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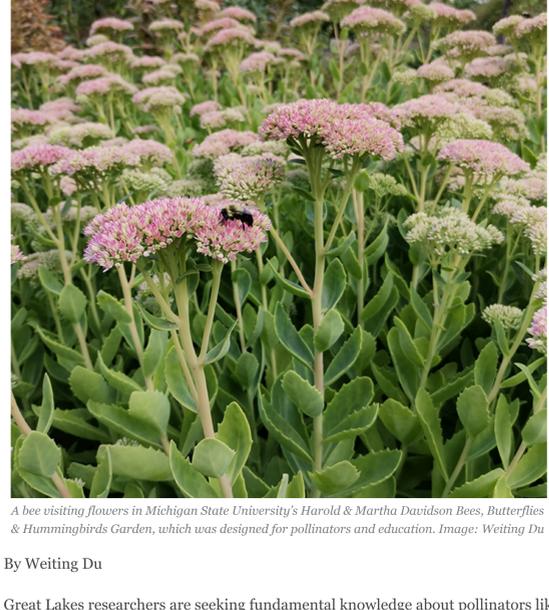
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Seeking the building blocks of pollinator conservation

By Weiting Du | January 2, 2020

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A bee visiting flowers in Michigan State University's Harold & Martha Davidson Bees, Butterflies & Hummingbirds Garden, which was designed for pollinators and education. Image: Weiting Du

By Weiting Du

Great Lakes researchers are seeking fundamental knowledge about pollinators like **bumble bees** and **butterflies**, hoping to reverse their decline.

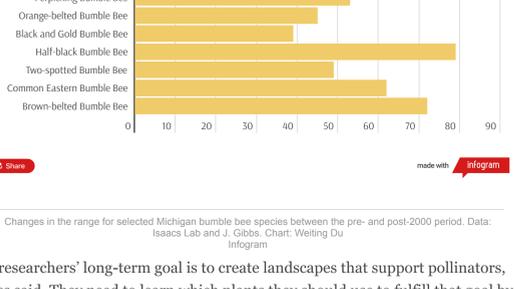
A new Michigan State University **study**, published in the journal Environmental Entomology last month, identified drought-tolerant plants that could best attract these beneficial insects. Because much of the fruit and vegetable production in this region occurs on coarse soils and periods of extended drought are becoming more common in this region, the researchers concentrated on drought-tolerant plants, the study said.

Another **study** also investigated what drought-tolerant plants attract wild bees the best, said Rufus Isaacs, an author of these studies and a professor in the Department of Entomology at Michigan State University.

"What they answered are some basic science questions," Isaacs said, "But a lot of our work is applied as we try to extend the results of the research to the farmers and general public."

The information provided by these studies will contribute to a plant selection tool called **Native Plants and Ecosystem Services**, Isaacs said. People can use it to pick out plants that support pollinators or other beneficial insects at the same time as meeting their own planting goals.

Change in the number of selected Michigan bumble bee species' occupied counties



Changes in the range for selected Michigan bumble bee species between the pre- and post-2000 period. Data: Isaacs Lab and J. Gibbs. Chart: Weiting Du, Infogram

The researchers' long-term goal is to create landscapes that support pollinators, Isaacs said. They need to learn which plants they should use to fulfill that goal by testing them on a small scale. That's how the two small-scale studies are connected to a more significant project he is leading called "Enhancing Great Lakes Landscapes for Healthy Pollinators."

Since 2017, Isaacs' team has been working on this project, aiming to align Michigan with the national priorities for supporting the honeybees, native bees and monarch butterflies whose decline is threatening national food security.

One of the key gaps in pollinators' studies is the lack of monitoring, Isaacs said. "Part of this project is to create a baseline for future comparison," Isaacs said. "We've been resampling places where pollinators were sampled 50 years or 100 years ago and trying to see how the populations have changed."

