

The importance of pollination

Have you ever wondered how plants produce your favorite fruits and vegetables? Pollination ensures the plentiful bounty of delicious crops, survival of important grasses, grains, and forbs that feed livestock, and quilts the blanket of wildflowers covering hiking trails. These plants may be pollinated by animals, the wind or a combination of both.

Types of pollination

Pollination is achieved when pollen grains produced on the anthers (male reproductive organ) of one plant are transferred to the stigmas (female reproductive organ) of another plant of the same species. Most plants have anthers and stigmas on each flower bloom. If the process is successful, the plant will produce seeds that develop into new individuals. If pollination is not achieved, the plant will produce few seeds and bear no fruit. Pollen transportation may occur with the help of animals (including insects), with the aid of water currents or gusts of wind or by a combination of all these.

Of the approximately 352,000 flowering plants species in the world, about 88 percent of these are animal pollinated and about

12 percent use wind or water to move pollen grains. Animal-pollinated plants typically have simple stigmas, produce nectar and have scented, brightly colored petals and sweet odors attract a variety of animal pollinators, including bees, butterflies, moths and hummingbirds. Sunflowers, Indian paintbrush and alfalfa are animal pollinated.

In contrast, wind-pollinated plants have feathered stigmas and make small amounts of nectar in tiny flowers. These plants position their flowers in the wind and produce pollen grains that can ride on air currents. Notable wind-pollinated plants include native grasses and sagebrush that dominate Wyoming prairies.

Pollination in your own life

Perhaps you have made your own observations and wondered about pollination while watering your garden or buying fresh produce. Common garden vegetables that require insect pollination include cucumbers, peppers, squash, pumpkins and watermelon. Meanwhile,



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How do we determine which means of pollination a plant uses—wind, insects or what? Observation and experimentation!

Mystery in the prairie

In 1909, a botanist by the name of Aven Nelson walked the wind-swept ridges of southeastern Wyoming prairies and found a peculiar plant that had never been described before. The discovery was named Laramie chickensage (*Artemisia simplex*) and placed in the plant group including sagebrush. Oddly enough, Laramie chickensage does not look like other sagebrush plants. Laramie chickensage only grows in southeastern Wyoming and occurs in the Laramie Range, Shirley Basin and Shirley Mountains. Over 100 years have passed since the plant's discovery, but it is only until recently that investigation has started for how similar this unique plant is to other members of sagebrush.

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Laramie chickensage

If you inspected more common types of sagebrush such as Wyoming Sagebrush, you would notice these plants produce tiny flowers that often go unnoticed. Typically, these types of sagebrush are thought to be wind pollinated. However, the mysterious Laramie chickensage produces large, yellow flower heads on top of slender stems. These flowers made me question how this plant is pollinated. As a graduate student at the University of Wyoming, I set out to determine if Laramie chickensage is pollinated in the same manner as other sagebrush species.

How is Laramie chickensage pollinated?

When insects take flight, they search for showy flowers that produce nutrient rich nectar. When an insect locates a preferred flower, it lands on the bloom, quenches its thirst with nectar and stores pollen grains on its fuzzy body or legs. Because insects use visual cues to direct foraging, it was suspected the large, yellow flowerheads of Laramie chickensage would be attractive to native pollinators.

To test if this was true, patience was key. Careful observations were made in the field to see if any pollinators stopped by chickensage plants. Although the wind blew during observations, one day a bee landed on a flower head. The bee took a drink of nectar, collected a little pollen and flew away.

After two years of field and laboratory work, suspicions held true. Five native bees carried Laramie chickensage pollen, suggesting this plant is at least in part pollinated by animals.

The investigation into wind pollination was a bit harder to carry out because the process is invisible to the human eye. If you have seasonal allergies, you know large amounts of pollen can float in the air, but you are not able to see them. The other portion of this research focused on pollen carried in the air because most other sagebrush species are wind pollinated. Wyoming has vast expanses of open and windy prairies ideal for pollen transport.

To tackle the wind pollination question, aerial pollen samples were collected to see if Laramie chickensage pollen was floating about. The aerial pollen was collected in the same manner used by weather stations to predict pollen allergen levels. The mystery of what pollen grains lie on those samples is yet to be unraveled. We suspect we'll find pollen from many wind pollinated plants, including Laramie chickensage, because this plant produces a feathered stigma that is equipped to catch pollen grains out of the air.

beets, carrots, corn, onions and spinach catch pollen grains on the wind. To bring more pollinators to your garden or home plant a mixture of nectar and pollen-rich wildflowers. Native Wyoming forbs buzzing with bees and butterflies include columbine, larkspur, blue flax, Rocky Mountain penstemon, purple coneflower, yellow prairie coneflower and lupine. More information related to promoting pollinators on your property can be found at, <https://bit.ly/PollinatorGuide>.

Pollination is of utmost importance to farmers, ranchers, outdoor enthusiasts and anyone who likes to eat! This essential process is not only vital for producing appealing gardens, but for Wyoming's economy. Without pollination, Wyoming could not produce the vast expanses of grass that supplement rangelands and many livelihoods. Pollination also ensures we have our favorite foods, such as coffee, nuts, fruits and vegetables. Next time you take a drive through Wyoming, remember how much work insects and the wind are doing to pollinate the plants that support people and our livelihoods.

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