

The Importance of Bees, Beekeeping and Bee Friendly Landscapes

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Introduction

Bees are vital to the existence of life. The primary reason bees are important is that they provide an essential ecosystem service, pollination. Pollen is produced by anthers (male part) and pollination occurs when bees transfer the pollen from the anthers to the stigma (female part), which allows for fertilization and reproduction in flower bearing plants (Nich). Since plants are unable to get up and walk around to reproduce, they depend on bees and other forms of pollination in order to continue their species.

A study performed by the U.S. Department of Agriculture determined that 80 percent of flowering crops are pollinated by bees, which makes up about one-third of all food humans consume. Without bees, many fruits and vegetables could be lost. Not only do bees provide the population with these necessary staples, but the loss of them would most likely have a major effect on the meat and dairy industry as well. This would occur as there would no longer be enough alfalfa and other food to feed the animals.

The pollination that bees provide enables the U.S. to net around 14 billion dollars each year due to the seeds and crops pollinated by bees (Boland). Bees are what allow plants and crops to thrive, and without them, life as all know it would change drastically.

The Inner Workings of a Beehive

A bee colony can consist of

thousands of individuals all focused on the maintenance of the hive. All bees work together to serve the Queen, clean the hive, and bring food back, all to protect their hive.

There are 3 roles within a colony. There is one queen, the largest bee in the colony, whose role is to lay all the eggs for future workers. Each colony consists of mainly worker bees. Worker bees, who are all female, play many roles, including cleaning larvae cells into honey storage cells, being soldiers, making comb, foraging for pollen, etc. Foragers take up to 6 trips a day averaging about 2 mile flights looking for pollen, propolis, nectar, and water to feed the other bees in the colony. These worker bees can even fly up to 5 miles away multiple times a day!

The honey comb, made out of wax from the bees' own body, consists of thousands of hexagonal cells that hold larvae and then honey when the larvae hatch. The hexagonal pattern is one of the strongest in the world and they are made to the exact size to fit the developing bee. The cell is also tilted 15 degrees upwards so the larvae and honey do not fall out.

The last group of bees within a colony is the drone, the male bees. These drones are solely there to fertilize the queen's eggs to carry on the bee lineage. For a honey bee colony, you are either growing or dying, so once a hive gets too large to sustain itself, the colony will swarm. The worker bees will create larger cells called 'super cells' that will accommodate the birth of a new queen. The old queen will take

50% of the colony and they will look for a new home elsewhere. Several scouts will be sent out looking for a new home.

Once they arrive and communicate with the rest of the colony where the new home is, they will decide which home is the best and move in! All the bees will follow their queen, if they protest they will not stand a chance at survival, therefore all bees must subscribe to the system. No anarchists in the bee world! Bees keep us alive, how could they not 'bee' cool?!

Colony Collapse Disorder

Colony collapse disorder (CCD), the sudden disappearance of a beehive, is a huge threat to the future of farming and plant life in general. There are many different causes of colony collapse and there are several theories as to what may be the reason for a sudden colony disappearance.

One cause may be the use of neonicotinoid pesticides, which cause dangerous effects when bees are exposed to them over a long period of time. Luckily, in some regions, steps have been taken to ban the use of neonicotinoids for the health of residents, which is also beneficial to the bees.

Another theory behind CCD is mites, or other pathogens and immunodeficiency threats, and migratory or commercial beekeeping. Mites can destroy an entire beehive quite quickly, making them a huge threat to bees. Commercial beekeeping is also a major threat to bees as bees are not well managed, and are overworked and

exposed to many chemicals. All of these factors lead to colony collapse.

Even though these theories are good ideas for what is causing CCD, there is still a lot we do not know. Therefore, the most proactive step to protect us from this threat would be to strengthen the current bee population that still exists. Bees are important to our survival because they are responsible for the pollination of most angiosperms, on which humans depend for food. If all bees disappear, the flowering plants will go with them, and the human race will be close behind.

