

2019

ANNUAL REPORT

FOR THE HONEY BEE NETWORK



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Support for translation provided through the AgriAssurance Program under the Canadian Agricultural Partnership, a federal-provincial-territorial initiative.

Key Facts

IN QUÉBEC

- Sporadic cases of the small hive beetle (SHB) have been detected since 2008. In 2019, eight insects coming from four businesses and sent to the lab for identification were confirmed to be SHBs. Control and monitoring measures were put in place in these businesses.
- Varroasis is the most widespread disease in colonies, apiaries and businesses of Southwest Québec, according to the results of the enhanced monitoring project carried out in 2017.
- Spinosad is the only pesticide that has been involved in cases of poisoning in 2019.

ACROSS THE COUNTRY

HEALTH SITUATION INVOLVING THE SMALL HIVE BEETLE

ONTARIO

On March 14, 2019, Ontario's Chief Veterinarian ended the quarantine that had been imposed in the County of Essex and the municipality of Chatham-Kent to control SHB. Thus, beekeepers with colonies in the quarantine zone were able to resume commercial activities and move their hives normally, subject to the requirements of the *Bees Act*. The quarantine zone was created in 2011 in order to limit the propagation of SHB. The quarantine effectively slowed the proliferation of this insect and allowed the industry to adapt to its presence. Ontario's Department of Agriculture reiterates that SHB has been identified in various parts of Ontario and found sporadically in five other Canadian provinces as well as all neighbouring states. The province thus chose to implement a multifaceted and collaborative strategy, that included industry and researchers, in order to limit the propagation of SHB. Beekeepers also implemented management strategies to control this invader.

NEW BRUNSWICK

In June 2019 an adult SHB was found in a colony imported from Ontario. Another case involving three apiaries that were in proximity to Ontario colonies in June, were reported in August 2019. Several SHB, adults and larvae, were detected. The first case of SHB was discovered in New Brunswick in June 2017 in the hives of an Ontario beekeeper who was visiting for pollination. During the same season, SHBs were found in the hives of seven New Brunswick beekeepers. In the spring of 2018 two of these beekeepers still owned positive hives: 12 adult SHB were found in 10 overwintered colonies. In 2018 an adult SHB was detected in the hives of one additional beekeeper.

GIANT HORNETS IN BRITISH COLUMBIA

Canadian and international experts have confirmed that three large insects found in the Nanaimo region in August 2019 were Asian giant hornets (*Vespa mandarinia*). This is the first time that this species has been found on Vancouver Island. The problem seemed to involve just one nest that was destroyed.

Since it is known that the Asian giant hornet feeds on domestic bees and that they can destroy hives rapidly, British Columbia's Department of Agriculture is currently studying the possibility of helping beekeepers to obtain material to trap the Hornets and to monitor their presence in the spring of 2020, should other individuals emerge from their dormancy or be introduced into the region.

Asian giant hornets do not seek human food; they feed only on insects. In addition, they nest only in the ground, which is different from other species of wasps or bees that build their nests and hives in trees and buildings. It is not known how the hornets, widespread in certain regions of China, Korea and Japan, arrived on the island. It is possible that they were transported with personal or commercial goods.



MAPAQ's Beekeeping Team Report

Thanks to the MAPAQ beekeeping team, made up of approximately 20 veterinarians and inspectors from the Direction de la santé animale, Direction des services vétérinaires et du bien-être-animal and of the Direction des opérations régionales, the Ministry of Agriculture Fisheries and Food (MAPAQ) plays a key role to ensure bee health. Among other things, the following activities are carried out:

- 1. Monitoring** the number of colonies and the winter mortality rate of colonies in Québec, and documenting hive management strategies used by beekeepers.
- 2. Carrying out health** visits to prevent and control disease.
- 3. Apiary inspection**, particularly in cases of complaints, suspicion of designated diseases or pesticide poisonings.
- 4. Laboratory analyses**, searching for pathogens and pesticides, in order to help to establish a diagnosis and recommend treatment when necessary.

SURVEY DATA

The number of registered beekeepers and of reported colonies in Québec has been increasing. In 2019, 1,308 beekeepers registered and reported owning 67,025 colonies, while there were 1,129 registered beekeepers in 2018 (65,128 colonies), and 984 (57,743 colonies) in 2017. Between 2017 and 2019, winter mortality remained high in Québec, at 20.4 to 31.9 percent. For more information on data related to registration and winter mortality, consult the MAPAQ website at www.mapaq.gouv.qc.ca/abeilles.

