The buzz from spring gardens is the extinction of bumblebees

By Reese Halter

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As a conservation biologist, I am charged with the responsibility of maintaining the genetic tapestry of life on our planet. And as a science communicator my job is to explain why nature and a healthy environment are crucial to the well-being of corporations, governments and children.

More than 20,000 species of bees including honeybees, bumblebees and solitary bees are responsible for doing the lion's share of pollinating of more than 235,000 species of plants on Earth. Honeybees, bumblebees and solitary bees pollinate more than 110 crops that feed almost 7 billion people, daily.

In North America there are more than 5,000 species of native bees of which 60 kinds of bumblebees occupy habitats ranging from the Arctic Circle to the Sonoran Desert. Georgia has more than 2,000 beekeepers and 75,000 bee colonies, with a combined sales of pollination, honey and beeswax worth in excess of $70 million, annually.

Bumblebees, like our beleaguered honeybees, are in trouble; their populations are crashing. A three year study, headed up by the University of Illinois has documented four species of U.S. bumblebees (B. occidentalis, B. pensylvanicus, B. affinis and B. terricola) declining by up to 96 percent and that their geographic ranges have contracted from between 23 percent to 87 percent, some within just the past two decades.

The news is grim from the U.K. where three of the 25 British species of bumblebees are already extinct and at least half of the remainder shows serious declines of up to 70 percent, since the 1970s.

Bumblebees are being found with high disease loads and low genetic diversity, meaning that they have less of a chance of fighting off any new pathogens or resistance to pollution. Even more distressing, it appears that bumblebees may be picking up some of the viruses known to afflict the domestic honeybees from shared flower pollen.

If that isn't bad enough, a 17-year study in the Rocky Mountains found that global warming is melting snowpacks three weeks earlier causing glacier lilies to emerge at least a couple weeks sooner. A climate-driven mismatch is now occurring, as the bumblebees (B. occidentalis and B. bifarius) that pollinate the lilies are wakening-up two weeks too late. The fate of the lilies is in jeopardy.

All 60 species of bumblebees in North America and worldwide bee populations are sensitive to the highly toxic, systemic insecticide called Clothianidin — the most recent addition to the family of potent synthetic chemicals called neonictinoids.

WikiLeaks documents show that the EPA allowed the use of Clothianidin despite the fact that the scientific study to support its use was flawed.

Beekeepers and environmentalists have called upon the EPA to remove this neonictinoid, which is linked to the widespread death of billions of honeybees around the globe or Colony Collapse Disorder.

Since the beginning of 2011, more than a million people, many of them children, have signed the AVAAZ.org online petition to outlaw the use of neonictinoids in the U.S. and throughout the European Union.

Bumblebees are crucial pollinators of — to name a few — tomatoes, blueberries, cranberries, sunflowers, canola, rapeseed, chilies, peas, lentils, red clover and alfalfa. Their large size and loud rumble with their long tongues and high frequency buzz pollination or sonification, helps release pollen en masse from the flowers. They work tirelessly each day from dawn until after dusk. About 19,000 flowering plants on Earth rely upon this unique buzz pollination in order to reproduce.

Recent research conducted at Queen Mary University in London shows that bumblebees in the U.K. can find the solution to a complex mathematical problem, which keeps computers busy for days. Although their brains may be the size of a pinhead, bumblebees show advanced cognitive capacities with very limited neuron numbers.

Moreover, bumblebees are able to find the shortest distance between each nectar and pollen patch effectively solving the age old question that the traveling salesman constantly grapples with: To find the shortest path that allows him to visit all locations on his route.

Today we are one step closer to understanding how bumblebee brains work because 25 British students from ages of eight to 10 years old conducted groundbreaking bumblebee research. They discovered that buff-tailed bumblebees (Bombus terrestris) use a combination of colors and spatial relationships in deciding which color flower to forage from, and reported it in the prestigious peer-reviewed Royal Society journal, Biology Letters.

Humans and bees do share a number of similarities including as we both age our memories fade. Although bees are extraordinary navigators able to use landmarks including rocks, trees and barns to find their way back to the hive, recent research from Arizona State University and the Norwegian University of Life Sciences found that aging impairs the bees ability to extinguish the memory of an unsuitable nest site even after the colony has settled in a new hive.

In ecology we study the relationship between living organisms and their environment. The fact that bumblebee populations are plummeting or becoming extinct due to global warming, habitat destruction and neonictinoids are wake-up calls for our species. We need bumblebees and our children are depending upon us to take better care of the natural world.

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