

# Pollinators

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## Educational Objectives

- Participants will gain an understanding of the importance of pollinators.
- Participants will learn practices that support pollination.

## What is pollination?

As the weather warms and plants come to life, we spend more time outdoors enjoying nature.

While we sit watching the bees bounce from clover to clover, the butterflies landing on our flowers and the hummingbirds hovering above them,

do we appreciate their hard work? These organisms play an important role in our day-to-day lives that many take for granted. Pollination is the act of transferring pollen from the anther (female) to the stigma (male), producing fertilized seeds. Without pollination, plants would not be able to reproduce, produce fruit or bloom. The pollinator often facilitates this vital process.

Pollination is the accidental consequence of an animal's visits to flowers. The pollinator often eats or collects pollen for protein and other nutritional needs or sips nectar from the flower, allowing pollen grains to attach to the animal's body during feeding. When the animal visits another flower for the same reason, pollen can fall off onto the flower's stigma and may result in successful fertilization.

## Importance of Pollinators

Flowers must rely on outside forces to move pollen. These methods can include wind, water, birds, insects, butterflies, bats and other animals that visit flowers. While some plants can self-pollinate, cross-pollination is sometimes necessary and typically preferred. Cross-pollination is when the pollen from one plant gets deposited in another plant. This type of pollination results in genetic diversity, adaptability and survivability, as well as larger and more flavorful fruit yields. The role of pollinators is to ensure the future of the plants we all enjoy.

To put this into perspective, out of the roughly 1,400 crops grown around the world, 80% require pollination by animals. According to the U.S. Forest Service, pollination of agricultural crops is valued at \$10 billion annually in the U.S.

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alone. Scientists estimate one out of every three bites of food you eat exists because of the efforts of pollinators.

Aside from pretty flowers and bountiful crops, pollinators also help the ecosystem around them. The air you breathe is thanks to the carbon dioxide exchange by flowering plants. Without pollinators, the succession of many of these oxygen-producing plants would stop. Pollinators also impact the soil and water around us. Natural ecosystems depend heavily on pollinators for food, cover for wildlife, sustaining plants to prevent soil erosion and keeping waterways clean.

## Types of Pollinators

When thinking about pollinators, the first that come to mind are usually bees and butterflies. However, there are more than 200,000 species of pollinators in the animal kingdom. While many of these are insects, you may be surprised what other animals made the list! The table below shows a sampling of those responsible for pollination worldwide. In a recent study, fish have even been linked to pollination. Fish consume dragonfly larvae, a natural predator of many pollinators, thereby increasing pollination around water ecosystems.

<i>Insects</i>	<i>Birds</i>	<i>Others</i>
Moths	Hummingbirds	Bats
Flies	Honeycreepers	Lemurs
Beetles	Orioles	Lizards
Wasps	Parrots	Mice

## Bees

Bees are some of the most essential pollinators in the United States. European Honeybees and around 4,000 species of native bees pollinate a large number of our crops. Corbicula, also known as the pollen basket, are tiny hairs on the hind legs of honeybees. After moistening the pollen with saliva, honeybees pack the pollen onto their pollen baskets, sometimes weighing up to one-third of their body weight. This is how they transfer pollen from flower to flower. Bees must collect nectar from about 2 million flowers to make one pound of honey.

European Honeybees were imported almost 400 years ago and live in colonies, while native bees nest in the ground and in twigs. Bees have varying tongue lengths that help them determine from which flowers they can get nectar. Bumble bees are generalists, which means they feed on a wide range of plants.

## Bats

Bats are crucial pollinators for night-blooming plant species in tropical and desert climates. The agave plant – used to make tequila – depends on bats for pollination. Both on the federally endangered species list, the Lesser long-nosed bat and the Mexican long-tongued bat migrate north more than 1,000 miles every spring from Mexico into Arizona, New Mexico and Texas to feed on the nectar of cactus blossoms. More than 1,300 bat species consume vast amounts of insects every night, including some of the most damaging agricultural pests, such as codling moths in California walnut orchards.



## Beetle

Beetles were some of the first insects to visit flowers, having ancient origins found in fossils from over 200 million years ago. Beetles are attracted to spicy or fruity odors, including magnolias and spicebush. Beetles need a wide opening in the flower because they are clumsy fliers.

## Butterflies and Moths

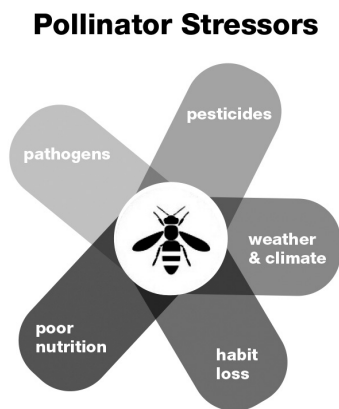
The monarch butterfly population has dropped by 80%-90% in the last two decades. With one of the longest migrations of any species, the monarch butterfly's flight can last for thousands of miles, from Canada to central Mexico. Butterflies and moths prefer broad, flat-faced flowers. Their long, straw-like mouth can suck nectar from deep within the flower.

