



Tribal Pesticide Program Council

Winter 2023-24

Peculiar Pollinators: Bats, Moths, Flies and More

What is a Pollinator?

Birds, bees, and butterflies come to mind for most people when thinking of pollinators. While these animals are incredibly important and intertwined with thousands of plants that require pollination, there are many other lesser known pollinators. These include bats, moths, wasps, hornets, beetles, flies, small mammals, and even male mosquitos. A simple definition of a pollinator is any being that



transfers pollen, the male reproductive element of a plant, to the stigma, the female reproductive element of a plant, resulting in fertilization. Fertilization allows plants to produce seeds, in preparation for the next generation of plants. Sometimes pollinators transfer pollen to a separate plant of the same species or the pollinator's presence allows the same individual plant to become fertilized with its own pollen. These animals visit the plants they pollinate because the plants provide them with food in the form of pollen and nectar and can also provide a safe location for them to lay eggs or sleep.

Pollinator Diversity

Honey bees and bumblebees are well known pollinators who have visible fuzzy looking hairs on their bodies that they use to collect pollen. This pollen will be brought back to their hives to feed their young. Flies also have hairs that function in this way but they don't feed their young pollen. Adult flies consume both nectar and pollen for food among other food sources. This allows flies to travel far distances because they are not bound by the vicinity of their hives. Flies can also tolerate colder morning and evening temperatures and many are active sooner in early spring, getting a jump on pollination before bees. Flies visit a huge variety of crops with one study observing that flies visited 72% of 105 common crops. Beyond pollination, some flies such as hover flies provide protection to

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Peculiar Pollinators: Bats, Moths, Flies, and More *(continued)*

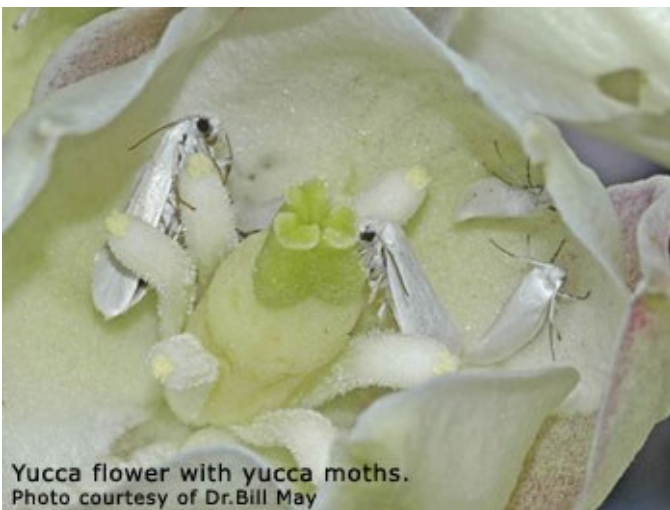
plants through their larvae. The larvae are laid on the plants and will feed on insects that could otherwise damage the plants, such as aphids. Flies are also valuable to ecosystems as they help with nutrient cycling by consuming organic material. Wasps do not intentionally collect pollen but it sticks to their bodies as they visit flowers to feed on their nectar. Some wasps lay their eggs in flowers, such as fig wasps, who will enter the fig flower to mate and end up pollinating the flower. Bats also feed on nectar and similarly accidentally end up with pollen on their hairy noses which they bring to the next bloom they visit. Moths also feed on nectar and unknowingly spread pollen around due to it sticking to their hairs. Many plants rely exclusively on these lesser known pollinators for reproduction. Certain flowers open their blooms at night, requiring nocturnal partners in pollination. This is where moths, bats, and other small nocturnal mammals are able to serve as valuable allies to these plants.

Ecosystem and Agricultural Services

Pollinators of all types support a thriving ecosystem. The symbiotic relationship between these creatures and the plant life they promote results in carbon sequestration and the production of oxygen. The root systems of these plants also help to purify water and reduce erosion by holding soil in place. The cycle of water throughout our planet depends on plants to retain moisture and to then release it back into the atmosphere. Disrupting plant and pollinator communities has a drastic effect on our global ecosystem. Beyond their inherent value as stewards of our planet, pollinators support human beings through their influence on our food supply. Approximately 80% of the 1,400 food crops grown throughout the world require pollination. When pollinators are absent, crops fail or produce smaller and fewer yields, and produce is less flavorful. Pollinators are truly priceless, but when quantified within the context of our agricultural economy it is estimated that their services are valued at \$10 billion in the US alone, and over \$3 trillion globally.



