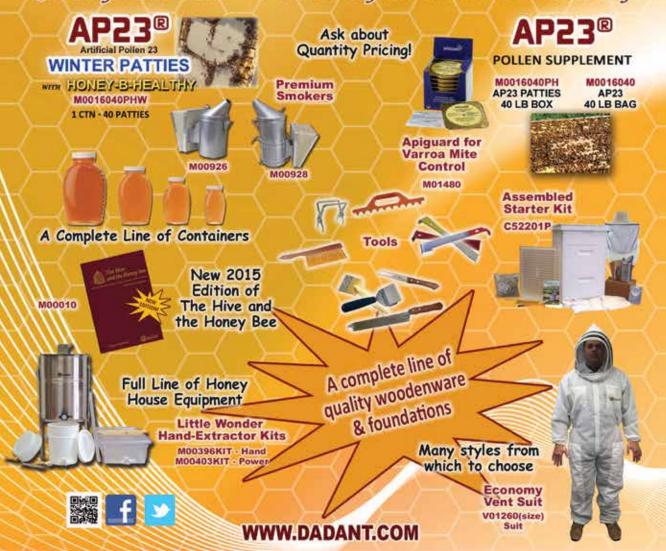






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Cover picture - Beehive built using Lego. See cover story, page 17. Cover photo by: Ruairi O Leocháin



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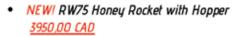
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Canadian Honey Council Report





Rod Scarlett, Executive Director, CHC

he events of the first half of 2020 exposed, what I believe to be, a great flaw in the Canadian beekeeping sector - an over-reliance on stock and manpower from outside of Canada. For the past ten years I have heard all sides of the argument - how we need packaged bees from the United States to how we can supply all our own stock needs with the possible exception of queens early in the year. The truth be said, there are strong cases to be made from both camps but ultimately, our reliance on foreign entities to meet the demands of our domestic industry exposes us to issues that we may have absolutely no control over. Many commercial operations have diversified and can, in normal times, maintain colony numbers and handle much of their queen production. While not every can or will follow the same business model, this should be the goal for the future. Domestic self sustainability should be something that more and more industry players should strive for. It allows for a diversity of operations and in fact, opens up new business possibilities. Research being conducted by Andre Rousseau and Renata Borba/ Shelley Hoover on over-wintering queens may address one of the big issues. This could lead to business opportunities in producing packages, and earlier nucs. It also means labour requirements may start earlier and employment opportunities may last longer attracting more local applicants.

Certainly, another vulnerability for the industry is commercial air travel. I am not sure there are many solutions for this other than charter flights but recognizing this is a pivotal component of the sector, it may allow for better planning and the exploration of contingencies.

While the Covid 19 outbreak exposed the

fragility of industry, it is also important that we maintain a degree of reliance on our international trading partners in order to ensure that if something disastrous happens domestically, we are not left with any alternatives. Somewhere, somehow a balance needs to struck, but for now, attention must be placed on addressing our own issues with our own solutions.

With everything that went on in the agricultural sector, I must say I am very proud to have been working in a sector that was not continually calling on the government for action and money, but sought solutions for themselves. From March to June, I have been on conference calls sometimes daily, sometimes every second day and listened to many commodities demand more and more financial assistance, and while yes, some operations desperately need that assistance , others do not. There are programs out there that beekeepers and others can take advantage of that will help offset lost revenue and that should be the intent of the programs.

On a different topic altogether, over winter losses varied substantially from province to province, but it seems the prairie provinces and, in particular, Alberta were hit the hardest. Because this area represents the largest number of colonies, I would expect the national average to jump substantially. Now this is all cursory as CAPA should have the final numbers in late June early July. A decent spring in much of the prairies has helped and beekeepers have been working overtime to get those numbers back up. Indications to date are that honey prices will continue to rise and that creates a degree of hope for the future. Everyone have a great summer!



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Covid -19 and the CHC

Rod Scarlett, Executive Director, CHC

ooking back to January of 2020, everything was pretty much normal. The CHC held its AGM in Ottawa and the Board had the opportunity to meet and set some priorities for the upcoming year. By the end of February, everything changed. The first things to go were trade shows. Supplies had been sent to Tokyo in preparation for participation in the Canadian Pavilion at Food-Ex 2020 in Japan, March 10-13th. It was cancelled and rescheduled to March of 2021. Soon afterwards two more show were cancelled and rescheduled, one in Singapore and one in Montreal. If, and when things get back to "normal" the CHC will have a very active schedule promoting Canadian honey and bee products internationally.

However disruptive the cancellation of the trade shows was, it paled in comparison to what came next. Commercial air travel ground to a halt and the labour issues of commercial operations throughout the country became front and centre. Canadian beekeepers hire hundreds if not thousands of specialized temporary foreign workers from all across the globe to work for the summer months, but with flights being dropped daily, it was more and more difficult to get the workers in to Canada. Employees from Mexico, Nicaragua, and the Philippines, the three countries from which a majority to the TFW's originate, were cut off. While the federal government focussed on getting Mexican workers in, the CHC was left to contemplate what to do. Our Labour Committee, chaired by Curtis Miedema, agreed that the CHC should look at chartering in workers from Nicaragua and thus began our journey into "How to charter a plane and what does it entail". Quotes were obtained and the numbers varied by over \$100,000! Notices to beekeepers about our intention were distributed and the results were clear, we needed to get this done or numerous operations would be in jeopardy.

Once the decision was made by the Board to go ahead and charter the plane, contact was made with the Canadian Embassy in Costa Rico, that looks after Nicaragua. There were also a number of Canadians stranded in Nicaragua who had no way of returning to Canada, so working in cooperation with Embassy staff we arranged to accommodate 33 Canadian wanting to return in addition to the 100 or so workers who had all their paperwork in order. On April 13, the Canadian Honey Council successfully chartered in the workers and the Canadians. It was one of the first, if not the first charter of workers from any agricultural organization this year.

Successful as it was, there was still a number of employers out there who needed to get their workers paperwork completed and transport arranged. The airport in Managua had shut down, the VAC centers closed and the Embassy in Mexico where paperwork was completed, was overwhelmed. The federal government tried to ease the burden by streamlining counterfoil documentation and making allowances for biometric testing. Once again, the Labour Committee was recommending a charter and the Board approved the request on May 6th.

Surveys were once again sent around to employers and 40 employers responded needing help in getting their workers into Canada. Inquiries were even also fielded from American beekeepers wanting to know if we could handle their workers. The Embassy in Costa Rico once again stepped up and 27 more Canadians wanted to fly home. Manifests were formulated and everything was a go for May 12th when the Nicaraguan government threw a curve ball and wanted the flight crew tested and official certification for Covid 19, which was something completely new to existing processes. The charter had to be cancelled until such time as testing was completed and results forwarded on the Nicaraguan government. With only two days warning, employers were notified to let their employees know the flight had been rescheduled to May 24th. Fortunately, despite a couple of hitches, everything turned out ok. Look back, the Labour Committee, the Canadian Embassy in Costa Rico and the charter company, Air Charter Services, deserve huge thanks from the beekeeping community.