## Birds

Hummingbirds are the primary birds serving as pollinators in the United States. Bright-colored tubular flowers attract hummingbirds, with the largest population of hummingbirds being in regions closer to the tropics and warmer climates.

## Decline of pollinators

Around the world, the population of pollinators is decreasing annually. In recent decades, managed honeybee hives have declined by more than 50%, with one in three hives lost during winter. Around 25% of the North American bumble bee and 17% of the Monarch butterfly species are at risk of extinction. The decline in wild and managed pollinator populations results from a combination of many factors, including the five stressors shown in the diagram above.



Parasites and pathogens are the most destructive factors the honeybee population faces. The Varroa mite weakens the hive, making it more susceptible to other pathogens. Urban landscapes – with the increasing loss of natural habitats and the invasion of nonnative species -- reduce plant diversity and



food sources that sustain healthy pollinator populations.

Overuse and misuse of pesticides have had lethal effects on pollinators. Herbicides can destroy the nesting, larval and overwintering habitats for pollinators. Pesticides can impair a bee's memory and ability to return to the hive, and they can also suppress the bee's immune system, making them more susceptible to diseases and pesticides. Be sure to check your herbicide, pesticide, fungicide and insecticide for the bee hazard warning in the environmental hazards section on the bottle. This warning alerts users to its harmful effects on bees. Chemicals with this label can kill bees, be carried back to the hive resulting in severe colony loss, or render the queen bee infertile.

## Doing Our Part

One of the most effective ways to support pollinators is to provide a diverse native plant selection with varying heights, flower shapes and colors that provide continuous blooms from early spring through fall. In addition to providing nutritional needs, a flower-rich foraging habitat provides egg-laying sites for butterflies and moths. Some pollinators have specific needs, for example, milkweed is the only host plant for Monarch butterfly eggs and larvae. Research what native plants are beneficial to pollinators in your area and plant those.

WVU Extension wildlife specialist Sheldon Owen suggests a few ways to create an area for native flowers to grow that are aesthetically pleasing and also create nectar resources and promote pollinators:

- A small, well-planned butterfly garden
- Meadow filled with native wildflowers







- Fencerow with various layers of flowering trees, shrubs and forbs
- Pollinator-friendly field borders and cover crops
- Changing mowing habits to allow marginal lands, fencerows and ditches to revert to some native vegetation, such as asters, goldenrods and milkweeds

It's important that pollinators have a place to nest. Ideally, there are nesting and foraging resources in the same habitat location. About 70% of native bee species are ground nesters, excavating tunnels in bare, poor quality sandy or loamy soils. Twig nesting bees make their homes in woody plant stems, including abandoned wood-boring beetle tunnels, dead trees, snags and the pithy stems of shrubs, such as elderberry and sumac. Bat boxes and native bee houses are becoming very popular, but it's essential that they have safe access to clean water. Native bees can help support agricultural activities if they have nesting habitats and suitable sources of nectar, pollen and water are available.

Many native bees are solitary, meaning they live alone and are often not aggressive because they do not have a hive to defend.

Consider using integrated pest management practices to control pests. Minimize the use of pesticides if possible, and do not spray when windy or if plants are in bloom. When using pesticides, apply at night or when temperatures are lower so pollinators are less active. Avoid using a broad-spectrum pesticide. Using

species-specific and liquid pesticides tends to be less harmful to beneficial insects.

Support local bees and beekeepers by purchasing honey and providing safe places for beekeepers to manage hives. And help spread the word about the importance of pollinators any chance you get!

For more information on selecting native plants that grow best in your region, visit the Pollinator Partnership at [www.pollinator.org](http://www.pollinator.org). Click on planting guides and enter your zip code.

## Club Activity

1. Have participants share plant species on their property that support pollinators.
2. Encourage members to plant pollinator-friendly habitats for spring, summer and fall at school, offices, homes, parks, churches, etc.
3. Celebrate Pollinator Week, a week in June that recognizes and addresses the declining pollinator populations.
4. Learn more about starting a pollinator habitat at Homegrown National Park, a grassroots call to action organization to regenerate biodiversity and ecosystem function by planting native plants.

## Resources

<https://www.pollinator.org>

<https://extension.psu.edu/pollination-and-pollinators>

<https://extension.psu.edu/planting-for-pollinators>

<https://www.saveourmonarchs.org/blog/pollinator-safe-pesticides-101>

<https://extension.umn.edu/natural-resources-news/important-lessons-pollinators>

<https://www.fs.fed.us/wildflowers/pollinators/importance.shtml>

<https://esajournals.onlinelibrary.wiley.com/doi/10.1890/120126>

<https://extension.wvu.edu/natural-resources/wildlife/insect-pollinators>

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