Bee Dependent Plants

The following is a brief list of some of the food that would disappear without bees around to provide pollination:

- Almonds
- Apples
- Asparagus
- Beans
- Blackberries
- Blueberries
- Broccoli
- Brussels sprouts
- Cauliflower
- Celery
- Cherries
- Cranberries
- Cucumber
- Garlic
- Grapes
- Kale
- Lettuce

- Peaches
- Pears
- Plums
- Pumpkins
- Raspberries
- Squash
- Strawberries
- Watermelon

(Canada agriculture and food museum)

This list is just the beginning, as there is a vast amount of other fruits, vegetables and other plants that depend on bees to survive.

What is Beekeeping?

Beekeeping, also known as apiculture, is the practice of maintaining bees in hives for their byproducts such as honey, wax, propolis, etc. The art of beekeeping is very important in the world today as the bee population continues to decrease. Due to this, beekeeping can be a beneficial way to restore the bee population.

Before a beehive has been acquired, it is important to make sure that there is adequate space available to maintain the bees and a proper bee box. Bee boxes are a series of wooden boxes and frames that contain wax sheets or other infrastructure to allow bees to have an area to start building their honeycomb. Usually, the top box will hold honey, while the bottom boxes contain the queen and worker bees (Hinders).

It is also a good idea for a beekeeper to have protective gear, such as gloves, a hooded suit, hat, veil and bee smoker (to calm the bees). However, one may choose to

interact with the bees without this equipment. As a beekeeper, one must inspect, assemble, extract, and interact with the bees. It is typical of most beekeepers to inspect the bees twice a week in order to make sure no diseases or other issues are harming the bees (“All About Bees”). Overall, beekeeping can be a relaxing activity that helps maintain the bee population and keep food on the table for all throughout the years.

History of Beekeeping

Beekeeping first began with the foraging of wild honey by hunters and gatherers about 15,000 years ago. Wild honey foraging most likely followed the creation of fire because of the calming effect of smoke on bees. Evidence from rock carvings and paintings of honey foraging date back to 13,000 BCE.

Beekeeping can be traced back to ancient Egypt. Temple walls dating back to 2422 BCE depicted workers blowing smoke into hives to extract honeycomb. Beekeeping also has roots in Greece where it was seen as a high valued agricultural industry. Straw and clay beehives were also found from the Bronze and Iron Age in Israel (900 BCE). Additionally, records from ancient Greek philosophers and ancient China all describe the practice of beeking.

In the 18th century, European scientists took an interest in bee biology. Early methods of honey foraging consisted of destroying the whole colony to extract honey. As people became more sedentary, colonies were more precious resources.

Monasteries became large centers for beekeeping because of the importance of beeswax, from this shift the bees would be protected in the harvesting process.

With the invention of the moveable comb in the 19th century by LL Langstroth, the hive, often in a wooden box, could be disassembled for inspection and honey extraction and then replaced so there was no harm to the bees inside. This invention sparked the growth of commercial beekeeping in Europe and the U.S. Since the invention of moveable comb, many different hives have gained popularity in different regions.

The 21st century marked the rise of urban beekeeping. Urban bees are in some areas healthier than rural bees due to fewer pesticides in the city and more diversity of plant life. However, as there are not enough plants in certain cities to sustain bee life, an increase in bee friendly landscapes and pollinator gardens should be a higher priority in city planning everywhere (Glorybee).

Bees are Friends

Many people are afraid of bees and beekeeping because they do not want to get stung. However, bees die after they have stung, so why would they want to sting you? Short answer, they don't. There is no foolproof way to not get stung if you are being careless, but there are strategies you can take to reduce the threat of getting hurt while beekeeping.

First, choose a more docile species of bees to keep in your hive. In the US, these would include Italian, Russian, and

Carniolan, these bees are known for their easy going nature. If your hive is more prone to stinging, requeening your hive with a younger queen could solve this problem.

If you plan on handling your beehive, another option is to use a smoker to subdue the bees. Smoke has a calming effect on the bees so they will be less likely to sting you. Also, make sure to wear proper beekeeping equipment, gloves, a hat, and a suit will limit your exposure to bees who may sting you. Bees are amazing creatures who just want to make honey and do their own thing, not harm humans or any other organism (BackYardHive).

Benefits of Beekeeping

There are many benefits of beekeeping. First and foremost we depend on bees immensely because they pollinate many plants that inhabit our earth. Without bees as pollinators, we would be in a food crisis. Keeping bees in your garden can help make your plants more productive and support the struggling bee population.

