2021

HONEY BEE
NETWORK REPORT

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Votre gouvernement

Québec

HIGHLIGHTS

In Quebec

While cases of **small hive beetle** (SHB), or *Aethina tumida*, have been detected intermittently in recent years, the distribution of the contaminated shipment, introduced in Quebec in 2020 without authorization from the MAPAQ, led to an increase in the number of reported cases compared to previous years. In 2020, a total of 27 positive sites were identified (24 cases spread over 17 regional county municipalities and 3 cases in the border area). In 2021, thanks to monitoring and control measures implemented with the affected beekeepers, 26 of these sites returned to negative status versus 1 site with an unchanged positive status in the Estrie region. Monitoring activities continued during the 2021 season and led to the identification of 11 new cases, bringing the total number of positive bee yards active in Quebec to 12 for 2021. These monitoring and control measures are still in effect to date.

Clothianidin is the only pesticide blamed for bee poisoning cases in 2021.

Across the country

Health status regarding the small hive beetle

Ontario

Since 2010, SHBs have been repeatedly identified in various parts of Ontario and are now found in all bordering States. After imposing a quarantine in the southern part of the province between 2011 and 2019, the Ontarian government shifted its focus in 2019 to a multifaceted and collaborative approach with industry and researchers in an effort to curb the spread of SHBs. Ontarian beekeepers also used management strategies to control this invader. The affected counties are shown on an interactive map that is published and updated by the Ontario Ministry of Agriculture, Food and Rural Affairs: https://www.arcgis.com/apps/webappviewer/index.html?id=4c52b96dcd3c470886c1579326df2611.

New Brunswick

The first case of SHB was discovered in New Brunswick in June 2017 in the hives of an Ontarian beekeeper who had traveled there for pollination purposes. In subsequent years, a number of SHB cases were reported in New Brunswick. Some reports were made in recent years before colonies from the outside were brought in for pollination, which suggests that the SHBs succeeded in surviving the winter. In 2021, a single case (including two small adult beetles) was confirmed in New Brunswick.

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MAPAQ'S BEEKEEPING TEAM REPORT

In Quebec, thanks to the work of its beekeeping team, which is made up of around twenty veterinarians and inspectors from the Animal Health Department, the Food Safety and Well-Being Department and Regional Food Inspection Departments, the MAPAQ plays a decisive role in keeping bees healthy. For instance, it carries out the following activities:

- preparing and performing **surveys** aimed at determining the number of colonies in Quebec and the winter mortality rate of these colonies as well as describe the beekeepers' management;
- making **animal health** visits to prevent or control bee diseases;
- **inspecting hives**, especially in the case of complaints, suspected designated diseases or pesticide poisoning or even for the purposes of active surveillance;
- conducting **laboratory tests** to detect pathogens and investigate pesticide poisonings, which is done to help make a diagnosis and recommend the proper treatment whenever necessary.

Survey data

Although the number of registered beekeepers in Quebec continues to rise, the number of registered colonies in 2020 and 2021 is lower than in 2019. More specifically, in 2021, 1,562 beekeepers (operations) registered as bee owners for a total of 59,974 reported colonies. In 2019, 1,382 beekeepers were registered for a total of 67,025 colonies. Therefore, a rising trend has been noted: more beekeepers with fewer colonies. This may be explained by the delays observed in the registration process in the last two years, which has resulted in the absence of a few large operations in the statistics provided. It may also be due to the difficulties that the large operations had in maintaining their hives during the pandemic. The Montérégie region is number one when it comes to the number of commercial pollination sites, the number of wintering sites, and the number of honey producing bee yards. In the winter of 2020-2021, the overall percentage of mortality in Quebec colonies was 23%. For more information on the winter mortality data, consult the annual survey on winter mortality in Quebec bee colonies published on MAPAQ's bee network web page.

MAPAQ's health and inspection activity report

The MAPAQ bee team's activities are wide-ranging but specifically include:

- preventive or curative veterinary services;
- health assessments and health inspection reports (such as for transporting colonies to other provinces or exporting bees);
- inspections regarding the regulations in effect (such as compliance with distance requirements, beekeeper records or hive identification);
- investigations in the event of suspected pesticide poisonings;
- many activities focused on SHB surveillance.

Table 1

MAPAQ bee team's activity data, 2019 to 2021

	2021	2020	2019
Number of beekeepers visited	174	128	118
Number of visits made	238	177	178
Number of hives inspected	2 518	3 165	2 846
Number of hives present	8 834	9 077	8 725

Table 1 shows that the number of beekeepers visited and the number of visits made increased in 2021, whereas the number of hives inspected decreased, which suggests the presence of a larger number of beekeepers in the territory, but a smaller number of hives.

Table 2 shows that the number of visits related to SHB surveillance activities is rising from year to year.

