


URBAN
GREENING
PART I

BLOOM OR BUST





By growing a diversity of flowering plants, gardeners are turning cities into havens for bees and other pollinators.

As tourists and office workers pass by, a bumble bee peacefully sips nectar from a purple cone-flower on New York City's High Line, an elevated public park built atop a historic freight rail line on Manhattan's West Side.

LIZ LIGON



By Laura Tangley

The first thing David Mizejewski does most mornings is head out the back door to see what's shown up in his wildlife garden. From early spring through late fall, the garden "teems with bees, butterflies and other pollinators," says Mizejewski, the National Wildlife Federation's naturalist. Native flowering plants, including coneflowers, milkweeds, asters and bee balm, draw droves of the insects to this mini refuge—a former "weedy patch of lawn and broken concrete parking pad"—in Washing-

ton, D.C. He's spied everything from monarch, swallowtail, painted lady and skipper butterflies to wasps, flower flies, beetles and "more kinds of bees than I can identify. I spend as much time out there as I can," he says.

Urbanites beyond Mizejewski's 8-foot fence might find this insect multitude surprising. But scientists who study pollinators, particularly bees, wouldn't blink. "Anywhere you have an abundance and diversity of flowers, including cities, you're likely to find an abundance and diversity of bees," says University of Missouri researcher Damon Hall.

He should know. Hall is lead author of an essay, published in *Conservation Biology*, that synthesizes surveys of



SAXON HOLT (PHOTOBOTANIC)

Created on the rooftop of an underground parking garage, Chicago's Lurie Garden is just one of 13,378 gardens the city registered during the Million Pollinator Garden Challenge.

United Nations report predicts that by 2050, nearly 70 percent of the planet's population will live in cities. Given these statistics, "we cannot ignore the role urban areas have to play in preserving biodiversity," says Mary Phillips, senior director of the Federation's Garden for Wildlife™ program. The 46-year-old program encourages gardeners to nurture native plants that benefit wildlife, particularly butterflies, bees and other pollinators.

Recent research suggests that even gardeners with no more than a porch, balcony or window box can make a positive difference. In a study published in 2018 in the *Journal of Applied Ecology*, Maria-Carolina Simao and colleagues at the University of Michigan–Ann Arbor placed pots of flowering sweet alyssum in 16 research plots around the city, varying the number of flower pots at each site. By comparing monthly visits by bees during the next two summers, the biologists discovered that plots with just one to three flower pots attracted bees—sometimes as many bees as plots with up to 10 pots. "If you only have room for a single pot of suitable flowers," Simao concludes, "you are still creating habitat and helping bees."

Helping bees and their brethren can soothe the soul, Mizejewski says. With a job that can be stressful, he says coming home to be amidst flowers, birds and butterflies "makes me happy. Having this place where I can recharge and connect with nature is important to my mental health."

Pollinators in peril

Helping pollinators can also help the planet. Nearly 90 percent of all flowering plants depend on these animals to reproduce, yet scientists have reported declines worldwide. The best known, and most beloved, of these beleaguered insects may be the monarch butterfly. Though the number of North American monarchs east of the Rocky Mountains was significantly higher this year than last (and the highest in a decade), this eastern population—estimated by the number of hectares it occupies each winter in Mexico—remains only 33 percent of what it was in the mid-1990s.

Sadly, the western monarch population "appears to have collapsed," according to Scott Black, executive director of the Xerces Society for Invertebrate Conservation. This January, Xerces released the latest results of its annual monarch survey at wintering sites along the California coast. Just since last winter, Black reports, the number of butterflies tallied fell from 192,668 to 28,428—an 86 percent drop in one year and a more-than-99-percent decline since the 1980s.

urban bees worldwide. The nearly two dozen scientists who conducted the review report robust native bee populations in cities across the globe, from Melbourne, London and Berlin to San Francisco, Chicago and New York City. Data from some urban areas are particularly striking. In St. Louis, Missouri, for example, essay coauthor and St. Louis University biologist Gerardo Camilo documented more than 200 bee species—or nearly half the state's total of 452 species. "In several places," says Hall, "more bees are found in cities than in surrounding rural areas."

