

VIRUS MAY BE CAUSE OF HONEYBEE LOSS

ENTOMOLOGY: Chemical stressors may weaken bees' immunity, researchers suggest

BEEKEEPERS have buzzed with speculation about why U.S. honeybee colonies declined by an average of 30% last year. Now, researchers in academia, government, and industry report that a virus may be responsible for what has become known as colony collapse disorder (CCD). The researchers underscore that they do not know the extent to which other stressors, including pesticide exposure, may be involved (*Science*, DOI: 10.1126/science.1146498).

What's clear to scientists is that more research is needed to make a definitive link. "The work is a major breakthrough, but it's not a slam dunk," says May R. Berenbaum, a professor of entomology at the University of Illinois, Urbana-Champaign. "But it certainly illustrates how complex this whole situation is."

For the study, epidemiologist W. Ian Lipkin at Columbia University and colleagues collected bees from healthy and CCD-stricken hives in the U.S., as well as healthy bees from Australia. The research team evaluated the samples collected over three years with a rapid genome-sequencing technique called pyrosequencing.

The results revealed genetic sequences that suggest the presence of a virus; upon further examination, the researchers found that the sequences are most closely related to those of Israeli acute paralysis virus (IAPV), first described in Israel in 2004. Bees in Israel infected with this virus had a shivering wing condition and died near the hive. In the U.S., however, bees have simply disappeared and are presumed dead.

"At this point, we do not have a cause-and-effect relationship with IAPV and CCD," says coauthor Jeffery S. Pettis, research leader of the U.S. Department of Agriculture's Bee Research Laboratory. Parasites such as the varroa mite are known to suppress bees' immune systems. The authors suggest that a variation in the virus strain, coinfection with another virus, poor nutrition, or interaction with pesticides may also explain the symptomatic differences.

Chemical pesticides could act as a potential trigger for the viral infection, and preliminary data from other studies show that some classes of pesticides may lead to the amplification of specific viruses, says lead author Diana L. Cox-Foster, an entomologist at Pennsylvania State University.

—RACHEL PETKEWICH

Parasitic varroa mites (one visible on top of bee) can make honeybees more susceptible to infectious agents, including viruses.



COURTESY OF ARS/USDA/SCOTT BAUER