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FEBRUARY 2020 ISSUE[More Issues](#)**A CITY ABUZZ****Publish Date: Feb 01, 2020****Erin Shank**

The frozen February ground at the Fresh Gatherings Garden in St. Louis looks bleak, brown, and lifeless. It's been months since the last color faded from blooms, and the final batch of harvested herbs flavored a meal. But not far below the surface, baby bees are morphing, biding their time to emerge from the ground and perform what is arguably the most important service of any wildlife in our state: pollination. And as it turns out, our cities are providing important habitat for a diversity of wild bees.

*Noppadol Paothong*

Pollination is the fundamental ecological process that drives our green world, and it is how plants, both wild and cultivated, reproduce and maintain genetic diversity. The importance of bees to agriculture and human health is well-known — think of strawberries, tomatoes, blueberries, and sunflower seeds. One in three bites of food we consume in the United States is the product of bee pollination. Much of the food in our country is pollinated by wind, water, or honeybees, an imported Eurasian species that functions as livestock. But approximately 30 percent of U.S. crops rely on native bees for pollination, including a large portion of our most interesting and nutritious foods such as fruits, nuts, and alfalfa.

BEYOND FOOD

Far less understood — and appreciated — is the critical role native bees play in the health and integrity of our natural habitats. A tremendous diversity of primarily bee-pollinated plants lies nestled within the wind-pollinated matrix of Midwestern oak-hickory forests, grasslands, and wetlands. Most of these bee-pollinated plants provide fruits and seeds that are of high value to a variety of birds and mammals, produce foliage consumed by herbivores, enhance soil-binding root systems, and support a host of invertebrates that serve as a food source for many animals.

In much the same way that bees support human health, they are also essential to the well-being of our natural habitats and many of the creatures in them. Wild bees are essential to the reproduction of a large diversity of plant life in Missouri, upon which other wildlife species depend. Goldfinches depend upon sunflowers for food and use native thistle down to line their nests. Sunflowers and thistle are bee-pollinated, meaning goldfinches depend on bees for food and nesting materials.

Missouri is home to nearly 450 native bee species. Some of these species are specialists, which have evolved alongside specific plants or families of plants and exclusively collect pollen from these species. Others are generalists and collect pollen from (and thus pollinate) a wide variety of flowering plants. Other animals pollinate as well — butterflies and moths, wasps, and flies — but bees are truly the premier pollinator of the temperate

ecosystems. They intentionally collect pollen to care for their young, are strict herbivores, and are highly adapted (covered with hairs and possessing scopa or pollen baskets) to a life that revolves around pollen collection.

While much has been made of colony collapse amongst honeybees, native bees across the United States — including those in Missouri — are also in decline. However, a new study has uncovered a bit of good news and outlined a path forward in helping native bees recover.

BEES IN THE CITY

Our cities — large and small — are where most of us live. Here, the value of bees and pollination is no less important but often under-appreciated, under-studied, and even unrecognized. Gardening in urban areas, from the community garden down to the backyard, and up to the rooftops, is becoming increasingly popular and important on a self-subsistence as well as an economic level. Our knowledge of native bees in cities and their importance to wildlife conservation and urban agriculture indicates that cities are playing a crucial role as a refuge for native bees.

Beginning in 2013, MDC partnered with Saint Louis University researchers Gerardo Camilo and Damon Hall to survey native bee diversity in St. Louis. After surveying 28 locations for four years, Camilo and Hall discovered that St. Louis hosts nearly 45 percent of the bee diversity in the state.

“I kept looking at the numbers and looking at the species lists and scratching my head,” Camilo said. “It’s not what I’d expected. It’s not what I learned about wildlife in cities from ecology class. But St. Louis has a lot of bees.”

Parts of St. Louis revealed greater bee diversity and abundance because those areas provide higher quality habitat. Neighborhoods with blocks of manicured lawns had significantly less bee diversity than neighborhoods with varied landscape. In other words, bees benefit when urban lawns grow a little wilder.