As the world becomes ever more urban, Hall and his colleagues' results should be welcome news. A recent

Bees—the most important pollinators both in natural and agricultural ecosystems—are much less studied than butterflies, yet scientists report disturbing declines among these insects as well. In a study published in the *Proceedings of the National Academy of Sciences*, for example, a U.S. research team modelled data derived from bee experts across the country. They estimated that between 2008 and 2013, the abundance of wild bees (as opposed to managed, nonnative honey bees) dropped across 23 percent of the United States. Also worrisome, the scientists saw the greatest declines in regions where farmers grow crops that rely most heavily on bee pollination, including apples, almonds, peaches and blueberries. “What this means for farmers may be lower and more-inconsistent yields as well as higher costs,” says coauthor Taylor Ricketts, director of the University of Vermont’s Gund Institute for Environment. “For the rest of us, it may mean a more-expensive and less-stable food supply.”

The best-studied native bees, bumble bees, provide some of the strongest evidence that pollinators are in trouble. In 2016, Xerces published an International Union for Conservation of Nature (IUCN) assessment showing that more than a quarter of North America’s 47 bumble bee species are at risk of extinction. One of them, the rusty patched bumble bee, last year became the first bee in the continental United States designated by the federal government as endangered. Once common and widespread from Maine to Georgia and west to North Dakota, the species has vanished from 90 percent of its historic range.

Pollinators are declining for many reasons, including climate change, diseases and pesticides. Yet most experts say the single biggest threat is habitat loss, especially in rural landscapes where vast stretches of grasslands and other ecosystems once filled with plant diversity have been converted to crop monocultures (mostly corn and soybeans

in the United States). For bees and other pollinators, “the key component of habitat is an abundance and diversity of floral resources,” Hall says. “We use land so efficiently now we no longer have that across most of the countryside.”

In contrast to uniform agricultural lands, most cities are brimming with flowers of every shape, size and color. Comprised of “a diversity of people from around the world,” explains Hall, urban residents also “display a diversity of preferences for the kinds of food and ornamental plants they like to grow.”

Scientists such as Hall hope that, for bees, robust urban populations might someday help boost depleted rural numbers—and recent research suggests this may already be happening. In the United Kingdom, Dave Goulson of the University of Sussex and colleagues found good numbers and survival rates for two native bumble bee species in the area’s home gardens. In the *Journal of Applied Ecology*, they write that the gardens “now provide a stronghold for bumble bees in an otherwise impoverished agricultural environment [and] our data suggest that the positive influence of gardens on bumble bee populations can spill over at least 1 kilometer into surrounding farmland.”

A million gardens strong

In recent years, the plight of pollinators has gained national prominence, thanks in part to well-publicized losses of commercial honey bee hives to pests and disease. “Far more people today know that the food they eat depends on insect pollinators,” Black says. In 2014, even the White House stepped up when President Barack Obama announced a federal strategy to conserve the animals, primarily by protecting and restoring habitat in national parks, national wildlife refuges and on other public lands.

The following year, a coalition of civic, gardening and conservation organizations, including NWF, formed the



CLAY BOLT



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Bees such as the metallic green bee (left) and rusty patched bumble bee (right) are the most important pollinators of wild and crop plants worldwide. Still spotted in some midwestern cities, this endangered bumble bee could benefit from more urban gardens.



TERESA CONSIDINE

How to help pollinators

By growing goldenrod (above, with a monarch and wasp) and other native flowering plants, gardeners can benefit pollinators in cities and beyond. Here are a few tips:

Provide pollen and nectar. Active from early spring through late fall, bees, butterflies and other pollinators need a diversity of nectar- and pollen-producing flowers that bloom at different times of year. Butterflies and moths also require host plants their caterpillars eat.

Supply nesting sites. Unlike honey bees, most native bees nest alone in holes in the ground or in brush piles, tree snags, logs or twigs. Provide cover where butterflies and moths can hang their chrysalises.

Reduce pesticides. Avoid insecticides and herbicides. In particular, steer clear of systemic insecticides, such as neonicotinoids, that can persist in pollen and nectar.

Help scientists study pollinators. Visit SciStarter.org/pollinatorgardens to report bumble bees, tag monarchs, track milkweed and more. For more pollinator gardening tips, go to www.nwf.org/Garden-For-Wildlife.

