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## Honeybees are modern-day canaries in coal mines

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By Reese Halter

Guest columnist

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 -- 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, 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 such as almonds, apples, avocados, blueberries, broccoli, canola, carrot seeds, cherries, citrus, cranberries, cucumbers, grapes, lettuce, macadamizes, melons, peaches, plums, pumpkins, onion seeds, squash, sunflowers, kiwis, tomatoes and zucchinis; alfalfa and clover for beef and dairy industries; cotton for our clothes; 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, are being trained to count and are helping people as an early detector of disease by sniffing skin and lung cancers, diabetes and tuberculosis.

Many blue-chip corporations depend on honeybees for their products including Generals Mills' Haagen Dazz ice cream, Starbucks coffee and Clorox's Burt's Bees, a specialty personal care company with over 150 products.

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

Each year five billion pounds of pesticides are applied globally. Many 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.

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, yet it's still used widely throughout the U.S.

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

Research from Europe showed that bees exposed to electromagnetic radiation from cellular towers made 21 percent less honeycomb and that 36 percent, 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's 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 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.

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

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

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

There is hope on the horizon, as organics is the fastest growing sector in the U.S. at \$24 billion a year. First Lady Michele 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 support 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.

Reese Halter is founder of the international conservation institute Global Forest Science. His latest book is "The Incomparable Honeybee and the Economics of Pollination." Contact him through [www.DrReese.com](http://www.DrReese.com).

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