

## Hawaii honey bee die-off points to likely culprits—Not pesticides, but varroa and viruses

Although honey bee numbers are no longer in decline—overall numbers have been trending up for the past four years and are at record global highs—their health globally is still impacted by [significant pressures](#). That's led some environmental groups to blame pesticides for regional bee population declines. However, a number of recent reports points away from pesticides toward a viral cause.

The latest—researchers from the University of Maryland and the U.S. Department of Agriculture last month released the first comprehensive, multi-year study of honey bee parasites and disease as part of the National Honey Bee Disease Survey. Published in the journal [Apidologie](#), the survey points to the varroa mite, a major honey bee pest, as a driving factor in bee health. The mite is far more abundant than previous estimates indicated and is closely linked to several damaging viruses.

“Our biggest surprise was the high level of varroa, especially in fall, and in well-managed colonies cared for by beekeepers who have taken steps to control the mites,” [said](#) study co-author Dennis vanEngelsdorp, an assistant professor of entomology at the University of Maryland. “We knew that varroa was a problem, but it seems to be an even bigger problem than we first thought. Moreover, varroa’s ability to spread viruses presents a more dire situation than we suspected.

The focus away from pesticides as the primary driver runs counter to the narrative shaped over the past few years by high profile advocacy groups. The Pesticide Action Network and Natural Resources Defense Council, among others, have blamed pesticides, particularly the insecticide class known as neonicotinoids, for declines in bee health and even have petitioned for a ban:

Neonicotinoids, especially seed treatments of imidacloprid and clothianidin on arable crops, have become of increasing concern to beekeepers and bee researchers in recent years with many of them suspecting that they may be connected to current bee declines. These concerns have led to partial bans on the use of some neonicotinoids for specific crops in several European countries.

Other activists point to the herbicide glyphosate as another possible threat. However, the USDA and other U.S. government agencies do not specifically suspect pesticides, acknowledging instead that bee health is impacted by a wide variety of causes, with varroa mites at the top of their list.

### **A mite visits Hawaii—to stay**

Hawaii has emerged as another battle ground—but it's also a place where researchers have made great progress in documenting the actual causes of bee die offs. The problem in Hawaii began to emerge around 2007, and the cause was mysterious to scientists. Anti-pesticide groups blamed the use of agro-chemicals, a charge which gained momentum in 2011 when the campaign to finger neonics as the culprit began gaining traction.

But a [2012 study](#) by British and American scientists, ignored by activist groups, aligns with the newest research that points to varroa mites as the cause. The varroa mite only arrived in Hawaii in 2007 and at first was confined to Oahu. Starting just about a year later, 274 of 419 managed beehives collapsed. Still more feral bee colony declines in cities on the island were noted by government officials and beekeepers.

The varroa mite harms bees in a multitude of ways. In addition to being a significant stressor in its own right, it also acts as a vector for a number of diseases, including deformed wing virus (DWV). The scientists performing the study in Hawaii noted that “the global spread of varroa has selected DWV variants that have emerged to allow it to become one of the most widely distributed and contagious insect viruses on the planet.”

Since Hawaii had never had the varroa mite, the British and Hawaiian scientists who conducted the study had a perfect opportunity to gauge the effect of the parasite on bee populations at a time when other variables were relatively stable. Before the arrival of varroa, most honey bee viruses were viewed to be harmless. Afterward, the prevalence of a single DWV viral species rose from 10 to 100 percent among honey bees.

“It is that strain that is now dominant around the world and seems to be killing bees,” [said](#) Stephen Martin of Britain's University of Sheffield, who led the research effort.

The study was well reviewed in the scientific community, with about 200 citations since its publication, and now is considered ahead of its time in pinpointing the most likely cause of bee health problems. The catastrophic effects of the parasite was well reported at the time, particularly in the British press. According to a 2012 article in [The Guardian](#):

The deadly link between the worldwide collapse of honeybee colonies and a bloodsucking parasite has been revealed by scientists. They have discovered that the mite has massively and permanently increased the global prevalence of a fatal bee virus.

However, by last year, even The Guardian was ignoring its own reporting, now claiming that neonicotinoids was the primary cause behind hive disorders. A [2015 story started](#) with this take on neonics:

There is a strong scientific consensus that bees are exposed to neonicotinoid pesticides in fields and suffer harm from the doses received, according to a new analysis of the all the scientific evidence to date.

But the story, and the scientific evidence, was not nearly so indicting as the first paragraph would suggest. Scientists had found no hard links between neonics and bee deaths:

But almost no data exists so far on whether this harm ultimately leads to falls in overall bee populations, the scientists found. They said one “gold standard” field study from Sweden had shown that the insecticides, the most widely used in the world, do significantly damage bumblebee populations. But it found no effect for honeybees, although the study design meant it could only rule out losses greater than 20%.

The claims that neonics, glyphosate and other pesticides were killing bees in Hawaii was also contradicted by the fact that Hawaii had been using these pesticides [for years before](#) varroa arrived on Oahu with no apparent negative impact. After a sharp uptick in bee deaths in 2008-2010 now linked to the varroa, the state [has reported](#) the lowest number of honey bee deaths in the United States.

The brief Hawaii bee death crisis underscores the need for full exploration of disease trends and ecological changes that could be affecting bees. It’s almost certain that improving honey bee management and mite control practices would have more of an effect on bee health than banning pesticides.

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