MAPAQ'S HEALTH AND INSPECTION ACTIVITIES REPORT

A general summary of the beekeeping team's activities is presented in Table 1. While the annual number of visits to beekeepers has increased, the number of hives has decreased.



Table 1

MAPAQ's beekeeping team activities for 2017 to 2019

Year	2019	2018	2017
Number of beekeepers visited	118	92	107
Number of visits	178	167	123
Number of hives inspected	2846	3870	4362
Number of hives present	8725	12911	13499

The activities of the beekeeping team include:

- Preventive or curative veterinary services;
- Issuance of a health certificate (for example, for the transportation of colonies to other provinces or the export of bees);
- Inspections tied to regulatory compliance (for example, mandatory distances, beekeeper registration, hive identification);
- Investigation of cases of poisoning by pesticides suspicion;
- Activities focussed on the small hive beetle.

Table 2 shows that visits for small-beetle monitoring activities increased from year to year, while visits for other reasons are relatively stable. Note however that in 2017 the monitoring of border areas was carried out by the Centre de recherche en sciences animales de Deschambault (CRSAD).

Table 2
Number of visits made by MAPAQ's beekeeping team, by reason, from 2017 to 2019

Year	2019	2018	2017
Preventive medical visit	21	20	26
Curative medical visit	14	20	29
Health certification	15	12	12
Verification of regulatory compliance	7	10	3
Suspicion of pesticide poisoning	6	9	4
Active monitoring of small hive beetle	106	89	43*
Other	9	7	6
Total	178	167	123

* Carried out primarily by CRSAD.



MONITORING ACTIVITIES

ACTIVE MONITORING OF THE SMALL HIVE BEETLE

The SHB is a destructive insect that can cause significant damage to hives and honey facilities. It was discovered for the first time in Canada in 2002, in the province of Manitoba. In Québec it is a mandatory reportable disease. Since 2008, a few incursions coming from the United States and from New Brunswick have been detected. Control and monitoring activities were put in place each time, such that the SHB is not considered to be endemic in Québec. In addition, Québec has set health requirements in 2012 to make the introduction of bees from other provinces more secure.

MAPAQ continues to perform necessary monitoring and inspection activities to prevent the introduction and dissemination of SHBs in Québec. These include active monitoring for SHB in border areas, inspection of colonies brought into Québec (purchased or rented for pollination) and of Québec colonies returning to Québec after pollination. Moreover, the team carries out regular follow-up visits in areas where a SHB has been detected (Table 3). In the course of the monitoring of border areas, 604, 480 and 300 colonies were inspected in 2017, 2018 and 2019 respectively.

Table 3
Small hive beetle (SHB) monitoring activities of MAPAQ's beekeeping team from 2017 to 2019

Year	2019	2018	2017
Monitoring visits in border areas	64	54	3*
Inspection of colonies introduced into Québec	30	14	33
Inspection of returning Québec colonies	5	5	7
Follow-up visits of positive cases	7	16	0
Total	106	89	43

* In 2017, the surveillance of border zones was primarily carried out by the Deschambault Animal Science Research Facility.

In addition to the activities listed in Table 3, MAPAQ's inspectors carried out other activities aimed at reducing the risk of introducing SHB.

Monitoring activities are carried out in blueberry and cranberry fields from Quebec to ensure that all hives coming from other provinces hold a MAPAQ introduction permit. In addition, a roadside check is carried out to verify compliance with transit standards. Finally, MAPAQ can inspect the queens imported from other countries.

ENHANCED ACTIVE MONITORING PROJECT

Passive monitoring can confirm the presence of certain pathogens, but it does not allow for an estimation of the proportion of Québec colonies infected. In 2017 MAPAQ, in cooperation with the University of Montréal's Faculty of Veterinary Medicine and CRSAD, has enhanced monitoring activities in the south-west region of Québec in order to research not only SHB but also other bacteria, viruses or parasites that could affect bee health.

