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Research Paper

Save the Bees!

The bees are a very important part of our lives. Because of their work, they provide us with numerous amounts of vegetables, fruits, and flowers. Sadly though, our little fuzzy friends are beginning to disappear. Through many problems being caused for the bees, the United States has lost up to 44 percent of their bee population in 2015-16. Bee populations are so low in the US that it now takes 60% of the country's surviving colonies just to pollinate one California crop (University of Maryland, "Nation's Beekeepers lost..."). The big question is, why are these helpful creatures disappearing so quickly?

Throughout the world, beekeepers lost a total of 44.1 percent of their colonies over the course of the 2015-16. This is about a 3.5 percent increase over the previous study year (2014-15), when loss rates were found to be 40.6 percent. The loss of bees during the winter increased from 22.3 percent in the previous winter to 28.1 percent this past winter, while summer loss rates increased from 25.3 percent to 28.1 percent (University of Maryland, "Nation's Beekeepers lost..."). Basically, the bees are going, and fast.

According to an article from Greenpeace, the main reason for bee-decline is linked to industrial agriculture, parasites/pathogens, and climate change. The loss of biodiversity, destruction of habitat, and lack of forage due to monocultures and bee-killing pesticides are very big threats for honeybees and other wild pollinators. It is becoming very evident that some

insecticides are negatively affecting bees, both individually, and at the colony level (Greenpeace, “The Causes”).

Another article from *Opposing Viewpoints* from the Gale research said that bees have been experiencing colony collapse disorder, or CCD, a phenomenon in which adult worker bees leave the hive and never come back. This results in the destroying of the colony. They think that a possible reason for this is because of a mite called varroa destructor which preys on several types of bees, including honey bees. What these mites do is the female mites enter the hive, and then lay their eggs. Once the mites hatch, they feed on the bee larvae and viral and bacterial pathogens transmit to their host, or in this case the bees, causing them to later collapse (Schultz, “Bee Extinctions”...)

Another article on EBSCO also said that many hives around the country are experiencing CCD. Hackenberg, a Pennsylvanian beekeeper, had 400 hives on his site and all but 32 hives had collapsed. What was strange about this is that there were no dead bees in sight. Even the moths and beetles that usually raid the hives would not go near the dead bees old homes. They found that high levels of neonics, which are known to disrupt the nervous systems of the bees, can cause disorientation and eventually death. These chemicals have been found in large amounts in pollen, which is the bees main protein source. After doing more research on CCD, they found that more than 170 different chemicals in bees from the affected hives, including fluvalinate and coumaphos (chemical compounds), are commonly used by beekeepers to combat varroa mites. So, it seems that the varroa mites are not only infecting the bees with their parasites, but they are also causing the bees problems due to the chemicals beekeepers are using to get rid of them (Wayne, “Why Are They Dying?”).

Researchers collected pollen from hives on the east coast pollinating cranberry, watermelon and other crops and fed it to healthy bees, those bees showed a significant decline in their ability to resist infection by a parasite called *Nosema ceranae*. The parasite has been implicated in CCD, though scientists took pains to point out that their findings do not directly link the pesticides to CCD. The pollen was contaminated on average with nine different pesticides and fungicides though scientists discovered 21 agricultural chemicals in one sample. Scientists identified eight chemicals associated with increased risk of infection by the parasite. Bees that ate pollen contaminated with fungicides were three times as likely to be infected by the parasite. Widely used fungicides had been thought to be harmless for bees as they're designed to kill fungus, not insects on crops, but it turns out they were greatly harming our little helpers (Quartz, "Scientists Discover...").

It is said that growing evidence has suggested that neonics disrupt the normal functioning of bees, making them more vulnerable to ailments that eventually lead to death. They say that more than 90 commercial crops in the U.S. rely on pollinators like bees as well. It is said that managed honey bee colonies in the United States have dropped by about half since shortly after World War II, and a parasitic mite that arrived in the late 1980s virtually eliminated feral colonies. Though normal attrition of hives over the winter was once about 5 percent, the die-off of honey bees has been around 30 percent each year from 2007 through 2010 (Wayne, "Why Are They Dying?"). According to another article in the Global Issues from the Gale research, disease and climate change all play a part in the decline of the bees. They have also found that neonicotinoids, a type of insecticide sprayed directly onto seeds before planting, was linked to a "large-scale and long-term" decline in wild bees. In the past decade, neonicotinoid insecticides

have gone from little-known chemical compounds to the most commonly used insecticides in the world. Virtually every genetically modified corn seed and at least a third of soybeans that are planted in this country are coated in these toxins (The Times, “Plan Bee...”).

People believe that another reason the bees aren't returning to their hives is because of cell phones. There was an experiment done where they placed two cell phones next to four of eight hives. They marked 25 bees to see if they would be able to return to the hive. They reported that in one exposed colony, only six of twenty-five test bees returned home within forty-five minutes, while in a second exposed colony, no bees returned (Schultz, “Bee Extinctions...”). Research conducted in Lausanne, Switzerland has shown that the signal from cell phones not only confuses bees, but also may lead to their death. Over 83 experiments have shown the same results. The bees sense the signals transmitted when the phones ring, and emitted heavy buzzing noise during the calls. The calls act as an instinctive warning to leave the hive, but the frequency confuses the bees, causing them to fly erratically. The study found that the bees' buzzing noise increases ten times when a cell phone is ringing or making a call (Zimmer, “It's Official”).

The fact of the matter is, we will not survive if the bees die off. There are many of the foods we eat everyday that are pollinated by bees. For example, almonds, apples, apricots, avocados, blueberries, cantaloupes, cashews, coffee, cranberries, cucumbers, eggplants, grapes, and many many more. If the bees die, so will these foods. What people don't know is that not only will many plants disappear, but we will most likely lose our dairy products as well. Dairy cows are very large consumers of alfalfa hay. This hay needs to be pollinated by bees and without it, there wouldn't be enough food for the cows. This would result in things like butter, milk, and cheese to all disappear (Griminick, “10 Things...”).

An article from Natural Living Ideas gives us a few ways to help the little critters live on. They say to plant bee friendly flowers and shrubs. By doing this we keep them in a safe area as well as making some plants happy. They also say to buy only local honey. We do this because local beekeepers are much more likely to take good care of the bees and care for their health. Another great way to save the bees is to set up a bee refreshment station. This helps tired bees, that might not have enough energy, find fresh food and water (Leonard, "Here's Why...").

We need to do something, and quickly. While some may find bees scary and mean, they are actually a very important part of our environment. There are many problems causing the bees to disappear, but if we can provide them with a safe place to pollinate and live, we might be able to bring them back to their former glory. We have caused them so many problems, and what we don't understand is that soon, those problems are going to start becoming our own. It's as simple as making a bee friendly garden that will help our helpful friends. It's not too late, but soon it might be. So, let's join together and save the bees!

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