

May 2013
Vol 26 # 2



Hive Insights

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

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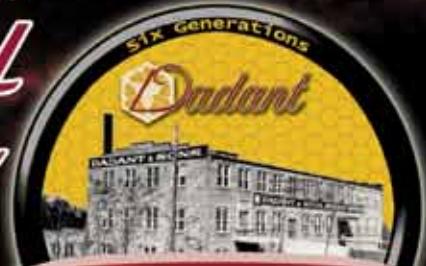
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Please contact the CHC office for more information.

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Hivelights is published quarterly (Feb, May, Aug, Nov). Deadline for submissions are 6 weeks prior to publication (i.e. Dec 15th for Feb issue). For guidelines on article submission and advertising rates please visit our website at www.hivelights.ca

The opinions expressed in the articles printed in Hivelights are those of the authors and do not imply endorsement of the Canadian Honey Council for the promotion of any product, goods or services mentioned unless specifically stated.

Field Editor Doug McRory
Design and Production Cristian Campean
Advertising enquiries Geoff Todd
Publisher Bunker to Bunker Books Inc.
Printed in Canada

Publication Mail Agreement number
40031644
ISSN 1489-730X
Return undeliverable Canadian addresses to
CANADIAN HONEY COUNCIL
#36 High Vale Crescent
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HiveLights

May 2013 Vol 26 #2

Canada

We acknowledge the financial support of the Government of Canada through the Canada Periodical Fund of the Department of Canadian Heritage.

Real-Life Education in the Bee Yard.
(Campbell Bee Yard near Stonewall)

Photo: Jim Campbell collection

The University of Manitoba had 70 students starting the beginners beekeeping class, January 2013, double the previous year.



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Canadian Honey Council Report

Rod Scarlett, Executive Director, CHC

During the winter season, much like other agricultural activities, beekeepers have a little time to catch up on things that may have been set aside during the hectic summer months. For me, winter certainly is the busiest as the CHC tries to get as much done as possible while Board members still have a little time to help out. Our Bee Incident Committee had a number of meetings and conference calls over the winter months and the Board of the CHC approved the first in a series of recommendations that were forwarded to the PMRA. Further along in Hivelights you will find those recommendations. In March, I was asked to serve as the CHC representative on the Corn Dust Research Consortium, an international consortium set up to help fund two research projects related to pesticide management in corn. By now, many of you will be aware of the successful research projects.

For much of January and February, concerted efforts were focussed on getting together a proposal to develop a national bee health database as well as to put together a national screening program. A great deal of work was put into these efforts by Bryan Ash and Jerry Poelman but unfortunately when all was said and done, national agreement could not be reached. The CHC will now re-examine the approach and perhaps in time, a new application can be put forward.

The CFIA sponsored Bee Biosecurity program should be unveiled shortly. Lee Townsend and myself attended an evaluation session and from a CHC perspective I found it very interesting to hear what the cattle industry had done and how much further advanced it is in amalgamating bio-security, traceability food security and environmental programming. I believe it will certainly be of benefit to introduce food safety and bio-security programs in a shortly spaced timeline. CFIA is currently considering how all the products will be launched and is examining what follow-up will be needed



in the Growing Forward II suite of programming to assist in educating and implementing bio-security initiatives. While providing feedback to CFIA on CHC experiences related to bio-security, I came away with a far better awareness of the experiences of other commodities and will surely take advantage of that in recommending ways and means to engage beekeepers in adopting bio-security into their operation. This will be particularly important in dealing with smaller hobby operations where, for example, the chicken industry has some experience that can be drawn upon.

The CBISQT program is progressing. The CHC Producer Manual and HACCP Plan have been revised and represent a substantive change from early versions of the program and the version submitted for technical review in September 2012. The draft Producer Manual is in effect, evolving into the "standard" by which the CHC will recognize competency among producers enrolled in the program. Several components may accompany the development of formal standards, such as accreditation and second- or third-party certification, both of which add considerable market value and market access attributes to both domestic and international markets. These will be important considerations as the CHC moves forward with this program.

In March, representatives from the CHC, CropLife Canada, farm organizations and government met to continue discussions on a number of issues of mutual interest. Of paramount importance to beekeepers is the continued development of hive health products. The companies involved in developing these types of products are aware of the industry's needs and the threat of resistance to current products only amplifies the need for new product development. Aside from hive health products, there was considerable discussion on broadening the awareness of key stakeholders in the challenges confronting beekeepers including such

things as pesticide incidents and best management practices.

Finally, I attended the Canadian Agricultural Human Resource Council board meeting and workshop as Lee Townsend's proxy. CAHRC was in jeopardy of going out of existence since it lost its core funding but HRDC recently approved three projects the extend over three years and are worth about \$9 million so funding limitations have been muted. At the meeting they outlined the new projects. There may be some benefit in a couple of the projects since they will be clarifying the job descriptions for a number of agricultural related jobs. A couple of the products that CAHRC have produced should be of significant value to beekeepers. They have developed an International Trade workshop for producers which seems very interesting and may be of benefit for those looking at expanding either their honey or bee business. As well the Agricultural Human Resource Tool kit looks very good. It is an online tool that provides all the human resource needs for an employer and is available for around \$100. Please contact the office if this is of interest to you.

As we move into the spring, I hope your wintering season was successful and the spring and summer of 2013 brings health, wealth and success.

CO-OP Honey Packer

**Bee Maid
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Growth**



Bernie Rousseau

On March 5th, 2013 Bee Maid Honey held an open House at the Alberta Honey Producers Cooperative Plant (AHPC) in Spruce Grove Alberta. It was attended by many Government officials invited Dignitaries, Producing Members and Staff. The theme was the Celebration of Growth and Innovation that has now made Bee Maid Honey the Largest Canadian

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CAPA award goes to Brock Harpur

"The Canadian Association of Professional Apiculturists (CAPA) Awards Committee is pleased to announce that Brock Harpur, a PhD candidate at York University, is the recipient of the 2012 award. Brock is a student of Dr. Amro Zayed and is focusing on honey bee genomics and immunity.



Brock's scientific record is outstanding. He has published early in his career and his work is relevant to apiculture, honey bee science, social insects and entomology as a whole. Brock has been recognized internationally for his work. Along with a productive research career, Brock is also active in the beekeeping community.

Three outstanding applications were received for the award. We encourage the other applicants to reapply next year when their work is more advanced.

CAPA Awards Committee

Membership in CHC

National organizations with a vested interest in honey bees, in addition to the existing provincial beekeeper organizations, are eligible for membership in the Canadian Honey Council. Applications are subject to review by the CHC Membership Committee. Those associations that meet established criteria are then considered for approval by the Board of Directors. Application form available from CHC office.



Regional Reports

Maritimes

It's too early for an accurate assessment, but



Paul Vautour

Winter in all three Maritime Provinces appears to have been difficult for bees.

