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The great honeybee mystery

By Reese Halter

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Over the last three years, more than 50 billion honeybees have died. Scientists understand the causes. Now we need everyone to lend a hand.

The humble honeybee has been inextricably linked to humankind since prehistoric times — at first we were drawn to this remarkable creature because of its sweet honey.

Honey is to a bee what electricity is for humans: energy. One teaspoon of honey weighing 21 grams contains 16 grams of sugar or 60 calories, and it took 12 bees their entire foraging lives, a combined flying time of about 6,000 miles, to produce 21 grams of honey.

To understand the importance of honeybees, consider that every third bite on your plate is a result of their primary role on the planet as pollinators; the most important group on Earth.

Honeybees contribute at least \$44 billion a year to the U.S. economy pollinating crops, including almonds, apples, avocados, blueberries, broccoli, cherries, cranberries, cucumbers, grapes, peaches, plums, tomatoes. They pollinate the alfalfa and clover for beef and dairy industries and the cotton for our clothes.

Bees have been on the planet for more than 100 million years, or about 14 times longer than the first human progenitor. Bees have a memory. They are being trained to count and are helping people as an early detector of disease by sniffing skin and lung cancers, diabetes and tuberculosis.

They help humans in other ways, too: The Red Cross estimates there are 80 million to 120 million land mines in 70 countries, and that 40,000 new land mines are being deployed weekly. Each year, these brutal weapons maim tens of

thousands of children. Researchers from the University of Montana are using bees to find TNT residue — the primary ingredients in land mines — while conducting surveys many miles away from the hive.

Many blue-chip corporations depend on the honeybees for their products, including General Mills, Häagen-Dazs ice cream, Starbucks coffee and Clorox's Burt's Bees, a specialty personal care company with more than 150 products.

A combination of factors has collided to create the perfect storm responsible for memory loss, appetite loss and auto-immune system collapse, resulting in a rapid decline in honeybee populations worldwide.

Each year, 5 billion pounds of pesticides are applied globally. Many of them are neonicotinoids, a nerve poison. In humans, it would trigger Parkinson's and Alzheimer's disease.

Imidacloprid — one form of neonicotinoids — is manufactured by Bayer under the trade names of Gaucho and Pancho. It killed millions of bees in France before eventually being banned in that nation. It's still widely used throughout the United States.

Research from Europe showed that bees exposed to electromagnetic radiation from cellular towers made 21 percent less honeycomb. Thirty-six percent of them, taken a half mile from their hive, were unable to navigate home.

In 2006, the honeybee genome was decoded. Their genetics revealed only half as many genes for detoxification and immunity compared to other known insects. Scientists found specific "good" bacteria inside their stomachs and intestines crucial for fighting pathogens and digesting the silica casing around each pollen grain, providing access to its protein.

Bees evolved to feed on a wide assortment of pollens, but today we use them in monoculture fields. Pollens provide their only source of protein. Proteins grow eggs, larvae, brains and auto-immune systems.

The abnormally high temperatures in 2006 probably were the tipping point for bees in North America. The searing spring temperatures during the onset of

flowering are believed to have caused sterile pollen in many plants. Sterile pollen produces little if any protein.

In 2007, almond, plum, kiwi and cherry pollen that was tested exhibited little if any protein content. Infertile soils lacking essential nutrients, bacteria, fungi and protozoa, along with climate change, were implicated.

Beekeepers around the globe are feeding their hives a type of protein shake with eggs, brewer's yeast, pollen and honey and other special ingredients.

Clearly, the agriculture industry must reduce the levels of toxicity from pesticides, herbicides and miticides, globally.

There is hope on the horizon, as organics are the fastest growing business sector in the United States at \$24 billion a year. First Lady Michelle Obama has an organic garden on the White House lawn with two honeybee hives close by.

Each of us can help by purchasing organic foods and cottons and by supporting local beekeepers by buying organic honey. Do not use herbicides, pesticides or miticides in your yard. Plant a wide variety of native yellow and blue flowers and help scientists in the U.S. National Phenology Network (www.usanpn.org).

Without the bees, we cannot survive.

Dr. Reese Halter is a visiting conservation biologist at St. Louis University and founder of the international conservation institute Global Forest Science. His most recent book is "The Incomparable Honeybee and the Economics of Pollination."

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