But that is not the end of the story. As all other the labour issues were being addressed such as quarantines and inspections, flight cancellations had also significantly impacted packaged bees and queen imports. Numerous conference calls and negotiations with government officials took place attempting to identify the seriousness of the situation. Importers were contacted and some flights from New Zealand and Australia did come in. Negotiations with Air Canada resulted in them in reversing a decision not to allow the transport of bees. Last year we imported about 95,000 lbs of packaged bees into Canada and I suspect that that only between 10-20% of that was done this year. Attempts to look at domestic solutions were initiated, and I imagine this will be at the forefront of discussion for quite some time.

Hawaiian queen imports were also jeopardized as commercial flights stopped. With the outstanding work from Derrick Johnson of BeeMaid and his crew, alternate flight plans were finalized and shipping through Seattle turned out to be a workable solution. Fortunately, the shipping of California queens wasn't affected by air travel complications since it wasn't done through commercial airlines. However, there was an unrelated issue that sprung up during the Covid crisis as an Africanized colony was found in a quarantine zone in northern California resulting of the suspension of export permits. Quick action by the Board of the CHC, CAPA and especially CFIA resulted in resumption of imports after a weeklong interruption.

From the very beginning, staff at AAFC have been working tirelessly, trying to identify problems and developing solutions. There were daily conference calls addressing emerging issues, and answers to inquiries were provided at all times of the day. I for one can attest to getting immediate responses from high level AAFC and HDSC officials well past normal working hours and on weekends. As much as we may disparage the civil service at times, their actions and support certainly helped alleviate many problems that did, or could have, existed for beekeepers. The Board of the CHC and the Labour Committee also deserve a great deal of credit and respect for the work they did in addressing the issues that the Covid-19 pandemic presented.





Maritimes





Well we have once again had a roller coaster spring. The first two weeks of May were bitter cold and the second two weeks of May saw most days hovering between 25 and 30 degrees. Winter losses weren't heavy but they were a bit higher than some people had hoped. The first couple of weeks May certainly did not help the situation.

We just finished getting the last of our bees out to blueberry pollination the other night. It

was once again a flurry of activity trying to get them ready and move them all out at the same time. Working day and night for several weeks. Pollination season was extremely late last year and was shaping up to yet again be very late but the hot weather brought the berries around in a hurry and everyone's fields seemed to be ready for bees all at the same time. It can be very difficult to plan with large weather swings.

The Maritime Bee Tour was unfortunately cancelled this year. With border restrictions in place and so much uncertainty it would have been difficult to try to hold such an event. We hope that this event will be able to go on next season. The NBBA was finally able to have their AGM over a zoom call which was well attended and went very smoothly. With social restrictions changing weekly it is still unknown whether or not provincial associations will be able to have outdoor field days or be restricted to possibly doing live seminars online for people to attend.

The Atlantic Tech Transfer Team has welcomed new members Jennifer Harrison and Andrew Byers for 2020. Robyn McCallum will be going on maternity leave beginning in June and has done a great job in difficult times filling temporary vacant positions for this season. We look forward to having these new members as well as existing member Jillian Shaw continuing their important research in our region.

Québec

Maggie Lamothe Boudreau



Après l'arrivée saccadée des travailleurs étrangers, des paquets d'abeilles et des reines importées nous voici aux prises avec un printemps froid, pluvieux et changeant rapidement. Tout semblait aller pour le mieux ici, mais le vent a vite tourné. La période d'affaiblissement des ruches est enfin terminée et des pertes considérables de

ruches chez plusieurs apiculteurs commerciaux ont été signalées. Ces pertes sont certainement dues au froid, aux varroas, mais plus récemment fort probablement à des empoisonnements aux pesticides. Certains de ces apiculteurs étaient présents dans leurs ruchers lorsqu'une application de pesticides a eu lieu dans les champs voisins occasionnant une pluie d'abeilles morte. Pour le moment, l'information que nous avons indiquerait qu'il s'agissait d'un mélange d'herbicides.

Ajoutons que nous sommes maintenant aux prises avec le petit coléoptère de la ruche. Un fournisseur de matériel aurait importé illégalement des abeilles en provenance de l'Ontario. Une plainte aurait été déposée auprès du MAPAQ et le 31 mai 2020, un insecte adulte fortement suspecté d'être un petit coléoptère de la ruche (PCR) (Aethina tumida) a été récolté par un inspecteur du MAPAQ dans un chargement de ruches introduites de l'Ontario sans autorisation. Le 10 juin, 2 individus étaient confirmés comme étant des PCR par les laboratoires. Les ruches infestées auraient été distribuées sur tout le territoire du Québec. Tous les apiculteurs du Québec doivent suivre de très près l'état sanitaire de leurs ruches et déclarer tout insecte suspecté d'être un PCR.

Sur ce bon été à tous, j'espère que ce dernier sera plus clément pour vos ruches.

What a spring!

After the jerky arrival of foreign workers, packets of bees and imported queens we are now struggling with a cold, rainy and rapidly changing spring. Everything seemed to be going well here in Quebec, but the tide quickly turned. The "dwindle" period is finally over and significant losses of hives of several commercial beekeepers have been reported. These losses are certainly due to cold, varroas, but more recently most likely to pesticide poisoning. Some of these beekeepers were present in their apiaries when pesticide applications took place in nearby fields causing a rain of dead bees. The only information we have for now indicate it was a mixture of herbicides.

We are now struggling with the small hive beetle (SHB) (Aethina tumida). A supplier of equipment is reported to have illegally imported bees from Ontario. A complaint was filed with MAPAQ and on May 31, 2020, an adult insect strongly suspected of being a SHB was collected by a MAPAQ inspector on a load of the hives from Ontario. On the 10th of June, two individuals were confirmed as SHB's by the laboratories. From the information we now have, these infested hives would have been distributed throughout the Quebec territory. Beekeepers are mandated to monitor the health of their hives very closely and report any sign of SHB.

On this, good summer to every one of you, I hope that the summer will be good for your hives.



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Ontario





Albert Devries

Spring has made a quick transition to summer. In the space of two weeks, we went from snow showers to 30 degree temperatures! Many queen breeders were prepared because of looking at the long-range forecast. There are more than a few stories about wrapping cell builders with insulation and grafting while it was snowing. Now that good weather is here, it seems the queens are mating very well.

Overall, wintering has been good. Most beekeepers report low losses and many strong hives. The delay in nice weather caused some hives to drop back to four frames of brood from the six they had averaged earlier in the spring. Demand for hives to pollinate low-bush blueberries in New Brunswick is strong again. Prices have risen and are reported to be around \$165 per hive. It is likely that demand will be more than the available supply.

The Covid-19 virus has had an impact on beekeeping as well. The Ontario Beekeepers Association has decided not to hire a new Lead for the Tech-Transfer Program. The uncertainty caused by the pandemic made it prudent to delay this for the time being. As well, the tight supply of foreign queens has caused some beekeepers to change their hive management. Hives are being allowed to grow while beekeepers wait for local queens to be ready. Hives swarming could become a problem.

