

# The Buzz About Bees

WRITTEN BY SAM SCHUNK

VENICE GULF COAST LIVING MAGAZINE

Have you ever wondered what the world would be like without bees? These fascinating flying insects have a vital impact on our lives, one that we might not have fully contemplated. Although we may realize that these highly social creatures produce honey and beeswax, we might be surprised to discover that bees also play an integral role in the process of growing the majority of fruits, vegetables and nuts that we eat.



According to the U.S. Department of Agriculture's Natural Resources Conservation Service, three-fourths of the world's flowering plants and approximately 35 percent of food crops around the globe depend upon pollinators—creatures such as honey bees, butterflies, bumble bees, bats and birds—to reproduce. Experts estimate that bees are directly or indirectly involved in producing one out of every three bites of food that we eat. To give a sense of how much food is impacted by pollinators, the U.S. Fish and Wildlife Service reported that honey bees aided the growth of over \$19 billion in crops in 2010, while other insect pollinators assisted in the production of \$10 billion in plants for the same year. Additionally, research shows that the size, taste and quality of our important dietary staples significantly improve as a result of the pollination process.

As farms across the nation produce the food we eat, they depend upon the assistance of bees; however, natural pollinators may not be as common to the agricultural landscape as might be thought. CNN reported that bees can be transported thousands of miles—such as from Florida to California—to assist in pollinating crops. Renting the use of these bees has become a necessary expense for farmers, one that can range anywhere between \$10 to \$180 per hive. That figure increases exponentially when taking into account the fact that farmers often need to rent dozens of hives each season. The net effect is that the demand for bees impacts the prices that consumers pay for crops, particularly for popular items such as almonds or avocados which almost entirely rely on bees for pollination. According to research from North Carolina State University, this travel can have adverse effects on the honey bees' health and lifespan including shorter lives and higher oxidative stress levels than are observed in stationary bees. The latter factor ages the honey bees more rapidly and may diminish their ability to fight off disease and parasites.

Wild bees such as bumble bees also play a key role in the food production cycle: figures estimate that about 4,000 species of wild bees, 49 of which are bumble bees, are found in North America, and they help to pollinate blackberries, cherries, kiwi fruit, raspberries, tomatoes and an assortment of other delicious fruits, nuts and vegetables. Their presence has also been shown to increase yields across many types of crops: research has demonstrated that bumble bees are often more efficient than honey bees at pollinating crops. To cite one example, it's been found that a honey bee would have to visit a blueberry flower four times to deposit the same amount of pollen as results from a single visit from a bumble bee queen. This may be due to the uniquely efficient method called "buzz pollination" that bumble bees use to extract pollen from flowers. Through this technique, the bees shake the flowers at a certain frequency, stimulating the release of larger amounts of pollen.

For this and many other reasons, it may be alarming to find that wild bees are threatened as well, with some bumble bee species clearly in decline. Once prevalent across the eastern U.S. and southeastern Canada, the rusty patched bumble bee (*Bombus affinis*) is now only found in a few small populations in the Midwest. After its numbers dropped by an estimated 91 percent over 20 years, it became the first bee in the lower 48 states to be listed as an endangered species in March 2017. The decline rate has been more gradual in other types, such as the American bumble bee (*Bombus pensylvanicus*); however, because they are free-roaming, it is harder for researchers to track them, making the exact numbers more difficult to determine. Therefore, authorities in the scientific community are concerned that the losses within these critical populations may be quite substantial.

As the facts illustrate, these buzzing insects are important contributors in the process of growing our foods. On its website about pollinators, the U.S. Fish and Wildlife Service shares that, without the assistance these creatures provide, most plants

would be unable to produce the fruits and seeds which are important food sources for people and wildlife. As a result, we are dependent upon bees for the colorful rainbow of produce available to us and they rely on us to responsibly care for the environment in which they live.

## Combing for the Cause

As the situation for bees and other pollinators is becoming more critical, it is only logical to wonder how this happened; however, research has shown that it is a question with no simple answer. In recent years, public attention was drawn to the bees' plight as the media reported on a phenomenon known as Colony Collapse Disorder (CCD), an affliction noted for the sudden death of nearly the entire population within a hive, when it was first observed in 2006. After about 10 million hives, or \$2 billion worth of honeybees, fell out of commission nationwide due to CCD, it became the focus of environmentalists, scientists, and many others, making headlines globally.

