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Plants and Pollinators: Will this Drama End Well?

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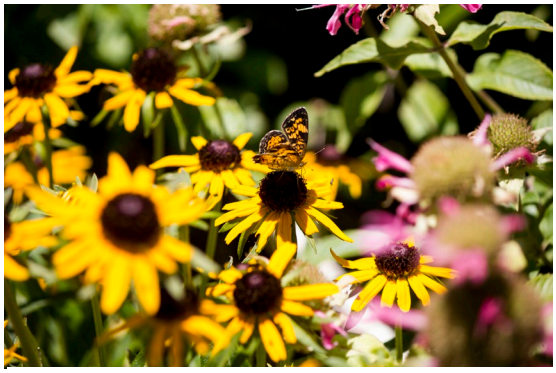
Spring. The curtains rise on a spectacular plant pageant, complete with drumrolls from nature's rhythm section, the woodpeckers. The show gets louder and brighter by the hour until the entire theater booms and blooms. The audience holds its breath in expectation of the grand entrance of the heroes.

Ah, but they are already on stage, busy in the flowers. While we watched the shoots push up, the leaves stretch out, the petals uncurl, they were being beckoned silently by the plants, who for survival of the species desperately need to make seed. The tiny heroes, mostly insects, were gathering pollen and sipping nectar to feed their young and get energy for themselves. While transferring pollen to stigma in the plants, they unwittingly perform essential services for seed production. Because of what they do, however accidentally, we call them "pollinators".



A Crescent Butterfly visits a Black-eyed Susan flower for nectar, all the while pollinating it so that it can produce seeds. Photo: 4-H Youth

In truth, pollinators include flies, wasps, butterflies, bees, moths, beetles, hummingbirds, and even some bats and spiders, but bees are the most numerous and efficient in North America. New York State is home to 450 different bee species, mostly solitary (not colonizing) bees that do not roam far from home and do not sting.

The show continues through the summer and fall, each act with its own magnificent set but the same heroes. Only winter brings a pause.

Heroes? Some of my acquaintances think every insect should be sprayed, stomped or swatted. But wait, pollinators are *good*. They help feed multitudes – both human and non-human. More than one third of all human food and an even greater proportion of the food for wildlife comes from plants pollinated by insects. Some of the wildlife – including birds, bats and bears – eat the insects themselves. A few of the foods we enjoy thanks to pollinators? Tomatoes, peppers, blueberries, strawberries, cranberries, raspberries, apples, melons, pumpkins, squash, plums, coffee, chocolate, carrots, broccoli.

Although grasses, conifers and ragweed produce millions of pollen grains to be carried by the wind (as allergy sufferers can tell you) in the hopes of a few landing in the right places, many more plants – an

estimated 75 percent – rely on the more efficient transfer made by pollinators. Because the survival of so many other species depends on them, they are called a **keystone** group.

This show has had a long run. For thousands of years, the flowers adapted to the exact conditions of the area – the sun, rain, soil, climate. They developed intricate and elaborate structures to attract pollinators to help them reproduce. The pollinators adjusted, too, so that both plant and pollinator could get exactly what they needed when they needed it. You might say they developed strong interdependence. They need each other. We call the plants and pollinators that were part of the original long-running show "natives". No one introduced them from afar; they lived together naturally and became perfectly adapted to the place and each other.

Most insects are beneficial to us and nature. Watch them carefully and you will see their gentle nature as they float from flower to flower in your garden, performing essential pollination services. Photo: 4-H Youth

Some of the connections between native plants and specialist pollinators have become so nuanced that one kind of insect feeds on, and therefore pollinates, only one kind of plant. Early on a summer morning, go out and look in your squash blossoms; a squash bee (*Peponapis pruinose*) just may be sleeping inside.

The native heroes are disappearing at an alarming rate all over the world (see links at the end of this article. We can find a few reasons. Turn your attention to your flower gardens. Do you have lots of eye-popping color and stunning leaves, hybrids of all shapes and sizes. Sadly, gardens like this often present a problem for the native pollinators, as the nectar is often less nutritious and the pollen harder to get; they can't seem to adjust their behavior or their bodies fast enough to keep up with our insatiable appetite for new double-blossomed exotics. Unwittingly, we trade their nutrition for our visual pleasure. We have hybridized the plants but not the pollinators.

Not all non-native plants are well suited to the places we put them, and may require more inputs like fertilizer and water to survive. Some native plants may also require this extra care if you put them in the wrong spot in your garden. Ample research and understanding of a plants' needs will best equip you to make a good choice about plant type and placement in your garden.

Conversely, some of our non-native plants have decided they *like* it here, have escaped cultivation and begun populating the wild as invasive species. Botanists and naturalists have noticed that they often grow and reproduce quickly, adapt easily to many different environments, sometimes either release a soil toxin or mutate to keep themselves going. If they fool pollinators with visuals, leaf out earlier, grow larger, or

Gardens for pollinators can be beautiful and functional. Note the variety of texture and color in these gardens. Photos: Lynne Bernstein

reproduce more quickly (and some do all of that), they can crowd out the species that have been here thousands of years. What difference does that make?

Insects will go to plants they know they can eat or reproduce on. For just one example, let's turn the spotlight towards the Monarch butterfly (*Danaus plexippus)*. This iconic insect king has become the ambassador for planting not only pollinator gardens but pollinator pathways because of its epic annual migration. The larvae must have native milkweed plants (*Asclepias syriaca*, *A. incarnata*, or *A. tuberosa*) for food. They have adapted to thrive on the nutrients provided by the milkweed plant, and also to use the toxins in the leaves to make themselves poisonous to predators.

A monarch caterpillar munches on native milkweed, the only plant on which it can survive. Photo: Jen Lerner

Adult Monarchs used to lay their eggs exclusively on milkweed but a non-native plant that has invaded the landscape, black swallow-wort *(Vincetoxicum nigrum)*, has a flower that fools the butterfly into thinking it is milkweed. The adult lays its eggs on swallow-wort, and the story ends for that Monarch family. This is just one story of many that are not ending well. The sirens sing from introduced plants, habitat loss, climate change and pesticides. Their song is getting louder.

We can be big heroes for the little ones. Native pollinators have four basic habitat needs: food, water, shelter, and somewhere to lay eggs. It's easy to add these into your garden and create a haven for the pollinators and ourselves. If we supply a forage area with native flowers blooming at various times from spring through fall, host plants or nest sites for eggs, and an environment free of pesticides, we can help reunite native pollinators with their native plants. Save the pollinators, save the food they help supply. Taking any action, no matter how small, is better than taking no action at all. You can start with a small patch of—say 12—native plants – trees, shrubs, flowers, whatever you like. You can expand at your own pace. Little by little, you can definitely make a difference.

Cornell Cooperative Extension of Putnam County has launched the Putnam Pollinator Pathway initiative to inspire, encourage and support the establishment of connected pollinator habitat throughout Putnam County. You can join! Go to http://putnam.cce.cornell.edu. On the website, you can also find more detailed information about issues discussed in this article, links to information about bloom times and plants for pollinators by region, even a webinar presentation called "Planting a Pollinator Paradise". Be a hero for the native pollinators by planting native plants. Save the show! Follow us on Instagram @CCEPutnam for weekly suggestions of plants and practices that help promote pollinators.

Further exploration:

http://putnam.cce.cornell.edu/gardening/create-a-pollinator-paradise

https://pollinator.cals.cornell.edu/wild-bees-new-york/rare-threatened-and-endangered-bees/

https://pollinator.cals.cornell.edu/resources/