



VANISHING BEES

POSE MYSTERY

By Bonnie Coblenz

An unknown enemy is destroying honey bee colonies across the nation, and researchers are scrambling to discover what is causing it and how it can be prevented.

The problem is being called colony collapse disorder, and it was identified in late 2006. It has mostly appeared in Florida and up the East Coast to Pennsylvania, but beekeepers nationwide are concerned, especially those who transport their hives across the country to pollinate crops.

Hives with the disorder go from a robust colony with a large adult bee population to an empty hive with the queen and brood abandoned in the space of a few weeks.

Clarence Collison, an MSU Extension Service entomologist and head of the Department of Entomology and Plant Pathology, said the colonies are collapsing without leaving quantities of dead bees to study.

A workforce composed of state apiculturists (scientists who study honey bees), personnel from state departments of agriculture and the U.S. Department of Agriculture's Agricultural Research Service are investigating the problem, collecting samples and dissecting dead bees to learn about the problem.

"They're finding a lot of pathogens in the adult bees. Most of these pathogens are related to stress diseases," Collison said. "We firmly believe the bees are under some type of stress, and a scientist at Penn State has been able to show that these bees have suppressed immune systems."

When colony collapse disorder strikes, beekeepers can lose up to 90 percent of their hives in a very short time.

"Ultimately, it will affect fruit and vegetable production if we don't have adequate pollination forces," Collison said. "Bees pollinate many plants that affect wildlife and birds, so it's not just our diet that would suffer if bee populations are decimated."

Similar phenomena have been recorded before under such names as spring dwindling, disappearing disease and autumn collapse. Collison cited a similar collapse in 1896, and he recalled problems like this in the mid-1970s and early 1990s.

"These are somewhat cyclical. Each time we go through one, it seems like the worst, but this one seems definitely the worst in my time," Collison said.

Richard Adee owns the Woodville-based Adee Honey Farms, the largest bee keeping operation in the nation. He takes his bees to California each year to pollinate the almond crop before bringing them back to Mississippi to split and requeen his colonies.

"If they would just come home and die, then we could diagnose the problem," Adee said.

In late March, Adee was in Washington, D.C., for the congressional hearing on honey bee colony collapse disorder. He said bees are very important to several agricultural industries as they provide the pollination that allows crops to produce.

"At one time, honey drove this industry. Now it's pollen," Adee said. "Every third bite we take is from a bee-pollinated nut or flower."

Harry Fulton, state entomologist with the Mississippi Department of Agriculture's Bureau of Plant Industry and secretary/treasurer of the Mississippi Beekeepers Association, said Mississippi's agriculture is not as dependent on bee pollination as is the agriculture in some states.

"In Mississippi, we have \$250 million a year in crops that rely on bee pollination. Nationally, a Cornell University study said the value of bee pollination is \$14.7 billion annually," Fulton said.

While no cause or trigger for the disorder has been identified, researchers have several suspects. These include pesticides, including imidacloprid, a systemic insecticide used extensively in fruit and vegetable production; parasitic mites and the viruses they can transfer to their hosts; chemicals used to control bee mites; and a new nosema disease of Western honey bees, which is a disease caused by protozoa.

Fulton said dry weather across the nation last year probably hurt the quality of pollen produced. Pollen provides the nutrition bees need to survive. Poor nutrition would stress the bees' bodies, making them susceptible to other factors, such as cold weather.

"The scientists haven't yet decided what is causing the problem, but it may be a deadly combination of stress on the bees and one of these other factors that normally is not pathogenic," Fulton said. "If we know what it is and what causes it, we might be able to do something to predict when it's going to happen and stop it."

Bee Essay

Each year, the MSU Department of Entomology sponsors a bee essay contest for 4-H members. This year's winner is Merry Johnson of Iuka. She is a member of the Tishomingo County 4-H Club. Below is the text of her essay. The full essay, including footnotes and bibliography, is on the Web at http://msucare.com/4h_Youth/4hentomology/bee_essay_winner2007.html.

Pollinator Conservation



By Merry Johnson

Pollinator...with this word a mental image of a honey bee generally appears in one's mind, but who would imagine that the population of these incredibly beneficial insects is decreasing at an extremely alarming rate? In Arizona, feral honey bee losses have increased 61 percent in one year. Sacramento, California, has experienced a 75 percent decrease in the number of feral honey bee colonies. The introduction of exotic parasites and diseases, the extensive use of herbicides and insecticides, the loss of plant diversity, the cultivation of monocultures, and the development of land for human occupation are a few of the most influential factors in this astounding honey bee decline.

The blame for a major portion of honey bee decrease can be placed on introduced parasites. Varroa and tracheal mites have been responsible for the death of up to 90 percent of feral honey bees. Since these mites were introduced to North America in the 1980s, they have created havoc in honey bee colonies. When the pin-sized varroa mite attacks a bee, it attaches itself and sucks the bee's hemolymph fluid, which causes adults to be badly deformed and sometimes results in death. They also feed on developing honey bees and lay eggs inside the brood cells. The varroa mite can destroy an entire honey bee colony in only a few seasons. The tracheal mite is perhaps an even more serious pest than the varroa mite. Tracheal mites infest the bee's trachea in which they lay eggs. These microscopic invaders are capable of killing a whole colony before an infestation is even detected. The best method to rid a colony of mites is the utilization of an effective, safe miticide such as fluvalinate for varroa mites or menthol crystals for tracheal mites. Such treatments have saved many domestic honey bee colonies, but unfortunately there is no way to detect and treat feral honey bees and as a result many continue to perish.

Diseases prove to play an active role in honey bee population decreases. The American foulbrood is a serious bacterial



Photos by Marco Nicorrichi