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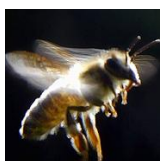
Collapsing Colonies

Are GM Crops Killing Bees?

By Gunther Latsch

A mysterious decimation of bee populations has German beekeepers worried, while a similar phenomenon in the United States is gradually assuming catastrophic proportions. The consequences for agriculture and the economy could be enormous.

Walter Haefeker is a man who is used to painting grim scenarios. He sits on the board of directors of the German Beekeepers Association (DBIB) and is vice president of the European Professional Beekeepers Association. And because griping is part of a lobbyist's trade, it is practically his professional duty to warn that "the very existence of beekeeping is at stake."



Is the mysterious decimation of bee populations in the US and Germany a result of GM crops?

The problem, says Haefeker, has a number of causes, one being the varroa mite, introduced from Asia, and another is the widespread practice in agriculture of spraying wildflowers with herbicides and practicing monoculture. Another possible cause, according to Haefeker, is the controversial and growing use of genetic engineering in agriculture.

As far back as 2005, Haefeker ended an article he contributed to the journal *Der Kritischer Agrarbericht* (Critical Agricultural Report) with an Albert Einstein quote: "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."

Mysterious events in recent months have suddenly made Einstein's apocalyptic vision seem all the more topical. For unknown reasons, bee populations throughout Germany are disappearing – something that is so far only harming beekeepers. But the situation is different in the United States, where bees are dying in such dramatic numbers that the economic consequences could soon be dire. No one knows what is causing the bees to perish, but some experts believe that the large-scale use of genetically modified plants in the US could be a factor.

Felix Kriechbaum, an official with a regional beekeepers' association in Bavaria, recently reported a decline of almost 12 percent in local bee populations. When "bee populations disappear without a trace," says Kriechbaum, it is difficult to investigate the causes, because "most bees don't die in the beehive." There are many diseases that can cause bees to lose their sense of orientation so they can no longer find their way back to their hives.

Manfred Hederer, the president of the German Beekeepers Association, almost simultaneously reported a 25 percent drop in bee populations throughout Germany. In isolated cases, says Hederer, declines of up to 80 percent have been reported. He speculates that "a particular toxin, some agent with which we are not familiar," is killing the bees.

Politicians, until now, have shown little concern for such warnings or the woes of beekeepers. Although apiarists have been given a chance to make their case – for example in the run-up to the German cabinet's approval of a genetic engineering policy document by Minister of Agriculture Horst Seehofer in February – their complaints are still largely ignored.

Even when beekeepers actually go to court, as they recently did in a joint effort with the German chapter of the organic farming organization Demeter International and other groups to oppose the use of genetically modified corn plants, they can only dream of the sort of media attention environmental organizations like Greenpeace attract with their protests at test sites.

But that could soon change. Since last November, the US has seen a decline in bee populations so dramatic that it eclipses all previous incidences of mass mortality. Beekeepers on the east coast of the United States

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complain that they have lost more than 70 percent of their stock since late last year, while the west coast has seen a decline of up to 60 percent.

In an article in its business section in late February, the *New York Times* calculated the damage US agriculture would suffer if bees died out. Experts at Cornell University in upstate New York have estimated the value bees generate -- by pollinating fruit and vegetable plants, almond trees and animal feed like clover -- at more than \$14 billion.

Scientists call the mysterious phenomenon "Colony Collapse Disorder" (CCD), and it is fast turning into a national catastrophe of sorts. A number of universities and government agencies have formed a "CCD Working Group" to search for the causes of the calamity, but have so far come up empty-handed. But, like Dennis vanEngelsdorp, an apiarist with the Pennsylvania Department of Agriculture, they are already referring to the problem as a potential "AIDS for the bee industry."

One thing is certain: Millions of bees have simply vanished. In most cases, all that's left in the hives are the doomed offspring. But dead bees are nowhere to be found -- neither in nor anywhere close to the hives. Diana Cox-Foster, a member of the CCD Working Group, told *The Independent* that researchers were "extremely alarmed," adding that the crisis "has the potential to devastate the US beekeeping industry."

It is particularly worrisome, she said, that the bees' death is accompanied by a set of symptoms "which does not seem to match anything in the literature."

In many cases, scientists have found evidence of almost all known bee viruses in the few surviving bees found in the hives after most have disappeared. Some had five or six infections at the same time and were infested with fungi -- a sign, experts say, that the insects' immune system may have collapsed.

The scientists are also surprised that bees and other insects usually leave the abandoned hives untouched. Nearby bee populations or parasites would normally raid the honey and pollen stores of colonies that have died for other reasons, such as excessive winter cold. "This suggests that there is something toxic in the colony itself which is repelling them," says Cox-Foster

Walter Haefeker, the German beekeeping official, speculates that "besides a number of other factors," the fact that genetically modified, insect-resistant plants are now used in 40 percent of cornfields in the United States could be playing a role. The figure is much lower in Germany -- only 0.06 percent -- and most of that occurs in the eastern states of Mecklenburg-Western Pomerania and Brandenburg. Haefeker recently sent a researcher at the CCD Working Group some data from a bee study that he has long felt shows a possible connection between genetic engineering and diseases in bees.

The study in question is a small research project conducted at the University of Jena from 2001 to 2004. The researchers examined the effects of pollen from a genetically modified maize variant called "Bt corn" on bees. A gene from a soil bacterium had been inserted into the corn that enabled the plant to produce an agent that is toxic to insect pests. The study concluded that there was no evidence of a "toxic effect of Bt corn on healthy honeybee populations." But when, by sheer chance, the bees used in the experiments were infested with a parasite, something eerie happened. According to the Jena study, a "significantly stronger decline in the number of bees" occurred among the insects that had been fed a highly concentrated Bt poison feed.

According to Hans-Hinrich Kaatz, a professor at the University of Halle in eastern Germany and the director of the study, the bacterial toxin in the genetically modified corn may have "altered the surface of the bee's intestines, sufficiently weakening the bees to allow the parasites to gain entry -- or perhaps it was the other way around. We don't know."

Of course, the concentration of the toxin was ten times higher in the experiments than in normal Bt corn pollen. In addition, the bee feed was administered over a relatively lengthy six-week period.

Kaatz would have preferred to continue studying the phenomenon but lacked the necessary funding. "Those who have the money are not interested in this sort of research," says the professor, "and those who are interested don't have the money."

Translated from the German by Christopher Sultan