Wishing each of you and your families good health and a successful

Manitoba





Osee Podolsky

The spring build up has been slow to say the least. Pendulum sways of extremely warm weather to unusually cold weather seem to have been the norm this spring. We seen temperatures cresting 20 degrees in late March, to lows below freezing in Mid June, hindering spring build up of hives and making of splits. Significant portions of the province have had a dry spring causing flea beetles to be quite the problem in

regions, requiring 2 or 3 passes of increasingly potent, and higher residual insecticides, I am hoping that caution was taking to prevent the killing of hives located near these fields. One upside is that the dry spring has caused some farmers to reseed due to poor germination, we may be seeing some late Canola flows in areas.

Over winter losses have been a normal in some areas and well above average in other areas. Compounded with the cool spring, troubles getting Temporary Foreign Workers due to travel restrictions and flight unavailability because of Covid-19. Provincial hive counts are projected to be down this season as many operations are running less hives due to being understaffed this season. We can expect the see an increase in demand for replacement stock for next spring.

The time, effort, and work put in by all who helped getting travel exemptions, paperwork processed, and the chartering of flights is greatly appreciated. You all can not be thanked enough for your efforts and dedication.

As of now the bees seem to be coming along nicely, seconds and thirds are going on some hives with some lagging behind. Hopefully with some of the canola being later the weaker hives will have a chance to catch up for the honey flow.

Saskatchewan





Jake Berg

As I'm sitting down to write this, I told myself a few days ago that I was not going to talk about Covid-19 in this article. But the pandemic has completely and utterly overrun and changed everything we do. In March, there was the cancellation of Food Ex in Japan which CHC board member were planning on attending. The cancellation of the food show was one of many cancellations in the weeks and now months that fol-

lowed. Most of these shows have been rescheduled for later in 2020 or in 2021. It is yet to be determined if these events will take place.

By mid March when the travel restrictions were implemented, we started to realized the impact Covid-19 was going to have on the upcoming beekeeping season. The CHC labor committee spent a tremendous amount of time discussing ways to get our foreign workers to Canada in a safe and timely manner. Daily conference calls finally concluded that the best plan of action to get Nicaraguan foreign workers here was by chartering a flight. Rod Scarlett did an outstanding job researching, organizing, and compiling all of the information required for two chartered flights from Nicaragua to Canada. It is yet to be determined on how we will get our foreign workers home in the fall if commercial air traffic is not operational. The possibility of doing another chartered flight or flights may be our only option.

Also due to lack of international flights, the bee package shortage became a huge issue. The reliance of the beekeeping industry in Canada for international imports of bee stocks is a huge liability and weakness for our industry. I believe an effort must be made to either grow each individual farm into a more self-reliant operation or grow the replacement stock industry within Canadian borders to lessen the annual international need.

Although the pandemic has turned the world upside down, hopefully in the weeks and months to come we will be able to return to a more normal existence.

Alberta



No report at this time.

British Columbia





It's that time again, for the report, this year was and still is our 100th anniversary, unfortunately it's not going to be held in the normal fashion because of Coved 19. We are fortunate enough to have a very capable individual who can direct us down the path to an on line conference and expect to have a good conference. While it's still in the planning stages and Dan and crew are working out the kinks, I believe it will be the best

we could expect under the circumstances. (Dr. Bonnie will approve and we won't cause her any headaches) I think.

Jeff and Dan are looking at some interview document sessions with the audience able to ask questions. They are looking at four different topics so I am looking forward to these presentations.

Kerry has had his funding approved for the brood minder projects. Three of them in total one up north one in the central interior and one for the slower mainland.

▶ pag. 10

Pollination this year reports are that they were short about 10,000 hives but that is almost an urban myth seems every year it's the same. Some of the hives made a box of honey and others nothing, and by the sounds of it the hives did not come out of pollination very healthy, matter of fact quite sick. Some places on the island did quite well in the nectar flows and others not so good, we had quite a few yards that were going the wrong way until we joined force with Lantic sugar and now everything is looking quite good. Surprising what feed will do. Not really if you have been a beekeeper for any length of time, if in doubt feed feed feed.

Nuc sales this year were good to excellent and we still have new entrant interesting in getting started, even taking the time to explain that the best they could hope for is to get the hive established this year through feeding and what nectar flows come along and help out.

One of my tasks in CHC is the pollination committee. Neil Spect from Saskatchewan had this folio last year and now I have it. The CHC has had a request from the Beekeepers of the Lac St Jean region for hives to do pollination. They are short as the only hives available are from Ont and they cannot guarantee they are hive beetle free. The estimate is they are 1,000 - 2,000 hives required to pollinate wild blueberries. We responded to the Quebec Association with possible farms that could pollinate the crop. Now whether they have been in contact, we have no knowledge but are waiting to hear back.

In the meantime it has come to light that one business in Quebec has imported a number of Nucleus colonies from Ontario without permits or inspections and sold them through Quebec. They were found to be positive for the small hive beetle. We know that Quebec has endeavored to work very hard to control and eradicate the incursions that have happened in the past and been very successful at doing so.

In light of this latest incident this now puts a big damper on supplying clean hives for pollination due to the fact we do not have any idea where the Nucs from Ont wound up? If the people willing to supply hives for pollination from other provinces were to send their hives to Quebec to do the pollination and the small hive beetle were found in the area then most likely they would not be allowed to return there hives to their province.

At this point in time there is a lot of speculation and a lot of the facts have yet to come to light. In any event, this is a serious blow to the Quebec beekeepers, and their berry growers. The CHC stands ready to assist however we can and hope for the best possible outcome, for all concerned.

BeeMoid

COVID-19 has influenced every facet of life, and the operation at Bee Maid Honey Limited is no exception. As soon as people

across Canada starting stocking up on toilet paper, they were also adding honey to their grocery carts and we quickly saw big jumps in orders from our retail customers. Of course, we are happy when our sales are strong as we work to sell our members' honey, but these increases in retail sales were intense and required careful planning. We couldn't be more proud of our dedicated workforce who were committed to helping us fulfil as many customer orders as possible in the fastest time possible.

Our blow molding team also jumped in and did everything they could to ensure we had the bottles required to meet the increase in orders. In fact, in May, we achieved a company personal best for blowing the most bottles ever in a single month! That wasn't the only company record broken. We also had our highest volume of honey packed and sold during the prime of COVID-19 orders.

At the same time as all our honey orders were piling in, our Bee Supplies staff were also tasked with fulfilling orders during their busiest time of the year and they needed to adapt quickly to figure out how to get supplies into the three outlets and the stock out to customers in a fast and safe manner.

When we look back at what we accomplished during the early months of COVID, it is nothing short of astounding. We've now had a few weeks of back to pre COVID-19 sales averages and everyone can take a breather and get our safety stocks back up to levels that are more comfortable.

Of course, COVID-19 isn't just about the sales increases. Most importantly, we looked at all facets of our operation and made adjustments to ensure the health and safety of our staff and Bee Supplies' customers as our first priorities. Two precautions implemented swiftly were directing our office staff to begin working from home and closing our storefronts to customers. We appreciate how understanding our customers have been and how quickly our office staff adjusted to working from home. The most critical changes however, were those implemented on the production side of the business to keep our front line staff as safe as possible. Plans were put into place on physical distancing, temperature checks upon entry into the building, educating staff to stay home should they experience any symptoms, supplying PPE, segregating staff as much as possible and limiting entry into our buildings to essential staff only.