Bees also have many other beneficial qualities for humans. For example, honey has many advantageous health qualities including the following:

- Remediating allergies as it has anti-inflammatory effects and has traces of pollen, an allergen, and with repeated exposure to local honey, it may help reduce allergies.
- Ointment for burns or other wounds due to the honey's antimicrobial and antibacterial qualities.
- Beeswax can also be harvested to make candles, lip balms, lotions, and

many other goods.

There are several benefits of honey and of bees in general. Beekeeping can even keep away more hostile bees that may inhabit your neighborhood. Ultimately, keeping bees strengthens the current bee population that is in threat of collapse if no action is taken (BackYardHive).

Potential Beekeeping Obstacles

Many cities across the United States have incorporated legal beekeeping in the city. For example, in Eugene, OR, according to local ordinance 20507, adopted in 2014, residents are allowed up to 3 beehives as long as they are at least 5 feet from the property lines, the opening of the hive is facing the middle of the property, and there is a water source for the bees.

Due to changing laws around the country, urban beekeeping has been gaining popularity, and beekeeping can be seen on the tops of fancy hotels in New York and Boston, and in backyards in Los Angeles. Even though urban beekeeping may not be the cure to colony loss, urban beekeeping can benefit urban agriculture and improve the overall beauty of a city.

Other obstacles that may prevent beekeeping and other efforts to support the bee population include:

- Fear of the unknown: Many people are hesitant to even consider the idea of beekeeping because they do not really understand what beekeeping is and how important bees are to life. Getting people invested in bees is a struggle because most people think bees want to sting or harm them, but

in reality, bees just want to do their own thing and provide for their colony. In order to get people over their fear of bees, people need to get hands-on experience with how amazing these creatures are and learn about all that they do to support us and the earth.

- Renting: Another struggle is to gain involvement of people who are renting houses or apartments. Most renters are not allowed to even put in a garden, let alone a colony of bees. It is difficult to explain to landlords that the bees will be beneficial, not harmful. However, once the stigma that is attached to bees has been dismantled, it will be easier to get homeowners on board and create a space in the city where people who live in apartments can beekeep.
- Cost of maintaining bees: Keeping bees can be tricky at times, but overall, it is a fairly simple process. Many people do not understand the significance of bees and are usually unwilling to put in their own money and time to take care of them. However, beekeeping is a worthwhile investment. Though bees can be somewhat spendy, there are cheaper ways to go about acquiring bees, whether that be catching your own bees, sharing the beekeeping process with a neighbor, or a number of other options. There are several possibilities when it comes to beekeeping, and it is essential to help people realize that it is necessary and

practical to support bees.

- Time donated to bees: Another obstacle that turns people away from beekeeping is that it takes time. A beekeeper has to be willing to put in the time necessary to keep a successful beehive. It is best to mainly just let bees do their own thing, so not that much time is required, but the bees should be checked on a couple times a week to make sure that the hive is healthy and that no diseases are present. Overall, beekeeping is not a very complicated process and it is important to help others realize how tangible it is to beekeep.
- Creating bee friendly landscapes: People can at times be afraid of change or to go against the norm, so they simply relinquish new ideas instead of embracing the possibilities that can come with these changes. It is essential that cities enhance bee friendly landscapes in order to better promote the bee population. This can be done through planting more green spaces that include plants bees enjoy at businesses, parks, homes of residents, along sidewalks, and other spaces. If your city is not taking action, start a movement through contacting local government officials or creating a group that works with residents and the city to implement more bee friendly landscapes. In addition, Guerilla gardening, which is the practices of planting food crops and other plants without

seeking permission, is taking off as more people realize how important gardens are for all of life even if the area where they reside does not yet understand the value.

How to Support Bees through Landscapes

Bees are intelligent and strong creatures, but they are still susceptible to different elements that can hurt them. Humans are one of those elements that at times can harm bees. Due to this, it is important to support bees in whatever capacity you are able. The following provides methods to support bees:

- Do not use pesticides in your garden. The chemicals in these pesticides can cause harm to bees and to the plants.
- Plant as many native plants in your garden as possible.
- Make sure to plant groups of similar plants together to attract more bees.
- Provide a freshwater source, such as a dripping hose, a small dish filled with rocks and water, or a little fountain to supply bees with access to freshwater.
- Try to choose plants with long blooming cycles and be sure to let them flower (Deeley).
- Have a diversity of plant life within your garden that are active during different times of the year in order to attract a full spectrum of pollinators. This means including plants of different heights, colors, and sizes (Gardeners Supply Company).