They found evidence of decline. **One of their studies** found that during the last 20 years, the population of half of Michigan's bumble bee species dropped by 50 percent or more.

Nevertheless, there is good news. In the Saginaw Bay area, they rediscovered some *Epeoloides pilosulus*, a parasitic bee that hadn't been seen in Michigan since the 1940s, Isaacs said.

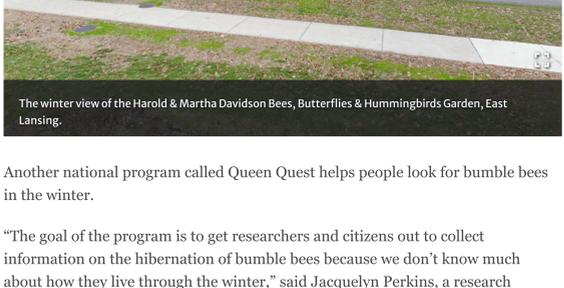


A male *Macropis nuda*, the principal host of a rare parasitic bee (*Epeoloides pilosulus*.) at Algonac State Park, St. Clair County. Image: Thomas Wood

"Because we haven't been monitoring them over decades, it's hard to know if the reason why we're finding them is that we're looking for them harder, or if they just weren't there in between," Isaacs said. "But if we don't look for them and don't identify them, we remain knowing nothing."

Monitoring pollinators is not just for scientists; the general public can play an important role too.

"I always tell people that there's a great monitoring program called the **Bumble Bee Watch**," Isaacs said. "It's easy to use and you can put it on your cell phone. I think they're doing a good job in gathering data from around North America."



The winter view of the Harold & Martha Davidson Bees, Butterflies & Hummingbirds Garden, East Lansing.

Another national program called Queen Quest helps people look for bumble bees in the winter.

"The goal of the program is to get researchers and citizens out to collect information on the hibernation of bumble bees because we don't know much about how they live through the winter," said Jacquelyn Perkins, a research technician at MSU's Department of Entomology.

"Citizen participation is extremely important," said Karmi Oxman, a doctoral student studying urban pollinators conservation at Drexel University, Philadelphia. Their research team's Philadelphia Urban Pollinator Project combines scientific study and public education.

The group placed beehives around Philadelphia and has each hive set up with a camera in the "dance floor," where the bees do waggle dances, Oxman said.



"The beehive is set behind a pane of glass so that you can observe the bees' behaviors inside," Oxman said. "We placed them in public locations in the city and provided posters that explain what the project is."

Bees dance to communicate with each other about their foraging locations. By recording and translating the dances, Oxman and her team built a map of the bees' food resources inside the city.

"I like this project because the data is very visual," Oxman said. "People can learn how pollinators interact with the same city they are living in. I think it's cool and can be a model for other cities as well."

Other groups around the Great Lakes also collect pollinator information. The federal government established the Great Lakes Restoration Initiative Pollinator Task Force in 2018. It consists of staff and scientists from U.S. Fish and Wildlife Service, U.S. Forest Service, National Park Service, Natural Resource Conservation Service and U.S. Geological Survey.

"We want to know the distribution and status of native pollinators and their communities all around the Great Lakes Basin," said Meri Holm, the coordinator of the task force.

The group is designing a common surveying protocol that all these agencies can use, Holm said.



A rare parasitic bee (*Epeoloides pilosulus*) that was rediscovered last year in Wisconsin for the first time since 1910 as part of the Great Lakes Restored Initiative Task Force's efforts. Image: United States Geological Survey Bee Inventory and Monitoring Lab

Since each agency will have staff doing surveys in different areas, the task force will then have a bigger and comparable data set if the crews use similar protocols. Based on that data set, they can start to design strategies to reverse population declines and restore habitats for pollinators.

"There haven't been many efforts where multiple agencies have come together to collaborate on such an important issue," Holm said. "So it's exciting to see where it will go. Hopefully, we can make a big impact on native pollinators together."

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