Our management team participated in industry conference calls to learn best practices of other manufacturing organizations so that we could evaluate our protocols and learn other methods to keep our employees safe. In May, representatives of CFIA, Alberta Regional Health Authority and Alberta Occupational Health & Safety visited our Spruce Grove facility so that they could observe our policies and practices around keeping our employees safe during the pandemic. We were happy to have this outside observation and we received a favourable report, which confirmed we had the correct measures in place and that our staff were following these measures.

We are now beginning to discuss reentry of some administrative staff and will do so in a safe and measured manner. We continue to adapt our facilities to ensure all employees as protected as possible as the pandemic continues. 2020 will definitely go down in Bee Maid Honey's history books for record sales and a sense of accomplishment, as everyone in the organization from our members to our office and front line staff showed unbelievable commitment during a very uncertain time.



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The Queen Castle

By Freddy Proni, Véto-pharma North America Area Manager

he world of beekeeping, no matter where you reside, was once a simple passion that has evolved into a complexity that at times leaves us wondering which actions and what equipment we need to be successful. This evolution brought upon by economic interest, efficiencies, and new challenges often entices us to consider new methods. Amongst those colorful glossy catalogs', products abound, each with a purpose and each with a required level of experience. Perhaps the newest consideration for addition to your equipment arsenal should be a Queen Castle. The castle is an affordable versatile piece of equipment, that pays for itself in a single-use and offers us, as beekeepers, security and options in our great apicultural adventures.

Beekeeping is a lifelong learning pursuit where Murphey's law often prevails. We tell ourselves, what are the chances that an event will happen but have no choice other than to mark these occasions as education... leading to wisdom. We are indeed a wise group (double meaning here) but we all have come across times where queen failures, swarms, or multiple queen cells, or even wandering virgins entice our decision-making process. It can be a gut-wrenching feeling to watch our prize mated queen fly off into the great expanse upon an inspection, or worse yet, rolling her by accident. Things happen, but we can hedge our bets in some of these circumstances and profit from them instead of chalking up losses to learning.

The Queen Castle Defined

A queen castle (referred to a "castle" going forward) is a piece of beekeeping equipment that is a single unit but with multiple compart-



Queen castles in an isolated yard

ments nestled together where the compartments are separate. Think of a hotel, where different family units or visitors can dwell amongst each other in the same building but are separated by walls and have their own entry and pantry. It is a collection of several two or three frame nucs that share the same structure. So, what does this Queen Castle offer us? Here are some of the benefits that we will explore in greater detail.

- Utilizes existing frames (no new equipment needed)
- Offers an opportunity to rear queens on a small scale from capped or uncapped queen cells
- Can be a resource for a frame(s) of brood to help enhance or equalize a colony
- Capped/open feed can be used to boost a nearby nuc or a split
- Works as a small manufacturing plant to pull foundation in small quantities
- Acts as a "mating nuc" by using the frames we have without the need of additional equipment
- May offer resources to support a failing nuc, or one that is sparse in the build-up
- Single mated queen bank
- Can be purchased or built

The Construction

Most manufactured queen castles utilize Hoffman frames sized to a Langstroth standard. They are usually deep brood chamber height in North America but can vary depending on the need of the beekeeper or what frame size(s) are used in an operation.



Inside and top view



Castles with entrance disks

Castles are one unit and can vary by the number of compartments that they hold. Usually a 10-frame hive body, once remodeled, will offer three separate areas for three different colonies of bees to reside independently from each other. The compartments are separated by removable inner walls (think back to the hotel where you may have a room with a shared door to the adjacent room). This allows the beekeeper to remove an inner section, (like a follower board) if the colony needs more room and the adjacent apartment is vacant. The roof is unique in that the side walls jet up and offer a barrier so that each colony has its own separate cover. This aids in working one compartment at a time without bees checking out their neighbors. The floor, or bottom board, is different in that a foundation of wood supports the removable inner wall sections which butt up, offering colony exclusivity. The entrance is usually a single hole that can be regulated with the use of an entrance disk. Homemade versions can vary in the number of compartments or the number of frames as well. Finally, castles are usually divided



Large Custom Castle

into three frame sections (deep mostly) but can be found in configurations of two frames and even accommodating different frame heights.

There are no absolutes in beekeeping. Mediums frame will also work if you purchase a deep queen castle as there is no reason why you cannot place medium frames in a deep height castle — the bees will usually draw comb below the bottom bar.

The beauty of a castle is its immense diversity. It may be used as a method to increase hive numbers, used as a mating nuc, or

serve as a back-up repository for the aid of another failing colony. We can also remove resources and bolster up other hives, convert these small colonies to nucs, or even use them to hold mated queens. Plus, we do not need new equipment – something many of us either run short of or have too much of. To emphasize, these mini nucs are our safety or security resources for when we have a queen related need.

The Set-up Frame Configuration:

As mentioned, castles are two or three frame nucs where we establish an environment to allow a virgin queen to emerge, mate, or hold a mated queen. Ensuring that there are adequate resources, bees, and comb space will aid in success. Just like making a 5 frame nuc, the configuration is on a smaller/slimmer scale.

3 frame

1 Frame Capped Brood 1 Resource Frame (pollen and Nectar/Honey) 1 Empty Drawn Comb or Foundation Frame + Bees

2 frame

1 Frame Partially Capped Brood 1 Partially Filled Resource Frame

Generous Amount of Worker Bees

Castles are small and easily portable. They can be carried to new yards for replenishment or to support increases, easily hidden in the yard from neighborhood prying eyes, and are usually quick and easy to work since they contain a minimum number of frames per compartment. For mentors, they are an ideal teaching tool sue to the limited population of bees and the ease to show variations amongst colonies quickly. So how do we use them?...

Look at All Those Swarm or Supersedure Cells!

There they are; all those beautifully capped swarm cells near the bottom bar or perhaps there are supersedure cells in multiples nestled amongst the comb further up the frame. Regardless if they are swarm or well-developed supersedure cells, these are resources for use. Hopefully most will develop into a queen as they mature and emerge presuming, they have had adequate resources and conditions, and were not previously slayed by an already emerged competitor. If we do nothing, we chance that many of these emerged virgin queens may take flight draining our bee population as they may cast off. The feeling of culling queen cells also has its detriment. So why not take advantage of the situation and produce some more viable queens that we may need in the

future or we can help other beekeepers?

The process is elementary. Take the entire frame with the healthy robust queen cell and place it in your castle. Add resources, bees, and an empty frame. Keep the compartment filled with bees and place the cover on. The colony will need adequate ventilation and should be placed at a minimum in partial shade. Sometimes we find multiple queen cells on a frame and the use of an isolation cage or pin cage over some of the queen cells will preserve the emerging queens without cutting out, potentially damaging multiple cells on a frame. Just three queen cells will fill all three compartments of a castle. The investment and risk is minimal as locally produced queens are considered desirable.

Virgins Galore - Let's Mate Them!