National Pollinator Garden Network™ to inspire similar efforts on state, municipal and private properties. In 2015, the network's first move was to launch a nationwide campaign, the Million Pollinator Garden Challenge™ (MPGC), rallying hundreds of thousands of people—from homeowners and schoolchildren to city mayors and the heads of parks and botanical gardens—to create 1 million new or enhanced pollinator gardens across the country.

This February, NWF President and CEO Collin O'Mara and network partners shared the news that the campaign had surpassed its goal by late 2018—registering 1,040,000 gardens encompassing some 5 million acres. Cities that registered the highest number of gardens per capita ranged from large metro areas such as Washington,

D.C., Chicago and New York to smaller ones such as Santa Fe, New Mexico, Mount Vernon-Anacortes, Washington, and Wilmington and Asheville, North Carolina.

A map of the United States presents all the MPGC gardens as orange dots—so many that they turn entire regions solid orange. Yet the gardens “mean much more than dots on a map,” Phillips emphasizes. Creating millions of acres of pollinator habitat required unprecedented collaboration among conservationists, municipalities, the garden industry and individual gardeners themselves. As a result, she says, the effort “is changing the way many people garden and the way landscapers and nurseries do business.”

To bolster that point, Phillips cites results of a recent survey by the Horticultural Research Institute (HRI), the science arm of the industry trade association AmericanHort. Comparing responses to identical questions asked in 2015 and again in 2018, surveyors learned that 92 percent of 200 association members queried witnessed increased consumer demand for pollinator-friendly plants during the three-year period. Eighty-six percent of those businesses—which include landscapers, wholesale nurseries and retail garden centers—have responded by stocking more plants that nurture pollinators. Calling the results “both surprising and exciting,” HRI Administrator Jennifer Gray says the MPGC “absolutely played a role.”

Conservationists' call to action

But with butterflies, bees and other pollinators—including some bats and birds—still in decline, “a million-plus gardens are not nearly enough,” Phillips says. Network partners ended the February briefing with a “Call to Action” urging participants to continue to create and enhance habitat for these vital animals. Phillips stresses the importance of adding new plants to existing gardens, making sure pollen and nectar are available during all seasons that pollinators are active—from very early spring to the first winter frost in the case of native bees. “We’d love to see each of the 35 million Americans who garden with flowers put in one new pollinator plant per season each year,” she says.

Gardeners also need to make smart plant choices, and soon they will have more resources to do exactly that. While many garden centers today offer bee- or butterfly-friendly plants—and many books and websites feature lists of such plants—the options are rarely based on peer-reviewed science. With a five-year, \$6.5-million grant from the U.S. Department of Agriculture, researchers across the country are now conducting standardized tests on hundreds of plants available at garden centers to assess their “attractiveness” to pollinators. Results of the tests, which measure how many insects of a particular kind are drawn to and fed by a particular kind of plant, will be available by 2022. In



GREENSCAPE GARDENS

Greenscape Gardens in St. Louis, Missouri, is among a growing number of nurseries nationwide that promote pollinator-friendly plants and practices such as avoiding pesticides.

the meantime, project participant David Smitley, a Michigan State University entomologist, advises gardeners who want to help pollinators to “diversify what’s on the menu” by including—in addition to the usual annuals and perennials—flowering bulbs, herbs, vines, shrubs and trees.

Even armed with the most-nourishing plants in the best-designed gardens, cities alone cannot rescue pollina-

tors. Many rare species of “specialist” bees, for example, live only on the nectar and pollen of a single group of closely related native plants, often rare themselves, found only in forests or other natural habitats. Similarly, if the monarch butterfly is to survive, the insects’ overwintering sites in Mexico and California must be protected as well as the migratory routes they take to get there. Experts say solving the pollinator crisis will require participation from all sectors of society, from large-scale farmers to the managers of protected areas, roadsides, utility corridors and shopping malls—along with millions of gardeners in urban areas and beyond. “This is one global environmental problem,” Hall says, “that every individual can do something about.” **W**

Laura Tangley is senior editor. For more on the Million Pollinator Garden Challenge, see millionpollinatorgardens.org.



SAXON HOLT (PHOTOBOTANIC)

Bursting with black-eyed Susans, purple coneflowers and other native perennials, a streetside “hell strip” in Minneapolis provides food for bees and other pollinators. Scientists say such humble urban oases can make a major positive difference for the insects.