

2011 Ontario Provincial Apiarist Annual Report

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MARCH 2012

WEATHER

Weather was a major factor negatively affecting honey bees in many areas of Ontario in 2011. The spring of 2011 was characterized by a very prolonged, cool and rainy period throughout most regions of the province. These cool conditions stressed weakened colonies and delayed the building of worker population by honey bee colonies. This may have contributed to a further decline in weakened colonies into the late spring resulting in increased spring mortality. The summer conditions were mostly hot and dry in many areas of the province.

Despite a long, cold winter (2010 - 2011) in Essex County the small hive beetles (SHB) found in the fall of 2010 have been able to successfully survive. Adult SHB were found in honey bee colonies in the spring of 2011. Furthermore, these adults were capable of reproduction.

HONEY PRODUCTION

It was a mixed year for honey production in Ontario. In many cases beekeepers reported a large variation of production from site to site. In areas of North Wellington and in areas surrounding Kingston many beekeepers reported average to higher-than-average levels of production. Production in northern regions of the province has been reported to be well below expected levels. The main issue identified by producers was insufficient numbers of foragers in the colony to capture the nectar flow. This was mostly attributed to the cool and late spring which held back colony development and growth. At the same time, beekeepers in the south-western parts of the province produced an unexpectedly large honey crop. Based on the responses to the provincial honey survey, the estimated average honey production in Ontario in 2011 is 90 lbs / colony, down from 107 lbs / colony in 2010.

VARROA AND TRACHEAL MITES

Varroa and tracheal mites are well established and widely distributed throughout Ontario. The only region where varroa or tracheal mites have not been recorded is the region of Thunder Bay. Varroa mites resistant to

both fluvalinate and coumaphos are established in multiple regions of Ontario. At present, there have been no confirmed cases of varroa mites resistant to the active ingredient amitraz (Apivar®).

AMERICAN FOULBROOD AND OTHER BROOD DISEASES

The bacterial disease, American Foulbrood (AFB), is resident within Ontario. In 2011, 24 instances of AFB, representing 57 colonies, were found in Ontario. This is still the most contagious and virulent brood disease of honey bees. When found, AFB samples are sent to the USDA Lab in Beltsville, Maryland to test for antibiotic resistance. Resistance to Oxy-tetracycline has not been found in AFB in Ontario. All beekeepers should take particular care to only use approved and registered antibiotics for the prevention of AFB infections. In order to prevent the development of resistance to antibiotics, beekeepers should only use oxytetracycline in powdered sugar. "Extender" or "grease patties" should never be used. This method has risks for contaminating the honey crop and the development of antibiotic-resistant AFB.

Other brood diseases that were tracked by the inspection program include European Foulbrood, *Mellisococcus pluton* (found in 0.01 per cent of inspected colonies), chalkbrood, *Ascosphaera apis* (found in 3.6 per cent of inspected colonies) and sacbrood (found in 0.01 per cent of inspected colonies).

POLLINATION

Pollination demand for berry crops in New Brunswick increased from 12,600 honey bee colonies in 2010 to 14,700 in 2011. This represents approximately 17 per cent of the managed colonies in Ontario. There are reports that blueberry growers in Eastern Canada were still in need of up to 6,000 additional honey bee colonies. There are also indications that the blueberry acreage will increase substantially in Eastern Canada with several thousand acres being developed in Northern Ontario within the next 10 years. This will

further increasing the demand for pollination services provided by Ontario honey bee colonies.

Honey bee colonies moving to New Brunswick and Quebec from Ontario require inspections for the presence of AFB and SHB and an import permit from Ontario and the receiving province. No SHB were found in, or in areas associated with, loads of honey bee colonies leaving Ontario.

INDUSTRY MAKE-UP

At present there are 2,900 beekeepers in Ontario. This represents 41 per cent of the beekeepers in Canada. The 87,000 managed honey bee colonies in Ontario represent 15 per cent of the honey bee population in Canada. Although Ontario has a very large proportion of beekeepers with relatively small operations, the vast majority of honey bee colonies are managed by a thriving commercial sector. Two hundred and thirty commercial beekeepers manage 70,000 of the 87,000, or 80 per cent, of the colonies in the province. Honey bee colonies are currently managed at approximately 6,000 sites.

This industry is one of the most diverse in Canada with beekeepers invested in honey production for a large domestic market, honey bee colony and queen production and sales, as well as pollination of a vast fruit and vegetable sector. A substantial proportion of the blueberry crop in Eastern Canada is reliant on the numbers and early build of colonies from Ontario. There is also a considerable production of domestic honey bee colonies in Ontario. In 2011, 82 beekeepers held queen and nuc permits allowing for the sale of honey bee material to other beekeepers.