Many of us have had that unique experience where a colony swarmed. It's one of those things where we either knew it swarmed or were unaware that our queen and her daughters took a one-way vacation. Sometimes, serendipity or just luck plays a role enticing us to inspect that hive. Upon inspection you may witness queens emerging or see multiple virgin queens running the comb. What an opportunity!

If we have a castle, we can take a generous frame of bees, one of



Newly emerged virgin queen

the virgin queens, offer a resource frame and an empty drawn comb or frame of foundation, and create a quick mating nuc. Just like with a queen cell method above, make sure there is a good population of bees and place them in their compartment. Again, adequate ventilation is key and considering "locking" them in for a day or two if you are keeping your bees in the same vard. This allows the bees to acclimate to their new home and reduces the number of older bees return-

ing to the original hive. If you have an opportunity, move this queen castle to a new location to eliminate the lockdown. If you find multiple virgin queens or hear that wonderful crackling sound of queen cell caps being cut, take advantage of the opportunity. Now there could be additional queens for late-season splits, replacement of queen failures, and so much more. It's a financial gain and will reduce the stress of sourcing a queen during a challenging time.

With virgin queens, and with queen cells – feed the compartment. Be patient and give the virgin queen a good 10 days to mature, mate, and then check on her progress. Look for eggs, larvae, pattern, and ensure the bees have enough space as they will require more real estate quickly. Should they run out of space simply remove a resource frame, shake off the bees and replace that removed frame with comb or foundation. Once you are pleased with the laying pattern, the prolific nature of the queen, and that she is laying worker bees, you can transfer these frames to a nuc or use this small colony as the replacement engine for a failing or queen issued colony.

Mating Nucs

In the commercial industry, many queen producers utilize minimating nucs. These are very tiny hives with limited amounts of bees designed for the exclusive purpose of queen mating. A queen cell that is close to emerging is installed, the virgin queen emerges, matures, mates, and then begins to lay. Afterwards her pattern and overall health is evaluated, and she is caged and begins a new path in life. The process repeats several times during the season until weather cools, resources limit, or pests or scavengers (wax moth, small hive beetle) invade.

The benefit of utilizing a queen castle in the same manner as a mini-mating nuc has many advantages. First, it utilizes existing frames from your apiary (brood pulls, bee populations, resources). Second, it requires no additional influx of investment and allows the beekeeper to return these frames back to full sized colonies after the season is complete or the needs of the beekeeper have been met. Castles are ideal for those who graft and produce their own queens as establishing and maintaining a mini-mating nuc can prove difficult and be a significant upfront equipment investment.

Same Yard or Different Location?

Castles can certainly work well in the same yard where beekeepers have their existing hives with a little bit of husbandry. When filling and placing a new castle in the same yard keep the bees contained in the castle for 48 hours. This reduces forager bees from returning to their original residence and accepting their new location as "home" during their isolation period. For those whose apiaries are far away, a castle is easily managed by vehicle transport and deposited at another location (preferably at least 2 miles away).

What About Overwintering in a Castle?

Great question, and the answer is dependent on region, but it can be a long shot. Three frame and four frame deep and medium castles have been successfully overwintered in North Carolina by the author. In warm southern US climates, it is more viable and unlikely in



Close to emerging grafted queen cells

northern cold regions. Constant liquid feed is offered throughout the winter season and the castles are placed in a warm location. They can also be placed in a garage/ basement or next to a south facing brick wall that absorbs heat. Wind breaks are beneficial and if kept indoors, your girls will appreciate the ability to have a cleansing flight on those warm days over 50 degrees F. Please note that some mortality is experienced, and it varies based on different winter temperatures, overall bee health, resources, and population - but it can be

successful. During the summer months, the colonies can be transferred to nucs and built up. These nucs can be placed above a full-size hive for overwintering with increased odds of success. Again, it is a gamble but a chance to offset winter losses come spring.

Can I Use a Queen Castle as a Cell Starter?

NO! We may be tempted to use our castle as a starter because of convenience or happenstance. There are not enough resources in a 2-3 frame nuc of establish the proper robust environment that a queen larva requires from a nutritional standpoint. Large populations of young bees, with generous resources are required to produce the most desirable queen cells.

Tips & Tricks

- · Always ensure your queen castle has enough resources (carbohydrate) and if they are lacking feel them. 50% sucrose syrup work well and may be fed via the use of top bottle or jar feeders. This feeding method allows you to visually inspect syrup consumption.
- Two and three compartment queen castles will populate quickly, or they can run out of room. When setting up a triple frame compartment, offer either an empty drawn comb frame or a frame of foundation. This allows us as a beekeeper time because we will without doubt have something in life that will take out attention away from monitoring our queen castle. Our bees will have something to do in our absence.
- Yes, queen castles can and do swarm. Two frame compartments congest quickly and will encourage swarming.
- In regions where small hive beetles are present take caution as the summer months wear on as many times small colonies may not be able to control small hive beetle populations especially during dearth.
- · Ensure each compartment of your queen castles has adequate ventilation. Additional drilled holes covered with #8 screen offer
- Keep your queen castles out of direct sun and give them at least partial shade – it can get hot in those little apartments!
- If you are using top feeder bottles buy modifying the cover of each compartment, simply place an empty box on top of your queen castle with a cover. It will protect your feed. Soda bottles work well with a tiny hole drilled into the cap. Avoid thin water bottles as they have a tendency to collapse.

The decisions we have as beekeepers are many but somedays a

simple investment into equipment can have a great pay off. Consider further investigating and adding a queen castle to your operation and witness the versatility, cost savings, and the nicety of having resources at a frame's pull away. Regardless of hive style, all it takes is come carpenter wizardry - give it a try. Happy Beekeeping! ■



Top view – feeding



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How did the creator of the world-leading feed supplement for bees, HiveAlive get to where he is today?

ara Scott's passion for all things honeybee related began with a trip to New Zealand over 20 years ago. The physics graduate who had been working in medical diagnostics took a year out to explore New Zealand and became fascinated by the amount of beekeeping that was going on there.

"Everywhere I went I could see beehives", he says of his New Zealand experience. In Ireland, where Dara is from, all the hives are hidden behind stone walls. Reading up on beekeeping, he loved the idea of the symbiosis of the beekeeper helping the bees and the bees returning the favour with honey. Upon returning he prepared for getting his own hives. He began with a small cast swarm captured near his home that a beekeeper collected for him. The apiary expanded and grew from there but so too did his frustration with the lack of natural methods to keep the honeybees healthy.

"I wanted to keep my bees as healthy as possible so that they could fight off diseases and stresses and also be more productive and survive better. The west of Ireland is definitely not the easiest place to keep bees!" says Dara. "It is one of the windiest and wettest places in the world with rarely having temperatures above 20 °C/68°F. Bees can survive the cold and the heat but rain and wind are not their friends." Still, Dara manages to get a reasonable honey return every year and builds nucs for beekeepers in the spring. He is keen on promoting Ireland's native honey bee Apis mellifera mellifera (Amm).