There have been extended periods of cold weather without the normal relief given by periodic, southern warm air flows. Although it remains too cold to open colonies, there are ominous reports (from small beekeepers) in New Brunswick, of extreme mortality in their apiaries. Speculation also points to the possibility that the unseasonably warm Spring of last year caused an abnormally high build-up of Varroa for those who treat late in the Summer and had failed to detect the problem. Likewise in Prince Edward Island, it is too early to assess the over-wintering situation. At the PEI annual meeting, the members were discussing the modernization of their constitution and by-laws with the aim of clarifying some ambiguities. They expect the border to be open for the importation of honey bees from other provinces with safeguards such as having been treated with formic acid to prevent the spread of tracheal mites. Phillip Milner was elected President of the

Nova Scotia Beekeepers Association at their annual meeting.

Québec

Despite the fact that colonies are generally weaker this spring, an early result for winter loss is around 10 percent, which is quite acceptable. Once spring clean up is accomplished we should be at around 20 percent, if the weather holds.

The honey price and demand remains strong at both the retail and wholesale level. Specialty honey such as blueberry always sells for more, while white honey seems to hovering around the two dollar range wholesale.

Blueberry producers are offering \$125 per hive this year for pollination services. This is an average increase of 4 percent on last year's price and does not necessarily include the price of fuel. The QBF has developed a pollination contract and we highly recommend that beekeepers offering this service use it. It can keep you out of all kinds of trouble like bear damage, insecticide/fungicide spraying, and terms of payment. It holds up much better in court than a hand a shake.

Quebec remains a SHB free zone and regulations have been put into place to insure this situation remains. All hives entering Quebec this year must be accompanied by the proper documentation and signed by the right authorities.

Non compliance will not be tolerated under the new zoo sanitary laws of 2012. For further information on this matter please consult your Provincial Apiculturalist.

Wishing you a good beekeeping season.



Scott Plante

Ce printemps, malgré le fait que les colonies soient généralement plus faibles que l'an passé, les pertes hivernales indiquent un taux préliminaire acceptable de 10%. Une fois la régie de printemps terminée, nous devrions atteindre un taux définitif de 20%, si toutefois la température se maintient.

Le prix du miel demeure élevé autant à la vente au détail qu'à la vente en gros. Le miel de spécialité, comme celui de bleuet par exemple se vend toujours à meilleur prix, alors que le miel blanc semble se situer autour de \$2.00 la livre à la vente en gros.

Les producteurs de bleuets offriront \$125 la ruche, pour les services de pollinisation cette année. Cela représente une augmentation moyenne de 4% sur l'année précédente et n'inclus pas nécessairement le prix

de l'essence. La F.A.Q. a développé un contrat de pollinisation et elle en recommande fortement l'utilisation à ses membres apiculteurs. Ce contrat peut vous être grandement utile contre les dommages causés par les ours, les arrosages d'insecticides/fongicides, ainsi que sur les conditions de paiement. Ce contrat pourra mieux vous servir en court que des paroles en l'air.

Le Québec demeure une zone sans petits coléoptères de la ruche et des réglementations ont été mises en place afin d'assurer la continuité de cette situation. Toutes ruches qui entreront au Québec cette année, se devront d'être accompagnées de la documentation adéquate ainsi que de la signature des autorités désignées. Selon les nouvelles lois zoo sanitaire de 2012, la non-conformité à ces exigences, ne sera pas tolérée sur le territoire. Pour de plus amples informations, veuillez consulter votre responsable apicole à ce sujet.

Nous vous souhaitons une bonne saison apicole.

Ontario

Ontario is experiencing a much colder winter than the last two exceptionally mild winters. This winter is closer to a "normal" winter if that exists anymore. From the reports that I have heard the bees seem to be wintering quite well when this report is being written. Eight more weeks will tell

► pg 7

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the tale. Hopefully we do not have losses like those we are hearing about from our neighbours to the south. Except for the clusters being a little smaller than beekeepers would like to see going into fall, there is no reason to feel that the bees will not winter well.



Doug McRory

As far as we know Apivar® is working well and most beekeepers have treated in the opposite season with Formic Acid and finished up with the insurance policy of Oxalic Acid so we should be in reasonable shape. I personally fed Fumagilin in the spring last year and there was no appreciable amount of spores in the fall samples so that looks good.

Manitoba

The past winter in Manitoba has been cold and windy with above average snowfall. Most honey producers are anxious to work bees but Mother Nature has not cooperated. Reports from indoor wintering producers are stating hives have smaller clusters, thus producers are expecting higher losses. Many are scrambling to line-up replacement packages and nucs. Packages suppliers commented demand is up from previous years. Supply is short. Manitoba Agricultural Services Corporation have been pleased with beekeepers response to Overwinter Bee Mortality Insurance introduction. Forty Four

producers purchased just over \$3 million coverage for the 2011-2012 winter. Total colonies insured was just over 29,000, with 9 producers making a claim. In 2011-2012 the average Mortality (weighted average) was 29%. Overwinter Bee Mortality Program for 2012-2013 has Forty Five producers representing 32,839 colonies with an insured value over \$3.4 million. Will be interesting to see what the average mortality will be after the long cold winter of 2012-2013.

Directors were disappointed to find out CHC has terminated the country wide Disease/Pest profile database project. The project had objectives to identify and survey new and emerging pathogens and pests in Canada, develop an integrated best beekeeping management system to manage pests and bee health, and a communications and technology transfer to deliver research results to beekeepers for implementation and practices. An initiative to define Bee Health through a country wide survey was a result which came out of the Winnipeg Stock Replacement Symposium. The data base survey was supported unanimously at the CHC AGM in Quebec City. Directors and producers would like answers. Honey producers in Manitoba are wondering how CHC, the national organization, serves our interests. Manitoba has queen producers wanting to export stock for

propagation, producers working towards self-sufficiency, producers moving hives inter-provincially for pollination, and producers dependent on imports, be it queens and or packages. In Manitoba our board works for the betterment of all producers. Without a national bee health study, Canada opens itself to a challenge in regulations from other countries, we simply don't have documentation to show the disease/pest status of Canada.

Manitoba producers are anxious to see how CHC will move forward with Small Hive Beetle policies. CHC may want to discuss zoning vs certification into more depth, as I know direction I receive from Manitoba Beekeepers is we don't want to put any economic strain on producers that are affected.



Bryan Ash

With zoning all beekeepers within the zone will be restricted. They will not be able to sell queens/nucs or move hives outside the zone. We have learned from tracheal mites and varroa that pests and diseases do not respect zones or borders.

Each summer Manitoba honey producers gather at an annual field day. This summer's field day is being held at Ash Apiaries Ltd, Gilbert Plains, Manitoba from 11:00am – 3:00pm, on June 20th, featuring a large commercial extraction facility, Provincial Apiculturist, and Entomologists. All are

welcome to attend.

Saskatchewan

The calendar says spring but the thermometer certainly doesn't agree that spring is anywhere close.

This winter in Saskatchewan has brought above average snowfalls to much of the province, this coupled with the early start to winter has made everyone more than ready for springs arrival.



Calvin Parsons

Driving by beeyards this winter you see a lot of odd shaped mushroom tops. The snow is piled high on the winter wraps and very little of the wraps are showing at this time. It is going to take a significant change in the weather to get the snow melt going. Indoor wintered hives appear to be fine and on the upside they are much easier to check, than wading up to your belly in snow.

The early bee yard work this year may involve snowshoes and snow toboggans for access. It will be slow access to most yards in this operation and much of Saskatchewan.

