Welcome to the *Natural Inquirer* Pollinator Edition!

Photo courtesy of Lance Cheung, USDA.

Glossary words are in **bold** and are defined on page 30.

Each night during the spring months in the desert of the Southwest United States, large white flowers open atop tall saguaro cacti (figure 1). These flowers have a distinct fragrance that attracts lesser long-nosed bats. The bats are there for dinner, consuming the plant's **nectar**, a sugar-rich liquid.

Figure 1. The flowers of the saguaro cactus open at night and stay open during the first part of the day. At night, lesser long-nosed bats visit the flowers for their nectar. During the day, bees and numerous bird species also visit the flowers.

Photo courtesy of Tomascastelazo / CC BY-SA (https://creativecommons.org/licenses/by-sa/3.0).

To learn more about monographs, read "About *Natural Inquirer* Monographs!" on page 5.

These visits are an important step in producing the next generation of cacti. For example, as a bee moves from one flower, sticky **pollen** from the male part of the flower, called **anthers**, attaches to the bee (figures 2a and 2b). Moving to another flower to feed, the bee unknowingly transfers the pollen to the female parts of the flower, called **stigma** (figure 3). The result is **fertilization**. This same process occurs with bats and the saguaro cacti.

Figure 2a. A bee visits a flower. Photo courtesy of Lance Cheung, USDA.

Figure 2b. As animals visit flowers, pollen collects on their bodies. As the animals move from plant to plant, pollen from one flower ends up on the flowers of another plant. Photo courtesy of Lance Cheung, USDA.

Figure 3. The anther and stigma are the most important parts of a flower for pollination. Anthers produce pollen and stigma collect pollen. Pollinators come in contact with both as they feed on nectar, transferring pollen from plant to plant.
Photo courtesy of Babs McDonald.

While wind, water, or rain pollinate some plants, the majority of flowering plants, like the saguaro cactus, require animal pollination. This includes plants that produce many of our favorite foods. Everything from strawberries to almonds to watermelons to tomatoes require animal-assisted pollination. In fact, scientists estimate that one out of every three bites of food you consume are connected to animal pollinators!

Pollinators include more than just bees. Butterflies, birds, beetles, flies, ants, moths, wasps, and even lizards are all pollinators (figure 4). Some pollinator species pollinate only one plant species, and some pollinate many different plant species. For instance, hummingbirds may visit anywhere from 1,000 to 3,000 different flower blossoms each day.

Figure 4. Pollinators such as butterflies are valuable to ecosystems and agriculture. Here, a monarch butterfly visits a flower at the Cranberry Mountain Nature Center on the Monongahela National Forest.

Photo courtesy of the Forest Service Eastern Region, Flickr.

Of the many pollinators, however, the estimated 20,000 bee species worldwide may be the most important to our everyday lives. They are responsible for pollinating native plants in ecosystems across the world. Additionally, the U.S. Department of Agriculture (USDA) estimates that up to 100 major crops rely on bee pollination. Pollination by bees in the United States results in larger crop growth, valued at nearly $15 billion dollars per year.

However, honey bee populations are shrinking. According to the USDA, honey bee **colonies** in the United States have shrunk from 6 million to 2.5 million since the 1940s. As with other pollinators facing population decline, many issues are to blame, such as habitat destruction, viruses, pollution, and invasive species. For instance, as large industrial farms and other development have replaced native grasslands, we have lost many native plants that honey bees rely on for food to survive (figures 5a and 5b).

Other pollinators face challenges similar to those the bees face. Scientists believe that we can help these bees and other pollinators. One simple way to improve the health of pollinators is to create more habitat with food resources. We can do this by planting native flowering plants in yards, parks, and farms, and by limiting mowing to allow these flowers to grow. Scientists suggest limiting chemical use on farms and in gardens and using no-till gardening methods to avoid damaging the nests of ground-nesting bees. Scientists also suggest reducing greenhouse gas emissions to limit the impacts of a changing climate on native plants and animals.

As you read this, think about pollinators you see in your daily life. Which pollinators do you see frequently? What can you do to improve your local environment for pollinators?

Number Crunch

Write out the number 15 billion.

Figures 5a and 5b. As native habitat is lost to development, pollinators lose many of the native plants they require as food.

Photo 5a courtesy of Babs McDonald and photo 5b courtesy of Jessica Nickelsen.