This bee was once spread across the whole of Europe but studies have shown that Ireland may have the last significant, stable population of Amm, because in the few other places where it does still survive in Europe, its genetics have been severely compromised by introgression from other strains. By keeping the nucs over the winter Dara can get them to new beekeepers early in spring when they are looking for them. "By providing these beekeepers with an option to obtain native bees early in the spring they are less likely to import different sub species from the continent which additionally can carry diseases not yet in Ireland", says Dara.

Ireland has a long history of beekeeping, despite the inclement weather. Over 1600 years ago beekeeping was so important to Gaelic Ireland that there was a complete list of laws dedicated to beekeeping. The bee laws, called the "Bechbreatha" were the most important of all the Brehon Laws relating to land and agriculture at the time. Over twenty pages were dedicated to bees and beekeeping covering swarms, hives, honey production and so on. One law in particular shows how high a value was placed on bees. If a person who was stung by a bee had not retaliated by killing the bee they would be entitled to a meal of honey from the beekeeper. If, however, the person died from the sting then two hives were paid in compensation to their family!

After his visit to New Zealand, Dara landed a dream job with the Woods Hole Oceanographic Institution, USA. He spent almost a decade exploring the planet's deepest oceans with one of the world's deepest underwater vehicles, a robot called Jason, which could travel to depths of over 4 miles. Dara had the opportunity to explore multiple exotic locations such as the Pacific islands, Easter Island and the Aleutian Islands in Alaska. On his travels around the world Dara met with many beekeepers and learnt the many ways people keep bees. From Carniolans to Russian mite resistant bees, Italians to Apis mellifera jemenitica in the Middle East,

Dara has seen a lot of bees!

The work was very interesting and there were lots fascinating experiences like massive lava flows into the sea, the world's first live recording of an underwater earthquake and piloting the robot around giant, thirty meter, hydrothermal vents with 300°C/572°F



water piping out of them. The craziest adventure was probably climbing a volcano in Papua New Guinea that exploded the following day! However, the travelling took its toll on Scott. "I'm six foot six and going to Hawaii takes a painful three days", he says with a laugh. "Seriously though, I really missed having a proper garden and being able to mind my bees properly. By the end, I was sick of it."

He wanted to focus on developing a solution to improve the health of his bees and began work on developing HiveAlive. "I was lucky, Ireland has some of the world's top seaweed experts, so I got help from them in developing HiveAlive. These scientists knew exactly what seaweed extracts to choose and had special extraction techniques to be able to pull out all the anti-bacterial, anti-fungal, anti-viral and immune stimulatory properties that seaweeds naturally have along with a range of vitamins, minerals and amino acids. "I knew about the health benefits of seaweeds for humans and at the time they were just starting to be developed for animals. Now, they are an extremely popular feed ingredient used commercially to reduce the need for antibiotics, boost the immune system and improve gut health." He was intrigued to find out would the same benefits apply to bees. Through government supports Dara collaborated with scientists from several universities across Europe in developing and testing what would soon become HiveAlive.

His theory was correct. HiveAlive has since been tested in multiple field studies around the world. Results consistently show that feeding hives with HiveAlive makes the colonies more productive - they have more brood and more honey with less disease, in particular Nosema, and lower overwinter losses. "To be honest we could spend lot of money on marketing but the best marketing team we have are the beekeepers that give HiveAlive a proper try over a full year. Once they do, they are our best advertisers as they can really see the benefits and are keen to tell their friends. People don't believe our claims when we tell them, but they believe them when their friends have seen it for themselves. That is genuinely the most rewarding part of the job, when I go to shows and people tell us how much they love using HiveAlive."

"We are currently selling HiveAlive in over 40 countries worldwide, which means we have a lot of labels to look after for all the different languages", he jokes, "However, it is very interesting to get to interact with so many beekeepers worldwide who all have different methods of beekeeping and tips to share". Dara reflects that he is missing the comradery at beekeeping tradeshows and conferences worldwide due to the lockdown but is positive about the future. "Beekeepers are a tough bunch, constantly being challenged by weather, disease and now Coronavirus. I think we will all adapt and grow in the coming months and years".





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Cover Story

Irish beekeeper builds fully functioning hive out of Lego

By Vincent Barone (Westmeath Independent)

Ruairi O Leocháin, a schoolteacher and wildlife activist, became the buzz of the beekeeping community after sharing his creation online, the Westmeath Independent reports.

O Leocháin, who runs Athlone's Wildlife Apiaries, has racked more than 100,000 views on his video of the hive and says fellow beekeepers around the world are asking for guides on how to make their own.

"To be honest, I wasn't expecting such a big reaction," he told the outlet.

"I have had people getting in touch with me from China, America and elsewhere saying that they love the idea."

O Leocháin said he started the project just for fun about two months ago and didn't have a coherent plan for building the hive as he began stacking the toy bricks.

"I had the idea before COVID-19, so when that happened I thought I would order a load of Lego and see what happens with it," he told the Independent. "I've been making it bit-by-bit over the last eight weeks or so."

O Leocháin managed to build the toy hive while comparing it side-

by-side to the real thing, he said.

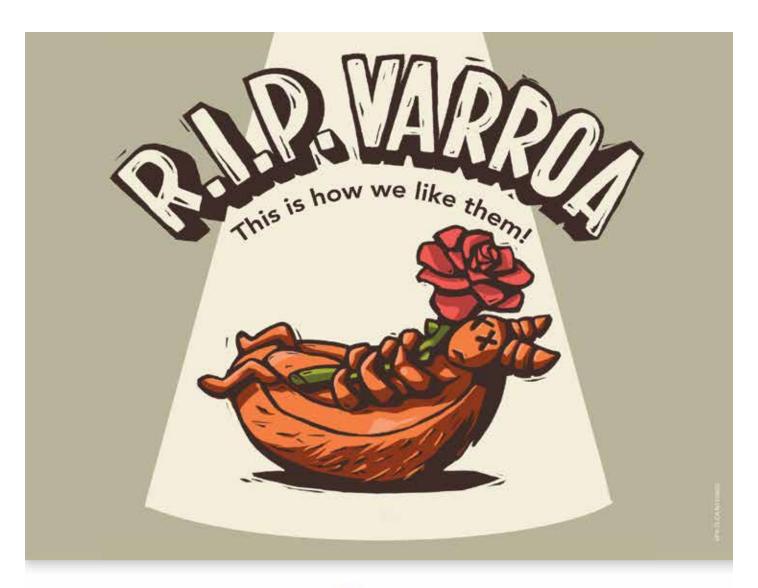
The colorful digs are now home to about 30,000 native Irish black bees, with the population expected to double at the peak of summer, according to O Leocháin.

He added that he didn't use any glue to hold the bricks in place, but that the bees would actually work to seal up the structure themselves.

"What the bees will do, given enough time, is they will propolize the whole thing," O Leocháin went on. "Propolis is a kind of glue that the bees get from trees, and with any gaps in a beehive, with any wind or air getting through, they will basically put their glue in between to seal it up."







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Native Irish Black Bees

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e rear Native Irish Black Queen Bees (Apis mellifera mellifera). Native Irish Honey Bees are under threat due to hybridisation with foreign strains of honey bee.

It is important to protect our native honey bees at as a genetic resource.

Importations of honey bees into Ireland and the propagation of non-native sub-species has a negative effect on our native honey bees.

