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**Viewpoint: Honeybees are modern-day canaries in the coal mines**  
**Dr. Reese Halter**

Over the past three years, more than 50 billion honeybees have died. Scientists understand the causes and now we need everyone to lend a helping hand.

The humble honeybee has been inextricably linked to humankind since prehistoric times and 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 takes 12 bees their entire foraging lives, combined flying distance 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.

Worldwide, our honeybees are sick.

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

Each year, five billion pounds of pesticides are applied globally. Many of them are neonicotinoids, a nerve poison that prevents acetylcholine from allowing neurons to communicate with each other and muscle tissue. In humans, it would trigger Parkinson's and Alzheimer's disease.

In 2008, researchers from Penn State found 43 different pesticides in a Pennsylvania apple orchard. Many farmers combine or stack their chemicals to reduce application costs, however stacking chemicals is known to increase toxicity levels in some cases by 1,000 fold.

Clearly, agriculture must reduce the levels in toxicity from pesticides, herbicide and miticides, globally.

Research from Europe showed that bees exposed to electromagnetic radiation from cellular towers made 21 percent less honeycomb and that 36 percent of bees, taken a half mile from the hive, were unsuccessfully able to navigate home.

In 2006, the honeybee genome was decoded and 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 that are 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. Pollen provides their only source of protein. Proteins grow eggs, larvae, brains and autoimmune systems.

The abnormally high temperatures of 2006 were likely the tipping point for bees in North America. The searing springtime temperatures during the onset of flowering are believed to have caused sterile pollen in many plants. Sterile pollen produces little if any protein.

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

Honeybees contribute at least \$44 billion a year to the United States economy. Along the mid-coast of California, they pollinate crops like apples, avocados, broccoli, carrot seeds, citrus, cucumbers, grapes, lettuce, melons, peaches, plums, pumpkins, onion

seeds, squash, sunflowers, tomatoes and zucchinis. They also pollinate alfalfa and clover for beef and dairy industries and make honey, candles and medicines.

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 vote, they are being trained to count and are helping people as an early detector of diseases such as lung cancers, diabetes and tuberculosis.

There is hope on the horizon for bees as organics is the fastest growing 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 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 participate by helping scientists in the U.S. National Phenology Network ([www.usanpn.org](http://www.usanpn.org)).

Without the bees, we cannot survive. *Dr. Reese Halter lives in San Luis Obispo. His latest book is titled "The Incomparable Honeybee and the Economics of Pollination."* Follow him: [twitter.com/DrReeseHalter](https://twitter.com/DrReeseHalter)