Table 2

Visits made by MAPAQ's bee team by reason, 2019 to 2021

	2021	2020	2019
Health assessments	29	19	15
Regulatory non-compliance and complaints	11	5	7
Preventive medicine visits	10	11	21
Curative medicine visits	25	17	14
Suspected pesticide poisonings	5	3	6
Small hive beetle surveillance	155	113	106
Other	3	15	9
TOTAL	**238**	**183**	**178**

Small hive beetle surveillance activities

SHBs are a pest that can cause major damage in hives and honey houses. They were discovered for the first time in Canada in 2002, in the province of Manitoba. Since 2008, a few rare incursions of SHBs from the United States and New Brunswick have been detected in Quebec, where it is a notifiable disease. Surveillance and control activities were implemented each time, so that SHBs are not considered endemic to Quebec. Furthermore, Quebec set health requirements in 2012 to make it safer to introduce bees from other provinces.

MAPAQ continues to carry out the surveillance and inspection activities required to prevent the introduction and dissemination of SHBs in Quebec's territory.

Active SHB surveillance activities include surveillance in border areas and the inspection of colonies introduced in Quebec (purchased or rented for pollination) and Quebec colonies that return to Quebec after pollination activities (Table 3). In addition, MAPAQ's bee team regularly monitors sites where SHBs have been detected.

Table 3

Small hive beetle surveillance activity data by MAPAQ's bee team, 2019 to 2021

	2021	2020	2019
Surveillance of at-risk zones	101	46	64
Inspection of colonies or queens introduced in Quebec	14	35	30
Inspection of Quebec colonies that have returned to Quebec	0	0	5
Monitoring of positive cases	38	32	7
Verification of transit standards	2	0	0
TOTAL	**155**	**113**	**106**

Table 4 shows the active surveillance data for small hive beetles in at-risk zones in 2021.

Table 4

Active surveillance data for small hive beetles in at-risk zones in 2021.

	Inspected hives	Hives present	Inspected hives (%)
Total number	995	1 228	81 %
Average per bee yard	8,5	10,5	81 %

Monitoring of positive cases in 2020

On May 31, 2020, an unauthorized cargo of nuclei contaminated by SHBs was brought into Quebec's territory from Ontario and distributed to hundreds of buyers across the province. As a result, MAPAQ implemented tracing and surveillance activities throughout the 2020 season. This lead to the identification of 24 SHB-positive bee yards that were directly or indirectly linked to the distribution of these contaminated nuclei in 17 different regional county municipalities (RCMs). Most of the affected beekeepers owned a small number of colonies in one stationary site. Three additional cases were detected as part of active surveillance activities in border areas, bringing the total number of positive sites to 27 in 2020.

Inspections in 2021 revealed that 26 of these sites had returned to a negative status thanks to control measures. One single case in 2020, located in Haute-Yamaska (Estrie), remained positive in 2021 (a single adult SHB was found).

Active surveillance of at-risk zones

In 2021, MAPAQ adjusted its annual active surveillance efforts by adding areas in Quebec where SHBs had been detected after the contaminated cargo was distributed in 2020 to border regions that already ran the risk of SHBs being introduced naturally and were usually inspected (United States border areas). In the Montérégie region, the border RCMs that are subject to surveillance are Haut-Saint-Laurent, Jardins-de-Napierville, and Haut-Richelieu. In Estrie, the border RCMs of Brome-Missisquoi, Memphrémagog, and Coaticook were targeted. These RCMs are in addition to La Matanie (Bas-Saint-Laurent), the Quebec City and Île-d'Orléans urban agglomeration (National Capital-Quebec), L'Assomption (Lanaudière), Laurentides and Thérèse-De Blainville (Laurentians), Chenaux (Mauricie) as well as Haute-Yamaska, Longueuil, Pierre-De Saurel, Rouville and La Vallée-du-Richelieu (Montérégie). Like every year, the inspected bee yards were randomly chosen.

During the surveillance activities carried out in 2021, five sites were found positive and directly or indirectly linked to the cargo of contaminated nuclei distributed in 2020. Three of these sites belong to the same beekeeper and are located, together with a fourth site, in an outbreak area affecting the neighbouring RCMs of Rouville and La Vallée-du-Richelieu. The last site, epidemiologically unrelated to this source, is also located in La Vallée-du-Richelieu RCM.

Six additional sites located around the three infestation sources (in the RCMs of Jardins-de-Napierville, Haut-Richelieu, and Brome-Missisquoi) were found to be positive, along the U.S. border, as part of this inspection, bringing the total number of positive active bee yards in Quebec to 12 in 2021.

Control measures were implemented in all affected bee yards. Appropriate monitoring efforts will be scheduled in the beginning of the 2022 season.

