

The Role of Native Plants and Pollinators in Biodiversity

Over many millennia, native plants and animals have evolved — or adapted — in response to changes in the physical and biological characteristics of their region, allowing them to form intricate relationships and making them uniquely suited to life in their native habitat. Studying the relationships among native species and their importance in supporting the biodiversity of a habitat can deepen students' understanding of the natural world and encourage environmental stewardship.

The dramatic decline in native plant and pollinator populations is a well-documented phenomenon. One noteworthy example is the monarch butterfly, whose larva (caterpillars) feed exclusively on milkweed. The elimination of large stands of native milkweed due to habitat loss and agricultural practices parallels the decline in monarch populations: no milkweed, no monarchs. While the loss of even a single pollinator species would be a tragedy, the implications of such a loss to the larger ecosystem are less obvious and yet arguably more far-reaching. That's because, despite their small size, native pollinators play an outsized role in maintaining the biodiversity of an ecosystem.



What is Biodiversity and Why Does It Matter?

Biodiversity is an umbrella term that refers to different aspects of an ecosystem, including:

The variety of life forms (plants, animals, insects, fungi, etc.) within a given region, also known as *species diversity*.

The variation among members of the same species, also known as *genetic diversity*.

In general, the more biodiversity in an ecosystem, the more stability and resilience it has. Although the terms are sometimes used interchangeably, the *stability* of an ecosystem describes how much it changes in response to shifting conditions. A stable system is one that remains relatively unchanged despite variable environmental conditions, such as periodic droughts or heat waves. The term *resilience* refers to how quickly an ecosystem returns to its original state after a major disturbance or extreme climatic event. Native plants and native pollinators are part of an intricate web that supports the biodiversity — and therefore the stability and resilience — of their ecosystem.

Defining “Native”

Defining the term *native* can be tricky. Generally speaking, a native plant or animal is one that exists in the region in which it evolved. In common usage, native is often used to describe plants and animals that were present prior to European colonization. In contrast, non-native species (also known as exotic, alien, or non-indigenous species) are those that have been introduced into an area by people, rather than by natural means. For example, many non-native species were brought to North America by European explorers for use as foods, fibers, and medicines, as well as for ornamental uses.

Although many non-native species were brought from other continents, the term “non-native” also refers to species that were introduced to regions within a country or continent. Plants and animals, after all, don't recognize state or national boundaries; rather, they're found in appropriate habitats that may span multiple states and even countries! Therefore, instead of simply describing a plant as native

KidsGardening is a nonprofit educational organization. Support provided by sponsors and donors is critical to our ability to provide free garden-based resources for parents and educators. All gifts are tax-deductible.

to North America, it's important to specify the region. For example, a plant might be native to eastern North America or coastal California or the northern Rocky Mountains.

Plants native to one region of a country may become troublesome when they're introduced to other regions. One example is the Jerusalem artichoke (*Helianthus tuberosus*), also called sunchoke, which is native to eastern and central North America. In California, the plant is on a watch list of potentially invasive plants.

The honeybee is a non-native pollinator species that was introduced to the U.S. from Europe. It's so common that it's often the first species that comes to mind when discussing pollinators. However, there are thousands of native bee species in the U.S., many of which are in serious decline. These native bees play a critical role in pollinating native plants and supporting a region's biodiversity.

How Native Pollinators Support Plant Biodiversity

Some plants evolved such that their flowers can be pollinated by a variety of pollinator species. Other plants and pollinators coevolved to form exclusive relationships, with a plant species relying on a specific pollinator for reproduction; if that pollinator disappears, the plant eventually goes extinct.

Examples of coevolution include:

- Certain native orchids, which rely on a single insect or animal species for pollination.
- Plants with tubular blooms and bees with long tongues that can reach the nectar deep within the flowers.
- Plants that open their flowers at night and require pollination by moths, bats, or other nocturnal species.

