

2016 Provincial Apiarist Report

Ministry of Agriculture, Food and Rural Affairs
Apiary Program

June 2017

ONTARIO BEEKEEPING INDUSTRY AT A GLANCE

- Number of registered beekeepers: 2,896
- Number of producing colonies: 97,342
- Average honey yield/colony: 91 lb (41.4 kg) per colony
- Total estimated honey crop: 8.8 million lb (4.0 million kg)
- Overall reported 2016 overwinter honey bee losses: 18%

PREVALENCE OF DISEASES AND PESTS

- American foulbrood: 0.51%
- European foulbrood: 0.10%
- Chalkbrood: 11.14%
- Sacbrood virus: 0.75%
- Small hive beetle: 0.16%
- Varroa mite: 29.90%

YEAR HIGHLIGHTS

- Ontario beekeepers reported an overall overwinter honey bee mortality of 18 per cent in Ontario for the winter of 2015-2016. This was the lowest reported overwinter mortality since the winter of 2011-2012 (12 per cent).
- Approximately 38,000 honey bee colonies were shipped outside of Ontario for the pollination of blueberry and cranberry crops in Eastern Canada.
- OMAFRA conducted regular and targeted inspections for the presence of the small hive beetle (SHB) which was identified in 21 bee yards in the counties of Niagara, Norfolk and Chatham-Kent. All honey bee colonies and associated equipment at these yards were detained while beekeepers completed and submitted biosecurity and movement plans. The SHB quarantine area (Essex County and part of Chatham-Kent County) remains in place.

WEATHER PATTERNS

The weather was favourable for honey production in many areas of Ontario with high temperatures and dry conditions throughout the summer.

HONEY PRODUCTION

Honey survey questionnaires were mailed to registered Ontario commercial beekeepers (those operating 50 or more colonies) to estimate the average honey production in the province. Responses were received from 39 per cent of commercial beekeepers, representing 13,000 colonies across the province. Based on these responses, the estimated average honey production in Ontario was 91 lbs or 41.4 kg per colony. This is similar to what was observed in 2015 and slightly greater than the five-year average. The honey flow varied by region. In areas of the province where there was adequate precipitation and suitable forage, many beekeepers anecdotally reported greater honey yields than beekeepers in dryer areas of the province.

OUT-OF-PROVINCE POLLINATION

The demand for pollination services for berry crops in Eastern Canada (Quebec, New Brunswick, Nova Scotia and Prince Edward Island) has increased in recent years. The number of honey bee colonies leaving Ontario to pollinate crops in Eastern Canada has increased from 12,600 colonies in 2010 to 38,000 colonies in 2016. Bees raised for pollination services now represent 39 per cent of the total managed honey bee colonies in Ontario.

To ensure the demand for pollination services continues to be met, Ontario and the Eastern Canadian provinces worked collaboratively to develop additional pre-transportation inspection requirements before colonies were shipped across provincial borders, which allowed for the continued movement of Ontario honey bee colonies.

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PREVALENCE OF PESTS AND DISEASES

The prevalence of common apiary pests and diseases was assessed by ministry apiary inspectors during the inspection of 9,684 colonies (brood nest inspections) during the beekeeping season. In addition, they inspected for the presence of small hive beetle in 31,301 colonies and for the presence of *Varroa destructor* mites in 4,326 colonies.

American Foulbrood (AFB) and Other Brood Diseases

American Foulbrood (*Paenibacillus larvae*) was detected in 49 honey bee colonies or 0.51 per cent of the colonies inspected in Ontario. This represents a decrease from 2015 when AFB was observed in 0.95 per cent of colonies.

Sample analysis has confirmed that the strains of AFB circulating in Ontario remain susceptible to registered antibiotics (oxytetracycline, tylosin and lincomycin). While antibiotic resistant strains of AFB have been detected in other jurisdictions, no antibiotic resistant strains of AFB have been detected in Ontario to date. Antibiotics are not a cure for AFB, rather they are to be used prudently as a management option to reduce the chances of clinical (observable) AFB becoming established in a colony. When a colony has clinical AFB, antibiotics are not effective and all infected colonies must be destroyed by fire or irradiation.



Other brood diseases that were tracked by the ministry's Apiary Program include European foulbrood, chalkbrood, and sacbrood (see page 1).



Small Hive Beetle (SHB)

A total of 21 apiaries, both commercial and small-scale, tested positive for SHB in Ontario (16 in Niagara County, two in Chatham-Kent County and three in Norfolk County). Due to the high rate of inspection of colonies in the Niagara region to allow the movement of colonies out of province for pollination, colonies in this region make up a large proportion of apiary inspections.