Beekeepers have moved most of their honey this year with very little remaining in their hands. Prices have been good and have risen considerably this winter. It seems there is a demand for white honey and it is paying

a premium price. It would be good to see this strong price trend continue into the next crop.

Alberta

Winter just seems to persist all across the prairies so far. As I write this, it is the end of March and it looks like we may get temperatures above zero this week. However there is still a pile of snow out in the fields. A lot of locations here in south central Alberta have snow level with the top of the hives. Even southern Alberta which is pretty well brown has had challenges with the weather being good enough to get out and put on patties and medications. I am aware of a few people making it out and getting a start at looking at the bees and initial reports are sounding like the bees are looking not to bad. Hopefully the weather will swing here soon and we will continue hearing good news.

It seems the demand for pollination services is pretty strong again for this coming year and with honey prices being where they are, it may be harder for some to justify going the pollination route rather than keeping the bees home and running for honey production. We have been hearing of a high demand for blueberry pollination as well on both ends of the country. This may be a great opportunity for some beekeepers, but also a challenge to find where all these bees may come from. And with pest



Kevin Nixon

and disease issues and potential control measures being put into place to prevent any spread, will only increase the pressures.

I guess a big question we are faced with is, does the potential risk of manageable pests and diseases outweigh the potential of a great business opportunity and will any control measures put into place have a negative economic impact on beekeepers who base their business on selling queens and nucs to other beekeepers? I believe a large part of the purpose of a national organization is to support the needs of other regions in the country. Just because some regions don't necessarily share the same need, does not mean another region (or industry) should be impacted negatively because the rest of the country won't support it. Some may think I'm wrong in my thinking, but I really believe if we only continue supporting the needs of a couple regions and those same regions can never support the others in return, it will only fracture this organization beyond repair. The crazy thing is, we have the same objectives. We all want a thriving, healthy beekeeping industry. At least, I would hope this is the case. We just get wrapped up in the process of how to get there. We must realize that just because its not how you or I would do something, it does not make it wrong. We must work together whether amongst ourselves

or with other industries as well.

British Columbia

Despite the mild winter in B.C., only a week or so of subzero temperatures, a high winter loss of colonies occurred in spurious areas of most regions of the province. On Vancouver Island, some beekeepers losses over 60 % while others in the same region loss less than 10%. Similar situations occurred in the Fraser Valley and Interior. Samples of fecal matter covering frames of the "Dead outs" sent to the Provincial lab did not reveal any abnormal levels of Nosema spores. Samples of bees have also been forwarded to Dr. Castillo at the National Bee Disease Centre, Beaverlodge, to search for traces of viruses.

The B.C. Honey Producers held their Semi Annual Spring meeting, March 15 & 16th, at Kamloops and there was a respectable showing of membership. There were no resolutions to CHC but members are interested in the testing of prospective miticides in the prairies and developments for overwintering insurance and confirmed pesticide damages. The "dust-off" incident in Ontario, last April, does concern most beekeepers in that it is not clear what PMRA is doing to investigate the suspected sub-lethal impact to honey bees and other pollinators.

Our Education Day began with Yvonne Herbison, PMRA Enforcement

Officer, based in Kelowna. After outlining the role of PMRA and beekeepers in terms of compliance in using miticides, she briefly covered the Agency's report on the Ontario Bee Incident. She drew attention to Agency's website for directions to report incidences of suspected poisoning. In responding to questions of how beekeepers could protect their bees from pesticides, Yvonne advised beekeepers to communicate with the growers in their area to make them aware of the location of apiary sites and to request that spraying be done early or late in the day when bees are not foraging. She pointed out no bee pesticide bee incidences have been reported lately. In the mid 1980's, there were problems with pesticide spraying in



Gerry McKee

the Okanagan tree fruit orchards and it was the cooperation between the fruit tree growers and beekeepers who worked out solutions to mitigate the threat.

Heather Higo, MSc, SFU, presented an update on the UBC/Agri-Canada Next Generation Bee IPM, which is testing a technique to reduce the time requirements in selecting hygienic strains of bees by using molecular technology to trace protein markers. This is the second year of a three year project involving Dr. Pernal at Beaverlodge and Dr. Currie, University of Manitoba. This program is based on the previous two year Aphis project at UBC. Results of the F1 generation revealed that the group selected for hygienic

behaviour had an 85% removal of dead pupae, while queens from Alberta had 80%, B.C. queens 75% and New Zealand 60%. In regards to removal of AFB dead larvae, Dr. Pernal's investigations showed the hygienic strains left only 15% in cells while Alberta strains left 63% and B.C. strains left 40%. Examinations of the F2 generation revealed an improvement of 25% over the F1 generation leading to cautious optimism of promising outcomes.

The topic of managing nucs for increases as well as overwintering received considerable attention as presented by Joe Lomond of Ashcroft and Liz Huxter from Grand Forks. Before discussing the winter management system that she and Terry Huxter evolved, Liz briefly covered methods developed by others in different parts of the province. The Huxters have two overwintering sites in different climatic zones: the Okanagan, zone 5 and Rock Creek, zone

3. Their methods differ slightly but essentially allow for mid summer treatment for varroa control and early vibrant colony buildup for overwintering. Before they had developed their system, they did experience heavy losses of more than 40% ten years ago. This year, they expect their losses will be less than 11%. Joe Lomond makes up nucs from his overwintered hives in early spring and uses Hawaiian queens. This method not only enables him to replace the "dead outs" and serve as

swarm control, but also the income from the sale of nucs helps his cash flow. This method caught everyone's attention.

Honey prices remain strong with specialty Blueberry priced at \$ 9.00 per 500 gm jar and Fireweed at \$ 14.00 per 500 gm jar. Perhaps this is one of the reasons there are so many new beekeepers?

Best wishes for a prosperous spring build up.

The Importance of Reporting Bee Kills

Submitted by Doug McRory (Field Editor)

(This article represents the opinion of the writer and not necessarily that of the CHC).

It is critical that beekeepers report all bee kills or pesticide poisoning incidents in Canada to PMRA, whichever provincial authority that investigates pesticide incidents in your province and your Provincial Apiarist. It would also be a good idea to let your Provincial Beekeeper's Association office know of the incident. Damage to honey bees is a serious problem. PMRA has an Incident Reporting Procedure and if you contact the regional office of PMRA, one of their officers will help you with the reporting protocol. Please use the incident reporting if you have a bee kill situation. If the government does not get these reports, they have no way to assess that a problem is occurring out there in the real world! In the last "Hivelights" there is a table with the number of reports from each province across Canada. As you can see from this report, there has been very few reported pesticide incidents for honey bees.

Events where the grower or pesticide applicator have done everything correctly according to the label but a pesticide incident still occurs is a major problem and needs to be reported and hopefully a solution to the problem can be found. Incidents such as occurred last spring in Ontario show that even with the current best use guidelines and risk assessment that there may be unanticipated issues that require attention. We would expect the same with a medication that was considered safe if things showed up that were not resulting in the expected outcome.