In addition to the exciting abundance of species, St. Louis is also home to some rarely occurring bees, including the southern plains bumblebee (*Bombus fraternus*), whose population has declined 85 percent from historic levels. Another featured St. Louis City specimen is a specialist sweat bee that requires sandy soil for nesting and is infrequently found in floodplains. A rare cleptoparasitic bee, one of the rarest bees in North America — with less than 20 female specimens ever recorded — was found during two different sampling years at an urban farm in Ferguson. Cleptoparasitic bees, or cuckoo bees, are nest parasites. Many cuckoo bees parasitize a narrow range of host species and are useful as a health indicator of wild bee diversity in general. For cuckoo bees to persist, there must be a healthy population of the host wild bee on the landscape. Researchers found that St. Louis is home to 32 species of cuckoo bees, which is consistent with the findings that indicate a healthy diversity of wild bees in the city.

GENERATING A BUZZ

Motivated by the study’s results, Hall, with support from MDC, conducted native bee workshops and found city residents receptive and enthusiastic about planting with bee diversity as a goal.

“Most native bees are small and solitary, with a small foraging range,” Hall said. “Many bees can live their entire lives in an area the size of an average city yard, provided there is a diversity of flowers. This fact makes this a global conservation issue where one person can make a difference.”

Hall observed that a fundamental concern over pollinator health was a significant motivator for city residents to plant more flowers to support native bee diversity. Also, residents noticed that companion planting of native flowers helped them grow more and better vegetables. The native flowers attract native bees, which are better pollinators of many garden vegetables. In exchange for the extra flower power, the bees will provide highly efficient pollination for your food (See *Garden Partners for Pollinators* list.).

South St. Louis resident Seth Goldkamp, whose backyard garden produces much of the food for his family of six, decided to plant native wildflowers, including bee balm and common milkweed next to his tomatoes, peppers, okra, and squash.

“I’ve been surprised at how our plants are now absolutely alive with bees of various shapes and sizes, and not just honeybees,” said Goldkamp.

SUPPORTING BEE POPULATIONS

The plight of wild bees should concern us all. Fortunately, homeowners can easily help bee populations in their yards. Start by planting flowers that will bloom throughout the season, especially early and late in the season, when fewer pollen and nectar sources are available. Avoid pesticides and any plants or seeds treated with neonicotinoids, as these are harmful to all insects, including bees. Neonicotinoids can be found on labels, listed as imidacloprid or acetamiprid.

Reduce mowing as much as possible. A solid green lawn is a desert to bees. When allowed to grow, common broadleaf lawn weeds provide food for bees. Research indicates that reducing mowing from once per week to once every two weeks can lead to a 60 percent increase in bee diversity. Reducing further to once every three weeks can result in a 300 percent increase in diversity. Finally, leave small patches of bare ground for bees to access nesting spots. Seventy percent of our native bees are ground nesters and small bare patches of ground will allow them to construct nests. Bee houses are also a good addition, and they will provide for cavity nesters like mason and leafcutter bees. Bee houses can be interesting and beautiful additions to a garden, or they can be as simple as drilling some holes in the woodpile — though be sure not to burn those logs over the winter (See A Place to Stay, below).

Ultimately, the consistent predictor of urban bee health is floral resources. Bees need an abundance and diversity of flowers suitable for forage. The potential for bee conservation in the city is real and significant, Hall said. “A diversity of people, with a diversity of flower preferences, supports a diversity of insect pollinators,” he said.

MISSOURI’S NATIVE BEES

Missouri has five families of native bees, all with fascinating and complex adaptations and habits.