In addition to the standard inspection of colonies, ministry inspectors also performed targeted SHB inspections where the top bars of frames directly below the inner cover are assessed visually. When a colony is suspected to be positive for SHB upon visual inspection, a specimen (either adult or larvae) is collected and submitted to the University of Guelph's Animal Health Laboratory for confirmatory testing.

The province has transitioned from a SHB eradication strategy to a management strategy which is consistent with other jurisdictions. Further steps to mitigate the spread of SHB in Ontario included the provision of funding to the Ontario Beekeepers' Association (OBA) to support increased knowledge transfer on the biology and management of SHB to help beekeepers plan and adapt their operations for SHB. This included several workshops and meetings throughout Ontario led by the OBA's Technology Transfer Program and beekeepers with experience in managing SHB.

The ministry has created an [on-line map](http://tiny.cc/SHB-viewer) (<http://tiny.cc/SHB-viewer>) showing the number of SHB confirmed bee yards in each township. This map not only provides current and data to other jurisdictions that import Ontario honey bees, but also informs beekeepers about where SHB has been detected in Ontario and helps them to manage the risk to their beekeeping activities.

Additionally, the provincial apiarists from each of the eastern provinces to which Ontario honey bee colonies are shipped for pollination (QC, NB, NS, PE) travelled to Ontario for an information session on SHB. This was an excellent opportunity to share information on inspection protocols and detection techniques, confirmatory testing methodology and laboratory service contacts, SHB best management practices, regional data on biology of the pest and industry concerns. Two commercial beekeeping operations in Ontario generously provided the venues for the information session for the visiting provincial apiarists regarding adaptations and changes in management related to SHB, both in the field and in the honey extraction facility.

For more information, please review the SHB materials found online at www.ontario.ca/beekeeping or call 1-877-424-1300.

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PREVALENCE OF PESTS AND DISEASES (continued)

Varroa destructor Mites

The presence of varroa is widespread in North America and is found in apiaries across the province. This pest has been identified as the main culprit for the death and reduced populations of overwintered honey bee colonies in Ontario (Guzman et al. 2010). Monitoring varroa infestation throughout the season continues to be valuable for beekeepers to confirm the degree of infestation at key times in the season and to determine if mite control methods were successful.

Ministry apiary inspectors sampling for varroa mites during regular apiary inspections typically documented low levels of infestation throughout the beekeeping season. Across the province, 4,326 colonies were inspected for varroa using a standard alcohol wash and 1,293 of those were found to be positive. The prevalence of varroa in Ontario apiaries in 2016 is twice as high as what was observed in 2015 (29.9 per cent in 2016 vs 14.5 per cent in 2015).

As varroa is widely distributed across the province, the prevalence of these mites is not as informative as the degree of infestation. Guzman et al. (2010) established treatment thresholds for varroa infestations. They recommended that colonies be treated for varroa:

- in May if the infestation is greater than two per cent, and
- in August if the infestation is greater than three per cent.

