



Are the Honey Bees Disappearing?

By Dr. R. Chris Williamson, Department of Entomology, University of Wisconsin-Madison

If you saw it on television, heard it on the radio, read it in the newspaper, or "someone told you so," it must be true, right? We are relentlessly barraged by information (good, bad, true, false and everything in-between) everyday. After you hear or read something enough times, one's perception or opinion might become that what is stated may be true. This too may be the case with the phenomenon associated with honeybees known as colony collapse disorder (CCD). CCD is described as the rapid loss of adult bees from a colony. Essentially, worker bees are abandoning their hives, and no one understands why.

The CCD phenomenon was first reported in 2006; however, beekeepers noted unique colony declines consistent with CCD as early as 2004. To date, CCD has resulted in a loss of 50 - 90% of honeybee hives associated with



Fig 1. Honeybees are important pollinators of the nation's crops. Pollen adheres to bees' bodies when they visit flowers (like this citrus flower pictured). As they go from flower to flower, they transport the pollen between flowers, thus pollinating each flower. Flowers that are adequately pollinated produce fruit, vegetables, or nuts. Higher fruit set, larger fruit, uniformly-shaped fruit, and better taste are all indications of successful pollination.

commercial, large-operation migratory beekeepers in the United States. So, what is going on and why? These questions have created a firestorm of theories ranging from poor diet (limited or low nutritional food resources), stress, cellular phones (electromagnetic radio frequency), pathogens (bacteria, fungi, virus), predators (mites), weather, or pesticides.

The public's opinions about CCD vary widely and there is little consensus among scientists about the cause(s) of CCD likely due to the lack of data on domesticated honeybees and even less on wild populations. Furthermore, by in large, scientists are not convinced that what is going on with the honeybees is really a new phenomenon. Fortunately, researchers from across the world are actively and diligently investigating the CCD phenomenon.

It is important to understand that honeybees are extremely valuable; they provide an estimated 80% of

the country's pollination services. Based on the records available, it is understood that honeybees were first introduced into the U.S. in 1622 from Europe. It was 1960 before the first significant problem (Chalk Brood) with honey bees occurred. Unfortunately, within the past 20 years, six major problems have threatened honey bees including: 1) tracheal mite; 2) varroa mite; 3) Africanized bees; 4) small hive beetle; 5) Israeli acute paralysis virus; and 6) *Nosema ceranae*. The biggest issue for beekeepers has been the varroa mite, first noticed in the U.S. in 1987. An untreated (no miticide) hive can be totally wiped out in just a few months once infected with varroa mite. Varroa mites have nearly eliminated native, non-managed colonies of honeybees that used to pollinate numerous vegetable crops. As a result, farmers have resulted to renting honeybees (hives) for pollination, which has contributed to the growth of large-scale beekeeping. Beekeepers now

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Fig 2. Healthy colonies of bees contain thousands of worker bees. Colonies suffering from CCD have few or no bees remaining in the hive.

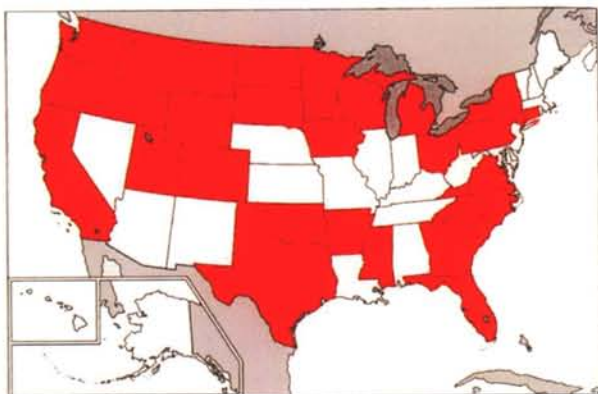


Fig 3. States (in red) where beekeepers are reporting significant honeybee losses to CCD.

make more money by renting their hives to farmers than for producing honey, they receive as much as \$120 per hive where just a few short years ago they received \$50 per hive.

In California, more than 1.2 million honey bee colonies are trucked-in from all across the U.S., placed into holding yards in October and November, fed high-fructose sugar syrup, and then placed into the flowering almond groves in February to begin pollinating. Dr. Marion Ellis (Professor and Apiculture Specialist, University of Nebraska) thinks "this may be throwing bees' rhythms out of whack and that the syrupy diet may impair the bees' health, putting them on the verge of colony collapse." Dr. Ellis and others also speculate that the physical movement of hives from state to state disturbs the colonies and may cause problems for bees. They are concerned that the bees may be subjected to less nutritionally complete food sources (wild-flowers) and less nectar, thus weak-

ening the colonies. Another concern is that by placing large numbers of colonies in one specific part of California raises the risk of spreading diseases and parasites.

As far as the potential of the role that insecticides play in CCD, published research has revealed little to support this claim. There are not many studies that suggest insecticides in the class called neonicotinoids (e.g., imidacloprid) harm bees in the field. Furthermore, although many of the neonicoti-

noids have systemic properties that enable them to be taken-up (absorbed) by root tissue and translocated (moved) upward via the xylem into foliage tissue, plants cannot physiologically translocate insecticides into flowers, fruit or pollen. Consequently, the likelihood of a honeybee acquiring a lethal- or sub-lethal dose is for all practical purposes nil. Albeit inconclusive, some data suggests that low doses (non-lethal) of imidacloprid (neonicotinoids) do interfere with a bees' ability to navigate back to the hive. This information coupled with the outcry of beekeepers in France complaining about imidacloprid causing 40% of their honeybee colonies to die caused France to ban imidacloprid in 1999. Despite this drastic measure, the colonies are not doing much better now! Furthermore, organic beekeepers are also losing their colonies, and they do not use pesticides.

So again, the question remains, what is responsible for CCD? Some scientists theorize that the miticides used to control tracheal and varroa mites may play an important role. For now, there are more questions than answers. The answer(s) to the CCD phenomenon are likely quite complex, it may be a combination of factors. Many of the theories mentioned are currently being investigated by scientists across the world; hopefully a solution will be developed soon. 🌱

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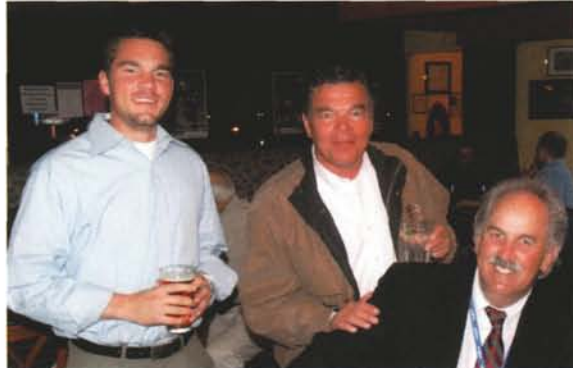
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