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The Pollinator Debate: Just How Concerned Should We “Bee”?

Most of us have probably heard a soundbite, read an article, or had a discussion about a crisis affecting bee populations. For the most part, the concerns are true: bee populations are facing challenges, and beekeepers are reporting higher rates of colony loss than historic levels. Resentment towards chemicals and other unnatural substances producers and users—especially in agriculture—seems to be mounting. Although these factors contribute to colony losses, there is more to the story.

Pollination, achieved primarily by bees and other insects, is an incredibly important element of diets and nutrition worldwide. About one out of every three bites or mouthfuls of food we eat benefits in some way from pollination, whether it is directly grown food like fruits and vegetables, or the feed products for livestock. The U.S. Department of Agriculture (USDA) estimates that pollinators contribute approximately \$15 billion of value annually to agriculture in the United States.¹ In Europe, it is estimated that without bees around to pollinate, farmers and other agricultural contributors would have to spend about €53 million each year to pollinate crops by hand.²

Bees are clearly an important part of nature, but what exactly is causing so many environmentalists and other groups to take issue with bees’ health? In 2006, beekeepers around the world began to report unprecedented rates of bee colony loss—large numbers of bees dying off all at once—for inexplicable reasons; this phenomenon was later named Colony Collapse Disorder (CCD). In addition to more losses of whole colonies, higher-than-ever rates of summer loss of bees have been reported. Beekeepers, farmers, and environmental groups all recognize the reality that is seasonal loss; in winter, when bees are less able to find nourishment and weather conditions are harsher, it is normal and rational to expect that some members of the colony will not survive. However, the rates of summer loss, for multiple years in a row, have many groups worried.³ Between April 2015 and April 2016, 44% of U.S. honeybee colonies were lost, an increase of more than 3% lost during the previous 12 months, but an increase of just over 10% from the period 2013-2014. The increase in summer losses contributes to the rise in overall colonies lost.



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While it is tempting to jump straight into the blame game with pesticide-producing companies such as Bayer, BASF, Dow, DuPont, Monsanto, and Syngenta,⁴ there are actually a number of factors that harm bees: parasites and pests, pathogens, poor nutrition, and pesticides. Parasites or other pests such as small hive beetles, wax moths, and Varroa mites can harm bees. The Varroa mites cause serious problems for bees, as they suck

bees’ blood and can transmit fatal viruses and other diseases, weakening bees’ defense systems. Some of the pathogens that harm bees are the Israeli acute paralysis virus, the European foulbrood bacteria, and the Nosema cernal fungi.⁵

The remaining two categories of complicating factors—poor nutrition and pesticides—can be attributed to human activity. As we expand and develop land for our own uses, we are simultaneously diminishing available habitats for bees, through simple loss of land and flowers. Additionally, when agricultural land becomes dedicated to a single crop, the land loses diversity, and cannot produce as many sources of nectar or pollen for bees. Humans are also responsible for the use of pesticides. While there are many types of chemicals and treatments available, some of the most concerning for bees are neonicotinoids, of the neonic class of pesticides, which are chemically related to the compounds in nicotine. Unlike other types of pesticides that are sprayed on crop foliage, neonicotinoids are systemic, and can be applied at the base of crops, resulting in the plants’ uptake of the chemicals into their entire structures, causing the nectar and pollen the plants produce to turn poisonous.

When bees and other pollinators encounter neonicotinoids in their diet, they suffer great damage to their central nervous systems (CNS), leading to paralysis and death.⁶ With their CNS impaired, bees lose their senses of navigation and orientation as well as experience stunted development and weaker immune systems; weaker immune systems leave bees vulnerable to fighting off viruses and other toxins, such as those spread by the Varroa mites.

For years, pesticides and GMO crops have been targets of scrutiny and banning efforts in Europe. But unlike in the European Union, the U.S. Environmental Protection Agency

(EPA) has yet to pull any specific neonicotinoid products from the market. However, the EPA is currently reviewing at least five neonic pesticides, including products developed by Bayer CropScience, Syngenta, Mitsui Chemicals, and other companies; results are expected by December 2016.