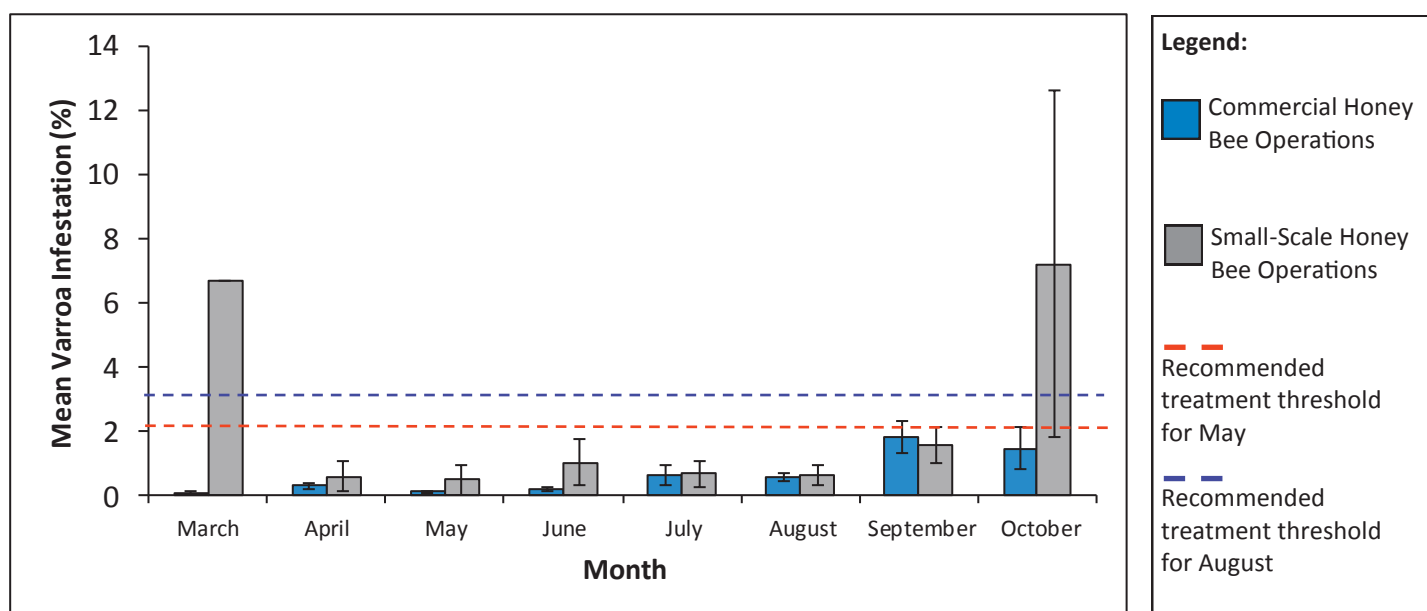


Fig. 1: Mean varroa infestation levels and treatment thresholds in Ontario commercial and small-scale honey bee operations, 2016.

Among commercial operations (those having 50 or more colonies), the mean varroa infestation remained below treatment thresholds and ranged from 0.11 per cent in May to 1.81 per cent in September (Fig. 1). The degree of varroa infestation among small-scale operations (those having 49 or fewer colonies) was variable, ranging from 0.48 per cent in May to 7.21 per cent in October (Fig. 1). The mean varroa infestation for small-scale operations was above recommended treatment thresholds in March and October.

The data presented here represents the colonies inspected in 2016 and is not necessarily reflective of the beekeeping industry across the province. The low degree of infestation among commercial honey bee operations may confirm the success that some beekeepers have had with the management of varroa mites. Some commercial operations however, reported anecdotally high varroa infestations in late fall. Compared to commercial beekeeping operations, fewer colonies operated by small-scale beekeepers were inspected. This resulted in smaller sample sizes, particularly for March and October when four and 16 bee yards were inspected, respectively. Small sample sizes may have contributed to the observed increase in mean varroa infestation for small-scale operations in March and October.

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PREVALENCE OF PESTS AND DISEASES (continued)

Monitoring for *Varroa destructor* Mites

In an OMAFRA survey of management practices, beekeepers were asked how they monitored for varroa infestations and which treatments were used at the beginning (spring) and the end (fall) of the beekeeping season. Of the beekeepers who responded to this question, 78 per cent of commercial beekeepers and 64 per cent of small-scale beekeepers indicated that they monitor for varroa infestation in their colonies. This highlights the need for improved monitoring and an opportunity for some small-scale beekeepers in particular to improve varroa management. Survey respondents reported using a number of varroa monitoring methods, the most common being either an alcohol wash or a sticky board. Some beekeepers used more than one method to monitor for varroa. Most commonly, when the response “other” was selected, the beekeepers reported that they visually checked their colonies for varroa or used the sugar shake method. Occasionally, beekeepers reported examining drone brood for varroa mites.

It is important to stress that visual surveys for mites and other methods are not considered to be reliable. Reliable methods require the beekeeper to quantify, document and compare varroa to an established threshold using one of the three established varroa monitoring methods: alcohol wash, ether roll and sticky board. This highlights a need for improved monitoring and an opportunity for some small-scale beekeepers in particular to improve varroa management.

According to this survey of commercial beekeepers:

- The most popular synthetic acaricide was a 65 per cent liquid formic acid treatment in the spring, followed by Apivar®.
- In fall, the most popular acaricide was Apivar® followed by oxalic acid.

To date, there have been documented resistance issues with both Checkmite++™ and Apistan® in Ontario.

More information, including monitoring and treating for varroa mites is available online at www.ontario.ca/beekeeping or by calling 1-877-424-1300.



STRESSORS AND TARGETS

The Ontario government initiated a Pollinator Health Strategy and released the Pollinator Health Action Plan to address current and emerging threats to pollinators under four broad categories:

- Reduced Habitat and Poor Nutrition
- Diseases, Pests, Genetics
- Exposure to Pesticides
- Extreme Weather and Climate Change

As part of the strategy, the Ontario government highlighted three aspirational targets aimed at improving conditions for pollinators in the province:

1. Reduce overwinter mortality rates for managed honey bees to 15 per cent by 2020.
2. An 80 per cent reduction in the number of acres planted with neonicotinoid (NNI) treated corn and soybean seed by 2017.
3. Restore, enhance and protect one million acres of pollinator habitat in Ontario.