The chemical companies were not involved in assessing the acute bee kills last spring. They have complained about being left out of the picture. It needs to be said that objective information gathering is necessary when an incident occurs such as the bee kill from last spring. A company never wants their product to be doing harm or be at fault of an injury. However,

these are huge international companies with world-wide interests and as a business, profits must always come first. It is natural for them to deflect any deleterious effect of their product on the honey bees by trying to find any other reason that they can to explain away the effect to protect the reputation of their product. This is exactly what they tried to do in meetings with several of the beekeepers last spring that led to distrust on the part of the Ontario beekeepers that met with the company representatives. In the cold real world of economics this is what businesses are structured to do. The companies refused any discussion of compensation at the time also.

The role of a company in the current scenario is to accept the conclusions of the third party investigation, take the findings and address the issue by developing a new or improved product or process that is safer and protects the honey bees from death.

The role of government is to protect the public and environment from harm through the regulations and direct government intervention.

This is why the response to the events of spring 2012 – irrespective of the cause – was handled appropriately. Third party government inspectors responded by doing inspections, and where required, investigations. We had for the first time ever – the Ministry of Environment (MOE), the Pest Management Regulatory Agency (PMRA) and the Ontario Ministry of Agriculture and Rural Affairs (OMAFRA) all working together within their mandates and supporting each other with resources and expertise to address a complex and large scale set of incidents. Many other jurisdictions are looking to the situation in Ontario and they are rethinking how they could do something similar. At present the EPA is looking to respond to pesticide incidents in a similar manner and engage the expertise of the State Apiarists and Bee Inspectors. The pesticide specialists know what they are doing with pesticides, however, detecting bee diseases and pests and knowing what a colony is supposed to look like is not in their skill set. This is a complex set of skills that takes years

to develop, looking at thousands of different colonies. This is why bee inspectors from the Apiculture Program should be doing joint inspections with the MOE and PMRA inspectors. Beekeepers become very concerned when people without recognized beekeeping skills start opening their bee hives and assessing them for problems.

Where Companies have responded (in cases in the USA) there has seemed to be mistrust and skepticism over the results. Even if all the intentions were genuine from a company when investigating a potential case of liability, it will never be truly trusted and this will do more damage than good.

This has not happened in Ontario. The objective sampling through government inspectors has been well received. PMRA and MOE made it clear from the on-set that these situations were not off label situations for which they can take action under their respective pieces of legislation. Perhaps because of this, the debate and conversation between beekeepers and the growers has been largely civil and constructive. Growers have not been blamed by beekeepers. Beekeepers are aware that the growers used these products according to the label. Beekeepers have often heard growers asking how they can help. Stewardship must always start with a sound and safe product. IMP by the growers where they determine if they need to use the product would be one suggestion to reduce exposure to only those fields that really need to be treated with these insecticides. Most Best Management Practices (BMPs) that are being put out there

will at best have minimal effect at offsetting the problem but they make it appear that the agencies promoting them are proactive and at least doing something for their clients. The root problem needs to be solved – the bees should not be exposed to the product in any way that leads to deleterious effects either in an acute manner such as last spring or in a sub-lethal way as much research is pointing too.

Moving forward, it will difficult to know what is going to happen this spring – everyone hopes that last year was just caused but an abnormal situation and there will be no effects on honey bees. Many beekeepers are thinking that there have been similar kills before but they have not recorded them and as they were not wide spread, they ignored them. The companies are saying that they will make changes but these cannot be in place for 2013 but will happen by 2014 (new stickers, and a new lubricant to replace the current Talc). However, for future issues with bee poisoning the work that was done in spring of 2012 should be continued where required and built upon.

Beekeepers need to check their colonies very carefully on a regular basis this coming spring especially when corn is being planted near your bees. It is important to report any abnormal numbers of dead bees to the Provincial Apiarist, MOE and PMRA. Tech-Transfer will be doing articles on reporting and how to do it. My main concern is that you report any exceptional bee kill incidents to PMRA so corrective action can be taken and everyone will be better off!

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No trade-offs between social and innate immunity in the honey bee

CBRF 2012, Brock A. Harpur, Arash Soltani, Anna Chernyshova, Zhixing Xu, Mohammad Mahjoorighasrodahti and Amro Zayed*
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Bees have been subjected to a plethora of diseases and pathogens threatening both the livelihood of beekeepers as well as food security. Bees can reduce pathogen loads through two mechanisms: social immunity, such as hygienic behaviour, and/or individual innate immunity (Evans and Spivak, 2010). Like other insects, the honey bee is equipped with an innate immune system that combats pathogens and diseases through several generic cellular responses such as encapsulation, coagulation and melanization of hemolymph, and secretion of antimicrobial compounds (Evans et al., 2006). With pathogens becoming resistant to chemical treatments (Elzen et al., 2000; Miyagi et al., 2000) breeding for healthier and less-susceptible bees is emerging as a critical strategy for circumventing bee declines (Rinderer et al., 2010).

Social immunity is an important aspect of disease resistance in honey bees, and many breeding programs now produce bees with higher resistance to pathogens, primarily by selecting for 'hygienic' bees (Büchler et al., 2010; Rinderer et al., 2010). We do not yet know the relationship between innate immunity and social immunity in honey bees, but knowledge of this relationship is extremely relevant in breeding healthier bees. For example, if hygienic behavior positively correlates with innate immune function, then breeding hygienic bees is extremely beneficial as it is expected to also improve innate immunity. But, some theories suggest that there may be a tradeoff between innate immunity and hygienic immunity; because maintaining a strong immune system is energetically costly, it is possible that individuals and colonies may invest in either social or innate

immunity, but not both. Under such circumstances, breeding hygienic bees may actually inadvertently select for bees with lower innate immune function. Alternatively, if innate immunity is independent of social immunity, then breeding for both hygienic traits as well as stronger innate immunity can increase overall bee health. Clearly, knowledge of the relationship between social and innate immunity is very important for breeding healthier bees.

We initiated a study to learn about the relationship between social and innate immunity in 2011/12 – the study was partially funded by a Bee Research Fund. The basic design of the experiment involves measuring hygienic behaviour on many colonies and correlating it to a measure of innate immune system strength. Hygienic behavior was quantified using established methods involving freeze-killing brood sections then quantifying the proportion of dead brood removed after 24 hours (Spivak and Downey, 1998). We used bacterial zones-of-inhibition (ZOI) as a robust measure of innate immune response, a robust measure of innate immune function in bees (Mallon et al., 2003; Laughton et al. 2011). The technique relies on the presence of antimicrobial molecules in the honey bee's hemolymph which can kill bacterial colonies maintained on agar plates, resulting in so-called zones-of-inhibition (ZOI). The size of ZOI can be easily quantified to provide a measure of innate immune function (Mallon et al., 2003). We measured the strength of a bee's 'active' innate immune system by first injecting nurse bees with 2 µl of Ringer solution with 4% Lipopolysaccharides (LPS) extracted from *E. coli*; LPS is a potent but non-pathogenic elicitor of immune response (Mallon et al., 2003). We then extract hemolymph

from the nurse bees (N=15 nurses per colony) and place it onto an agar plate containing soil bacteria (Fig. 1). The sizes of the ZOI are quantified relative to an antibiotic standard. We measured hygienic behaviour and ZOI on a total of 31 colonies at our research apiary in Ontario; 10 colonies were more than a year old and successfully overwintered during the 2011/2012 season, while 21 colonies were established from nucs in the spring of 2012. All colonies were assayed for both traits in August/September 2012.

