

An Overview of Insect Pollinators in the Landscape

Articles by Dick Seaton

What would life be like without butterflies and bees? We may find out, if current trends continue. Monarch butterflies have diminished by 90% in North America. There were perhaps a half billion in the mid-1990's. Now that number is about 33 million. In central Mexico where they overwinter, their colonies now cover only 1.7 acres, compared with 44.9 acres in 1996-1997. Other butterflies are also declining in North America.

It's a similar story for bees. The Xerces Society for Invertebrate Conservation estimates that about one-third of all bumble bee species in North America are of "serious conservation concern." Fifty thousand bumble bees died recently in one suburban Oregon parking lot, after ingesting nectar from insecticide-treated linden trees. The number of winter-managed commercial beehives has dropped 30% in the past five years.

Pollination is of immense value to agriculture and home gardeners, but how does it actually work? Most of the labor is done by insects. They carry pollen grains from the male part of a flower (the anther) to the female part (the stigma), thus enabling fertilization and reproduction. They do this while feeding on pollen, or on plant parts or plant nectar. The pollen adheres to the insect's body parts, and is transferred almost incidentally. Lucky for us that it is! According to the American Institute of Biological Sciences, native insect pollination produces \$40 billion worth of products per year in this country alone.

Commercial beekeepers imitate combine wheat harvesters, following the agricultural bloom from south to north, thus providing pollinators for a whole variety of crops. One million hives are trucked to the California almond groves every spring. In New York 30,000 are used in the apple orchards; and Maine's blueberries require about 50,000 per year.

Of course, managed beehives serve monoculture farms and orchards, but large single crop fields are one factor in the decline of native bees and butterflies. Chip Taylor, a monarch expert at the University of Kansas, estimates we have lost an area the size of Indiana to cropland conversion just in the last ten years.

This phenomenon is surely driven, in part at least, by the ethanol craze. And those thirsty cornfields are planted with "roundup-ready" seed, so spraying eliminates the milkweed between rows, on which monarchs must depend. The caterpillars feed exclusively on various milkweed species and the adults drink the nectar.

Bees and butterflies also depend on native plants, which are eliminated by loss of natural landscapes to urban and suburban development and excessive roadside mowing and herbicide spraying. They need a place to nest, and flowers to forage on. When these are gone, the pollinators suffer. So do many farmers, who lose their pollinating benefits.

Another prime suspect in the decline of pollinators is a new class of chemicals called neonicotinoids. They constitute the principal killing agent in almost all popular garden insect sprays. Several are highly toxic to honeybees and bumblebees. They can persist in the soil, and thus be absorbed by untreated plants the next year. That Oregon bee kill was directly traced to insecticide containing neonicotinoid. The International Union for Conservation of Nature points to them as key factors in pollinator decline.

So what are we doing on the positive side to restore pollinators? Close to home,



Valerie Wright Photo



“The beauty of a butterfly’s wing is not a slave of purpose.”

— Donald Peattie



Valerie Wright Photos



at the University of Kansas, there is Monarch Watch, led by Professor Chip Taylor. It is an educational outreach program involving over 2,000 schools, nature centers and the like in the U.S. and Canada. Its website (www.monarchwatch.org) estimates that over 100,000 people participate in tagging monarchs each fall before the butterflies leave for Mexico.

Monarch Watch also sells and distributes thousands of milkweed plugs each spring and fall for planting by citizens in their yards and gardens. Since milkweed is essential to the survival of the monarch, its disappearance is an important factor in the butterfly’s decline. (Interestingly, most species of milkweed are toxic to vertebrate herbivores, so when monarch larvae ingest it they also take in the toxins, which are then sequestered in their bodies to make monarchs toxic to many predators. As a result, most birds avoid them when eating other insect prey.) Find out which species of wildflowers and milkweeds are native to your area. Orders for plugs can be emailed to milkweed@monarchwatch.org. Another source of information about milkweed seed sources is www.xerces.org/milkweed-seed-finder.

Similar efforts are underway to restore bee numbers. Chief among these is the planting of native shrub hedgerows and

wildflower mixes alongside and between farm fields. The Xerces Society attempts to do this by partnering with USDA’s Natural Resources Conservation Service, which helps farmers with the cost. Audubon of Kansas will be doing the same thing at its Connie Achterberg Wildlife Demonstration Farm in Lincoln County. The flowers to be planted will differ from one region of the country to another, but often include coneflower, beebalm, many species of milkweed, lupine, aster and goldenrod.

Even President Obama has gotten into the act. On June 20 of 2014, he issued a presidential memorandum creating a Pollinator Health Task Force. It is intended to expand federal efforts to reverse pollinator decline, and requires that a national pollinator health strategy be developed. Among other steps, it calls for increases in pollinator habitat along highways, and reduction of pesticide use on military bases. Importantly, it directs the EPA to assess the effects of neonicotinoids on the health of bees and other pollinators.

Perhaps we are finally beginning to realize what Rachel Carson said over 50 years ago in *Silent Spring*: “Nature has introduced great variety into the landscape, but man has displayed a passion for simplifying it. Thus he undoes the built-in checks and balances by which nature holds the species within bounds.”

At Home With Pollinators, A Gardener's View

By Mary Powell

Springtime! You're ready to fill containers at your front door or on your deck. Or maybe you're planting a vegetable garden. Or your new home needs landscaping.

