

# What a buzzkill: Early-ending winters disrupt bumblebee slumber

October 20 2022, by Olga Koppel

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Gardeners across [North America and different parts of the world](#) have been growing worried over an eerie quiet settling over their gardens—a silence caused by the missing buzzing of bees.

With the increasing use of land for development and [climate change](#) worsening the bee disappearance globally, these gardeners have had to painstakingly transfer pollen grains from flower to flower with a paintbrush, simulating the [process of pollination necessary for fruit or vegetable production](#).

Losing these bees and other pollinators is no mere inconvenience, but a far broader challenge that is evolving with the changes in their environment.

In a recent research paper, [my colleague Jeremy Kerr](#) and I found that [72 percent of native bumblebee species in North America are ending their winter hibernation much earlier](#). While these bees have been timing their emergence to earlier [spring](#) onsets, the rest face the threat of extinction.

## Early wake up call

Since the 1970's, climate stressors including the increased rate of warming, earlier onset of spring and more unpredictable extreme weather events have added [new and severe challenges to the agricultural sector—and the pollinators it relies on](#).

Bees are extremely sensitive to [environmental change](#). The changing climate increases the likelihood of an [earlier end to winter and, thus, early flowering of spring plants](#). These flowers are essential food sources for bumblebee queens that hibernate in the winter and search for pollen and nectar after [waking up hungry and in need of energy](#).

The survival for those emerging from hibernation before the arrival of spring flowers—their main food source—is unlikely. This leads to smaller colonies with lower odds of persisting in the following years.

However, bumblebees that sync with the changing timing of spring take

full advantage of the season's floral resources and are more likely to thrive over time.

## **In sync with climate change**

Our research found that many native bumblebee species in North America are adapting to the changing climate by cutting their hibernation period short.

We examined the relationship between climate and bumblebee spring emergence using records from museum collections across North America. After studying 17,000 individual bees across 21 species, we found that the climate influenced the spring emergence patterns of 15 species.

Species including the Rusty-patched bumblebee (*Bombus affinis*)—[a species that is important to crop pollination but facing extinction across North America](#)—and the Half-black bumblebee (*Bombus vagans*) failed to keep up with the seasonal changes. Landscape fragmentation, pesticides and diseases from commercial bee colonies compounded these native species' survival risk.

On the other hand, bee species like the *Bombus pensylvanicus*, *Bombus melanopygus* and *Bombus huntii* successfully tracked the early arrival of spring and woke up from their winter hibernation in time to feast on the early-blooming flowers.

As there are about 40 [native species](#) in North America, this research stresses the need for more research and better conservation of these economically valuable pollinators.

## **Who runs the world? Bees!**

Like canaries in a coal mine, [the dwindling bee presence is an indicator of deteriorating environmental quality](#).

The [agriculture industry](#), which takes up approximately [38 percent of our land surface](#), heavily relies on these pollinators to thrive. The production of coffee, kiwis, blueberries, pumpkins, tomatoes and vanilla depends on pollination by bees, while other crops like bananas [benefit from pollinators like birds and fruit bats](#).

[Agriculture contributes \\$49 billion](#) to the Canadian economy and over [US\\$1 trillion](#) to the U.S. economy.

However, the conversion of land from forests or meadows to crops and pasture and the use of pesticides is [making these habitats increasingly unsuitable for many bees](#). Pesticides are deadly to bees, and agricultural monocultures fail to provide consistent food sources for pollinators throughout the spring and summer.

Our diets consist of foods pollinated by bees. If some pollinators struggle to adapt to climate changes, many of our crops will yield far less fruit and vegetables, triggering food security challenges globally.

## **The future of bees**

Our research highlights potential concern in those species that demonstrated decline over time and inability to match changes in the climate.

Given the importance of bees to our global economy and food safety, it is good news that some bees are matching changes in spring onset between years. It is crucial that we target conservation efforts towards those species that are faring worse.

Meanwhile, policies to protect our pollinators must continue to include [pest and pesticide regulation](#) and the protection of natural spaces, [even in our cities](#).

Research studies like this can help [policy-makers](#) and species conservation authorities [find effective and long-lasting ways of protecting the biodiversity of our planet for future generations](#).

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