We found no overall relationship between innate immunity and hygienic behaviour in the 31 colonies studied (Fig. 2: $r^2=0.001$, p value = 0.85). We also did not find an association between the two traits in spring-established colonies (Fig. 2: $r^2=0.071$, p value = 0.245, N = 21). However, we found a positive correlation between hygienic behaviour and innate immunity among year-old colonies (Fig. 2: $r^2=0.462$, p value = 0.031, N = 10); year-old colonies with high hygiene tended to have a strong immune system.

We found an interesting positive relationship between hygienic behaviour and innate immunity among year-old colonies. This can arise because of a common genetic basis for the two traits (e.g. mutations that increase hygienic behaviour also increase innate immunity, or because of environmental correlations (e.g. hygienic colonies may have fewer pathogens resulting in healthier workers that are better able to mount a costly innate immune response). Additional studies are needed to differentiate between these two hypotheses. We also observed a difference in the relationship between innate and social immunity as a function of colony age; although nucs were assayed approximately 3 month after establishment in the spring, our work suggests that a longer time is required for colony genotype and environment to influence colony level



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traits such as hygienic behaviour, pathogen loads, and innate immunity.

Fig. 1: Antimicrobials in bee hemolymph kills soil bacteria resulting in clear 'zones of inhibition'. Top: ZOI from nurses treated with LPS to elicit an immune response. Bottom: ZOI from nurses treated with a sham injection.

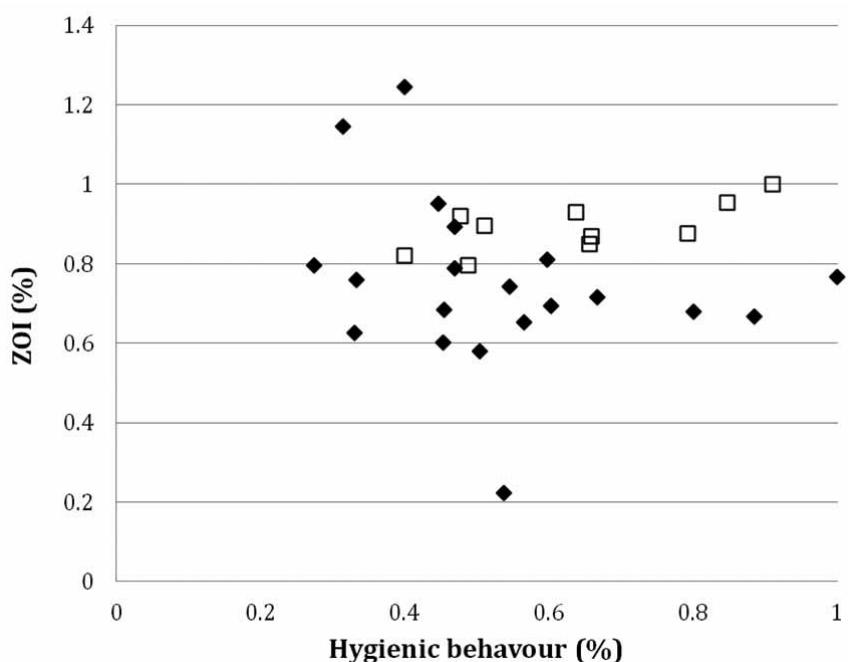
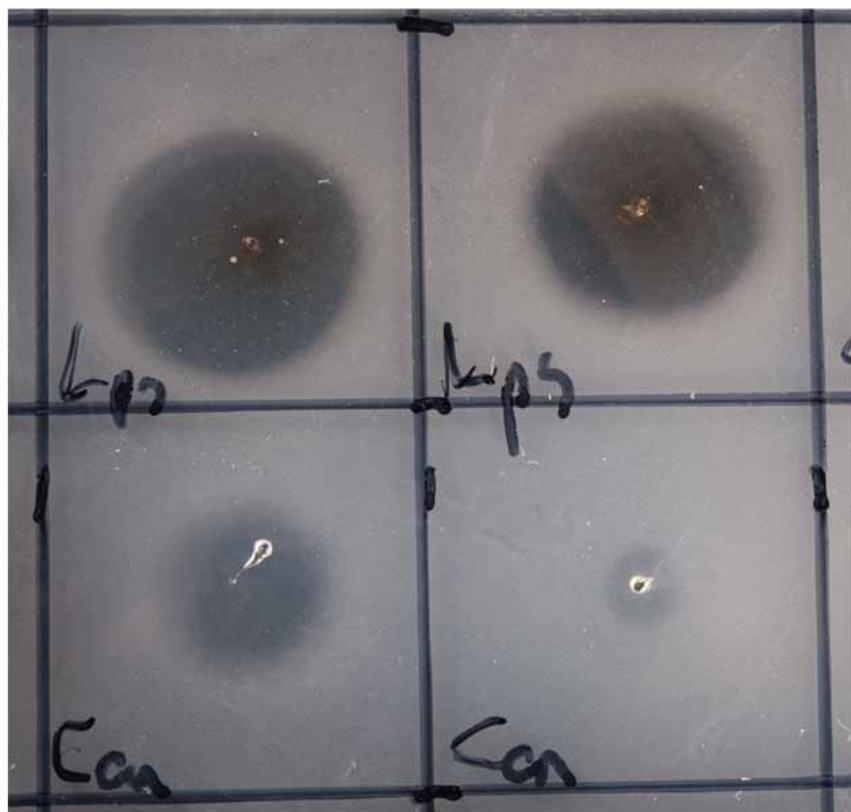


Fig. 2. The relationship between hygienic behaviour and innate immunity in 31 honey bee colonies. There was a slight positive relationship between hygienic behaviour and innate immunity in overwintered colonies (white squares) but no relationship between the two traits in newly established colonies (black diamonds).

Our experiment suggests that there is no overall tradeoff between innate

and social immunity in the honey bee; colonies with high hygienic behaviour did not have low innate immunity, and vice versa. It does not appear that breeding honey bees with more hygienic behaviour will negatively affect individual innate immunity.

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Plants for Bees: Soybean Can Bees Build Soybean Yields

New research on bee habitats could improve yields

by Edith Munro, Corn an Soybean Digest

A self-pollinating crop like soybeans shouldn't have a need for bees. But recent research into the little-understood relationships between the two indicates there could be big bean yield benefits from bees. Creating more bee-friendly habitats could prove to be a worthwhile goal for soybean growers.

At Iowa State University (ISU), Matt O'Neal's lab started out looking for conservation practices that would encourage beneficial insects such as the syrphid fly larvae, which eat soybean aphids. "We were approached by the industry to look further at bees in soybeans," recounts the entomologist. "It's remarkable. We've seen more bees than I initially thought were there. During a single summer we collected close to 2,000 pollinators and some 20 different bee species.



"So can we prove they are there for the soybeans rather than the bee traps?" he asks. His team checked the bees and found 20-25% carried soybean pollen.

"They are going to the flowers, but we don't know yet what that means for the plant," he says. "The challenge is to see whether they affect yield. There is some evidence in scientific literature that they may improve yields."

Three examples of earlier research include:

A short-term Canadian study found bees' presence was associated with much higher yields in food-grade soybeans.

