

The first complete bee census, led by Michigan State University scientists, confirmed a new species and revealed that the actual number of bee species in Michigan exceeded earlier estimates.

Identifying potential pollinators, including the 38 new bees recorded in the state, is crucial, especially in the face of declining honey bee populations. All pollinators make an estimated \$14 billion annual contribution to U.S. agriculture, wild bee populations and their benefits to crops and the environment.

"Pollinator conservation is not possible without a good understanding of what bees we have and where they are found," said Jason Gibbs, former MSU graduate student now with University of Manitoba. "We need better and more thorough sampling of our wild bee communities and an increased emphasis on understanding their basic taxonomy and natural history."

The monograph is featured in a recent issue of the journal *Zootaxa* and shows that the Great Lakes State hosts 465 species of bees -- the highest number of species reported by surrounding states. Along with providing a more accurate count, this deep-dive into wild bees provides summaries of their taxonomy and behavior as well as a preliminary conservation assessment.

"It was illuminating to learn of the high number of species; one reason that our count could be higher than other nearby states, however, could be attributed to our overall efforts to document bee diversity," said Rufus Isaacs, MSU entomologist and co-author. "Regardless, this will be an indispensable reference that will help guide current and future research on our region's wild bees, which is a focus for a group of us at Michigan State University."

Previous estimates suggested there were around 420 species in the state. Gibbs, who led a holistic, intensive effort, confirmed that past estimates were a tad low.

The treasure trove of bee data stands as a tribute to fieldwork and scientific sleuthing. The team scoured more than 100 years of bee records, including private and university collections at MSU, the University of Michigan and the American Museum of Natural History. Gibbs reviewed bees collected on Isle Royale, gathered pollinators at MSU's KBS Bird Sanctuary and even "bioblitzed" the Sleeping Bear sand dunes. (A bioblitz focuses on finding and identifying as many species as possible in a specific area in a short amount of time.)

Scientists collected on their lunch hours, while pedaling along the Lansing River Trail and perusing flower gardens at MSU. The team's dedication across Michigan's most-scenic to the state's somewhat-pedestrian locales, led to the confirmation of the new species -- in Grand Rapids of all places. The new bee species, *Triepeolus eliseae*, is described in the journal with a full taxonomic description and photographs of the distinguishing features.



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Credit: Jason Gibbs*

This new species does not collect pollen or live in colonies. It is a cuckoo, sneaking into the nests of more-industrious bees to lay its eggs. The larva that hatches grows enormous mandibles to dispense with its competition for the host-provided food stores.

The discovery was brought to fruition by Molly Rightmyer, study co-author who named it after her daughter, Elise. This parasitic bee's presence in Michigan had been known since the early 1940s. However, only now -- more than 70 years later -- has the taxonomy of this species been identified and resolved.

Balancing the joy of the new discovery is the fact that a number of bees once found in Michigan are now absent. One example is the rusty patched bumble bee, which has not been seen here since 2000. This is now listed as an endangered species, even though there are active populations in some nearby states.

Not sitting on its heels, the team is already thinking of how Michigan's bee monograph could be improved. The researchers hope more citizen scientists will increase their bee awareness and help document new finds.

To assist identification efforts, MSU has published "Bees of the Great Lakes Region and Wildflowers to Support Them." Citizens can also log their finds at Bugguide.net and iNaturalist. In fact, citizen science submissions to these sites were included in Michigan's improved bee count. John Ascher, with the National University of Singapore, also contributed to this study as part of his effort to document the entire world's bee fauna. His exhaustive list is available through DiscoverLife.org.

Story Source:

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Journal Reference:

1. JASON GIBBS, JOHN S. ASCHER, MOLLY G. RIGHTMYER, RUFUS ISAACS. **The bees of Michigan (Hymenoptera: Apoidea: Anthophila), with notes on distribution, taxonomy, pollination, and natural history.** *Zootaxa*, December 2017