Less obvious than preventing outright extinction is the role that pollinators play in maintaining a plant population's genetic diversity. Pollinators carry pollen from flower to flower, resulting in fertilization and seed production. This type of reproduction leads to the mixing of genetic material between plants, increasing the genetic diversity within a plant population. Genetic diversity is a critical component of evolution because it confers adaptability and resilience. Genetically diverse populations have an increased chance of surviving in changing environments because some individuals within those populations may exhibit adaptations that allow them to survive when other individuals succumb to challenging conditions. These resilient individuals confer the beneficial adaptations to their offspring.

How Plant Diversity Supports Native Pollinators

As much as plants rely on pollinators, pollinators rely on healthy and diverse plant life! Many pollinators require multiple plant species to survive. For example, although the monarch caterpillars feed exclusively on milkweed, the adults require a continuous supply of nectar, usually supplied by a variety of plants that bloom at different times. In addition to food, pollinators also rely on various plants for shelter and nesting sites.

When the populations of native pollinating insects decline, it affects not only the plants they pollinate, but also other organisms, such as the reptiles, birds, mammals, and other organisms that feed on the pollinators. Simply put, the loss of individual species of native plants and pollinators can have catastrophic effects on other members of the ecosystem.

Non-Native Species: The Good and the Bad

Not all non-native species are troublesome. The honeybee is one non-native species that has proven its worth in terms of the pollination services it provides to agriculture. Many non-native plants have found happy homes in landscapes where they provide habitat and food for native insects and animals.

However, some non-native species, lacking the natural diseases, pests, and weather extremes necessary to keep their populations in

KidsGardening is a nonprofit educational organization. Support provided by sponsors and donors is critical to our ability to provide free garden-based resources for parents and educators. All gifts are tax-deductible.

check, can run rampant and become invasive. They can outcompete with native species for nutrients, shelter, and space to grow, to the point where the very existence of the native species is threatened. Invasive plants represent the second greatest threat to native ecosystems in North America after habitat loss.

Challenges Posed by Climate Change

As temperature and precipitation patterns shift due to climate change, the composition and behavior of plant and pollinator species change. Flowers may bloom before the emergence of the insects that rely on their nectar. Pollinators may need to travel longer distances to find the food and shelter they require, disrupting local populations. When climate changes occur faster than the species' ability to evolve and adapt, populations crash.

What Can We Do?

Encouraging environmental stewardship in your students is an important step. For example, you can: Challenge them to learn about and protect native plants and pollinators in their region.

Teach kids to avoid disrupting native organisms when spending time in natural areas.

Encourage them to communicate with government officials; state highway, agriculture, and/or parks departments; and landscaping companies to advocate for native species.

Invite experts from your local native plant society to speak to your class.

Create a public awareness campaign around the importance of native plants and pollinators.

Invite students to participate in local efforts, such as the removal of invasive plants from parks.

Organize a field trip to a natural area to identify and inventory native species.

Have students research where they can purchase seeds for native plants, as well as the germination and growing needs for the plants.

Invite kids to investigate the ways indigenous peoples used native plants for food, fiber, and other uses.

Resources

Native Pollinators (Center for Biological Diversity)

https://www.biologicaldiversity.org/campaigns/native_pollinators/index.html

Ecoregional Planting Guides (Pollinator Partnership)

<https://www.pollinator.org/guides>

Pollinator-Friendly Native Plant Lists (Xerces Society)

<https://xerces.org/pollinator-conservation/pollinator-friendly-plant-lists>

Pollinator Conservation Resource Center (Xerces Society)

<https://xerces.org/pollinator-resource-center>

Native Plants of North America (Lady Bird Johnson Wildflower Center)

<https://www.wildflower.org/plants-main>

Center for Plant Conservation

<https://saveplants.org/>

Native Seeds/SEARCH

<https://www.nativeseeds.org/>

KidsGardening is a nonprofit educational organization. Support provided by sponsors and donors is critical to our ability to provide free garden-based resources for parents and educators. All gifts are tax-deductible.

