The Obvious Secret About Honeybees

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Oftentimes, people will hear someone say this phrase: "I never knew that, but it's kind of obvious and makes a lot sense now that I think about it". This is not to say that someone lacks critical thought. It simply means someone is suffering from the age-old adage of "Can't see the forest because of all the trees". The information is there, but it is clouded by bits that are louder and more prominent common knowledge. In other instances, the topic is such a forgotten part of life that no one really gives it a second, or even third, thought to uncover those facts. Now let us focus on one tiny little topic that most likely has rarely crossed your mind unless you are at a dinner table or running away in fear. Honeybees lead a double life as purveyors of creation and potential harbingers of death.

Let us start with the basics of a honeybee's life by building a mental picture. Imagine it is a warm spring/summer day; there is a meadow full of flowers and honeybees are buzzing all around collecting nectar from flowers and interacting with a substance we humans have a love/hate relationship with: pollen. Pollen is vital to the survival of over a quarter of a million plant species and has a variety of ways to spread, but humans tend to think of pollen in a narrow way; it floats in the air, covers our cars and wreaks havoc on our sinuses every spring. While true, that leaves out what it truly accomplishes. Pollen is the reproductive method of flora around the world. Wind can carry it – as we know all too well – and it can be transferred physically via insects. That simple, inadvertent act classifies those insects as pollinators. This is where the honeybees come in, but take it one step further. Honeybees called Workers collect nectar from flowers as the singular ingredient for their food source: honey. As workers collect nectar by moving from flower to flower, they come into contact with the pollen in those flowers which sticks to their bodies. Some of the pollen will inevitably fall off and be left behind at each stop, which is where the pollination process occurs for those particular plants; this is a critical step in the ecosystem for plants that have pollen too heavy to be carried by the wind. The Workers then travel back to their hive to begin the process of converting the pollen into honey. The Workers arrive and pass off the nectar from a special sac on their bodies to Workers inside the hive. As it is passed from bee to bee, the PH level changes and it is eventually deposited into the honeycomb. Workers then begin the process of constantly fanning the honeycomb cells with their wings to dehydrate the nectar to the point of solidification that we know and love: honey.

Honeybees are big business. Products include honey, contracted pollination services, beeswax, and venom for medicine research to name a few; it all adds up to a roughly estimated $339 million a year industry ("Honeybees" – FDA). Given this number, it should be no surprise that hobbyist beekeeping has seen a rise in recent years. The US Department of Agriculture counted an estimated 2.88 million bee colonies in the United States at the beginning of 2021, which is up eight percent from 2019 (Coen). Collecting all of that honey does not deprive the bees however. In Coen's article, urban beekeeper Dan Fox of Louisiana has a single hive in his backyard, yet he manages to obtain over seventy Mason jars a year and still leaves enough behind for the bees to feed on

in order to survive the winter. Fox answers the question everyone wonders when a seemingly large amount of honey is taken from a hive: "They're hoarders. They always need something to do. They're making more honey than they can use." (qtd, in Coen). With all of those honeybees around, mother nature should be extremely happy, right? Perhaps not.

We can all see the benefits of honeybees; after all, those are the proverbial trees. They are not without their problems however, so now we need to step back to see the entire forest and uncover a few "ah-ha" moments. Honeybees are not native to North America; managed honeybees have European origins dating back to the 1600s when they were first introduced ("Managed Honeybees"). There are now over 400 different species that have been identified in Minnesota alone. There is also a popular consensus that honeybee populations are in rapid decline and extinction would spell doom for a third of the crops generated in North America ("Helping Agriculture's"). On the surface, this claim seems dire. What is driving it however? Nationwide there has been a conservationist effort to save honeybees from pesticides. One can imagine how much of the chemical honeybees would come into contact with during their nectar collection. While it is true that pesticides do cause harm to living creatures if exposed to them enough, some biologists like Dr. Sheila Colla at York University in Canada tend to disagree. She states, "People mistakenly think keeping honey bees, or helping honey bees, is somehow helping the native bees, which are at risk of extinction. The focus on neonics [a kind of pesticide] and honeybees has taken a ton of resources away from conserving wild pollinators from their most important threats" (qtd. in McAfee). So, what is Dr. Colla saying? Her stance is somewhat mixed, but in summary she believes that adding more hobbyist colonies is detrimental to the ecosystem and the cause. How could that be? More honeybees mean more pollination and the plants are happy; but what about the other pollinators in the area?