The detailed list of positive bee yards and the caution notices issued since 2018 can be found on MAPAQ's website:

https://www.mapaq.gouv.qc.ca/fr/Productions/santeanimale/maladies/soussurveillance/Pages/ruchers-positifs.aspx.

Information about SHBs and methods of preventing and fighting them are also accessible on MAPAQ's website:

https://www.mapaq.gouv.qc.ca/fr/Productions/santeanimale/maladies/soussurveillance/Pages/aethinatumida.aspx.

Laboratory diagnoses report

Pathogens

When preventive or curative medicine visits were made by veterinarians on MAPAQ's bee team, numerous samples were submitted to detect pathogens. The summary of test results is shown in Table 5. Although the disease names are specified in this table for comprehension purposes, it should be noted that it is the pathogens of these diseases that were detected, and not the diseases themselves (the colony did not necessarily show signs of disease). In addition, since submission practices vary by region, year and disease, the data shown is not representative of the health status of Quebec's bee hives. However, this data does provide other relevant information such as confirmation of the presence of pathogens that cause the diseases that laboratory services are often asked to test for.

Table 5

Varroa destructor (varroosis)*	2021	2020	2019
Number of samples submitted	56	57	81
Number of positive samples	8	14	10
Number of positive enterprises	5	7	6
Paenibacillus larvae (American foulbrood)	2021	2020	2019
Number of samples submitted	126	119	39
Number of positive samples	22	24	11
Number of positive enterprises	13	7	1
Melissococcus plutonius (European foulbrood)	2021	2020	2019
Number of samples submitted	156	115	39
Number of positive samples	75	45	9
Number of positive enterprises	15	12	6
Nosema spp. (nosemosis)	2021	2020	2019
Number of samples submitted	56	57	131
Number of positive samples	53	53	95
Number of positive enterprises	17	19	27
Acarapis woodi (tracheal mite)	2021	2020	2019
Number of samples submitted	10	3	6
Number of positive samples	0	0	0
Number of positive enterprises	0	0	0
Aethina tumida (small hive beetles)	2021	2020	2019
Number of samples submitted	28	62	14
Number of positive samples	20	34	8
Number of positive enterprises	10	27	4

* This represents the number of bee samples submitted to the laboratory to detect *Nosema spp.* where the presence of *Varroa destructor* was noted. Therefore, they do not represent active searches for the parasite, which explains the low number of positive results.

Four conditions are notifiable in Quebec: small hive beetles, mites of the genus *Tropilaelaps* (exotic disease not present in Canada), American foulbrood (*Paenibacillus larvae*), and the African bee and its hybrids. In 2021, the number of requested diagnostic tests for small hive beetles decreased significantly.

Pesticide poisonings

Every year, investigations are carried out whenever pesticide poisoning is suspected. In 2021, nine situations where a beekeeper suspected this type of poisoning were reported and examined. In one of the nine cases, the bee samples contained a significant quantity of pesticides, which could explain the mortality rate observed. In that case, the poisoning occurred in June and the pesticide in question was clothianidin. This insecticide from the neonicotinoid family is highly toxic to bees (DL50 orally of 0.004 µg/bee and DL50 per contact of 0.03 µg/bee). It should be noted that the last case of acute poisoning associated with the presence of a neonicotinoid, also clothianidin, was in 2017. Table 6 provides an overview of test results for pesticide detection in the last three years.

Table 6

Summary of test results for pesticide detection at MAPAQ's food assessment and analysis laboratory, 2019 to 2021

	2021	2020	2019
Number of cases submitted	9	10	10
Number of significant cases	1 (June)	1	4
Molecules at issue	Clothianidin	Spinosad	Spinosad

QUEBEC'S INTEGRATED ANIMAL HEALTH PROGRAM (PISAQ)

In 2021, MAPAQ gave workshops and conferences to beekeepers as part of a varroosis awareness and surveillance pilot campaign. These workshops were given through Quebec's integrated animal health program. They were aimed at encouraging collaboration and knowledge transfers between various beekeeping actors (veterinarians, seasoned beekeepers, amateur beekeepers) and promoting community-based varroosis management. The data gathered was used to develop awareness tools that were then made available to beekeepers on the web page of MAPAQ's bee network. Workshops were offered in targeted regions (Chaudière-Appalaches, Laurentides, Estrie) and included a small number of veterinary practitioners and a total of approximately 45 participants. Given the overwhelming success of this activity in terms of participation and appreciation, the project will be repeated in 2022 on a larger scale. For more information, you can consult the column entitled «Programme intégré de santé animale du Québec (PISAQ)» in *L'Abeille* magazine.

BEE NETWORK

Feel free to contact regional veterinarians in the bee network to let them know about any unusual or worrying situations. You will find more information about this network on MAPAQ's website at http://www.mapaq.gouv.qc.ca/abeille.

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