- **Apids** are the most well-known and include the bumblebees, long-horned bees, and carpenter bees. Their most visible members, the bumblebees, are social, but 90 percent of apids and other wild bees are solitary.
- **Megachilids** are known for their big mouths. Large cutting mouthparts allow them to collect pieces of leaves, soil, or plant resins to line their nests. These bees are solitary but will nest in groups and above the ground. They line their nests with soil or plant material and lay one egg in each chamber of the nest, with a pollen ball to feed each young.
- **Halictids**, or sweat bees, are easily identifiable as iridescent, beautifully colored green, yellow, and black. They are some of the smallest bees that can buzz-pollinate. In this process, the bee grabs the anther of the flower in its mandibles, curls its abdomen around the anther, and vibrates its wing muscles, causing the flower to release pollen. Many flowering plants require buzz pollination to release pollen for reproduction. Honeybees are not capable of buzz pollination, so these plants are dependent on native bees to perform this important duty.
- **Andrenids** are mining bees that are exclusively solitary and ground-nesting. They are often specialist pollinators and are some of the first to emerge in the spring. Their emergence is tied precisely to the blooming of specific flowers. How andrenids know when to emerge from their winter homes 12–24 inches underground is a true phenomenon of the natural world.
- **Colletids** are known as plasterer or polyester bees. They nest in small cavities, such as the pith of a twig or underground, and are the smallest of the wild bees. While other bees carry pollen on their exteriors, colletids carry pollen in their crop or digestive tract. They use their digestive fluids to create a waterproof coating on the walls of their nest to protect the young larvae over the winter.

GARDEN PARTNERS FOR POLLINATORS

Garden plant - Native partner

- tomato or pepper foxglove - beardtongue, pale purple coneflower, or leadplant
- cucumbers, squashes, or melons - native thistles, sunflowers, or wild bergamot
- strawberries or blackberries - New Jersey tea, pale beardtongue, or wild hyacinth

A PLACE TO STAY

By Norman Murray

While providing nectar and pollen resources for bees is important, you can make your yard even more inviting to native bees by providing nesting places. Nesting areas fall into three categories: bare soil or sand, bee houses, and natural vegetation.

The majority of bees nest in the ground, so leaving an area of bare soil or sand in your yard is a quick and easy way to attract nesting bees. To prepare the ground for bees, several steps will help ensure success:

- Use loose, well-drained soil or sand exposed in sunny areas
- Do not till or otherwise disturb the soil during the growing season
- Fill a 2-foot-deep hole with fine sand and loam or provide a pile of sand and loam in a raised bed; even a planter box may be used
- Watch for small holes with bees entering/exiting for evidence of use

Bee houses can be built using wood or tubes. Bees will use mud caps to close the holes. Wood houses are made from untreated lumber and work best with the following features:

- Drill nesting holes between 3/32 and 3/8-inch diameter at 3/4-inch centers into a block of untreated lumber
- Place holes at least 3–4 inches deep and closed at the back
- Install a roof
- Hang facing the east to get early morning sun; height isn't important

Tube houses are typically made from natural stems, like elderberry, cane, bamboo, and ragweed stems. Paper tubes can be made or purchased and used in a similar manner, but beware of any chemicals in the paper or glues, and keep them dry.

- Cut natural stems close to a node (swelled, closed portion of stem) and behind the next node to form a tube filled with pith closed at one end
- Diameters should vary to allow for different bee species to use them
- Bundle them together and fasten them into a frame or box and hang like a wood house, or hang them in a sheltered location where bees have access, such as under a roof overhang, in a shed's rafters, or under a deck

Perhaps the easiest way to help native bees is to do nothing — or at least postpone that fall garden cleanup. Some bees require nothing more than leaving standing dead stems and clumps of vegetation to overwinter in and use for nesting.

The Xerces Society for Invertebrate Conservation, which is an international nonprofit organization focusing on the conservation of invertebrates and their habitats, have two fact sheets with additional information on making and maintaining nesting options for native bees. Find them at short.mdc.mo.gov/ZWD and short.mdc.mo.gov/ZWz.



Bumblebee



Male Bumblebee



Leaf-Cutter Bee



Sweat Bee



Researchers With Bees



Researchers With Bees



Brown Belted Bumblebee



Female Striped Sweat Bee



Female Bombus Griseocollis



Bumblebee In a Net

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