BEE Informed Partnership

Coordinated BIP effort aims to cut in half annual bee colony losses.

by Richard Lehnert

After five years of annual colony losses near or above 30 percent, beekeepers have settled in for the long haul in their struggle to find solutions to the problem of unsustainably high honeybee death losses.

Scientists have also settled in to help them.

A new consortium called the Bee Informed Partnership, under the leadership of project director Dennis vanEngelsdorp, was funded by the U.S. Department of Agriculture last May with $5 million for five years. Instead of the lofty research goal of finding "the cause" of the mysterious Colony Collapse Disorder, this is an extension endeavor to help beekeepers identify and adopt methods to reduce the number of managed honeybee colonies that die over winter.

"Thirty percent is not sustainable," vanEngelsdorp told Good Fruit Grower. "Beekeepers say they can live with about 13 percent. If these high losses continue, they threaten not only the livelihoods of beekeepers who manage bees, but the livelihood of farmers who require bees to pollinate their crops."

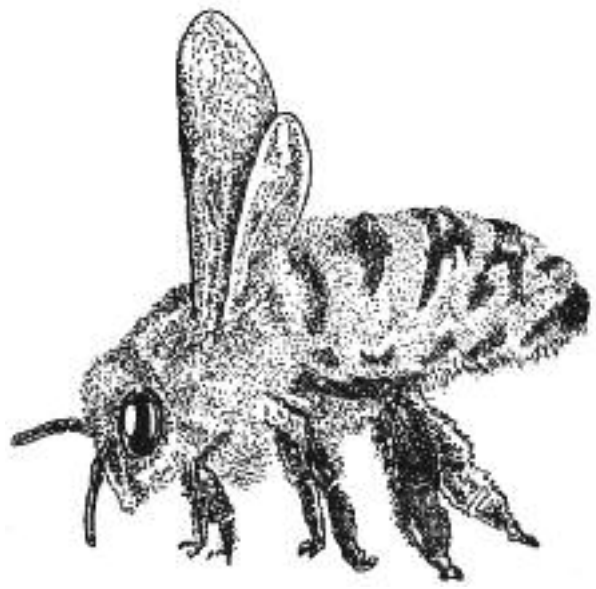
In the years since the winter of 2006-2007, when losses from colony colapse first became apparent, the rental rate for a hive of bees has risen from about $100 to more than $150 as beekeepers struggle to maintain colony numbers.

The new Bee Informed Partnership was announced last May. At that time, vanEngelsdorp was at Pennsylvania State University. He moved to the University of Maryland at the start of this year. He directs the project, which involves extension educators and specialists from the University of California, the University of Illinois, the University of Georgia, the University of Tennessee, the University of Minnesota, North Carolina State University, Appalachian State University, Penn State School of Medicine, and the U.S. Department of Agriculture's Agricultural Research Service and Animal and Plant Health Inspection Service.

The Bee Informed Partnership plans to use its Web site, *http://beeinformed.com*, to communicate new information quickly to beekeepers. Another tool is the use of surveys to discover details of beekeeper practices and correlate them with bee survival. The first such survey was done last year. For the last five years, beekeepers have been surveyed annually about death losses.

"One thing surveys have shown is that not all beekeepers are losing 30 percent or more of their hives," vanEngelsdorp said. "In the last loss survey conducted after the winter of 2010-11, about a quarter of the 5,200 beekeepers surveyed lost less than 15 percent of their hives—but another quarter lost more than 55 percent.

"So what's the difference? Why are some beekeepers losing a few colonies while others are losing so many? That question, in a nutshell, is the main question the Bee Informed Partnership is trying to answer."



VanEngeldorp says that the tools used by human epidemiologists to study human diseases can be used to study honeybee health and to identify management practices that keep colonies alive. Last year, the first detailed surveys were conducted to begin sorting out such things as interactions of location, site conditions, disease and parasite levels, insecticide exposure, feeding regimens, and bee forage.

Results from the first producer survey were expected in February.

The investigators will then use these data to form a comprehensive, accurate, and timely honeybee health database to promote best management practices based on scientific evidence.

The cause of CCD

A variety of culprits have been identified in the search to find the cause of Colony Collapse Disorder, including pesticides, varroa mites, viruses and diseases, and even a parasitic fly that infects bees.

The current thinking, vanEngelsdorp said, is that stresses of many kinds—singly or added together— can lead to Colony Collapse Disorder. It now appears that the disorder may be "altruistic suicide," in which worker bees, sensing their own growing weakness, abandon the hive "for the good of the colony," to reduce the risk of their transmitting a pathogen to their colony. The result is an abandoned hive, still containing honey and brood, but from which the worker bees have disappeared.

Last year, in a paper authored by Jeffrey Pettis at the USDA-ARS research lab in Beltsville, Maryland, and vanEngelsdorp, Josephine Johnson, and Galen Dively at the University of Maryland, the scientists wrote that interactions between pesticides and pathogens could be a major cause of bee mortality. They reported on a study showing that sublethal doses of the pesticide imidacloprid greatly increased the amount of spores of the fungal pathogen *Nosema ceranae* being carried by individual bees.

Why might pesticides be having this effect, now? VanEngeldorp says that older, contact pesticides acted by killing bees outright. But the newer pesticides are systemic, moving into the plants and contaminating the pollen and nectar with small amounts of pesticides. Imidicloprid was one of the first of these new pesticides.

"Others may be doing the same thing," vanEngelsdorp said. "It needs a lot more explanation."

Another announcement early this year reported the discovery of a parasitic fly that lays its eggs inside mature honeybees. As the maggot grows, it causes the host to abandon the hive and die after "a bout of disoriented, zombie-like behavior," according to researchers at San Francisco State University.

Genetic tests on parasitized hives showed that both bees and flies were often infected with deformed wing virus and Nosema, both of which had been previously implicated in Colony Collapse Disorder.

Research will continue, vanEngelsdorp said. But equally important, he thinks, is the need to compile knowledge from beekeepers who have found ways to successfully manage their colonies to keep losses low. ●