The Native Irish Honey Bee is a strain of the Dark European Honey Bee which was once native to most of Europe north of the Alps.

It is now relatively scarce in mainland Europe.

Through DNA research carried out by Jack Hassett at Limerick Institute of Technology, it is known that Ireland has one of the largest populations in the world.

Galtee Honey Farm were involved in this research from the beginning and the first samples to be tested were from our bees.

We were also involved in a European wide genetic testing project (BABE) carried out by Bo Vest Pederson at University of Copenhagen in 2000.

Our bees were identified as being ecotypes of Apis mellifera mellifera termed 'Galtee' and 'Glengarra'.

Through this project it was discovered that our bees were almost identical to the Tasmanian Black Bee which is widely believed to be the purest strain of Dark European Honey Bee in the world.

The DNA carried out in both projects showed that our bees are 95% to 100% Apis mellifera mellifera.

Why are Native Honey Bees Important?

- Known as 'Black Bees' due to appearance, but colouration may vary

▶ pag. 20

- Naturally adapted to the Irish climate
- Can be very docile with low swarming tendencies
- They are ideal for Irish honey production
- Excellent at sparing their stores during bad weather
- Can fly at lower temperatures
- Good honey producers, even in poor weather conditions
- Genetically diverse populations in Ireland

We are proud of our involvement in the formation of the Native Irish Honey Bee Society and of giving it ongoing help and support.

We are patrons of NIHBS & have contributed the sum of €5,000 to the NIHBS Research Fund which helps to support the important work of research on the Native Irish Honey Bee.

NIHBS was established in 2012 by a group of beekeepers who wish to support the various strains of Native Irish Honey Bee (Apis mellifera mellifera) throughout the country.

It is a cross border organisation & is open to all. It consists of members & representatives from all corners of the island of Ireland.

Promote the conservation, study, improvement & re-introduction of Apis mellifera mellifera (Native Irish Honey Bee), throughout the island of Ireland.

Establish areas of conservation throughout the island for the conservation of the Native Irish honey bee.

To promote the formation of Bee Improvement groups. To



provide education on Bee improvement and to increase public awareness of the native Irish honey bee.

Act in an advisory capacity to groups and individuals who wish to promote it.

Co-operate with other Bee-Keeping organisations with similar aims.

Seek the help of the scientific community and other stake holders in achieving our aims and objectives.







Registered Medications and Pesticides for **Honey Bee Health in Canada**

Please note that these medications must be applied according to the labels, and in some cases a Veterinary prescription is required. If you are using ingredients or formulations that are not listed on the label, there is good reason why applying could be illegal and harmful to your bees, produced honey and yourself. For more information and if you have a question, consult with your Provincial Apiculturist.

Submitted by Medhet Nasr

American Foulbrood Medications:

- Oxytetracycline (Oxytetracycline) This product requires a veterinary prescription
- Tylan Soluble (Tylosin tartrate) This product requires a veterinary prescription
- Lincomix Soluble (Licomycin hydrochloride) This product requires a veterinary prescription
- Note: Highly recommended to destroy the infected hive(s) if showing heavy infections

European Foulbrood Medications:

• Oxytetracycline (Oxytetracycline) — This product requires a veterinary prescription

Nosema Medications:

• Fumagilin-B (Fumagillin Dicyclohexylamine). Does not require a veterinary prescription.

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- Checkmite+ (Coumaphos) Reported mite resistance in Canada)
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- Thymovar (Thymol)







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BEE HEALTH

Submitted by The Canadian Honey Council. Taken from the Apimondia Abstract Book 2019

Pathogen prevalence and risk factors for winter loss of honey bees in Southwestern Quebec

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Winter mortality of bees represents a major source of economic losses for the beekeeping industry. Pathogens, management practices and environmental factors are thought to be involved in this phenomenon, but their exact roles and interactions between one another are still poorly understood. This pilot project aims to estimate the prevalence of the main pathogens of the honey bee and determine the impact of these risk factors on overwintering loss in Southwestern Quebec.

The pathogens Varroa destructor (detected by alcohol wash), Paenibacillus larvae, Melissococcus plutonius, Nosema spp., Acarapis woodi and Apocephalus borealis were investigated on adult bees in 242 colonies of 31 apiaries of Pontiac and Montérégie areas in the province of Quebec in August 2017. Colony mortality (<4 frames of bees) was registered in May 2018. The prevalence of each agent was estimated at the colony and apiary levels. Varroa was the most common pathogen, found in 48% of colonies and 93% of apiaries. However, only 16% of colonies in 49% of apiaries had significant infestation rates of at least 1 mite per 100 bees. Nosema spp. and M. plutonius were respectively detected in 40% and 21% of colonies. A. borealis was detected in one colony. A. woodi and P. larvae were not detected.

Overall colony mortality was 31%, whereas intra-apiary mortality ranged from 0 to 100% with a mean of 37% and a median of 30%. The impact of pathogens, clinical signs of disease, environmental factors and management practices on colony mortality over the subsequent winter, based on logistic and negative binomial regression models, will be presented.

The preliminary data shows that Varroa remains the most frequently encountered pathogen in apiaries in southwestern Quebec. Given the recognized impact of Varroa on colony health, it is essential to establish a strategy for effective monitoring and management of infestation levels. The findings of this study will provide useful information for the implementation of targeted and effective preventive medicine programs.

Treatment and Supplemental Feeding on Colony Production and Survival In Canada

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We examined what effect management factors, specifically treatment for Nosema spp. with fumagillin and provision of supplemental nutrition, had on honey bee colony productivity, pathogen levels, and survival. The study was conducted at three locations: 125 colonies in

northern Alberta, Canada, managed for honey production; 120 colonies in southern Alberta managed for hybrid canola seed pollination; and 76 colonies on Prince Edward Island, managed for lowbush blueberry pollination. Protein patty supplements with 25% pollen were provided to half the colonies continuously during the active beekeeping season, except during the bloom period of the major crop. Fumagillin was provided in sugar syrup to half the colonies each fall. Colony populations were assessed at 11 time intervals between May 2014 and May 2016, and samples of adult bees were collected for determination of parasite, pathogen and virus loads.

Sites differed in colony survival over two years, adult and brood populations, and seasonal population patterns. Colony performance in blueberries was poorest overall. Supplemental protein feeding had no general effect on colony productivity measurements and neither protein supplementation nor fumagillin treatment influenced overall colony survival at the two-year time point.

Treatment with fumagillin did suppress Nosema spp. loads in colonies after treatment, but was only associated with improved rates of winter survival and honey production for specific site-year combinations. Overall, our results provide modest, conditional support for the use of protein supplements and fumagillin. Parasite loads in adult bee samples showed that colonies originating from New Zealand packages were initially predominantly infected with N. apis., however after one year, N. ceranae was found to be the dominant species. The trypanosomatid Lotmaria passim was found to be common among colonies. Increased frequency of L. passim detection over the experiment was also associated with greater infections of Nosema spp., as well as increased colony weight loss during winter. Overall, increased incidence of clinical disease symptoms in colonies were found to be highly associated with decreases in honey production and reduced fall adult bee populations, suggesting that disease status may be the most influential determinant of colony outcomes in cold temperate climates.