Australian researchers demonstrated yield increases of 10-40% in honey bee-pollinated soybeans, compared to self-pollinated beans.

In 2005, a Brazilian research project compared soybean seed production with and without honey bee colonies by raising plants in cages, and reported 50% higher yields when bees were present.

While all three showed yield improvements, they involved honey bees rather than the native bees

O'Neal's research found. Among the thousands of native bee species, some are more effective pollinators of specific plants than honeybees. It's a challenge to link specific bees' activities to the soybean plants and then to yield.

ISU's Reid Palmer, a research geneticist who studies plant and insect pollinator attraction and reward traits, suggests pod set is a possible explanation for the yield bump. "Soybeans naturally drop a lot of flowers, and not from lack of fertilization," he says. "Plants usually produce many more flowers than develop into pods, so if you can reduce flower drop, you should increase yield."

O'Neal is part of an interdisciplinary team conducting field trials to see

what happens when small strips of prairie are incorporated into row-crop landscapes. (See <http://bit.ly/CSDstrips> for more information.)

"Integrating a little bit of prairie can produce big changes in soil erosion and nutrient loss," he explains. "That same prairie could also be habitat for beneficial insects like bees."



CRP land, roadsides, terraces or any wasteland might be suited to such a conservation "triple stack." Native bees in particular might benefit from forage plants and undisturbed ground for nesting. Farmers with CRP acres can check with their local FSA office for details on the CP42 Pollinator Habitat practice, which can qualify CRP land for higher payments.

One challenge – the issue of which plants to incorporate in native planting – is being resolved by multiple research efforts around the country. O'Neal has found good results in Iowa with two non-invasive candidates – meadow zizia and cup plant – without seeing an increase in weeds. He's now determining how much bee habitats benefits soybean plants.

"It's all connected," he concludes. "If you think about these issues individually, you miss the opportunity for multiple benefits."

Canadian Soybean

reprinted with permission Canadian Grain Commission

Description

The Canadian Grain Commission provides resources about Canadian soybeans that are related to the Canadian Grain Commission's functions as defined under the Canada Grain Act. This includes information about Canadian soybeans standards and grades.

Biological classification of soybeans

Family: Fabaceae
Species: Glycine max
Type: Pulse

Growing areas in Canada

Growing areas: Prince Edward Island, Quebec, Ontario, Manitoba, Alberta

End uses for Canadian soybeans

Soybeans are used to make a diverse range of products. Tofu, soy milk, flour and meal are all made from soybeans. Soybeans are used to make soaps, cosmetics, resins and other products. In agriculture, soybeans are



used in livestock feed.

Canadian soybeans and Canada Grain Regulations

Soybeans are one of the grains defined in the Canada Grain Regulations – Section 5. This means that the Canadian Grain Commission establishes and maintains quality standards for soybeans. Also, this means that soybeans are one of the crops protected by security. If a licensed grain company refuses or fails to pay for a delivery of soybeans, the producer can make a claim against security.

Canadian soybeans standards and grades

The Canadian Grain Commission defines Canadian grain standards and assesses the grade of grains against these standards. The Grain Grading Guide contains all the standards for Canadian grain. Chapter 20 presents the standards for soybeans.

The Western Standards committee and Eastern Standards committee review these grading standards and recommend changes when necessary. The committees also select the standard samples of Canadian grain used each year.

Scientific analysis of Canadian soybean crops

The Canadian Grain Commission's Grain Research Laboratory conducts scientific analysis of harvest and crop export quality and generates reports that offer information about each year's crop. Crop quality data is taken from samples collected during our annual Harvest sample program. Export quality data is taken from samples collected from export shipments.



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New miticides for Varroa destructor management in Canada

CBRF 2012, Lynae Vandervalk¹, Medhat Nasr^{1,3}, Lloyd Dosdall²

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A fifth formulation did not cause significant mortality of *V. destructor*; its LD₅₀ was approximately 450% of the commercial formulation. The four formulations causing significant mortality of *V. destructor* under laboratory conditions will undergo further testing for bee safety and in

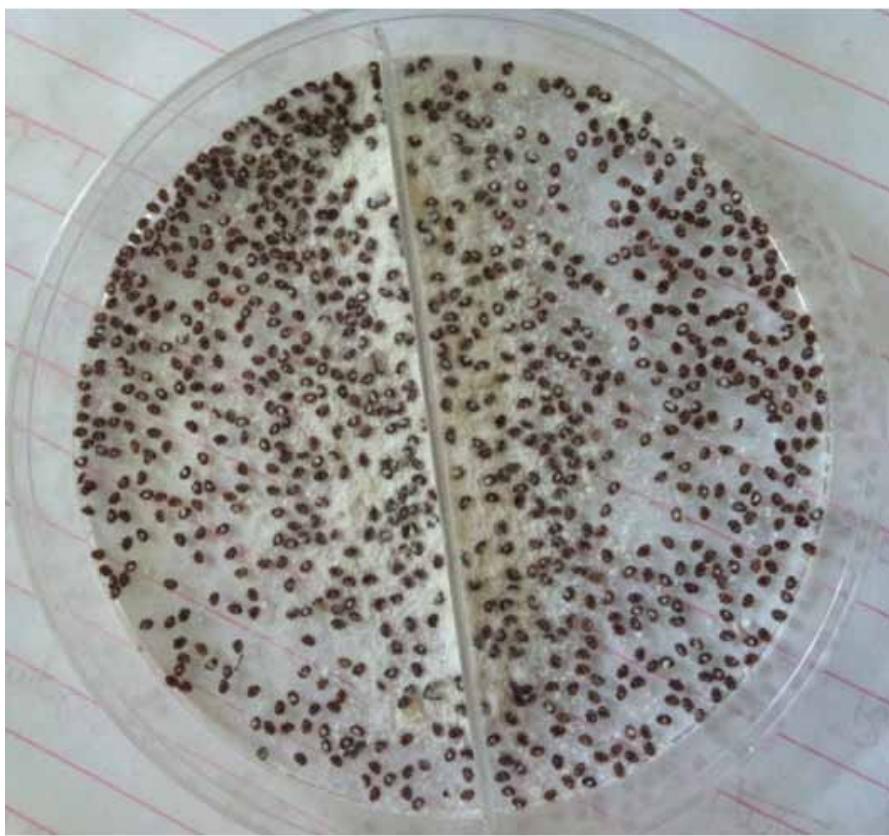


Figure 1 Approximately 700 *V. destructor* collected in a petri-dish prior to placement in vials

New miticides for Varroa destructor IPM were investigated under laboratory and field conditions. Five commercial formulations of miticides registered for other mites in Canada were evaluated in the laboratory for their activity against *V. destructor*. These formulations were unrelated to any miticides currently used to manage *V. destructor*. The commercial miticides formulations were evaluated using a glass vial bioassay. Of the five formulations tested, four formulations caused reasonable mortality of *V. destructor* with LD₅₀s ranging from 2-10% of the commercial formulation.

bee colonies for varroa control and any side effects.