Currently, researchers are no closer to identifying what caused the bees to die off in this fashion; it is widely believed among experts in the industry that CCD was due to the confluence of stresses affecting bees' health. An entomologist at the University of Maryland and the lead author of the Bee Informed Partnership's annual honey bee loss report, Dennis vanEngelsdorp says, "I, as a researcher, was a little naive in the beginning thinking that we would find one cause and then hopefully one solution [to CCD]. But it's clear especially in the broad definition of CCD—high rates of winter loss and annual loss—that it's a lot more complicated."



The United Nations Environmental Programme (UNEP) notes, "More than a dozen factors, ranging from declines in flowering plants and the use of memory-damaging insecticides to the world-wide spread of pests and air pollution, may be behind the emerging decline of bee colonies across many parts of the globe." The 2007 book "*Status of Pollinators in North America*," adds climatic change, habitat losses, invasive plant and bee species, possible genetic factors, and transgenic crops to the list of possible underlying reasons. In recent years, experts would also include poor nutrition amongst bee populations as another cause for concern.

**Floral preservation.** A closer look at the first of these potential causes reveals the serious nature of the problem. The UNEP cautions that, unless conservation efforts are increased, an estimated 20,000 flowering plant species, which provide vital food sources for insects, may be lost in the upcoming decades. Since the bees pollinate such a significant portion of the fruit, nuts and vegetables that we eat, losing these plants could have a trickle-down effect upon our food supply.

**Nix the spray.** Data has emerged suggesting the chemicals used to treat our produce may be one of the major factors impacting bee health. In 2018, the European Union expanded its ban on three neonicotinoids (often called neonics)—clothianidin, imidacloprid, and thiamethoxam—to all field crops, due to growing evidence that the pesticides can harm domesticated honey bees and also wild pollinators. This May, the U.S. Environmental Protection Agency (EPA) announced that it would be pulling 12 of these pesticides from the market, a decision that was required as part of a successful legal settlement on behalf of a coalition of conservationists and beekeepers—over the agency's failure to protect pollinators, beekeepers, and endangered species from these dangerous pesticides.

**Pests, "bee" gone.** While bees have always had to contend with various diseases and pests in their colonies, the increasingly global market we live in has resulted in the influx of new illnesses

and parasites to which the buzzing creatures may have little to no resistance. Additionally, invasive plant and insect species can pose a threat to pollinators.

**The air we breathe.** Since pollution may interfere with the bees' ability to locate their food sources, air quality is another important consideration. Also, according to the UNEP, climatic changes seem to be having an impact on the plant-pollinator relationship, as they may alter flowering schedules and rainfall patterns, which can have a significant effect on both the quality and quantity of nectar supply.

**A growing concern.** Industrial agriculture, with its reliance upon transgenic crops, may be playing a significant role in the decline of these species. In these crops, which are also known by the terms 'genetically engineered,' 'genetically modified' (GMO) or 'biotech' plants, one or more genes have been artificially introduced into the plants. Scientists have made these alterations generally so that the plants have greater resistance to pests and insecticides or to improve crop yields.

While these traits may sound beneficial, concerns have been voiced that transgenic crops may not only present a potential threat to bees, but also to people consuming these plants. Since transgenic crops can have traits introduced that make them resistant to herbicides, one of the arguments for genetically engineered plants has been that they will not need to be exposed to a substantial amount of pesticides; however, recent research has actually found the reverse to be true. The study, which examined the use of pesticides on U.S. crops from 1996 to 2011, found that the overall use of these chemicals increased by 7% during that period, reflecting a rise both in volume and number of agents applied (Environmental Sciences Europe).