Effect of natural immune inducers on honey bee survival, Nosema ceranae spore numbers and innate immunity of Western honey bees (Apis mellifera)

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Nosema ceranae is the dominant microsporidium that causes nosema disease in Western honey bees (Apis mellifera). For several decades, the common treatment for the disease has been the antibiotic fumagillin. However, there are risks associated with this treatment, including the development of antibiotic resistance in N. ceranae and antibiotic contamination of hive products. Therefore, there is a need to develop alternative safer treatments. Four natural pathogen-associated molecular patterns (PAMPs) were examined that are known immune inducers in other insects as alternative treatments.

The tested immune inducers were chitosan, peptidoglycan, flagellin and zymosan. Bees were individually inoculated with N. ceranae along with an immune inducer in sugar syrup, while the control bees were either inoculated with the pathogen or just received sugar syrup. Chitosan and peptidoglycan significantly increased honey bee survival and reduced spore numbers of N. ceranae at 20 days post treatment.

Additionally, these two immune inducers influenced the expression of the genes for the antimicrobial peptides, hymenoptaecin and defen-

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sin2, as well as the gene for the stress tolerance-related protein, blue cheese, compared to the controls. These results suggest that chitosan and peptidoglycan are inducers of innate immunity and have the potential as alternative treatments for N. ceranae infections.

Permanently Averting Disaster or Delaying the **Inevitable? Development of a Varroa Action** Plan for mite-free Newfoundland and Labrador

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Newfoundland and Labrador, Canada, is one of the few regions on Earth with a managed honey bee population that is completely free from the parasitic mite Varroa destructor. Despite provincial government importation restrictions, little in the way of Varroa-specific biosecurity measures had been developed to prevent and/or cope with a mite incursion into this last bastion of mite-free bees in North America. We report on both the process undertaken, and the progress achieved, to produce a Varroa Action Plan (VAP) for the province.

The VAP is the result of collaboration by hobby and commercial beekeepers, academic researchers, government representatives, and the provincial beekeeping association. The VAP contains education efforts to prepare beekeepers for the possible arrival of Varroa destructor, biosecurity guidelines to ensure that apiaries and beekeeping activities minimize the risk of rapid mite spread across the province, research efforts towards developing mite-resistance characteristics in the bees before the arrival of the mite, and a containment and eradication plan uniquely suited to the province that may allow recovery of its mite-free status even in the event of a biosecurity breach and mite incursion.

We will summarize the contents of the VAP, as well as report on findings concerning the hygienic behavior (freeze-killed assay) of a number of mite-naïve bee colonies from the province.

Long-term comparison of therapeutic efficacy of Fumagillin, prebiotics, and probiotics on Nosema infection, health and productivity of honey bee colonies

H. Neil, I. Medici de Mattos

Saskatchewan Beekeepers Development Commission, Saskatoon, SK, CANA-DA, University of Saskatchewan, Western College of Veterinary Medicine, Department of Veterinary Pathology, Saskatoon, SK, CANADA

Sustainable Canadian agriculture is in part dependent on a robust apiculture industry that provides healthy honey bee (Apis mellifera) colonies for crop pollination. Thus, recent unsustainably high colony losses have been raising concerns throughout Canada. Increasing evidence indicates that the microsporidian pathogen Nosema spp plays a significant role in mortality.

Despite the significant negative impact of nosemosis on honey bee health, the only homologated treatment in Canada (i.e. Fumagillin-B) recently became unavailable due to discontinued production by the manufacturer. Moreover, the efficiency of commercially available alternatives have been often reported as contradictory. Accordingly, we initiated a long-term large-scale investigation to compare therapeutic efficacy of probiotics (i.e., Super 233 DFM and ProBee) and prebiotics (i.e., Nozevit and Honey-B-Healthy) to Fumagillin-B. A total of 105 experimental colonies were divided into 7 groups (n=15) and used in this experiment. 5 groups (total 75 colonies) were infected with No-

sema spp. spores mixed with sugar syrup (~15,000 spores per bee) and subsequently treated with one of the above treatments according to manufacturers' instructions. In addition, one group (n=15) was challenged with Nosema but not treated (positive control) and another group (n=15) was not challenged and not treated (negative control).

The variation between the spore loads found after inoculation (AI) and after treatment (AT) (δAI-AT) was used to assess the efficiency of the tested supplements. The ANOVA test showed a significant difference across all tested groups (F= 3.420, df= 5, P= 0.009) and the post hoc comparison showed a significant increase in the spore counts of ProBee treated colonies (X= 68.71, SD= 91.91) when compared to the untreated control colonies (9.48, 12.49) (Tuckey test: P= 0.027). Four weeks after treatment there was no significant effect of probiotic and prebiotic supplementation on the Nosema spore counts in experimental colonies. This experiment is in progress and evaluation of Nosema spore load, overwinter survival, and productivity of honey bee colonies exposed to above-stated treatments will be compared among experimental groups over two years.

Four years of Field Trials Conducted in Saskatchewan for the Determination of Formic Pro™ Efficacy Against Varroa destructor, effects on Deformed Wing Virus and Nosema Levels in **Colonies of Honey Bees**

D. VanderDussen, C. Rutherford, Y. Tan, H. Garez, W. Connor, P. Griebel, A. Robertson

NOD Apiary Products Ltd, Frankford, CANADA, Meadow Ridge Enterprises Ltd., Saskatoon, CANADA, VIDO InterVac, University of Saskatchewan, Saskatoon, CANADA, School of Public Health, University of Saskatchewan, Saskatoon, CANADA

The objective of this series of Formic ProTM (MAQS+) field trials was to determine the efficacy and impact of applying the formic acid vapour delivery technology at different time periods (early spring, late spring, late summer and early fall) in Saskatchewan, Canada.

The effects on phoretic varroa mite levels, varroa viability in sealed brood, DWV virus profiles before and after treatment, nosema levels and queen status were determined. Eight trials were performed over 4 years involving 270 colonies. The temperature conditions were monitored for all trials to assess the effects of the temperature conditions on efficacy and queen mortality. The treatment periods were also varied (7 to 14 days). Live and dead adult worker and drone bees were collected before and after formic treatments to determine DWV levels and distribution between different castes at different times during the season. Composite samples of bees were extracted from selected trials and subjected to QPCR to determine the colony virus levels. Nosema levels were also determined by PCR analyses after formic treatment. Phoretic mite levels were determined by alcohol washes of at least 300 adult bees and brood infestation levels and varroa viability assays were assessed visually by opening ~100 cells.

In general, these trials of the Formic ProTM technology showed good efficacy with little effect on colony activities other than some short term effect on brood production. Temperature had an effect on queen mortality, with higher mortalities at higher temperatures, but better varroa kills. The 14-day treatment period trials showed the best results with good to excellent efficacy and the highest levels of varroa kill in sealed brood. ■



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The Benefits of Elderberry

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A: Yes, in limited quantities. Our lozenges are well within those limits.

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Q: Is it safe for children?

A: Our elderberry lozenges are safe to take for up to 10 days, for children 6 years and older. Beyond that please consult your physician.

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