POLLINATION VALUE

Honey bees provide \$171 million in annual pollination value to Ontario agriculture. This figure may be greatly underestimated as the high pollination value of blueberries outside of Ontario is not included. Michigan State recently revised their estimates for pollination value of honey bees at approximately \$1 billion for the state. For comparison purposes, see <http://bees.msu.edu/2010/03/bees-worth-a-billion-in-michigan/>

2011 APICULTURE SURVEY RESULTS

Based on the results from the 2011 Apiculture Survey, the provincial mean for estimated colony mortality over the winter of 2010-2011 was 43 per cent, while the median was 41 per cent. This survey represents a response rate of 39.4 per cent amongst 218 commercial

beekeepers. This is the highest level of average winter loss recorded in Ontario. A normal level of winter mortality is typically considered to range from 5 to 15 per cent (Furgala and McCutcheon, 1992).

Many of the beekeeping operations that responded to the survey reported their losses well above the mean, up to 60 per cent in the 75th percentile of the respondents. At the same time, some beekeepers reported much lower wintering losses in the 5th percentile, at 10 per cent mortality. Although the range of wintering losses reflects a wide variation in mortality among different operations (2 to 95 per cent winter mortality), both the median and mean are indicative of high levels of loss.

Based on research from the University of Guelph (Guzman *et al.*, 2010) and reports and field observation from other provinces (Currie *et al.*, 2010), varroa is still the main factor in colony mortality. The overall virulence of *Nosema ceranae* in honey bees is somewhat unclear (requiring further research) and there are many other pathogens such as viruses that further impact honey bees.

Weather patterns may have had some impact on the survival of colonies into spring. In 2010, in most parts of the province, the spring was early, up to three weeks earlier than normal in most regions (April). This would have resulted in much earlier brood production in honey bee colonies and varroa reproduction. Without effective varroa control in spring of 2010, it is possible that many colonies may have gone into the fall with much higher varroa levels than a typical year. This is only speculation as no data was collected to demonstrate varroa levels increasing earlier than normal.

As mentioned above, the extremely wet and cool spring conditions in 2011 may have contributed to further colony decline, particularly in weak colonies that could not increase their numbers. This was anecdotally reported from many different beekeeping operations.

Colony Collapse Disorder, which has been identified in the USA, has not been identified in Canada. To be clear, this disorder has been associated with a distinct set of conditions that has not been presently validated in Canada (vanEngelsdorp *et al.*, 2008; Currie *et al.*, 2010).

Figures 1 and 2 below show average winter mortality of honey bee colonies in Ontario from 2003 to 2011, and a

comparison of winter mortality between provinces in 2010 and 2011.

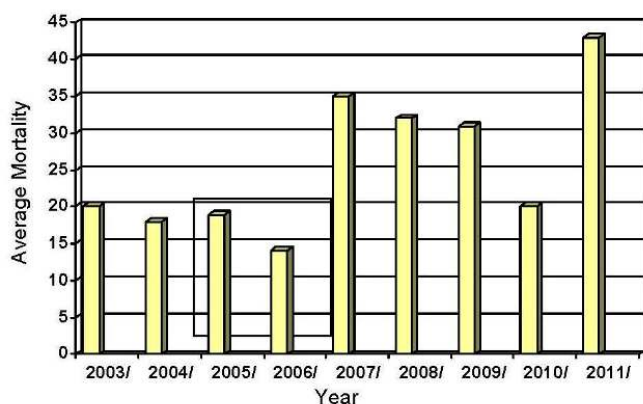


Figure 1. Average winter mortality of honey bee colonies in Ontario

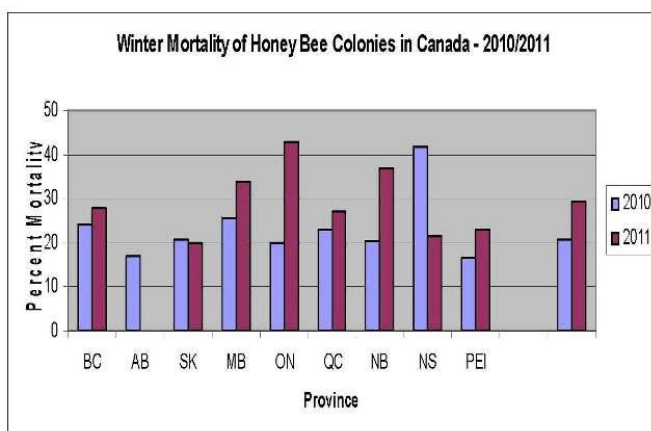


Figure 2. Winter mortality amongst Canadian provinces in 2010 and 2011

For more information on winter mortality in honey bees see <http://www.omafra.gov.on.ca/english/food/inspection/bees/2011-winter-loss.htm>

SMALL HIVE BEETLE DISTRIBUTION

The distribution and population levels of small hive beetles (SHB) in Ontario are being tracked by the Apiculture Inspection Program (OMAFRA). All honey bee colonies that are inspected for the presence of American Foulbrood are also inspected for SHB. This includes all colonies that belong to beekeepers applying for a permit to sell, move or import queens and nucs. Colonies are visually inspected for the presence of SHB adults and larvae with particular attention to areas of the hive where SHB is more likely to be found.