Plants, Pollinators, and Cultural Relationships



Yucca flower with yucca moths.
Photo courtesy of Dr. Bill May

Moths are unique pollinators in that they are active during day and night, depending on the species. Flowers that are visited by moths due to their nectar production are morning glories, tobacco, yucca, and gardenia. Yuccas depend specifically on the yucca moth to continue to reproduce. The yucca moth is one of the only pollinators that seems to deliberately pollinate. They create a ball of pollen using their mouths which is later stuffed into the stigma of a different flower they visit. Just as the yucca plant depends on the yucca moth for pollination to reproduce, the yucca moth similarly relies on the yucca plant for reproduction. Female yucca moths lay their eggs within the inner chambers of the yucca flowers for protection. The yucca plant is deeply intertwined in cultures of the

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Southwest. The Navajo Tribe values this plant as it is integrated into dances, is part of many ceremonies, and is used to make soap and rope. Tobacco plants typically bloom in the evenings, attracting a moth known as the hawkmoth to their flowers. The hawkmoths pollinate their flowers but also lay their larvae on the plants which feed on the foliage. It's been observed that tobacco plants overrun with hawk moth larvae will begin to bloom during the day to cease the attraction of hawkmoths in order to preserve their foliage. Although the relationship between the tobacco plant and the hawk moth is complex, some within the Navajo culture consider the caterpillars, also known as horn worms due to the appearance of antennae that resemble horns, the guardians of the tobacco plant. Camas, which has an edible root bulb, is another plant that is valued by many native cultures across North America and has a relationship with more obscure pollinators. This plant that was once traded widely across many tribes such as the Nez Perce, Walla Walla, and the Yakama is pollinated by hover flies and beetles in addition to bees. These lesser known pollinators may not be as charismatic as honey bees and butterflies, but their impact to our ecosystems and cultures is valued just the same.

Ideas to Support Peculiar Pollinators

- Plant species of plants that are native to your area that bloom at night.
- Install a bat hotel. Bat hotels are wooden boxes that are mounted on a pole, tree trunk, or other structure to provide habitat and safety for bats.
- Be curious: Many animals and insects you come across could be pollinators. Before squishing or spraying an insect, do your best or consult an expert to identify it and understand its role in the ecosystem. It may prove to be a friend, not foe!
- Educate: There are many websites, articles, and brochures dedicated to spreading information about these animals. Peruse the links below to learn more.

Links

[Bats USDA Website](#)

[Quick facts about bat pollination](#)

[Moth Pollination](#)

[The Simple Truth: We Can't Live Without Them](#)

[Learn more about the Camas plant and its significance.](#)

[Listen to a Diné man who is a Navajo Historian speak on the traditional uses of yucca](#)

Conferences and Meetings

AAPCO Spring Meeting

The Association of American Pest Control Officials (AAPCO) will hold its Spring meeting **March 3-6** in Alexandria, VA. For more information see <https://aapco.org/2015/07/31/aapco-2/>

TPPC Spring Meeting

The TPPC Spring Meeting will be held **March 6-8** in Washington, DC.

Trainings & Courses

Certification and Training PREP

The Pesticide Regulatory Education Program (PREP) Network will provide a certification and training course on **April 22-25** in Fort Collins, CO. For more information see <https://agsci.colostate.edu/agbio/prep/>

Compliance and Enforcement Management PREP

The PREP network will provide a compliance and enforcement management course on **June 24-27** in Davis, CA. For more information see <https://agsci.colostate.edu/agbio/prep/>



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The TPPC is a member-based organization with more than 100 members from 62 Tribes and tribal organizations as of January 2024, whose activities are funded by a cooperative agreement with the EPA. The Council serves as a tribal technical resource, and provides a forum for dialogue between Tribes and the EPA on program and policy development relating to pesticides issues and concerns. Assistance provided to Tribes includes support in building tribal pesticide programs and conducting pesticide education and training, and the preparation of resources for Tribes interested in specialized issues such as Integrated Pest Management and pollinators. Through its interaction with the EPA, the TPPC keeps Tribes informed of developments in the regulation of pesticides and pesticide use, and provides feedback to the EPA on such matters from a tribal perspective (though it is important to note that communication between the EPA and the TPPC does not substitute for direct government-to-government consultation).

For information about how to join the TPPC, contact Mark Daniels at mark.daniels@nau.edu or (928) 523-8897.