**Bees need food, too.** Much of the land that used to be natural meadow has now been converted to heavily controlled and chemical-covered farm fields. This results in fewer natural sources being available to bees as they travel about, collecting pollen and



nectar for the entire colony. As it becomes more challenging for them to find proper food, these vital insects have less energy. When this happens, they fly shorter distances and have less selection to choose from both in terms of what they eat and the amount of pollen and nectar that they can gather. They collect these items from flowers so that they can be converted into honey which the colony depends upon for feeding the bee larvae. This negatively impacts the health of the colony as a whole, a problem that is compounded in subsequent generations of bees.

## Give Bees a Chance.

In exploring the many possible factors contributing to decline in pollinator populations, it may become clear why the scientific community cannot offer a definitive answer to this problem at this point. That being said, the universal consensus is that it is an issue that requires our immediate attention and action.

Providing a welcoming environment for these insects and other creatures is crucial to our survival as a species too. We depend upon bees to ensure that many of the foods we eat continue to grow, bringing these important staples of our diets from the field to our tables. In the 2007 PBS documentary *Silence of the Bees*, entomologist May Berenbaum explained how critical bees are to the environment, saying "Pollinators are what ecologists call keystone species. You know how an arch has a keystone...If you remove the keystone, the whole arch collapses." By taking action today, we can do our part to help these critical species revive and, hopefully, to thrive once again. Here's how we can be part of the solution:

**Shop local.** One of the ways that we can support bees and other pollinators is by buying organic fruits, vegetables and nuts from our area's farmers. To qualify as organic as defined by the USDA National Organic Program (NOP), produce must be grown without the use of bioengineering, ionizing radiation, sewage sludge, and most synthetic fertilizers or pesticides. In addition, to ensure that the crops will not be contaminated, they must be grown in soil that's been free of prohibited substances for three years prior to harvest. As a result, crops on organic farms

are cultivated in an environment that has as few potential threats to pollinator populations as possible. Purchasing this type of local produce helps to protect their habitat, resulting in tastier, fresher food on our plates. Since it requires less energy to get these essential staples to market, it is better for the planet's overall health as it also lessens our carbon footprint.

**Take a closer glimpse.** When shopping, be sure to look at the labels on your food's package because, in the next three years, it is going to become much easier to distinguish which items contain modified ingredients. In 2017, the government passed a national Genetically Modified Foods (GMO) labeling law, instituting one uniform standard for labeling GMOs, which are

also referred to as BE (bioengineered). Originally, these requirements were set to be in place by July 2018; however, the U.S. Department of Agriculture (USDA) extended the implementation two years, going into effect at the beginning of next year. Although some food companies may introduce these labels sooner, they are required to be in compliance by January 1, 2022. The labeling has been supported by manufacturers because the rule states that "bioengineered food...shall not be treated as safer than, or not as safe as, a non-bioengineered counterpart." Rather, these labels are considered to be informative for the consumer, rather than indicating a food's overall safety or nutrition. That being said, those who choose to go non-GMO may find it much simpler to determine which food they wish to purchase.

**Speak up.** Organizations such as the Pesticide Action Network North America, the Environmental Working Group, and Beyond Pesticides are actively working to educate the public about the potential dangers of these chemicals to the bees and the foods that we eat. These advocacy groups have created petitions to let their concerns about the effects these products may have on our environment and personal health be known to the government, chemical

manufacturers and the agricultural industry. The latest research on related issues is shared on their websites, making it easier to stay informed about this critical subject.

**Create a welcome haven.** Since we now know that these flying insects visit the plants that become the fruits, vegetables and nuts that we ingest, we can make an important connection: by helping to keep the bees' food sources as pesticide-free as possible, we are also doing our part to ensure the safety of the food that we eat. If you choose to set

up a chemical-free garden or backyard habitat for bees and other pollinators, here are some tips to get you started:

1. Reduce or eliminate pesticide use in your lawn and garden. Whenever possible, incorporate plants that attract beneficial insects and employ organic solutions or homemade remedies to control pests. Be aware that plants may become slightly damaged if they provide a habitat for butterfly and moth larvae.



