Critic's Choice Essay

Take time to watch, not just smell the wildflowers!

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Although plant-pollinator interactions between orchids and bees in the tropics may seem more interesting than those closer to home, Oklahoma is full of fascinating plant-pollinator interactions and mechanisms. The most important pollination agents in Oklahoma are wind and insects. Wind is particularly effective where many plants of the same species grow close together. Prairie grasses, and dominant trees of our forests and woodlands, e.g. post oak and blackjack oak, are wind-pollinated. There are few things more beautiful than anthers dangling from a grass spikelet along with feathery stigmas that trap wind-borne pollen! In spring, male flowers of oaks are borne on pendulous catkins, releasing pollen that catches on stigmas of tiny female flowers held close to the branch.

Insects are major pollinators of our prairie forbs, and their flowers are visited by a variety of insects, including butterflies, moths, beetles, flies, bees, and wasps. Of these, bees are most important. You can observe bumblebees with glistening, saddlebag-shaped pollinia of green milkweed (*Asclepias viridis*) on their legs. You can hear their buzzing as bees clasp the anther cone of western horsenettle (*Solanum dimidiatum*) and use their flight muscles to vibrate pollen out through pores at the top of the anthers.

Flower characters such as color, shape, size, and amount of nectar can sometimes be used to predict major pollinator(s) of a species. But it takes many hours of observing and collecting insect visitors to see if they are carrying pollen, to determine which are actual pollinators. My students and I have observed over 20 families of insect visitors to a single species, but find that only two or three effectively transfer pollen.

Differences in flowers among species are often clearly related to pollination, but differences among flowers within a single species may also be related to pollination and are equally intriguing. Within a population you find sometimes subtle, and at other times obvious, differences between flowers at different stages. For example, when a pink gentian (*Sabatia campestris*) flower opens its anthers are bright yellow and release pollen, but its style branches are green, coiled together, and lay flat against the petals. As the anthers wither the style branches uncoil, become erect, turn bright yellow, and their stigmas become receptive to pollen. In any population and even on the same plant, you can find flowers with style branches in various stages of uncoiling. Difference in timing between pollen release and stigma receptivity is a mechanism to promote cross-pollination. When flowers of fog fruit (*Phyla*) open, they have a yellow spot near the corolla tube opening (the "throat"). Later in the day the spot turns a rosy-lavender color, less visible to bees. Older flowers remain on the inflorescence as new flowers open, but in many cases such as this, newer, more attractive flowers offer a greater reward, e.g. more nectar.

In prairie bluet (*Hedyotis nigricans*) some plants bear flowers with long styles and short stamens. Others bear flowers with short styles and long stamens with clearly visible blue anthers. Insects that contact anthers of long stamens will likely transfer that pollen to a long-styled flower on another plant. So this mechanism also promotes cross-pollination.

Details of flowering stages and plant-pollinator interactions of many Oklahoma plants have not been well-documented. I encourage you to stop, sit, and not only take the time to "smell" the wildflowers, but to watch them as well. You will surely see things that have never been observed before!

O.N.P.S

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