The buzz on what?s happening to the bees

Beekeeper John Van Blyderveen is troubled by the silence in his laneway in Ontario's Oxford County.

The familiar summertime buzz of bees hovering over the lush cherry blossom trees is noticeably absent. The flowers sit untouched.

?This is extremely unusual for this being a bee farm, there are no bees here,? Van Blyderveen says. ?This is really sad.?

This increasingly familiar scene, which is playing out across North America and Europe, worries beekeepers, farmers and scientists who have been tracking the collapse of honeybee colonies over the past decade.

In the process, two main camps have emerged, vigorously debating the root causes of the decline.

Some scientists and insecticide companies suggest the bees are being overrun by an infestation of mites, while other observers suggest seeds coated with neonicotinoid insecticide ? or ?neonics? ? are to blame.

On July 9, Ontario Premier Kathleen Wynne announced she will convene a working group ? made up of a range of experts ? to study this issue and provide recommendations.

It's a puzzle with huge implications. Bees and other pollinators are responsible for ensuring most fruit and vegetable crops around the world mature into food.

Most sources suggest about one-third of the food we eat is reliant on pollinators, and Bloomberg Business Week estimates bee pollination affects ?$200 billion worth of crops annually.?

Ernesto Guzman, a bee researcher at the University of Guelph, says Varroa mites continue to be the prime suspect in the bee deaths.

?We have evidence that Varroa mites are problem No. 1 associated to bee mortality in southern Ontario, although neonicotinoids have been associated to some isolated cases of colony mortality,? he said, noting that he has not specifically studied the effects of neonics on honeybees.

Bayer Crop Science and Syngenta, two major manufacturers of the neonicotinoid insecticide, have also suggested the bee deaths are tied to an epidemic of Varroa mites. The companies have recommended that beekeepers get their mite problem under control to rein in the collapse of bee colonies.

Ontario beekeeper John Van Blyderveen is troubled by the absence of buzzing bees surrounding his cherry blossom trees. (Janet Thomson/CBC)

But not everyone is fingering the mites.

?The whole world is saying us beekeepers don't know how to control mites,? says Van Blyderveen. He adds emphatically, ?We don't have a mite problem.?

Neonicotinoid pesticides have been approved for agricultural use in North America and Europe since at least the late 1990s. But earlier this spring, the European Food Safety Authority imposed a two-year ban on their use, specifically because of the risk they pose to bees.

Neonicotinoids are a class of insecticide that targets the nervous system of invertebrates. All insects are invertebrates ? from those that harm crops, like potato bugs, corn beetles, butterflies, grubs and aphids, to the so-called beneficial insects, such as earthworms, lady bugs and honeybees.

Those who say the pesticides are at the root of the bee problem note that neonicotinoids are synthetic copies of natural nicotine, which is very toxic to nearly all invertebrates.

One of the uses of neonicotinoids is as a coating applied to corn seeds to protect the plants.

For modern farm operations, the idea of a seed with the insecticide built in is hard to resist. The seed itself takes care of its own pest management, not only as a seed but as it grows and matures into a stalk of corn with cobs.

It is supposed to be a safe, targeted way to use the insecticide without harming pollinators, according to a pamphlet produced by CropLife Canada, a trade association.

The insecticide is on the seed and the seed is buried in the soil, so it is supposed to be inaccessible to the bees, says Pierre Petelle, a spokesperson for CropLife Canada.

But as corn-planting season began last spring, the bees in some parts of Canada began dying in record numbers. When the dead bees were collected and tested by Health Canada, 70 per cent were found to have traces of neonicotinoids on them.

?Based on the preliminary information evaluated to date, there is an indication that pesticides used on treated corn seeds may have contributed to at least some of the 2012 spring bee losses that occurred in Ontario,? said Health Canada's Ontario Bee Incidents 2012 report.

Scott Kirby, who works at Health Canada's Pest Management Regulatory Agency, adds that ?the acute incidents from last spring were definitely attributable to insecticide exposure.?

Ontario's bee die-off last year raised the question of how bees were coming into contact with this pesticide, if indeed the seeds were buried. That spurred investigators to look at the planting process, which was when most of the recorded bee deaths occurred.