Neonicotinoid Pesticides Under EPA Review (as of April 7, 2016) ⁷		
Imidacloprid	Bayer CropScience	
Clothianidin	Takeda Chemical Industries & Bayer AG	Banned in EU in 2013 ⁸
Thiamethoxam	Syngenta	Banned in EU in 2013
Dinotefuran	Mitsui Chemicals	
Acetamiprid	Aventis CropSciences	

Reductions in bee colonies will continue to be felt by all components of the food chain: manufacturers, retailers, and consumers will all feel the increase in the cost of food. Most of the companies that produce agrochemical products or pesticides have some sort of statement or reaction to the debate over pollinator health. However, these range in attitudes from vague and “pesticides are innocent,” to detailed actions companies have taken to contribute to research or alter their methodologies when it comes to bee populations and other pollinators’ health. For example, Dow AgroSciences asserts that its pest control products “do not directly impact pollinators,” and does not list any steps taken to foster bee health.⁹ On the other hand, Bayer CropSciences acknowledges the importance of pollinators, lists pesticides as one possible contributor in bees’ declining numbers, and outlines the organizations it partners with to fund research on new means of insecticide application.¹⁰

Some companies’ actions stand out for assisting bees and changing their ways. Ortho, a chemical company subsidiary of Scotts Miracle-Gro Co (SMG), has committed to phasing out neonics in its products by 2021.¹¹ And General Mills

(GIS), who relies heavily on crops produced en masse, and pollinated by bees, has invested significant resources in researching bee colony problems as well as in providing new land spaces dedicated to pollinator habitat restoration. Additionally, the company ran an educational campaign in its Canadian division by temporarily removing ‘Buzz’ the Honey Nut Cheerios® mascot from its boxes, with directions on where consumers could go online to learn more about the disappearing bees, along with the hashtag, <BringBackTheBees>.¹² For investors and consumers concerned with the environment, it is encouraging to see companies taking part in sustainability efforts.

In the meantime, many government, NGO, and environmental groups offer suggestions on how the public can help improve bees’ wellbeing and increase the number of surviving colonies: plant pollinator-friendly flowers and plants; avoid spraying pesticides during mid-day hours, (which is when bees are most active and feeding); have a birdbath or shallow water feature to give bees a drink (and prevent them from hanging around swimming pools); consult your state if beginning a hobby beehive, but remember bees are considered farm animals.¹³

Pollinator-Friendly Plants			
Red Clover	Chives	Clover	Bee Balm
Foxglove	Coneflowers	Indigo	Lavender
Dandelions	Joe-pye Weed		

Perhaps the “beepocalypse”, or “beemageddon”, as some have referred to it, cannot be singularly attributed to pesticide or neonicotinoid use. However, these chemicals do play a role that can be detrimental to nature, and at the very least, lower bees’ defenses against other natural predators and conditions. As always, there are many sides to every story, but when the bees cannot speak for themselves, maybe it’s time to consider precautions that would protect this natural, behind-the-scenes, asset that is so valuable to all of our daily lives.

¹ “ARS Honey Bee Health and Colony Collapse Disorder.” *Agricultural Research Service*. U.S. Department of Agriculture (USDA), 13 July 2016. Web. 1 Aug. 2016.

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³ “Nation’s Beekeepers Lost 44 Percent of Bees in 2015-16.” *Bee Informed Partnership*. Bee Informed Partnership, 10 May 2016. Web. 1 Aug. 2016.

⁴ “Save the Bees.” *Greenpeace USA*. Greenpeace USA, n.d. Web. 1 Aug. 2016.

⁵ “ARS HoneyBee Health and Colony Collapse Disorder.” *Agricultural Research Service*. U.S. Department of Agriculture (USDA).

⁶ “Neonicotinoids.” *PAN UK*. Pesticide Action Network UK, 2016. Web. 1 Aug. 2016.

⁷ “Pollinator Protection: Schedule for Review of Neonicotinoid Pesticides.” *US EPA*. U.S. Environmental Protection Agency (EPA), 7 Apr. 2016. Web. 1 Aug. 2016.

⁸ Bromwich, Jonah E. “Study: Insecticide cuts Bees’ ability to reproduce.” *San Diego Union-Tribune* 31 July 2016. *Global Factiva*. Web. 1 Aug. 2016.

⁹ Rogers, Travis, and Pat Burch. “VM Views: Making pollinator habitat a priority.” *VM Views*. DowAgro, July 2016. Web. 12 Aug. 2016.

¹⁰ “Bayer Bee Care Program, Ensuring bee safety.” *Bayer Bee Care*. Bayer CropSciences, n.d. Web. 12 Aug. 2016.

¹¹ “Editorial: The bees or not the bees. Ortho answers the question.” *Editorial*. *St. Louis Post-Dispatch* 15 Apr. 2016. *Global Factiva*. Web. 11 Aug. 2016.

¹² “Honey Nut Cheerios Bee Is Missing From The Box For A Very Good Reason.” *Huffington Post Canada*. Huffington Post Canada, 3 Mar. 2016. Web. 11 Aug. 2016.

¹³ Carlson, Debbie. “Turning your garden into a haven for bees.” *The Baltimore Sun* 24 July 2016. *Global Factiva*. Web. 1 Aug. 2016.

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