Field trials were replicated in fall 2011 and spring 2012. New miticides; HopGuard™ (cardboard strips saturated with hops extract) and Thymovar® (cellulose wafers incorporating thymol) were field tested under Alberta prairie conditions alongside the current industry standard treatments Apivar® and formic acid (applied as mite-wipes 3 times 90 ml of 65%, once every 10 days) and a control. The five treatment groups each consisted of

eight double story colonies. Colony strength was evaluated by assessing the area of brood, areas covered with bees, and honey prior to, during, and after treatments. Treatment effectiveness was monitored by periodically sampling 300 honeybees to determine *V. destructor* infestation and by using sticky boards to assess *V. destructor* drop. Finishing treatments of sublimated oxalic acid (fall 2011) and Apivar® (spring 2012) were used to evaluate efficacy.

Field testing of miticides in colonies indicated that Apivar® and formic acid applied as mite-wipe continue to provide effective *V. destructor* management. HopGuard™ showed high initial *V. destructor* drop, but limited activity thereafter, as the cardboard strips carrier of HopGuard™ were quickly removed by bees. Despite three applications of HopGuard™ in spring 2012, it did not provide effective management relative to the control. Modification of the delivery system is needed before HopGuard™ can be an effective treatment during treatment windows. Thymovar® was associated with high efficacy comparable to Apivar® during both trials. However, drastic brood reduction was associated with Thymovar® treatments during the spring 2012 trial, so its use is recommended for the fall treatment window only to avoid negative effects on brood, especially during warm ambient temperatures.

The results for the both the laboratory and field trials demonstrate that there are potential new effective treatment options that can supplement currently used *V. destructor* IPM systems.

Acknowledgements: Thank the Natural Sciences and Engineering Research Council (NSERC) Graduate Scholarship. Other funding for the project was provided by: the Alberta Crop Industry Development Fund (ACIDF), the Commission of Alberta's Beekeepers, Alberta Agriculture and Rural Development, BeeMaid, Canadian Bee Research Fund, Poelman Apiaries, and Southern Alberta Beekeepers, Bayer CropScience, and Pioneer Hi-Bred.

*Lynae Vandervalk is M. Sc. Candidate at University of Alberta.

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Recommendations concerning the reporting and investigation of pesticide incidents

by Rod Scarlett, Canadian Honey Council

In February of 2013, the Board of the Canadian Honey Council approved a number of recommendations concerning the reporting and investigating of pesticide incidents. The recommendations were passed on to the Peat Management Regulatory Agency for their consideration. We are extremely pleased that the PMRA has taken these recommendations very seriously and have adopted many of the initiatives for this spring's growing season. The recommendations are as follows:

#1. Reporting an Incident

- 1) The CHC recommends that the national toll-free telephone line for the reporting of pesticide incidents established by PMRA be more actively be promoted and publicized. Once the initial call has been placed, the appropriate provincial authorities should be immediately informed. If provincial authorities are contacted first, they should immediately notify PMRA of the incident.
- 2) The CHC recommends that the PMRA and/or provincial authorities contact (or connect) the registrant to beekeepers, when that course of action has been approved by the beekeeper.
- 3) The CHC recommends that Health Canada budget sufficient resources to PMRA in the long term to deal with bee incident reporting.
- 4) The CHC recommends that the PMRA alert the CHC when an incident is reported.
- 5) The CHC recommends that the PMRA revise their internal initial reporting policy to ensure that only after preliminary investigations are conducted, incident notification is posted on the web-site. In this way only those incidents where there is a likelihood of pesticide involvement are published.
- 6) The CHC recommends that the PMRA, representatives of the agricultural sector, and registrants draft appropriate guidelines to address gaps in the printed guidelines regarding bee incidents.
- 7) The CHC recommends that the PMRA abandon attempts to conduct the AG Field Questionnaire based on its current format for 2013 or until such time as there have been more detailed discussions with

landowners and beekeepers.

- 8) In conjunction with the CHC, the PMRA incorporate comments made by the CAPA Chemical committee into the Bee Yard Questionnaire.
- 9) The CHC recommends that the PMRA bee incident reporting form have a question asking the last time the bee yard was visited.
- 10) The CHC recommends that the PMRA allow for a check box on the bee incident reporting form indicating that no investigation is to occur. (For reasons of the grower/beekeepers relationship)
- 11) The CHC recommends that the PMRA allow for a check off box on the bee incident reporting form permitting PMRA to share the specifics of the incident with the appropriate registrant.
- 12) The CHC, Provincial Associations and Provincial Apriarists provide information to beekeepers on what to look for in the event of a pesticide incident.

#2. Investigating an incident

- 1) CHC recommends that PMRA, in cooperation with Provincial authorities, registrants, and the CHC develop a standard sample collection/investigation procedure so the necessary steps are taken for proper analysis. CHC should be consulted on this for the final draft.
- 2) The CHC recommends that PRMA use provincial bee inspectors where

available to carry out sample collection and investigation process in a knowledgeable and timely manner. Further that the appropriate sample, collection, and investigation procedures be shared with beekeepers so that they can collect their own samples.

- 3) The CHC recommends that Provincial authorities and Provincial Associations investigate the feasibility of developing an auditable course designed to teach beekeepers sample, collection and investigation procedures.
- 4) The CHC recommends that PMRA should allow for resources to carry out the investigating process beyond 2013.
- 5) The CHC should provide a list of qualified labs which a beekeeper could send samples to on their own.
- 6) The CHC recommends that PMRA needs to set a timeline from when the samples are picked up and when the results will be available to the beekeeper.
- 7) The CHC recommends that, if requested by beekeepers, registrants be allowed to carry out investigations.
- 8) Considerable work has been done on the introduction of a Best Management Practices for investigating a potential pollinator incident. Work needs to continue involving PMRA, CHC, Provincial Apriarists, crop production associations, registrants and other interested parties in order to formalize a national standard.

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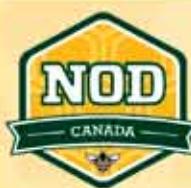
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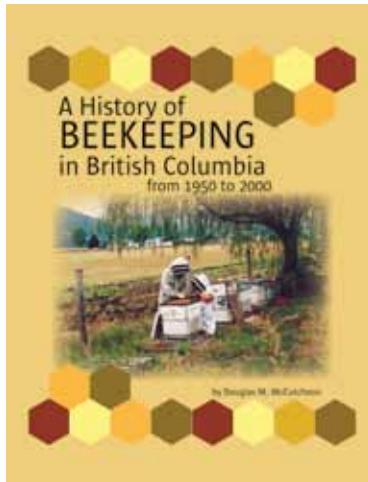
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Book Review:

"A History of Beekeeping in British Columbia from 1950 to 2000"

Douglas M. McCutcheon, 2013, published by the British Columbia Honey Producers Association, 334 pp.

Reviewed by Mark L. Winston, FRSC , Academic Director and Fellow Simon Fraser University's Centre for Dialogue, 3309-515 W. Hastings St., Vancouver, B.C. V6B 5K3 Canada, phone 778 782 7894 email winston@sfu.ca , www.sfu.ca/dialogue, www.sfu.ca/dialogue/undergrad



where a previous book "100 Years of Beekeeping in B.C." by W. H. Turnbull, left off. "A History of Beekeeping in British Columbia" is brilliantly organized, dancing between anecdote, facts, occasions, profiles of significant individuals and compelling stories about the people, places and events that made up 50 years of beekeeping.