When corn planters sow their fields, a lot of dust is kicked up as the large tractor and planter, followed by a fertilizer container, move up and down the fields. As the insecticide-coated corn seed moves through the hopper, it leaves behind residue that is carried up into dust clouds that can stay airborne and carry across the fields.

The irregular shape of the corn seed may further accentuate the problem. A talcum powder is sprinkled over the irregular shaped seed to help it flow smoothly through the hopper.

The powder itself is benign, but Health Canada and CropLife Canada now acknowledge that the talc actually helps disseminate the dust off the seeds.

This ?fugitive dust? is now considered by Health Canada and others as one likely route of exposure to neonicotinoids for honeybees and other pollinators.

Bees can come into contact with the insecticides through ?direct contact caused from planter dust, in which case bees are probably doomed almost instantly. It contaminates nearby flowers in a typical wash like any pesticide,? says University of California apiarist Eric Mussen.

Some scientists think the acute deaths that seem to coincide with planting are just the tip of the iceberg.

Jeff Pettis is the research leader at the U.S. Department of Agriculture bee lab in Maryland. Last September, around the time Health Canada reported the insecticide residues on 70 per cent of the dead and dying bees, Pettis told CBC News, ?I am almost more concerned about the possible residues in corn pollen as the plants mature than the temporary exposure that occurred this spring with

planting and dust.?

A farmer pours neonicotinoid-covered corn seeds into a barrel. (Janet Thomson/CBC)

Eric Mussen at the University of California's agrees. Because of the systemic nature of the insecticide, he says, ?any time the plant is in bloom you're going to have a long-term exposure, and now it becomes incorporated into the bee hive.?

Laval University entomologist Val Fournier suggests another potential source of exposure. When she sampled surface water from puddles in fields two to three weeks after they were planted with neonicotinoid-treated corn, she found levels of neonicotinoids 10 times higher than what is known to cause death.

?This water would be very, very toxic for bees,? she says.

In April, the European Union issued a moratorium on neonicotinoids as it assesses the ongoing global decline in bee populations. But Canada's pesticide regulatory agency does not want to take that step.

?We do not feel that a ban or a moratorium is necessary at this time,? says Kirby. ?But we will assess. I feel that if farmers communicate with beekeepers it will go a long way to mitigate the problem.?

The federal agency noted it doesn't allow a product to be registered unless the risks are ?acceptable.? Before neonicotinoids were approved for use on corn in Canada in 2004, Health Canada's evaluation concluded there was a ?possible risk? to honeybees and other pollinators.

?Our evaluation indicated a potential risk to bees,? says Kirby. ?However, we felt that the risk was not significant.? Health Canada agreed to register the product on the condition that the pesticide companies involved conduct further tests on the potential risk to honeybees.

But in the past nine years, according to Health Canada's Pest Management Regulatory Agency, the studies have not fully addressed the concerns and outstanding questions. As part of a re-evaluation of the pesticides, Health Canada has requested additional information on bee colony effects and residue exposure in pollen and nectar.

In a statement, Health Canada suggested that the re-evaluation ?may take several years to complete? as new information is assessed. ?If warranted,? it adds, ?regulatory action will be taken at any time during the process to further protect bees.?

Health Canada's neonicotinoid assessment has been underway for nearly a decade. In May, Sierra Club Canada called for a ban saying the Canadian regulators have ?got it backwards.?

In a press release, John Bennett, executive director of Sierra Club Canada, said, ?The federal government's response to this global crisis is grossly insufficient. Its job is to protect Canadians, not the profits of chemical companies and big agri-business.?

In a letter to Health Canada, Ontario Premier Kathleen Wynne has asked the federal government to ?speed up their re-evaluation, in order to use the conclusion of that research to make decisions on how to address bee mortalities.?

In the meantime, the Pest Management Regulatory Agency continues to collect an annual licence fee from chemical companies allowing them to manufacture and/or sell the insecticide-treated seed in Canada.

Those fees, along with each registrant's initial application fee, make up approximately 17 per cent of the PMRA's budget, according to Health Canada.

?The amount fluctuates somewhat from year to year, but on average it's approximately $8 million,? Health Canada said in an email

to CBC News.

By Janet Thomson