You drive to your favorite garden store or nursery to look for flower and vegetable seedlings, shrubs or trees. You find tomatoes, parsley, peppers and two rose bushes for that sunny spot off the patio.

And because you've heard that bees are in trouble, you make sure to include some bee-friendly salvia and sunflowers.

Caveat Emptor! Buyer Beware! Those plants have been pre-treated with a nicotine-based pesticide highly toxic to bees and other pollinating insects. There is no way for you to know because the label says nothing about this treatment. In fact, the tag on the plant may even say "bee-friendly" or "attracts butterflies and bees" and include a smiling bee.

Big-box stores and many local nurseries now use a long-acting pesticide, neonicotinoid, as a soil drench, which is taken up systemically in the plants' vascular system, making all parts poisonous—leaves, pollen and nectar. Neonics, as they are called, can kill bees. In a sub-lethal dose, this neurotoxin can impair their navigation, immunity, and learning. Hives are found empty. Bees can't find their way home.

In 2013, plants across the country were tested in an independent lab and results were published in August of 2014.

Here are some of the documented findings:

1. One application to plants lasts beyond a season. Measurable levels of residues were found in woody plants up to 5 years later.
2. Untreated plants can absorb residues from the soil where treated plants previously grew.
3. Neonics are toxic to all bees, commercially raised honeybees and native bees.

And you face another problem at the store. Many plants come from other countries. They are often the ones we grew to love at grandma's house—the iris or the peonies. The Japanese crab, flowering Dogwood or the English yew. Their neat foliage provides anchors to our landscapes and need little care. But these exotics are not native to North America and did not evolve for millennia alongside this continent's insects. They

"Do your little bit of good where you are; it's those little bits of good put together that overwhelm the world."

— Archbishop Desmond Tutu



Mary Powell harvesting vegetables from her garden. On September 23 she wrote an email with current news of the pollinators in her yard in Topeka: "Some thirsty migrating Monarchs on our Asters, zinnias and tropical milkweed! Bees on hyssop, oregano, basil blossoms, goldenrod, rose verbena. Hope you're seeing some too. We have too much shade but although not perfect, providing some energy sources. We can help by Planting milkweed. Planting nectar sources."

provide no foliage for baby caterpillars to eat or flowers with nectar for our butterflies to drink. No pollen for bees to take back to the hive to feed their young.

Your neighborhood, like others, used to be a prairie or woodland with acres of wildflowers, shrubs, vines and native grasses—a diverse habitat of plants, insects, birds and other wildlife. But now, your yard is likely a green expanse of an alien grass which depends upon herbicides, pesticides, fungicides, high-nitrogen fertilizer, frequent irrigation and manicuring with noisy, polluting fossil fuel-powered machines designed to mow, remove clippings, blow or vacuum leaves, and aerate soil in the absence of earthworms.

Instead of edging our lawns with rare plants from Asia, we need to bring back the native trees, shrubs and perennials. Do we need those scentless easy-care roses which pollinators fly right by? Or pear trees manipulated to be fruitless with shiny leaves that butterflies ignore?

Or can we start to think of our land, yards and gardens as edible landscapes? A wildlife banquet of leaves, such as a black willow or spicebush for the Eastern Tiger Swallowtail. Or a variety of pollen/nectar-rich colorful flowers for our native bees, butterflies and hummingbirds? Not a sterile quiet landscape; but places that vibrate and hum with life! Plant to feed our hard working pollinator friends in the growing season. And protect

them in the winter by leaving them alone. Don't rake up the chrysalis sleeping in the leaf litter at the base of that hackberry tree.

Native flora restores the bottom of the food chain—food that insects need to eat and thrive. Plant it and they will come. And our beloved birds will follow. We can all make a difference in restoring our battered ecosystem and support biodiversity in the Midwest and beyond.

How can you help?

1. Plant natives — a variety of flowering plants for nectar, pollen, seeds, and leaves.
 - a) If your house stands next to a field, convert an acre or two —or more—to native wildflowers.
 - b) Encourage businesses and industrial parks to keep prairie landscapes intact or include native plants in landscape plans.
 - c) Partner with state and county agencies about best mowing and spraying practices. AOK has worked for years to change mowing habits along roadsides, which can showcase 150,000 acres of grassland beauty along state highways in Kansas alone.
2. Avoid unnecessarily using pesticides, herbicides, treated seeds and plants.

- a) Be discerning where you buy flower starts.
 - b) Make sure they are third-party certified organic or untreated. (99% of GMO corn, soybeans and canola are treated with neonics).
 - c) Nurseries that specialize in native plants generally do not sell treated plants and seeds.
3. Assist native bees—bumblebees, blue orchard, mason, etc.— by providing areas of sunny bare soil for nesting. Avoid mulching everywhere. Leave hollow plant stalks for them to overwinter eggs.
 4. Avoid flowers with double blooms that have little or no pollen or nectar.

As more and more prairie habitat gets sprayed with herbicides or falls under the plow for cultivated crops, shopping malls and other development, what we grow on our land, in our yards and gardens makes all the difference.

As Douglas Tallamy said in *Bringing Nature Home*,
“Like it or not, gardeners have become important players in the management of our nation’s wildlife.”

Photos by Dr. Ben Franklin



“To cherish what remains of the Earth and to foster its renewal is our only legitimate hope of survival.”

– Wendell Berry

