

Briefing Note

Widescale Pesticide Monitoring for Honeybee Health

Pesticide use: Potentially killing our pollinators

Widescale pesticide monitoring in the Ontario agricultural sector has been absent for over a decade. Pesticide-use reporting from farmers is not required, leaving a significant blind spot for how we use these ecologically important chemicals, and how they are impacting our environment in real time. This data gap significantly hampers research into the effects of agrochemicals on Canada's ongoing honeybee health crisis. The managed honeybee (*Apis mellifera*) serves as a critical link between agricultural and natural ecosystems, essential for crop production and the pollination of native plant species.

To help save the honeybees and strengthen agriculture security, the government must allow for robust pesticide monitoring in relevant contexts.

Pesticides in Ontario

Pesticides are any substances used to prevent, control, or eliminate pests that threaten crops, livestock, and human health. They include insecticides, herbicides, fungicides, and bactericides, and non-chemical products such as traps¹. In Canadian agriculture, commonly used chemical pesticides include glyphosate (herbicide), neonicotinoids (insecticide), and chlorothalonil (fungicide). There are currently over 7,753 pesticide products approved for use in Canadian agriculture². Pesticide use is regulated by Health Canada's Pest Management Regulatory Agency (PMRA) to balance agricultural needs with environmental and human health risks.

Ontario's reliance on pollinators

Ontario agriculture is particularly reliant on managed pollinators for crop production and quality.



Pollinator-dependent fruits and vegetables comprise a large portion of the industry with farm values of approximately CAD \$413M and CAD \$251M, respectively^{3,4}.



In Canada, honeybee pollination services substantially enhance agricultural productivity by contributing an estimated \$7B in additional harvest value per year⁵.



28 percent or more of crops have experienced yield reductions due to insufficient pollination⁶.



Soybeans—the highest acreage crop in Ontario—also benefits from honeybee pollination with crop yields increasing upwards of 20 percent^{7,8}.

Pesticides impact pollinators



Reduces motor function, causes tremors and memory impairments^{9–11}



Can alter the structure of the honeybee gut microbiome, which has widespread health effects^{13–15}.



Can negatively impact honeybee immunity, increasing chances of deadly disease and infections^{16,17}.



Pesticide exposure through food and environmental contamination reduces honeybee nutritional status¹⁸.



Can negatively affect other wild pollinators, such as bumblebees.

Why improve pesticide monitoring schemes?

Responsibilities to previous commitments

Aside from a national 2-year pilot program to monitor water sources for pesticides in 2022–2024, widescale pesticide monitoring in the Ontario agricultural sector has been absent for over a decade¹⁹. Similar jurisdictions, including the United States and European Union maintain robust pesticide monitoring systems that provide valuable data on pesticide residues^{21,22}.

Canada is signatory to international agreements (ie. Convention on Biological Diversity) which focus on sustainability and stewardship with a particular emphasis on pollinator protection and preservation. Ontario's lack of pesticide-use monitoring undermines the country's ability to meet the obligations of the treaty and prevents Canada from meeting its goal of wildlife, agriculture, and natural space protection.

Honeybee health

1. Allows researchers to focus on pesticide impact and mitigation research with relevant chemicals in relevant contexts
2. Informs beekeepers on possible reasons for improved or decreased honeybee health.
3. Allows beekeepers to make informed decisions regarding how best to maintain their colonies' health.

1. Track pesticide use

1. Mandate annual pesticide-use reporting through a streamlined digital system.

We call on the provincial government to form a governance body where registered farm businesses are to report their pesticide applications throughout a given year. This body would require farms grossing more than a certain threshold a year to report what pesticide was applied, when, and what class it belongs to – through a digital online system. To ease the pains of reporting, the same governing body should provide training for farmers in using the digital system through online tutorials.

2. Reestablish governed pesticide residue tracking initiatives.

We implore the government to resume collecting neonicotinoid and other pesticide residue level data in agricultural land and pollen, allowing for informed decisions regarding pollinator and ecosystem health. This could be completed following a similar manner as the Pollen Monitoring Network Study completed by ECCC and OMAFRA in 2015²³. This monitoring program should be completed yearly, with samples collected from geographically distinct agriculture areas within Ontario.

2. Educate the public

1. Transparent and accessible reports.

The Ontario government should publish reports every five-years summarizing findings, alongside analysis of publicly available colony winter mortality data to allow for better research and to foster public and industry trust²⁴. Widely available data will allow researchers, the agriculture community and The Government of Ontario to make informed decisions regarding honeybee and ecosystem health in relation to pesticide use.

2. Require Integrated Pest Management (IPM) training for high pesticide users and provide financial incentives for pesticide reduction.

IPM is a science-based, sustainable approach that minimizes pesticide use while maintaining crop health. However, adoption is often hindered by a lack of training and financial constraints.

We call on the government to establish a voluntary IPM certification for farmers exceeding set pesticide application thresholds.

Training should be provided with help of local farming organizations focusing on IPM strategies²⁵. Additionally, those who take the training and show a reduction of pesticide use should be offered tax breaks or direct subsidies. This multipronged approach will reduce Ontario farmer's reliance on pesticides, limit effect on pollinators, and educate farmers on alternative IPM strategies.

Contributions & Partners

This policy brief was developed through the CARE program, in partnership with Food from Thought and the Arrell Food Institute.

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