

Bee Aware, Part 2

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Where have all the pollinators gone?

Last week we focused on two important pollinators: bees and bumblebees. Before we explore their alarming disappearance, let's take a moment to appreciate some of the other creatures helping move pollen from plant to plant.

Butterflies are important pollinators, with moths primarily covering the night shift. Bats are important pollinators in two very different climates: deserts and tropical forests. Banana, mango and guava trees all rely on these flying mammals to help them produce fruit. In North America nearly 40% of bat species are in severe decline, primarily due to fungal infection and habitat loss, according to researchers at Bat Conservation International.

Some wasps, beetles, ants and even common houseflies help pollinate plants, so be nice to them - unless houseflies are trying to share your food. They can carry serious diseases caused by *Salmonella* and *E. coli*. To protect your food while protecting beneficial insects, avoid toxic sprays and use a homemade sticky trap. The Rodale Institute has this easy recipe: Boil water or apple cider vinegar and sugar down to a thick, tacky syrup. Spread the mixture on strips of used paper bags, and hang them where the flies hang out. It's safe to compost the used traps.

Colony Collapse Disorder

In 2006 some beekeepers reported losses of 30 – 90% of their hives, according to the US Department of Agriculture's Ag Research Service (ARS). These huge losses are known as colony collapse disorder (CCD). The ARS Web site notes, "The main symptom of CCD is simply a live queen bee with few if any adult honey bees present and no dead ones in the hive. Often there is still honey in the hive, and immature bees (brood) are present. Before the appearance of CCD, losses averaged 15-20 percent annually from a variety of factors such as Varroa mites and other pests and pathogens."

Varroa mites were first found in beehives in Japan and the former Soviet Union in the early 1960s. They spread to bees around the world, appearing in the U.S. in 1987. The mites feed on bees, weakening the bees' immune system and causing them to succumb to viruses and bacteria.

Neonicotinoid Pesticides and CCD?

Recent studies published in the journal *Science* point to another possible cause of CCD – neonicotinoid pesticides. These synthetic nicotine derivatives are found in pesticides for home gardens, commercial agriculture, even some flea treatments for pets. Neonicotinoid pesticides attack the insects' nervous system. In the journal *Science*, French researchers found that “Non-lethal exposure of honey bees to thiamethoxam (neonicotinoid systemic pesticide) causes high mortality due to homing failure at levels that could put a colony at risk of collapse.” Note that the researchers studied non-lethal levels of the pesticide, amounts that don't kill the bees outright. But they found bees exposed to these non-lethal doses were unable to return to their hive, starving the queen bee and any offspring.



LEFT: The Discovery Garden in Mount Vernon provides an abundant and varied floral buffet; all pollinators are welcome. **TOP Right:** Wasps not only pollinate our wild berries, such as this thimbleberry, but some also lay eggs into the branches, causing galls to develop. Birds use the larva inside the gall as a food source. **TOP LEFT:** Even the common housefly, *Musca domestica*, helps to pollinate our shrubs and flowers. **Photos by Christine Farrow / Skagit County Master Gardeners**

A similar study by Italian scientists, published March 12, 2012, in the American Chemical Society's *Environmental Science & Technology* journal states, "Experimental results show that the environmental release of particles containing neonicotinoids can produce high exposure levels for bees, with lethal effects compatible with colony loss phenomena observed by beekeepers."

Most of this year's U.S. corn crop, covering over 94 million acres, will be planted with seed treated with neonicotinoid pesticides, according to Christian Krupke, PhD, entomologist at Purdue University. He led a team of researchers who found corn pollen, brought by bees to their hives, contained neonicotinoids at levels roughly below 100 parts per billion. "That's enough to kill bees if sufficient amounts are consumed, but it is not acutely toxic," he said. But the treated seeds are coated with talc to keep them flowing through the corn planters. Krupke found the talc, blown into the fields along with the corn, contained up to 700,000 times the lethal contact dose for bees! Ironically, corn pollen travels by wind, not insects – but bees do gather pollen from available plants.

Several European countries, including France, Germany, Italy and Slovenia, have banned agricultural use of neonicotinoids, according to the U.S. Environmental Protection Agency. A list of home and commercial products containing neonicotinoids is available from the California Department of Pesticide Regulations' Web site, <http://www.cdpr.ca.gov/>

What Can Gardeners Do For Bees?

Some gardeners are becoming beekeepers or installing Mason bee boxes near a variety of flowering plants. Eric Mader, Assistant Pollinator Program Director, The Xerces Society for Invertebrate Conservation and Assistant Extension Professor at the University of Minnesota's Department of Entomology says, "Often times diverse gardens with a variety of landscape features including patches of bare soil, piles of stone and clump-forming grasses can provide ample nest habitat." Since most native bee species nest in the ground, a bee-friendly gardener will avoid extensive use of plastic mulch, and leave some ground untilled.

Pesticides also threaten native and non-native bees, says Mader. "Even many products approved for organic gardening, such as rotenone and spinosad, are very dangerous to bees. The safest course of action is to avoid pesticides entirely." If you do use pesticides, never spray blooming plants or bee nests. Non-lethal pest control options include floating row-covers and pheromone traps. Mader said, "An abundant mixture of flowers and a diversity of species (including pest-resistant varieties) can prevent most major pest outbreaks." And what gardener wouldn't welcome an abundant, diverse garden?

Resources:

- "A Common Pesticide Decreases Foraging Success and Survival in Honey Bees," *Science*, April 20, 2012.

- “Global Honey Bee Viral Landscape Altered by a Parasitic Mite,” *Science*, June 8, 2012
- *Attracting Native Pollinators*, Xerces Society, Storey Publishing, 2011
- “Gardening for Our Friends, The Pollinators,” Master Gardener Program, Clark County: <https://extension.wsu.edu/clark/2017/05/gardening-for-our-friends-the-pollinators/>
- “Pollination and Pollinator Protection,” WSU Extension: <https://pubs.extension.wsu.edu/pollination-and-pollinator-protection-home-garden-series>

Note: some hyperlinks in this article have been updated since its initial publication.