ONTARIO'S POLLINATOR HEALTH STRATEGY

Ontario's vision is to become home to healthy pollinator populations that contribute to a sustainable food supply and support resilient ecosystems and a strong economy.

Further priorities and initiatives outlined in the Pollinator Health Action Plan include, but are not limited to:

- Release and consult on a discussion paper on modernizing the legislative framework for beekeeping. Among other components, the modernization proposals could include provisions related to beekeeper training, updated requirements for the location of hives, recordkeeping and traceability, and modernized tools for pest and disease management.
- Launch a research call with \$1 million in funding for research addressing key knowledge gaps related to pollinator health.
- Launch a digital awareness campaign to encourage Ontarians to plant pollinator-friendly gardens.

To read the Pollinator Health Action Plan please go online at: www.omafr.gov.on.ca/english/pollinator/action_plan.htm

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HONEY BEE MORTALITY

Overwinter Honey Bee Mortality

During the spring of 2016, a survey was used to estimate overwinter honey bee colony losses. The survey was distributed to 203 registered commercial beekeepers. Responses were received from 72 per cent of commercial beekeepers representing 67,250 colonies across the province. Based on the results of the survey, commercial beekeepers reported an approximate 18 per cent overall honey bee colony loss during the 2015-2016 winter. The reported decrease in overwinter losses is encouraging. In Canada, 15 per cent is considered the maximum acceptable winter loss. For the full report on 2016 overwinter losses, please go online at www.ontario.ca/beekeeping.

In-season Honey Bee Mortality

Reports of in-season honey bee mortality incidents have been reported from beekeepers throughout Ontario since 2012. A honey bee incident can be defined as atypical effects characterized by bee mortality or sub-lethal effects observed in a honey bee colony reported and suspected by a beekeeper to be related to pesticide exposure. From 2012 to 2016, these incidents were reported to Health Canada's Pest Management Regulatory Agency (PMRA). Starting in spring of 2017, beekeepers may report in-season honey bee mortality incidents to OMAFRA's Agricultural Information Contact Centre by calling 1-877-424-1300 or by reporting online at <http://tiny.cc/bee-incident>.

ANTIMICROBIAL USE IN THE APICULTURE INDUSTRY

The [federal government announced](#) plans to amend the *Food and Drug Regulations* to increase regulatory oversight of antimicrobials for veterinary use. In particular, this proposed change will move antimicrobials deemed important to human medicine to Health Canada's prescription drug list, thereby requiring a veterinary prescription for purchase. This change will also apply to beekeepers and once implemented, beekeepers will need to obtain antibiotics by veterinary prescription. The Ontario government is working with stakeholders, including the bee industry and the College of Veterinarians of Ontario to provide beekeepers access to needed products and build on veterinary access to apiary knowledge and expertise.

APIARY MONITORING

The ministry initiated the Apiary Monitoring Program in 2015 to determine the prevalence and load of apiary pests and pathogens in Ontario's apiculture industry. As part of this project, ministry inspectors visit selected apiaries across Ontario to monitor the prevalence of honey bee pests and pathogens multiple times throughout the season, assessing and documenting the condition of colonies and collecting samples that are tested for pathogens. Additionally, the Ministry of Environment and Climate Change (MOECC) initiated the Pollen Monitoring Network in 2015 to track the presence of pesticides in pollen collected by honey bees. The data collected as part of the apiary monitoring project provides a starting point from which subsequent monitoring data can be compared and, over time, will provide seasonal patterns and measures of honey bee pest and pathogen pressures. Monitoring data needs to be collected for multiple years before any broad conclusions can be made.

WHAT'S NEW: INTEGRATED PEST MANAGEMENT FOR *Varroa destructor* Mites

In 2017, the Apiary Program has committed to developing an Integrated Pest Management (IPM) strategy for the Ontario apiculture industry. IPM is an important concept in beekeeping. Pest management, as opposed to pest eradication, implies that that some pests will always be present.

The goal of IPM is to manage these pest populations below a threshold where they can be tolerated by the honey bee colony. An example of this IPM concept is the management of varroa mites below the treatment thresholds defined by Guzman et al. (2010). Beekeepers can use these thresholds as a guideline to maximize colony survival throughout the season and in advance of winter.

Ontario beekeepers currently have a variety of chemical treatment options available to manage varroa mites. Diverse treatment options for varroa are required for balanced and sustainable IPM and it is recommended to rotate treatments to delay the onset of resistance in varroa mites to particular active ingredients. When treating for varroa, beekeepers must also consider the seasonal weather conditions, the degree of mite infestation and the properties of each treatment.



Également disponible en français

For more information:
Telephone: 1-877-424-1300 E-mail: apiary@ontario.ca

www.ontario.ca/beekeeping