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Everything You Need to Know about Pollination

Pollination is an important part of the plant reproductive process. Pollination is the process by which pollen grains are transmitted from male plants to female plants.

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What Exactly Is Pollination and How Does It Work?

Pollination is the process that is essential for plants to achieve fertilization. It works through different methods of delivering pollen grains, driven by different [pollinators](#), such as insects, animals, humans, wind, and water. The pollinators carry and transport pollen grains from the male anther of plants, and deliver them to the female stigma of plants. The pollination initiates and begins the plant's fertilization process.

Pollination can have two forms: self-pollination, which occurs within the same plant, and cross-pollination, which occurs between two plants of the same species.

Read more: [Self-pollination vs Cross-pollination](#).

How Does Pollination Differ from Fertilization?

Pollination and fertilization are both essential to the reproductive cycle of plants. However, the difference between the two can be quite confusing. To better understand how pollination differs from fertilization, we must delve further into the process of plant reproduction.

Pollination

The pollination process begins when pollen grains from a plant's male anther are collected or transported away by various pollinators. Once the pollen grains reach the female stigma of the flower, a pollen tube will develop down through the style to the ovary. The nucleus of the pollen grains then moves along the pollen tube, ready for the fertilization process.

Fertilization

Fertilization is a process that happens after pollination. Fertilization occurs when the pollen grains that have reached the pollen tube fertilize the nucleus in the ovule, resulting in the formation of a zygote that will eventually form an embryo to a seed.

To put it simply, the pollination process is responsible for setting the reproductive cycle in motion, while the fertilization process that comes after pollination is responsible for the development of the seed or fruit.

Importance of Pollination

All plants in the world require pollination to reproduce. Without pollination, plants would not be able to exist, resulting in the collapse of every terrestrial ecosystem, loss of food security, and extinctions of wildlife species around the planet. The importance of pollination and the benefits it provides to humans, ecosystems, and wildlife are discussed below.

Benefit to Humans

Pollination ensures an abundant food supply and medicine since it boosts the production of flowering plants, which is where the majority of our food comes from. For example, many blueberry and almond producers in the United States use bees from beekeepers to boost pollination in their crop fields. Our entire agricultural system relies on pollination, whether self-pollinating plants or through pollinators like bees.

Benefit to Ecosystems and Environment

Pollination is one of the most important factors in sustaining healthy ecosystems, as all plants are dependent on pollination to maintain a thriving population. Ultimately, the services that plants provide to both humans and the environment are dependent on pollination. Services that plants provide to maintain a healthy ecosystem include:

- Increasing the collection of CO₂ from the atmosphere

- Purifying water
- Improving soil quality
- Preventing soil erosion

Benefit to Wildlife

Pollination enables plants to thrive, which most wildlife species rely on for food and shelter. All animals, including meat-eaters, depend on plants at some point in the food chain. Here are examples of how wildlife species critically rely on the benefits of pollination.

- Fruit bats only eat food provided by plants and trees, such as fruits, nectar, leaves, and even sap.
- Many birds nest in trees for protection and use materials like leaves and twigs from plants to build nests. Other birds, such as hummingbirds rely on fruits and even nectars for their diet.
- Deer, cows, and other large herbivore animals depend on a plant-based diet, including leaves, bushes, grasses, and berries.

Without pollination, these varieties of plants would be unavailable to these animals, potentially driving them to extinction.

Meet the Pollinators

Pollinators include all types of animals, people, and even nonliving entities such as wind and water, as they all contribute to the transportation of pollen grains. Below are the lists of different common pollinators and how they contribute to pollination.

Small Animals

- Birds
- Bats
- Butterflies
- Moths
- Lizards
- Beetles
- Mosquitoes
- Bees

These small animal species provide the biggest contribution to pollination. Every day, these animals feed on nectars and fruits from one plant to another where pollen grains are distributed. For example, honey bees alone are responsible for [80%](#) of the pollination of flowering plants, which includes fruits and vegetables. Not all small insects are pollinators, however. For example, dragonflies actually eat some pollinator species!



Source: [Pinterest](#) / [Melodie Szakats](#)

Large Animals

- Lemurs
- Monkeys
- Deer
- Dogs
- Cows

Large animals such as lemurs, who eat around [130](#) different varieties of fruits, are important pollinators. They usually open flowers and lick the nectar. In doing so, pollen gets stuck to their fur and snouts, allowing them to transport pollen grains to another flower. Larger animals, such as deer and cows, contribute to plant pollination by transferring pollen that sticks to their fur to other plants as they graze through plants and grasses.

Read more: [Mammal Pollinators](#)



Black and White Ruffed Lemur licking nectar from a flower.

