

Roth: Pollinators, the environment and the economy

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Bees are critical to our food supply and our economy. According to the president's Pollinator Health Task Force, honeybee pollination alone adds \$15 billion to the value of U.S. crops each year.

Bees pollinate a wide variety of crops, from corn to soybeans to apples to almonds. Bees and other pollinating insects travel from flower to flower, enticed by the plant's sugary

nectar. While the insect feeds, the plant covers it with pollen, which the insect then spreads to the next plant.

Pollinator populations are being threatened in several ways.

One problem that pollinating insects face is global climate change with rising temperatures. Scientists fear that climate change may be negatively affecting the plant-pollinator relationship. The problem is that many plants and pollinators respond to environmental cues, such as temperature and snow melt, in order to know when to flower and feed. If plants flower at different times or for shorter periods of time, this will negatively affect pollinating insects and their ability to spread pollen.

Another problem faced by pollinators is infectious disease. Diseases have traveled around the world with host populations due to the commercialization of honeybees and other pollinators. Hosts are naturally exposed to pathogens in a variety of ways, including flower sharing, social interactions, and predatory practices. Humans are also contributing to the spread of disease in both commercial and wild pollinator populations.

Honeybees have evolved and developed several ways of fighting disease on their own. One way is by naturally immunizing eggs as they develop in the queen bee. To do this, worker bees first collect bacteria from contaminated pollen and nectar in the environment. Then, the worker bees make royal jelly out of the bacteria-ridden pollen and nectar. The pathogens are passed to the queen when she feeds on the royal jelly. The pathogens spread to the eggs that are developing in the queen, which immunizes the unborn bees.

Honeybees also fight disease through nursing. Nursing bees will feed certain types of honey to infected brood to fight off different diseases. For example, linden honey is better at fighting off European foulbrood, while sunflower honey is

better at fighting off American foulbrood. American foulbrood is a highly contagious bacterial disease. As the name suggests, it initially infects honeybee brood, and it eventually kills the entire colony.

Another threat to pollinators is the severe loss of their natural habitats. Agriculture, urban and suburban development, and resource development have all contributed to the destruction of natural habitats. Many pollinators have lost their winter habitats, as well as their feeding and breeding grounds. While some natural habitats have survived these human developments, many of the remaining habitats are fragmented. These small, isolated habitats may not serve all of the pollinators' needs.

A final problem faced by pollinating insects is the use of pesticides. One particularly problematic pesticide is the neonicotinoid pesticide commonly referred to as neonics. These nicotine-based pesticides are used to coat the seeds of many crops, including corn and soybeans. Neonics are water-soluble, and the plants absorb the pesticide as they grow. The problem for pollinators is that trace amounts of the pesticide can be found in the flowers of the mature plants. The pesticide is picked up by the feeding pollinator. Eventually, the pesticide is carried back to the hive, where it can spread and kill the entire colony.

If you would like to help nurture and grow the pollinator community, please consider building a garden for bees, butterflies and other pollinators, as described here by the U.S. Fish and Wildlife Service: www.fws.gov/midwest/news/PollinatorGarden.html.

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