In addition to regular visual inspection of honey bee colonies throughout Ontario, Apiary Inspectors have

also monitored targeted sites on an ongoing basis. These targeted sites are located in areas that are of potentially higher risk of being infested by SHB (Counties of Lambton, Niagara, Chatham-Kent and those along the St. Lawrence), either by their geographic proximity to areas known to have SHB or by suspected association with a known area (e.g. through known or suspected trace-outs, selling, or movement of honey bees).

The standard SHB trap used this season (2011) was the bottom board trap. This trap is a shallow black plastic pan that fits underneath the colony, resting on top of the bottom board, elevated by a wooden slat. The pan is filled with food grade vegetable oil and covered with a grid that is too small for honey bees to fit through but big enough for adult SHB to fit through. Two other types of traps (top bar traps and bucket traps) were used in the field inspections, although at much lower levels and only under certain conditions.

Two hundred and forty-four sites were monitored in the 2011 beekeeping season, representing 123 beekeepers and 4,006 honey bee colonies (figure 3).

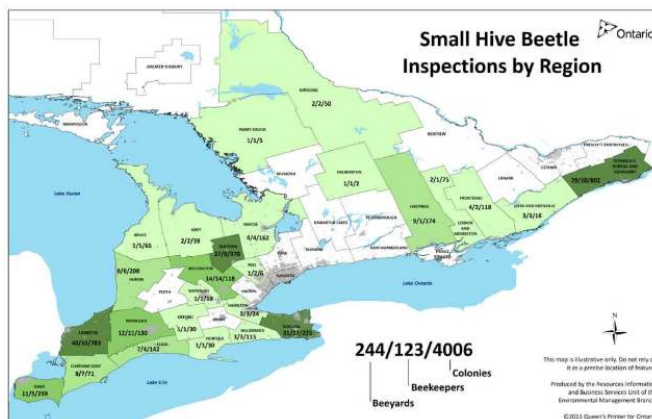


Figure 3. Small hive beetle inspections by region

SHB was found to be present in five of the 244 sites (figure 4)

One site less than 10 km outside of the quarantine area in Chatham-Kent County

There were six full-size honey bee colonies on site. The presence of SHB was self reported by the beekeeper. The beekeeper involved had purchased honey bee colonies from a beekeeper within the Quarantine Area a year earlier.

Action Taken: The site was placed under quarantine. The beekeeper agreed to voluntarily move all colonies to a site within the Quarantine Area. Ground drench

(Permethrin) was then applied to the soil where the bees were kept.

One site in Stormont, Dundas and Glengarry County, east of Cornwall

The yard is located on the north side of the St. Lawrence River and is approximately 10 km from Quebec where SHB is considered resident. The yard contains 25 full-size colonies. The beekeeper involved is a commercial beekeeper with multiple sites. Other yards of the beekeeper and surrounding beekeepers were inspected for the presence of SHB and none were found to be positive. The levels of SHB in the yards where the beetle was found is considered low (there was only one beetle found in all colonies examined).

Action Taken: The beeyard has been placed under individual quarantine.

Two sites in Dufferin County

The sites are located near the town of Shelburne, approximately 80 km north-west of Toronto. There are 17 colonies in one yard and 23 in the second yard. Both yards belong to a single beekeeper. This finding may be considered a traceout given that the colonies were purchased from another beekeeper who has an association with the Quarantine Area.

Action Taken: Both beeyards have been placed under quarantine.



Figure 4. Small hive beetle locations in Ontario

Two sites in Lambton County, near the city of Sarnia

There are 26 colonies in one yard and 23 in the second yard. Both beeyards belong to the same beekeeper. Both yards are very close to Michigan State where SHB is resident.

Action Taken: Both beeyards have been placed under quarantine.

All positive sites have been reported to the CFIA and the World Organization for Animal Health (OIE). The

CFIA has recognized all action that has been taken on the sites and has reclassified the Chatham-Kent site as free of SHB. Ontario will continue to work with the CFIA on monitoring and mitigating SHB.

The Quarantine Area (encompassing the entire County of Essex and all of that part of the Municipality of Chatham-Kent lying south-westwards of a line made up of a Town Line Road, Pump Road and Merlin Road also known as County Road 7) is still being maintained (figure 5). This was the first area where SHB was found in Ontario and is the epicentre of the infestation.



Figure 5. Quarantine area for small hive beetle in Ontario

OMAFRA's SHB inspection and monitoring activities are covered in greater detail in the Small Hive Beetle Report for Ontario - 2011:

<http://www.omafra.gov.on.ca/english/food/inspection/bees/apicultu.html>

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- Currie R., Guzman E. and Pernal, S. 2010. Honey bee colony losses in Canada. *Journal of Apicultural Research*. 49 (1): 104-106.
- Guzman-Novoa E., Eccles L., Calvete Y., McGowan J., Kelly P. and Correa-Benitez A. 2010. *Varroa destructor* is the main culprit for death and reduced populations of overwintered honey bees in Ontario, Canada. *Apidologie*. 4 (4) 443-451.
- Furgala, B; McCutcheon, D M (1992) Wintering productive colonies. In Graham J M (Ed). *The hive and the honey bee* (revised edition). Dadant and Sons; Hamilton, IL, USA. pp. 829-868.

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