2. Use pollinator-friendly vegetation in your landscape. Among Florida Native Plants Nursery's list of the best plants to attract pollinators are native trees such as the Sweet Acacia (*Acacia farnesiana*); shrubs like the Privet Cassia (*Senna ligustrina*) or Blueberry (*Vaccinium spp.*); wildflowers such as Goldenrods (*Solidago spp.*) or Dune Sunflower (*Helianthus debilis*); and palms like the Saw Palmetto (*Serenoa repens*).



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Please bring unexpired & unopened canned goods or non-perishable items.

**Most needed items include:** Peanut butter & jelly, canned tuna, chicken or salmon, rice, beans and shelf-stable milk

Packaged or canned fruit or fruit drinks.

Canned veggies (no salt or sugar added)

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### OUR WORLD

3. Choose a mixture of plants for each season. Varying colors, shapes and scents of flowers will attract a wider assortment of pollinators. If space is limited, consider planting flowers in containers on a patio, balcony, or in window boxes.
4. Provide a clean, year-round water source, such as a rainwater collection or irrigation system or a small garden water feature. Shallow water sources will offer enough water for bees without creating breeding opportunities for mosquitoes.
5. Attract wild bees to your backyard by leaving some dead tree trunks, also called snags, in your yard to provide shelter for wood-nesting bees and beetles.
6. Support land conservation in your community. Get involved by helping to establish and maintain community gardens and green spaces to ensure that pollinators have appropriate habitat.

*Mind the beeswax.* Another important way to lend our support is to buy items that are a result of the bees' busy efforts. Not only do bees produce deliciously sweet honey, they also make beeswax, which is used in a plethora of products such as candles, furniture polish, cosmetics, skin care solutions, and different types of wax. Some people even take pollen supplements to treat a variety of ailments. Whether we are at the table, the market or elsewhere, these purchases can make a world of difference for bees and other pollinators.



### Just to "Bee" Clear

As we have discovered, the situation for bees and other pollinating creatures has reached a critical point, and, given our dependence upon these insects, it is also a decisive moment for us. Administrator of the United Nations Development Programme and former UNEP Executive Director, Achim Steiner, explains, "The way humanity manages or mismanages its nature-based assets, including pollinators, will in part define our collective future in the 21st century." By doing our part and making responsible choices, we can help keep bees busily buzzing for many years to come.

*Log on to the following websites for more information:*

[AgDev.anr.udel.edu/MAAREC](http://AgDev.anr.udel.edu/MAAREC), Mid-Atlantic Apiculture & Extension Consortium

[BeelInformed.org](http://BeelInformed.org), The Bee Informed Partnership

[FloridaBeekeepers.org](http://FloridaBeekeepers.org), Florida Beekeepers Research Foundation

[Pollinator.org](http://Pollinator.org), site for the Pollinator Partnership

[PopSci.com/tags/bees/](http://PopSci.com/tags/bees/)

[SuncoastBeekeepers.org](http://SuncoastBeekeepers.org)

[SWFBees.com](http://SWFBees.com), Beekeeper Association of Southwest Florida

[UNEnvironment.org](http://UNEnvironment.org)

[WorldBeeDay.org/en](http://WorldBeeDay.org/en)

*December 2019*

- 12.14 The Nutcracker (thru 12.15)  
12.31 Decades Rewind: *New Year's Eve Event!*

*January 2020*

- 1.16 The Reflections  
1.18 Cash, Killer, & the King  
1.24 Broadway Boys  
1.30 Dick Hyman, Ken Peplowski, Clairdee: Movie Music  
1.31 Lecture: The Beatles Weren't Really So Great... Or Were They?

*February 2020*

- 2.1 The Beatles vs. The Stones  
2.4 The Limeliters and The Brothers Four  
2.11 A Charlie Chaplin Double Feature  
2.15 Peter Pan and Cinderella: ON ICE  
2.16 Gershwin... With a Twist!  
2.21 Zepparella  
2.22 Carmina Burana in Motion (thru 2.23)

*March 2020*

- 3.8 Terry Myers Orchestra: Tribute to the Big Band Generation  
3.13 Shen Yun (thru 3.16)  
3.21 Dancing Dream: A Tribute to ABBA  
3.29 A Midsummer Night's Dream and Ocean

*April 2020*

- 4.26 Good Vibrations

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