Source: [Pinterest](#) / [Sharkarosa Wildlife Ranch](#)

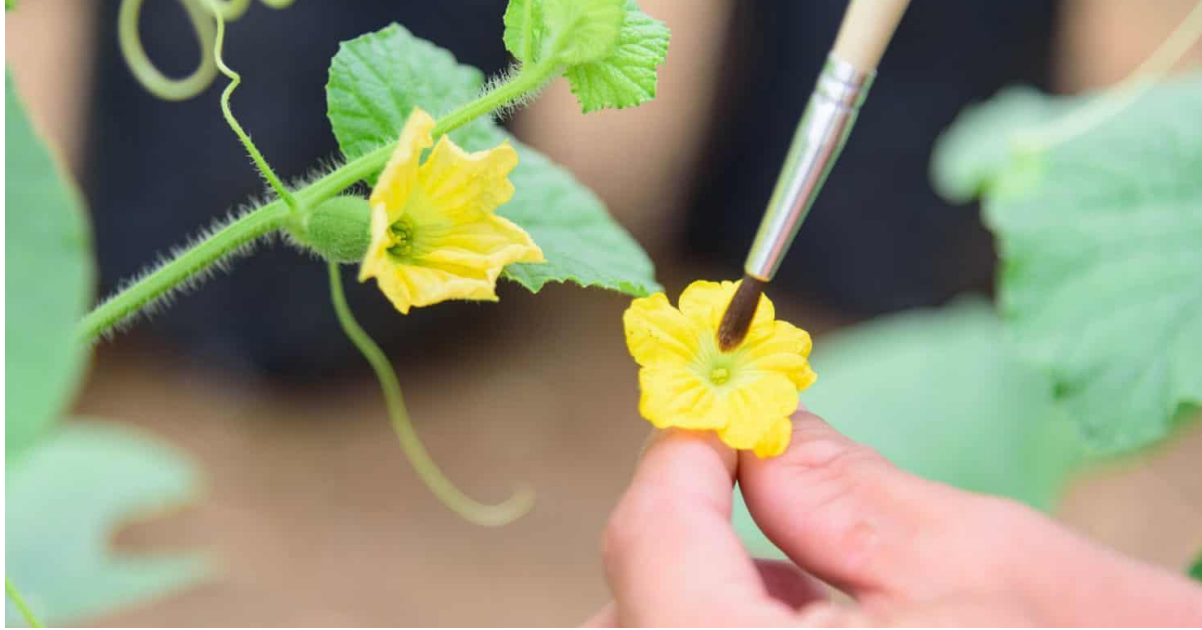
Wind and Water

Wind pollinates around [12%](#) of the world's flowering plants. This pollination process commonly occurs on various types of grasses or plants that do not have bright colors, nectars, or a distinctive aroma, like most flowers.

Water, on the other hand, pollinates only [2%](#) of the world's plants and is most common for aquatic plants. Pollen that has been washed down will eventually float to the surface and come into contact with a flower.

Humans

Human pollination can be both intentional and unintentional. For example, when people are in contact with plants while walking in the garden, pollen may stick to their clothes or skin unintentionally and could be brushed off to another plant in the area. On the other hand, some people practice [hand-pollination](#) to increase the reproduction of their fruits or crops. One way to do hand-pollination is by the use of a small brush to collect pollen grains.



An example of hand-pollination using a brush to collect pollen grains from a flower.

Source: [Harvest to Table](#)

Threats to Pollination

There are different factors that cause threats to both pollination and pollinators. This includes urbanization, air and light pollution, improper agricultural practices, and climate change.

Urbanization

Urbanization threatens pollination by transforming meadows and plant fields into concrete cities where flora don't usually thrive. Pollination does not occur if there is nothing to pollinate, particularly if plants are separated by urban development. Urbanization also destroys the habitat of animals and insect pollinators, which is an essential part of the pollination process as these pollinators are responsible for the reproduction of $\frac{3}{4}$ of the world's flowering plants and around 35% of the world's crop production.

Air and Light Pollution

Various air pollutants drive insect pollinators away from their natural habitat, leaving plants helpless in the pollination process. Artificial lights also attract insects, causing them to abandon their natural habitat where they normally pollinate the plants in the area.

Improper Agricultural Practices

Pesticides are chemicals that are made to kill pest insects that live on plants or crops in agricultural fields. Using it damages not only the pests themselves but also the local plants that cannot withstand the chemicals. Many pesticides have extremely harmful effects on crucial pollinators, and the use of these

pesticides is reducing pollinator populations worldwide. For example, a popular class of pesticides, [neonicotinoids](#), are toxic to bees.

Climate Change

The pollination process of insects is affected by climate change because it generates irregularities in seasonal cycles. As a result of climate change, certain plants bloom earlier or later than others. Pollinators with specific lifecycles may come while the plants and flowers are not yet in bloom. These events may push them to relocate and find a new home that fits their cycle, or may drive them to extinction

Conservation Efforts for Pollinators

Pollinator populations in the United States have dropped over the last 30 years as a result of multiple [factors](#). Several species of butterflies, moths and native bees are on the verge of extinction.

As a result of this alarming decline, various organizations have initiated projects to conserve and protect pollinators. Here are a few examples:

Bee Informed Partnership

This [organization](#) is conducting research to track the health of bees in the United States. This is done to understand what's causing their population reduction so that appropriate steps can be taken to save them and their population.

Xerces Society

The Xerces Society is spearheading a [campaign](#) to reintroduce pollinators by planting pollinator-friendly flowers, constructing nesting facilities, and educating people by spreading the word. The [pollinator conservation resource center](#) of the Xerces Society encourages the establishment, maintenance, and preservation of pollinator habitats across North America.

Pollinator Conservation Association

The Pollinator Conservation Association is a non-profit [organization](#) based in western New York that promotes pollinator conservation through assessments, community engagements, education, and best practices recommendations for protecting and conserving native pollinators.