Even if people are not interested in beekeeping, it is still beneficial for them to

plant landscapes that bees will enjoy and to implement other practices that will support bees. If every home was to take steps to increase food and habitat for bees and other pollinators, then it could lead to several more acres around the world that would allow for bees to thrive.

The most successful garden design to increase pollination and bee survivability would be to use both food crops and other flowering plants that flower at different times of the year. It is important to have early and late blooming plants so the bees or other pollinators have food year round. The following list provides various plants that bees enjoy: mints, basil, sage, thyme, borage, oregano, lavender, chives, buckwheat, berries, strawberries, blueberries, raspberries, blackberries, cucumbers, tomato, winter squash, pumpkins, melons, watermelons, flowering broccoli, crocus, snowdrops, jonquils, tulips, sunflowers, asters, dandelions, clovers, lilacs, wisteria, cosmos, black-eyed susans, gaillardia, cup plants, goldenrod, loosestrife, bachelor's buttons, bee balm, sedum, peony and honeysuckle (Deeley).

In addition, bees also enjoy the following trees: maple, willow, black locust, sumac (Deeley). It is essential that the discussed plants and others that bees enjoy are available for bees throughout the year. If you do not have space for a garden, even offering a couple of flower pots with beneficial bee flowers is helpful.

Supporting Bees and All Pollinators

Bees and other pollinators are crucial to not only the existence of humans, but of

most other life on the planet. It is crucial that we all do our part in whatever capacity that may be to support the bees and pollinators, whether that is through beekeeping, planting a bee friendly garden, implementing more green space in the city where you reside, or setting a flower on your porch, as all are helpful. Bees are amazing creatures that provide one of the most important ecosystem services on the planet, and it is up to each of us to support them so that this service may continue. After all, where would 'bee' without our bees?

References

"Attracting Beneficial Bees." *Gardeners Supply*. Web.

<<http://www.gardeners.com/how-to/attracting-beneficial-bees/5024.html>>.

"Beekeeping Benefits." *BackYardHive*. Web.

<http://www.backyardhive.com/general/general/beekeeping_benefits/>.

Boland, Maria. "The Importance of Honeybees." *MNN*. Mother Nature Network, 3 May 2010. Web.

<<http://www.mnn.com/earth-matters/animals/stories/the-importance-of-honeybees>>

Deeley, Anita. "Bee Friendly Garden -Plant a Bee Garden for Honeybees - BEVERLY BEES." *Beverly Bees*. Beverly Bees. Web. 26 Feb. 2015.

<<http://www.beverlybees.com/planting-bee-garden/>>.

“What Is Beekeeping.” *All About Bees*.
<<http://charearl.com/bees/What-Is-Beekeeping.html>>.

"Help the Honey Bees." *Center for Food Safety*. Web.
http://www.centerforfoodsafety.org/files/flower-listupdate_45778.pdf

Hinders, Dana, and O. Wallace. “What is Beekeeping.” *WiseGeek*. Conjecture.
<<http://www.wisegeek.com/what-is-beekeeping.htm>>.

"How to Grow Archive - Bonnie Plants." *Bonnie Plants*. Bonnie Plants, n.d.
Web. 20 Feb. 2015.

"LCBA Main Page." Lane County Beekeepers Association.
<<http://www.lcbaor.org/index.htm>>.

Nieh, James and Dylan Voeller. "Why bees are ecologically important." 3 & 4. Web.
<<http://labs.biology.ucsd.edu/nieh/TeachingBee/importanceofbees.htm>>.

"Pollination." *Types of Pollinators*. Canada Agriculture and Food Museum. Web.
<<http://bees.techno-science.ca/english/bees/pollination/types-of-pollinators.php>>.

"Selecting Plants for Pollinators." Eastern Broadleaf Forest. Web. 26 Feb. 2015.
<<http://pollinator.org/PDFs/Guides/EBFContinentalrx13FINAL.pdf>>.