



What bees can tell us about the Earth

By Reese Halter

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Each spring during my childhood I planted trees with my dad and my brother, and the bees always intrigued us. Last year in late June, I finished “The Incomparable Honeybee.” I was cautiously optimistic that the overall death rate among honeybees was trending downward.

Just before the BP Deepwater Horizon blowout in the Gulf of Mexico on April 20, the overwinter and spring bee survey numbers from across our nation were released. The numbers were startling; our humble honeybees are sicker than ever.

The honeybee deaths from 2010 were much higher than those reported in 2009. In 2010 the death rate was 34 percent, up from last year’s rate of 29 percent.

On average beekeepers in the U.S. lost 42 percent of their operational bees in 2009-10 compared with 23 percent in 2008-09. This loss is more than three times greater than what is considered acceptable at about 14 percent.

Moreover, last year marked record-low honey production nationwide. Honey production dropped by 12 percent from the previous year, or about 20 million pounds to 144 million pounds.

In America, more than 50 billion honeybees have perished within the past year. Scientists call this eerie condition — colony collapse disorder. When the honeybees get sick they will not return to the colony. Nature designed these social creatures, like the ants, not to infect one another when they get ill. The queen bee is the only insect left in the hive; helpless, she, too, dies, quickly.

Worldwide honeybees account directly for at least a quarter of a trillion dollars of commerce annually and every continent except Australia is suffering badly from the decline of the bees.

As early as 2005 some of my colleagues were alarmed by the amounts of pesticides that were turning up in hives. For instance, one study found 66 different pesticides in one hive. Not only were three quarters of these pesticides toxic to bees, but the combined effects, or what farmers call stacking, increase the toxicity effects of the chemicals by 10, 100 and/or 1,000 times. The pesticides also affect bees’ nervous systems, behavior and larval development.

The pesticide impact also can ripple throughout a colony. A tainted forager can contaminate the hive with

pesticides, which reduce the number of eggs laid by the queen and impair the workers memory and spatial orientation.

Since 2005 scientists have discovered in depth what appears to be going on. It turns out, interestingly, that bees and humans share a great deal in common. Of immediate interest is that bees, like humans, are much more susceptible to illness when they are stressed.

A combination of factors is causing colony collapse disorder: Parasites, viruses, bacteria, poor nutrition, climate change, electromagnetic cellular radiation and pesticides.

Research conducted in 23 U.S. states and Canada recently found 121 different pesticides in 887 samples of bees, wax, pollen and hive samples. Scientists strongly believe that pesticides are a key component of Colony Collapse Disorder.

Even low-level pesticide exposure weakens bees' immune systems. Stressed bees are highly susceptible to mites that spread viruses, and to fungal parasites like nosema ceranae which cause "bee diarrhea" in combination with members of the dicistroviridae family RNA viruses.

Of even more concern was that three out of five pollen and wax samples from 23 states had at least one systemic pesticide — a chemical designed to spread throughout all parts of a plant.

Essentially, bees are harvesting pollen laced with lethal poison and feeding it to their young. In addition, many of these systemic pesticides are from a family of highly toxic chemicals called neonicotinoids. Bees exposed to these chemicals exhibit symptoms similar to humans afflicted with Parkinson's disease or Alzheimer's disease.

Although cellular phones and towers are not, thankfully, found in any concentrations on farmers' fields or wild forests and meadows, recent studies have shown some disturbing results that impair any bees foraging near towns or cities around the globe.

A cellular phone placed in a bee hive, powered up twice daily for 15 minutes over a three- month period, caused, during each 15-minute period, honey production to cease. The queen only laid half as many eggs and the hive shrunk dramatically. Cellular phone radiation in the frequency range of 900 to 1,800 MHz also disrupts the bees' ability to navigate.

On the brighter side, a unique population of honeybees, *Apis mellifera*, isolated for perhaps 10,000 years, has been found living at an oasis in the northern Sahara Desert. This pathogen-free population is currently being studied, for it may contain genetic traits able to fend off the *Varroa destructor* parasite mite and therefore help beekeepers worldwide.

In the meantime, a colony of bees requires the equivalent of 20 football fields, without end zones, each full of flowers, to make a living for 30 days. In the wild, about 40 full-sized maples, basswoods, black locust, magnolias, eucalypts, apple and tulip trees per acre have about a million blossoms that also can support one colony of bees for part of their harvesting season.

Support organic farming and local beekeepers, eat locally and consider what Albert Einstein said: If the bees disappear from the surface of the Earth, man would have no more than four years to live.

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