McCutcheon follows a brief review of pre-1950's beekeeping with a general overview of the B.C. government's Apiary program and the activities of the B.C. Honey Producers Association. He then moves on to a historical time line of projects and activities in B.C. beekeeping, followed by a section about each region in the province and its unique beekeeping environment and beekeepers.

He next writes about the many unique aspects of B.C. beekeeping, from university-level research to pollination, educational conferences to the Bee Masters course, honey shows to the 1999 international conference Apimondia. The book is richly illustrated with photos, has a beautiful and deeply moving front cover of McCutcheon beekeeping with his young grandson, and a back cover with a fine apiary shot surrounded by hexagonal color chips representing the major bee pollen colours from important B.C. bee forage.

One of the best reasons to write history, and to read it, is to provide a sense of what has stayed the same and what has changed. One of the most endearing aspects of this history is the warmth and affection for beekeepers that

shines through all of McCutcheon's writing. Spanning fifty years, it's clear that beekeeping is populated by a rich set of quirky characters, many legendary but all united by their love of bees and their enjoyment of each other. That's one thing that hasn't changed, and it comes through clearly and strongly in story after story.

But much has changed, and we learn through McCutcheon's meticulous research just how much more difficult beekeeping is today. It's always been hard physical work, but from 1950 to 2000 beekeeping changed from a pastoral, fairly simple hobby or occupation to a complex endeavor in which disease control, border closures to importations, government regulations around food safety, increasing pesticide use and larger and larger commercial operations made beekeeping considerably more difficult for today's beekeeper than for the 1950's version.

At the end of McCutcheon's fine work I was left overwhelmed with gratitude for those who came before me, and for McCutcheon who dedicated so much of the last ten to fifteen years to uncover this rich treasure trove of history and present it in such an engaging way.

We all owe a great of gratitude to Doug McCutcheon for his herculean and highly successful efforts to. Buy this book; it's a real treasure, available online through the BC Honey Producers' website: <http://www.bcbkeepers.com/>.

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WORLD NEWS

Troubling Honey Bee Shortage in California Almond Orchards

by Kathy Keatley Garvey UC Davis Dept. of Entomology, Submitted by Doug McRory (Field Editor)

DAVIS--California almond growers may not have enough honey bees to pollinate this year's crop of 800,000 acres, says Extension apiculturist Eric Mussen of the UC Davis Department of Entomology. He attributes the difficulty to winter losses and less populous hives.

"We need 1.6 million colonies, or two colonies per acre, and California has only about 500,000 colonies that can be used for that purpose," he said. "We need to bring in a million more colonies but due to the winter losses, we may not have enough bees."

Those winter losses-- still being tabulated-- and the resulting fewer bees per hive could spell trouble for almond growers, he said.

"Last year was not a good year for honey production in the United States," Mussen said, "and it could be one of the worst honey production years in the history of nation, although it's been pretty rough in some of the previous years. Usually when we're short of nectar, we're short on pollen, and honey bees need both. So, 2012 was a bad year for bee nutrition."

Malnutrition is one of the stressors of colony collapse disorder, the mysterious malady first noticed in the winter of 2006 that has decimated one-third of the nation's bees every year. Some beekeepers have reported winter losses of 90 to 100 percent.

In CCD, the adult bees abandon the hive, leaving behind the queen bee, brood and food stores. Bee scientists think CCD is caused by a multitude of factors, includes, pests, pesticides, parasites, diseases, malnutrition and stress.

"We don't know how many more bees

will be lost over the winter," Mussen said. "We consider the winter ending when the weather warms up and the pollen is being brought into the hives."

"Many, many colonies are not going to make it through the winter," said Mussen, an apiculturist in the UC Davis Department of Entomology since 1976. "We won't have as large a bee population as in the past."

In other words, fewer colonies will be available for the almond growers and the colonies that are available aren't going to be as populous, he said. "Almond growers usually want at least eight frames of bees per hive," Mussen said, "but this year they may be lucky to get six. That's one-third less bees per hive to pollinate the orchards."

Mussen estimated a good solid hive with eight frames amounts to 2000 bees per frame or 16,000 bees.

Already brokers are getting calls from beekeepers saying "I can't fulfill the contract. I'm going to be short."

Mussen said it may all work out well in the end as "bees pollinate almonds on a community basis. The strong colonies will make up for the weak colonies. The strong colonies will clean the orchard of pollen by early afternoon and then go down the street and grab food from nearby orchards."

San Joaquin almond orchards are already starting to bloom, "but it's going to be late up here in the Sacramento Valley," he said. Kern County grows more almonds than any other county in the state.

"If we hit abnormally warm stretches that push out all the bloom at once, that will be good," said Mussen. "It's likely that cross-pollination will be

better if we have a steady period of warm weather, instead of a warm-cold fluctuating period."

Although the almond growers are paying a lot of money for their pollination services—an average of \$150 per hive—there's no guarantee it will be a good nut set, Mussen warned. "If it's too cool, fertilization may not occur. The pollen tubes won't grow all the way down to the base of the flower to the ovum. The good nut set occurs within the first three days of pollination or at the most, within five days."

On the other hand, if the weather is too hot and dry, the tissue dries out, he explained. "So we need nice warm weather that's not too hot or too cold to get good fertilization and nut set. It's not always the bees' fault if the nuts fail to grow."

Many beekeeping operations truck in thousands of colonies to pollinate California's almonds. One beekeeping operation used to bring 16,000 colonies, Mussen said, "but that 16,000 could be half that this year." The bees are trucked here from all over the nation.

Around Feb. 14 the average almond orchard in California is in full bloom, but some orchards bloom earlier or later, depending on the cultivar and the weather. An almond orchard blooms a total of about two weeks, he said, pointing out that "the season is short."

"Around March 7 to the 10th is the last pollination period for almonds in California," he said. That means that some beekeepers can do double duty with their bees, first pollinating orchards in early February and then heading off to other orchards for the last blooms of the season."

Almonds are California's biggest export. This year the National Agricultural Statistics Service is forecasting a record-breaking 2.10 billion meat pounds, valued at approximately \$3 billion. Eighty-percent of the global supply of almonds is grown in California, and about 70 percent of California's crop is marketed overseas.

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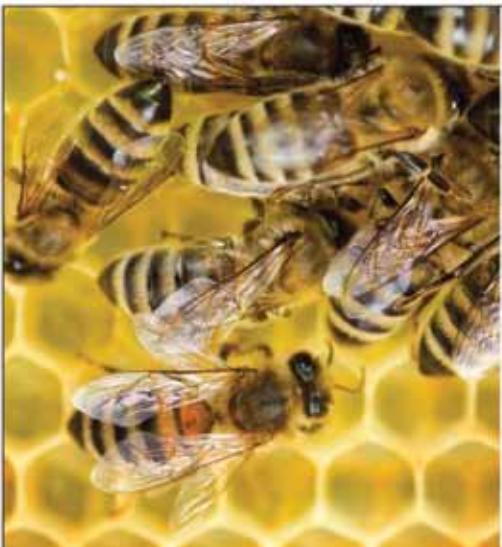
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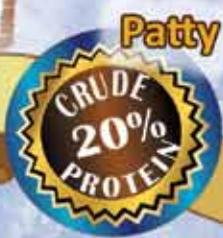
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