

Variety: Spice of life for bumble bees

December 21 2020



The research team put honey bee and bumble bee colonies next to an experimental field. Credit: Svenja Bänsch, University of Göttingen

The yield and quality of many crops benefit from pollination, but it isn't just honey bees that do this work: bumble bees also have a role. However, placing honey bee or bumble bee colonies next to the field does not guarantee that they will visit the desired plants since there may be other plant species flowering at the same time that prove more

attractive. A team from the University of Göttingen, together with researchers from the University of Applied Sciences Mittweida and the Julius Kühn Institute, used innovative molecular biological methods and traditional microscopy to investigate the pollen collecting behavior of honey bees and bumble bees in agricultural landscapes. They show that bumble bees take much more pollen from different plant species than honey bees to satisfy their need for protein. Furthermore, less pollen from the target—in this case strawberry plants—is collected when there are fields of flowering oilseed rape in the surrounding landscape. The results have been published in the journal *Molecular Ecology*.

The researchers placed [honey bee](#) and bumble bee colonies next to strawberry fields in the Göttingen and Kassel region and collected [pollen](#) from returning honey bees and [bumble bees](#). The bees collect the protein-rich pollen mainly for feeding their offspring. The pollen DNA was investigated working closely with the Division of Molecular Biology of Livestock and molecular Diagnostics at the University of Göttingen, and the Department of Biochemistry/Molecular Biology of the Mittweida University of Applied Sciences. "DNA analysis tells us which plant species the bees have visited and how diverse their foraging behavior is. To do this, we sequenced the DNA of the pollen and compared the sequences using a database of regional [plant species](#)," says Dr. Svenja Bänsch, post-doctoral researcher in Functional Agrobiodiversity at the University of Göttingen.



The pollen samples are prepared for DNA analysis. Credit: Svenja Bäsch, University of Göttingen

"Our study shows that honey bees and bumble bees use very different plants to source their pollen in the landscape. In particular, the wide range of bumble bee nutrition, which they find mainly in flower-rich habitats, should be taken into account when taking steps to improve nature conservation. Both [honey](#) bees and bumble bees, whose colonies can be purchased or rented, are suitable pollinators in strawberry cultivation. However, naturally occurring wild bees should be encouraged as a priority," concludes Professor Catrin Westphal, Head of Functional Agrobiodiversity at the University of Göttingen.



The pollen for the analyses has different colors, depending on the plant species. The team always analyzed the collected sample from each colony at specific times. Credit: Svenja Bäsch, University of Göttingen

More information: Svenja Bäsch et al, Using ITS2 metabarcoding

and microscopy to analyze shifts in pollen diets of honey bees and bumble bees along a mass-flowering crop gradient, *Molecular Ecology* (2020). [DOI: 10.1111/mec.15675](https://doi.org/10.1111/mec.15675)

Provided by University of Göttingen

Citation: Variety: Spice of life for bumble bees (2020, December 21) retrieved 6 May 2024 from <https://phys.org/news/2020-12-variety-spice-life-bumble-bees.html>

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