

Trade and economic growth, not pesticides, major driver of beehive declines?

The debate over whether bees are threatened and if so, why, is contentious. Globally, the number of bee hives has risen steadily over the past decade, and the number of bee hives is at record levels in North America and throughout most of Europe. But there are definite problems, say top entomologists. While the number of over-winter hives is at their highest numbers in years, losses during the summer are stubbornly high.

“Such high colony losses in the summer and year-round remain very troubling,” said entomologist [Jeff Pettis](#), a researcher at the USDA’s Agricultural Research Service [Bee Research Laboratory](#) in Beltsville, Md., and a co-author of the [government survey](#) that tallied up the bee losses.

But what’s driving these losses? Activists say pesticides, neonicotinoids in particular, are the primary driver. But overall colony numbers have risen in the decade and a half since the pesticide was introduced. Most scientists say the issue is multifactorial. But which factors are most key?

Honey imports and exports and dramatic economic changes in certain nations have been more responsible for honeybee colony decreases (and some increases) than GMOs, pesticides, mites or diseases, according to a new study by German researchers.

The [research](#), conducted by analyzing bee colony and honey production data collected by the U.N. Food and Agricultural Organization (FAO), countered popular assertions by environmental non-government organizations and even some European countries, which have advocated (and enacted) bans on neonic pesticides, and looked at mites and diseases as a cause for colony collapse disorder (CCD) and other declines in populations of European honey bees.

Robin Moritz and Silvio Erler at Martin Luther University in Halle, Germany, crunched numbers submitted to the FAO by more than 100 countries over 50 years (from 1961 to 2013), and found that major economic upheavals and trade in honey accounted for decreases in bee colonies. Pesticide use, disease or mite infestation did not at all correlate with decreases in colonies.

Moreover, the data clouded the picture often seen in media and NGO reports, pointing to a consistent, global decrease in bee colonies. While some countries, like the US and in Western Europe, have seen a consistent decline in colonies, other countries have seen dramatic increases in colonies and honey production. Southern Europe, for example, saw a doubling of colonies over the past 50 years, while South American colonies grew by 5.2 percent annually, African colonies grew by 3.3 percent annually, and Asian colonies grew by 4.4 percent annually (all over the past 50 years). Overall, despite the decreases in Western Europe and the United States, the FAO data showed an increase in the number of all colonies globally. Perhaps significantly, the data also showed an increase in demand for pollination which was higher than the number of existing honeybee colonies.

In fact, “countries with a positive correlation between honey production and colony number are the main honey exporters, while countries with a negative correlation are those importing honey,” Moritz and d Erler

wrote. “None of the colony number dynamics of the past 50 years, neither increase nor decrease, show any relation to the arrival of novel pests or the use of novel pesticides.”

But the Natural Resources Defense Council, among other groups, have advocated banning neonics because of alleged links to colony collapse disorder and other bee population declines. The NRDC [petitioned the EPA](#) to ban use of neonicotinoids pesticides, and cited several studies that used “field realistic” levels of neonics in a solution to determine bee behavior. A recent NRDC blog noted that “Scientific studies have shown that chronic exposure of honeybees to field-realistic levels of neonics can impair learning and memory, making their pesticide habit a dangerous one.”

EPA should cancel the use of neonics. An NRDC legal petition asks EPA to initiate cancellation proceedings for all neonicotinoids pesticide products, beginning with those for which safer alternatives are available. Systemic and persistent pesticides like the neonics pose too much risk to non-target and beneficial wildlife.

But while the NRDC cited studies looking at sub-lethal behavior and mortality rates, it did not look at actual field studies, nor did it cite studies looking at mites, disease and other factors. And other groups, as [we have covered](#) in Genetic Literacy Project stories, continue to look at the herbicide glyphosate (and, by extension, genetically modified crops) as a culprit in colony collapses.

Anti-GMO scientist Don Huber warned his readers to focus on “a more problematic cause of CCD”: glyphosate. Huber claimed that glyphosate’s widespread use worldwide could only link it to bee mortality. And the pro-organic website Natural News ran a headline in 2014, “Groundbreaking study shows that Roundup causes honeybees to starve,” based on an Argentine study that did not actually show that.

The USDA and the White House [have looked at](#) a number of other factors to develop a picture of colony collapse disorder that has far more complex causes:

- Varroa mite, a parasite-containing bug that helped wipe out hives in the 1980s.
- Global climate change, which could be affecting how bee foraging behaviors respond to weather patterns.
- Decreases in numbers of flowering plants, to which a White House task force recommended the planting of flowers and other plants to increase opportunities for pollination.
- Insecticides, which may kill bees outright or affect their foraging behavior

All in all, about [60 possible environmental causes](#) of bee health threats have been investigated. But nobody, until the German study, has tried to systematically match economic issues, individual country dynamics, and the behavior of professional beekeepers with changes in colony numbers.

The closest match, the German researchers wrote, were associated with severe political, social and economic changes, such as a 66 percent decline in colonies in Madagascar after a political coup in 1977, and a 73 percent decline in Burundi during that country’s civil war, and significant declines in eastern Europe after the collapse of the Soviet Union.

But in the U.S. and Western Europe, the declines [have been steady](#) and significant. Last year in the US, the number of disappearing hives reached 42 percent. The researchers pointed to the growth of commercial beekeeping as a possible link to colony declines, especially in the US and Western Europe. According to Moritz and Erler:

It may well be that slowly changing societal values, from hobby to business beekeeping, are important drivers of colony declines. Clearly, the increase of honey trade in relation to the national honey production in Europe goes hand in hand with the colony declines over the five decades listed in the FAO database.

Beyond trade figures, the researchers did not clarify exactly how professional beekeeping practices could contribute to decreases in bee colonies, and how practices in South America or Southern Europe may differ from the United States and Western Europe. However, several [beekeeping blogs](#) and articles reveal a rather passionate rivalry between hobbyists and professional beekeepers, including blaming incompetence on either side for what eventually became colony collapse disorder.

“I have a friend who works for a very large scale commercial beekeeping operation in California, and when I asked her about Colony Collapse she said they didn’t have a problem, and if others did it probably had more to do with bad beekeeping,” [wrote one](#). Meanwhile, a professional beekeeper [told one writer](#):

Ninety-nine percent of the so-called beekeepers are hobby beekeepers. In North Carolina there are thousands of hobby beekeepers. And there are less than ten commercial beekeepers. There’s a public misconception that a hobby beekeeper’s a beekeeper’s a beekeeper. But the difference between a hobby beekeeper and a commercial beekeeper is like the difference between someone with an aquarium in his living room and somebody that owns three oceangoing deep-sea vessels.

On the other hand, the long-distance transport of beehives practiced by commercial beekeepers also has been blamed for colony depletion. According to British beekeeper (and self-professed agent provocateur) Philip Chandler, the spread of the varroa mite is due to bee transport:

Bees are now in trouble as never before and much of the blame for this potentially disastrous state of affairs must be placed at the door of negligent, commercial beekeepers. The inter-continental migration of pests and diseases has widely been blamed on climate change, but in fact the spread of the Varroa mite from its native Asia and its original host species, the Asian bee *Apis cerana*, can be directly linked to the commercial bee trade.

So, while pressure has mounted on the United States to ban a pesticide that already is about halfway through a ban by the European Union, colony declines in some countries may continue despite any actions taken for or against neonics and other pesticides. And while correlation does not equal cause, the German research opens the door to including economic and business factors behind bee colony changes.

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