Honeybee Decline Threatens Crops

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The number of honeybee colonies decreased by more than 50% in the United States from the 1940s to the 1990s. The disappearance of those busy, buzzing insects might seem like a blessing to children afraid of getting stung. However, honeybees are much more important to humans than it might seem at first glance.

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Many flowering plants, including plants grown for food, depend on their interactions with small animals such as bees. Those animals pollinate their flowers. Pollination leads to the growth of fruit and seeds. Without the help of the pollinators, the plants would produce no fruit, no seeds and therefore no food for animals or people.

Many scientists claim that humans have threatened the crucial relationship between pollinators and plants. When people fragment natural ecosystems into smaller patches, pollinators fail to visit all the plants in many small plots. And some pollinators have disappeared as humans pollute the animals' habitats with pesticides. In the case of
honeybees, the spread of diseases has driven their numbers lower and lower.

These problems were outlined in a book, *The Forgotten Pollinators*, published by Island Press in July 1996. Authors Stephen L. Buchmann, of the University of Arizona in Tucson, and Gary Paul Nabhan, director of science at the Arizona-Sonora Desert Museum in Tucson, stressed the impact that a continuing decline in pollinators would have on humans. In an article in the July/August 1996 issue of the *Sciences*, Buchmann and Nabhan warned, "One in three mouthfuls of the food people eat is prepared from plants pollinated by animals. When the pollination network is disrupted, the effect on human populations is direct and potentially disastrous." They claimed the pollination crisis is a clear illustration of why humans need to be concerned with the loss of biodiversity on Earth.

**Plant Reproduction**

Plants that produce flowers are called angiosperms. Flowers are the plants' reproductive organs. A typical flower contains both male and female reproductive structures, although some plants have single-sex flowers. For fertilization to take place, pollen, from the male structure, must reach the tip of the female structure. Some species can self-pollinate, which means that the pollen in one flower can fertilize the eggs within the same flower. However, in most angiosperms, fertilization occurs only when pollen reaches the flower on a separate plant.

Wind carries the pollen of some species from one plant to another. Other angiosperms are pollinated by animals such as bees, beetles, birds, bats and other small animals. The animals visit flowers to feast on sweet, sugary nectar produced by the plants. As an animal sips the nectar, its wings, feet or fur rub against the flowers and pick up pollen grains. When the animal visits flowers on other plants, some pollen grains fall onto the flowers and pollinate them. Fertilization begins.

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The honeybee is an important pollinator of food crops in the United States. Agriculturalists estimate that the honeybee pollinates $10 billion worth of crops each year. Crops such as alfalfa, apples and almonds rely on honeybees for pollination. In 1996, almost all of the honeybees in the United States lived in commercial colonies maintained by beekeepers. In addition to harvesting honey from their bees, beekeepers leased their bees to farmers for pollinating crops.

Recently, the number of commercial honeybee colonies has declined. A survey of beekeepers across the country showed that the number of beekeepers in the United States decreased by 20% from 1990 to 1996. Beekeepers claim that honeybee diseases and cheap imported honey have made the beekeeping business more and more difficult. The cold winter of 1995-1996 also killed many honeybees and put some beekeepers out of business.

Colonies of wild honeybees have become virtually extinct, mostly because of diseases. The number of honeybee colonies, wild and commercial, has declined from 5.9 million in 1947 to 2.7 million in 1996.
Deadly Mites

An epidemic of parasitic mites poses the greatest threat to honeybees in the United States. Scientists first identified one of the pests, the tracheal mite, in England in the early 1900s. At some unknown time, the mite traveled to South America, and in 1984 the tracheal mite reached the United States. Bees inhale the tiny mites. The mites remain in a bee’s breathing passages, or trachea. They dig holes through the tracheal walls to eat the bee’s circulatory fluid. The fluid is similar to blood in other animals. As the mites eat the fluid, they weaken the bee and sometimes kill it. Also, the mites can become so numerous in the trachea that they suffocate the bee. Tracheal mites have infected honeybee colonies across the country.
A second parasite, a mite that belongs to the *Varroa* genus, appeared in the United States in 1987. Originally from Asia, the *Varroa* mite also spread northward from South America. Adult female *Varroa* mites, about the size of pinheads, feed on honeybee circulatory fluid. They do not enter the bee, but pierce its exoskeleton with sharp mouth parts and suck out the bee’s circulatory fluid.

Some beekeepers have lost 80% to 90% of their honeybees to tracheal and *Varroa* mites. Scientists estimate that beekeepers lose about $190 million each year due to mites and other honeybee diseases. Despite the decline in honeybees, however, scientists do not expect them to become threatened with extinction. Honeybees still number in the billions in the United States. And scientists suspect that they will become resistant to the two mites within 10 years. Honeybees in other countries have become resistant to the mites. However, the honeybee problem emphasizes the importance of recognizing and protecting other animals that pollinate crops.

### The Pollination Crisis

Scientists Buchmann and Nabhan, the authors of *The Forgotten Pollinators*, studied pollination in the southwestern United States. They issued a report stating that 180 pollinating vertebrate species are threatened with extinction. Those include geckos, hummingbirds, warblers, parrots, bats, weasels and lemurs. The main cause, according to the scientists, is human activities that threaten the pollinators’ natural environments.

Buchmann and Nabhan also studied an area along the border between Arizona and Mexico. They found that populations of cactus-pollinating moths had declined in recent years. They noted that in an area where people had sprayed pesticides, 27% of cereus cactuses were pollinated, and 5% of the plants produced fruit. In pesticide-free
areas, between 60% and 100% of cereus cactuses were pollinated, and between 75% and 100% of the plants produced fruit. The researchers concluded that pesticides have damaged not only animals that harm crops but also animals that provide the crucial service of pollination.

Buchmann and Nabhan stated that habitat fragmentation is a major cause of the pollination crisis. People clear land for farms, roads and housing developments. Those projects cut into prairies, deserts and forests, and leave behind isolated patches of natural land. Small, isolated patches cannot support diverse systems of plants and animals. [See 1996 Biodiversity Increases Plant Growth]. If such patches of land are separated from other regions by human habitation, pollinators might not visit them. The fragmentation threatens both the plants and the animals that pollinate them.

Further Reading


Keywords


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