

Nearly two decades of data proves concerns  
that pesticides are really bad for bees  
AND BAD FOR ALL OF US

By [Chelsea Harvey](#) August 16 at 2:58 PM



A bumble bee collects nectar from the calyx of a marguerite in Berlin. (Wofgang Kumm/AFP/Getty Images)

### *Med expo*

New research has provided some of the strongest evidence yet that pesticides can do serious, long-term damage to bee populations. And the findings may

help fuel the ongoing debate about whether certain insecticides should be permitted for agricultural use at all.

The [new study](#), published Tuesday in the journal Nature Communications, examines the question of whether the use of a common (and highly controversial) class of pesticides called neonicotinoids can be linked to wild bee declines in England. The results suggest that this could be the case. Using 18 years of data collected on more than 60 bee species in England, the researchers found that species foraging on pesticide-treated crops have experienced much more severe losses than species foraging on other plants. The study provides some of the first evidence that the effects of neonicotinoid exposure can scale up to cause major damage to bees.

“It’s nice to see the use of long-term data to look at trends in pesticide impacts over longer time scales,” said [Dara Stanley](#), a plant ecology lecturer at the National University of Ireland Galway, by email. (Stanley has [previously conducted research](#) on the effects of neonicotinoids in bees, but was not involved with the new study.) “That is something that has been missing in the debate on bees and pesticides so far, and there have been many calls to look at effects over time.”

The use of neonicotinoid pesticides has become hotly contested in recent years, due largely to concerns about their effects on bees and other pollinators. Numerous studies have indicated that exposure to these pesticides can have adverse effects in insects they were not intended for, hindering their ability to pollinate or reproduce or leading to increases in mortality.

In fact, in 2013, the European Union [placed a ban](#) on the use of multiple neonicotinoid pesticides, citing their potential danger to bees, although a few exemptions have since been allowed in the United Kingdom. Neonicotinoids are still widely used in many other places around the world, including in the United States. They’re produced by a number of different manufacturers and

include household names such as Bayer's [Admire Pro](#) insecticide, which includes a neonicotinoid called imidacloprid, or Syngenta's [Actara](#) insecticide, which contains thiamethoxam.

Until now, most of the research on their effects has been limited to short-term, small-scale studies, many of them performed in laboratory settings, said [Ben Woodcock](#), an ecological entomologist at the Centre for Ecology and Hydrology in the U.K. and the paper's lead author. They've also tended to focus on just a few species. The new study, on the other hand, relies on field data collected on many species over nearly two decades.

The researchers focused on the different responses between bee species that forage on pesticide-treated oilseed rape crops — the same plants commonly used to make canola oil — and bees that forage on other plants. Oilseed rape crops are widely treated with neonicotinoids around the world, and the practice began on a wide scale in the U.K. starting in 2002. It's the biggest mass flowering crop in the U.K. where neonicotinoids have been widely applied, according to Woodcock, making it an ideal subject for the study.

The researchers were interested in finding out whether bee species that forage on oilseed rape plants have experienced greater declines than bee species that don't. So they gathered nearly 20 years' worth of data, mostly collected in surveys by citizen scientists between 1994 and 2011, on where bee species have been spotted and what plants they foraged on. Different species often prefer to snack on different plants, and some of the included species visited oilseed rape plants while others didn't do so at all. The researchers incorporated all the data, along with information on oilseed rape cover and pesticide use in the U.K., into a model that helped them analyze all the information.

Using the model, the researchers zeroed in on individual plots of land. Using all the survey data they'd compiled, they were able to note which species had been observed in each plot and which ones disappeared from those plots over

the course of the study period. To be clear, the researchers weren't able to say whether the number of individual bees in any given plot decreased or increased in abundance. Rather, they simply took note of which species vanished, or went locally extinct, in any given area over time.

“The way we look at it is whether or not a species was present in a location and not present in the next year,” Woodcock said.

Overall, the researchers found that these little extinctions were three times more severe in bees that foraged on oilseed rape plants than in bees that didn't. It's impossible to say for sure that the neonicotinoids were responsible for this difference, but the results suggest a link. The findings support the previous research which indicates that neonicotinoids can have damaging effects on bees — and they also suggest that these effects could result in serious population declines on a large scale in the long term.

Looking at these mini extinctions rather than overall population abundance has its advantages, said [Christian Krupke](#), an entomologist at Purdue University, who was not involved with the new study.

“When you take an extinction-type event, you have more confidence that what you're seeing is a true effect,” he said. “We know populations go through ebbs and flows, but when there are no insects there, it's a lot more difficult to make the case that this is an ebb.”

In the future, though, “it would also be interesting to see whether abundances (or populations) of particular species were affected,” said Stanley, the National University of Ireland scientist, in her email. And Woodcock agreed that long-term population monitoring programs, which sample the same species in the same locations with the same intensity year after year, would be ideal in the future — they just haven't been implemented yet.

In the meantime, scientists from [Bayer Crop Science](#), a major manufacturer of neonicotinoid pesticides, took issue with the study's correlational findings, which they've pointed out cannot be used to argue with certainty that pesticides cause declines in bees. A statement from the company, sent to The Washington Post by Bayer spokesperson Jeffrey Donald, summarized their complaint.

“The authors chose to investigate only one potential factor, namely neonicotinoid insecticides,” the statement said. “This was chosen out of many different factors which may have an influence on the development of wild bees, for example landscape structures, climatic conditions, availability of specific foraging plants and nesting habitats. It is a well-known fact that the structure of agricultural landscapes in large parts of Europe has changed substantially in the last decades. The area of landscape structures available for nesting or foraging, especially for specialized species, has significantly declined, resulting in fewer habitats for pollinators.”

A statement from [Ray McAllister](#), senior director of regulatory policy at CropLife America, a trade association representing the manufacturers of pesticides and other agricultural chemicals, expressed similar concerns.

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The authors of the new study acknowledged that pesticides are by no means the only factor contributing to bee declines — and were likely not the only factor at play even in this individual study.

“Bees have been undergoing declines for a long time and it's been linked to a number of things — habitat fragmentation, climate change,” Woodcock said.

“This is a contributing factor to bee declines, it's not the sole cause. If you stop using neonicotinoids tomorrow, you wouldn't solve the problem.”

But many experts feel that limiting their use would certainly help.

“I think it’s still the case that when people talk about population declines, there’s broad agreement that there are many effects — it’s multifactorial — and it depends on the species you’re talking about,” said Krupke, the Purdue entomologist. “But I think in areas where pesticides are used extensively...that pesticides are high on the list of concern.”



**If the bee disappeared off the surface of the globe then man would only have four years of life left. No more bees, no more pollination, no more plants, no more animals, no more man."**



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