

# THE GLOBE AND MAIL

Web-exclusive commentary

## Why honeybees are falling through the cracks

Reese Halter explains their rapid decline, and why it stings

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Over the past three years, more than 50 billion honeybees have died. Scientists understand the causes, and now we need everyone to lend a helping hand.

The humble honeybee has been inextricably linked to humankind since prehistoric times. We were first drawn to this remarkable creature because of its sweet honey, which is to a bee what electricity is for humans – energy. One teaspoon of honey, about 21 grams, contains 16 grams of sugar, or 60 calories. It takes 12 bees their entire foraging lives, combined flying time of about 9,700 kilometres, to produce this much.

To understand the importance of these bees, consider that every third bite on your plate is a result of their primary role on the planet as pollinators – the most important group on Earth.

Honeybees contribute at least \$47-billion a year to the U.S. economy by pollinating crops such as almonds, apples, avocados, blueberries, broccoli, canola, carrot seeds, cherries, citrus, cranberries, cucumbers, grapes, lettuce, macadamizes, melons, peaches, plums, pumpkins, onion seeds, squash, sunflowers, kiwis, tomatoes and zucchinis. Pollinated alfalfa and clover contribute to the beef and dairy industries, while cotton helps make our clothes. Not to mention honey, candles and medicines.

Bees have been on the planet for more than 100 million years – about 14 times longer than the first human progenitor. They have memory, they vote (to locate hives), they are being trained to count and they can help people detect disease by sniffing out skin and lung cancers, diabetes and tuberculosis. Researchers from the University of Montana are using bees to find TNT residue in land mines. And many blue-chip corporations depend on them for their products, including Haagen Dazs ice cream, Starbucks coffee and Burt's Bees.

However, a combination of factors has created a perfect storm that has caused honeybee memory loss, appetite loss and autoimmune system collapse, resulting in the rapid decline in populations worldwide.

Each year, 2.3 billion kilograms of insecticides are applied globally. Many of them are neonicotinoids, a nerve poison that prevents acetylcholine from allowing neurons to communicate with each other and with muscle tissue. In humans, it would trigger Parkinson's and Alzheimer's disease. One neonicotinoid, called imidacloprid, was [blamed for the deaths](#) of millions of bees in France and eventually banned there, but it's still used widely in North America.

In 2008, researchers from Penn State found 43 different pesticides in a Pennsylvania apple orchard. Many

farmers combine or stack their chemicals to reduce application costs, but this is known to increase toxicity levels, in some cases by 1,000-fold. Research from Europe has showed that bees exposed to electromagnetic radiation from cellular towers made 21 per cent less honeycomb and that after being taken half a mile from the hive, 36 per cent were unsuccessfully able to navigate home.

In 2006, the honeybee genome was decoded, revealing that honeybees have fewer genes for detoxification and immunity than other known insects. Scientists found specific “good” bacteria inside their stomachs and intestines that are crucial for fighting pathogens and digesting the silica casing around each pollen grain, providing access to its protein.

Bees evolved to feed on a wide assortment of pollens, but now we use them in monoculture fields. Pollens provide their only source of protein. Proteins grow eggs, larvae, brains and autoimmune systems.

The abnormally high temperatures of 2006 were likely the tipping point for North America's bees. The searing springtime temperatures during the onset of flowering are believed to have caused sterile pollen in many plants. Sterile pollen produces little if any protein. In 2007, tests on almond, plum, kiwi and cherry pollen exhibited little if any protein content. Infertile soils lacking essential nutrients, bacteria, fungi, protozoa along with climate change were implicated. Beekeepers around the globe are now feeding their hives a form of a protein shake with eggs, brewers yeast, pollen, honey and other special ingredients.

Clearly, agriculture around the world must reduce the level of the toxicity from its pesticides, herbicide and miticides.

There is hope on the horizon. Organics is the fastest-growing business sector in North America, at \$27-billion a year – Michelle Obama has an organic garden on the White House lawn with two honeybee hives close by.

Consumers can help by buying organic foods and cottons, and organic honey from local beekeepers. Avoid the use of herbicides, pesticides and miticides in your yard. Plant a wide variety of native yellow and blue flowers and participate by helping scientists in Nature Watch's [PlantWatch](#) program.

Without the bees, we cannot survive.

*[Dr. Halter](#) is founder of the international conservation institute *Global Forest Science*. His latest book is *The Incomparable Honeybee & the Economics of Pollination*.*

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