

“Thieving” Bees Serve as Window to Health of Bee Communities

Summary: A recent study by researchers with the Canadian Pollination Initiative (NSERC-CANPOLIN) offers a new perspective on how to judge the health of bee communities. The authors suggest that cleptoparasitic bees may be valuable indicators of the health of the broader bee community.

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Bees that hijack the nests of other bee species could be used to measure the health of the wider bee community, says a new study by researchers with the Canadian Pollination Initiative (NSERC-CANPOLIN).

To assess biodiversity, ecologists traditionally rely on the number of species and abundance of individuals. But when it comes to bees, interpreting the results is not always simple. “This is because bees have such a wide range of lifestyles that numbers alone don’t always tell the whole story,” says Cory Sheffield, research scientist and curator of invertebrate zoology at the Royal Saskatchewan Museum and lead author of the study.

According to Sheffield, cleptoparasitic bees may offer a better way to assess bee diversity. Also known as “cuckoo bees”, cleptoparasitic bees don’t collect pollen to feed their young like other bees. Instead, a female cuckoo bee lays her eggs in the nest of another bee species. The larvae hatch and consume the pollen provisions that were meant for the host species’ offspring – and even consume the host larva itself. Different species of cuckoo bees target different groups of host species.

“Cleptoparasites are like the ‘top predators’ of a community – they are completely dependent on the presence of their host species. If something is affecting one or more of the host species, this will quickly be reflected in the composition of cuckoo species,” explains Sheffield.

To test their theory, Sheffield and his colleagues re-examined data from an earlier study looking at bee diversity in agricultural fields with different levels of disturbance. When the team focused only on the cleptoparasitic species, they found a much more consistent relationship between bee diversity and habitat disturbance compared to using diversity data for all the bee species present. Employing cleptoparasites as a proxy was particularly useful when it came to fields with intermediate levels of disturbance. Previous analyses for these sites gave inconsistent results that varied depending on which type of diversity measurement was used.

Sheffield recommends that cuckoo bee diversity and relative abundance become a standard part of all assessments of bee community health. “We know that human activities are having a strong impact on biodiversity and ecological services such as pollination. Having accurate and consistent tools to measure



A female cuckoo bee in the genus *Nomada* searching for a host nest. Because they don’t collect pollen, cuckoo bees are usually quite hairless compared to other bees (*photo by Patrick Coin at bugguide.net*)

diversity is essential to understanding changes in bee communities and developing effective conservation strategies.”

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The study is contribution #68 to the Canadian Pollination Initiative (NSERC-CANPOLIN).

Sheffield, CS, A Pindar, L Packer and PG Kevan. 2013. The potential of cleptoparasitic bees as indicator taxa for assessing bee communities. *Apidologie* (published online: [DOI 10.1007/s13592-013-0200-2](https://doi.org/10.1007/s13592-013-0200-2))

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NSERC-CANPOLIN (The Canadian Pollination Initiative) is a five-year NSERC Strategic Network based at the University of Guelph that is addressing the growing problem of pollinator decline in agricultural and natural ecosystems in Canada. CANPOLIN brings an exciting and unique approach to pollination research. Experts in entomology, ecology, plant reproductive biology, genomics, prediction and economics from across the country have joined forces to explore the full scope of the pollination problem - from pollinator health and conservation to gene flow in plants, the impact of climate change and the economics of pollination. (<http://www.uoguelph.ca/canpolin>) canpolin@uoguelph.ca