High densities of honeybees that are introduced into areas will almost certainly increase competition with other nectar foragers in the flight zone of the hive. Honeybees are generalists, they do not visit specific flowers or plants. If there is nectar to be had, they harvest it. This explains the wide array of honey flavors. It takes on the general taste and smell of the plant the nectar originates from. Simply visit a farmer's market or a specialty shop and flavor after flavor can be found; the flavors even change throughout the flowering seasons. Now imagine tens of thousands of honeybees in one area, all looking for food. An average colony consists of approximately thirty thousand honeybees. It doesn't take long for a picture to emerge. Honeybees can essentially starve out native pollinators such beetles, flies, ants, moths, wasps, and other insects that simply feed from the nectar and do not convert it to honey.

Honeybees can also negatively impact the reproduction cycle of plants, trees and flowers. A statement like this will naturally create confusion based on information given just a few paragraphs ago. Under most circumstances, there are minimal pollination impacts. However, a study performed in the Canary Islands off of the coast of Africa proved that there are indeed negative results to be had. Alfredo Valido and Pedro Jordano, researchers from the Spanish National Research Council in Tenerife and Sevilla, introduced hundreds of honeybee hives to one of the islands. Up until that point, the island only had native pollinators. The results were shocking. Valido stated, "By introducing tens or hundreds of beehives, the relative density of honey bees increases exponentially compared with wild native pollinators" (qtd. in McAfee). The introduction of large amounts of honeybees overpowered the natural pollinators around the hives, which in turn, caused a drastic reduction in flower resources and the

natural pollination cycle. While some plant species enjoyed higher fruit yields from the increased activity, fruits sampled nearest the hives contained only aborted seeds; a sure sign that the non-discriminate nature of the honeybees meant the correct types of pollen were not reaching their intended targets.

Honeybees are also subject to problems of their own, not just ones they create. There is the matter of a disease so specific, it only affects honeybees and no other creature on earth. Foulbrood Disease can partially or completely destroy a honeybee colony. It is a spore-producing bacterial infection that affects the larval and pupal stages of the unborn honeybees; adult bees seem to be unaffected. Unborn honeybees contract the disease from adults that are tending the cells by feeding them honey and other nutrients that contain the bacteria, and from there the overall health of the young begins to deteriorate to the point of death before they can emerge. If the disease does not destroy the hive, traditional means of eradication will. Since the honeycomb itself contains the bacteria, beekeepers often burn the entire hive. New research over the past twenty years, however, has produced two FDA approved antibiotics that seem to be very efficient at curing a Foulbrood outbreak. In 2017, the FDA modified the availability of these antibiotics due to concerns of misuse and the potential for a medicine not intended for human making it into a food supply. They are now only available through the assistance of a veterinarian ("Honeybees" – FDA).

What can one say about honeybees after finding out they are not simply the honey producing micro-chefs they were thought to be? The evidence thus far would make someone believe honeybees are nothing but a nuisance to their environment and have only one redeeming quality. It certainly seems as though they create their share of problems. Like most things in nature, where there is a problem, the answer is close by. While it's true that honeybees can cause interruptions to ecosystems where they are suddenly interjected, they can also be saviors. For example, Almond orchards in California are entirely dependent on honeybees for pollination; the density of the trees and the low concentration of natural pollinators means the trees would not be able to pollinate naturally. The man-made problem the farmers face is being solved with nature. The agricultural benefit of honeybees is roughly ten to twenty times greater than the total of beeswax and honey produced each year according to the FDA ("Honeybees" – FDA). Indeed, there are a multitude of uses for the products of a honeybee hive, and a financial boost for anyone willing to embrace the inevitable sting.

How does the entirety of this information influence someone's opinion on our quest for passing judgement on the humble honeybee now that everything is out in the open? How do we categorize them; friend or foe? Their benefits have always been obvious, but now their faults and even their damaging presence is laid bare. In my opinion, we have a hung jury. Honeybees are invaluable to agriculture that sustains a large portion of the United States' food supply, in addition to being a boon to a multitude of industries. They can also be a burden to ecosystems under the right set of circumstances. Just like any resource, care must be given to regulate numbers and use. It is truly amazing how a simple insect can bolster an economy and food production; but like any other resource, if used unwisely, they can collapse the system that depends on them. That is quite a lot of responsibility for such a tiny creature.

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