Samples were taken from 242 colonies in order to look for pathogens in the laboratory. As expected, *Varroa destructor* mites were found in all the businesses visited, which confirmed that **varroasis is very widespread and can be a major cause of productivity loss in domestic bees**. Its prevention and control depend on the implementation of good beekeeping practices and integrated pest control methods. The schedule for screening and control of varroasis was revised in 2019 to adapt to the new practices and knowledge, particularly to include the use of alcohol washing as a screening method. The complete results of this study will be published soon in the scientific literature.

RECORD OF LABORATORY DIAGNOSES

PATHOGENS

When preventive or curative medical visits were carried out by veterinarians from MAPAQ's beekeeping team, many samples were submitted to look for pathogens. The summary of test results is presented in Table 4. It is important to note that while the pathogens may have been detected, the colony did not necessarily display signs of the disease. Since submission practices vary by region, year and disease, these data are not representative of the health of the entire Québec bee stock. Nevertheless, they supply useful information about key pathogens and diseases of concern for Québec beekeepers.



Table 4

Pathogens detected in MAPAQ laboratories, during passive monitoring, for the years 2017 to 2019

<i>Varroa destructor</i> (varroasis)*	2019	2018	2017
Number of positive samples	10	47	77
Number of samples submitted	81	133	228
Number of positive businesses	6	18	23
<i>Paenibacillus larvae</i> (American Foulbrood)	2019	2018	2017
Number of positive samples	11	11	14
Number of samples submitted	39	77	147
Number of positive businesses	1	3	3
<i>Melissococcus plutonius</i> (European Foulbrood)	2019	2018	2017
Number of positive samples	9	16	43
Number of samples submitted	39	66	147
Number of positive businesses	6	7	15
<i>Nosema spp.</i> (nosema)	2019	2018	2017
Number of positive samples	95	121	221
Number of samples submitted	131	133	262
Number of positive businesses	27	43	67
<i>Acarapis woodi</i> (tracheal mites)	2019	2018	2017
Number of positive samples	0	0	2
Number of samples submitted	6	58	140
Number of positive businesses	0	0	1
<i>Aethina tumida</i> (small hive beetle)	2019	2018	2017
Number of positive samples	8	8	2
Number of samples submitted	14	11	5
Number of positive businesses	4	2	1

* results show the number of bee samples submitted to the laboratory for the search of *Nosema* spp. in which varroa was detected. It was not an active search for the parasite, which explains the low number of positive results.

There are four mandatory reportable honey bee diseases in Québec: the small hive beetle, tropilaelaps mites (an exotic disease not found in Canada), American foulbrood (*Paenibacillus larvae*) and the African bee and its hybrids. In 2019, four businesses were found to be positive for SHB (control measures have been put in place) and one business tested positive for American foulbrood.

PESTICIDE POISONING

Every year, under a dozen suspicious poisonings are reported to MAPAQ. Table 5 presents the results of analyses searching for pesticides.

Table 5

Analyses for pesticides carried out in MAPAQ's Laboratoire d'expertise et d'analyses alimentaires for 2017 to 2019

Year	2019	2018	2017
Number of cases submitted	9	9	7
Number of significant cases	3	3	4
Molecules involved	Spinosad	Spinosad	Clothianidine Spinosad

Clothianidin is an insecticide of the Neonicotinoids family which is very toxic to bees (lethal dose 50¹ [LD50] taken orally of 0.004 µg/bee and LD50 by contact of 0.04 µg/bee). It was found in significant concentrations amounting to as much as 33% of LD50. Poisoning events linked to clothianidin occurred in May.

Spinosad is an extremely toxic insecticide for bees with an LD50 by contact of 0.003 µg/bee. It was found in significant concentrations (amounting to between 34 and 240 times the LD50). Poisoning events linked to Spinosad occurred in July.

For more details on poisoning incidents in Québec, consult the report on suspicions of bee poisoning by pesticides in Québec between 2015 and 2018 on MAPAQ's website at www.mapaq.gouv.qc.ca/abeilles.

Beekeeping Network

Don't hesitate to communicate with the beekeeping network's regional veterinarians to let them know of any unusual or concerning situations. You can find more information about the network on MAPAQ's website at www.mapaq.gouv.qc.ca/abeilles.

1 LD50 is the dose of a substance that can cause a 50% death rate in an animal population, under conditions of precise experimentation, which corresponds to an acute exposure to a single pesticide at a time.