

Managed honeybees linked to new diseases in wild bees

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This is a bumblebee on a flower. Credit: Matthias Fuerst

Diseases that are common in managed honeybee colonies are now widespread in the UK's wild bumblebees, according to research published in *Nature*. The study suggests that some diseases are being driven into wild bumblebee populations from managed honeybees.

Dr Matthias Fürst and Professor Mark Brown from Royal Holloway

University of London (who worked in collaboration with Dr Dino McMahon and Professor Robert Paxton at Queen's University Belfast, and Professor Juliet Osborne working at Rothamsted Research and the University of Exeter) say the research provides vital information for beekeepers across the world to ensure honeybee management supports wild bee populations.

Dr Fürst, from the School of Biological Sciences at Royal Holloway, said: "Wild and managed bees are in decline at national and global scales. Given their central role in pollinating wildflowers and crops, it is essential that we understand what lies behind these declines. Our results suggest that emerging diseases, spread from managed bees, may be an important cause of wild bee decline".

This research assessed common honeybee diseases to determine if they could pass from [honeybees](#) to [bumblebees](#). It showed that deformed wing virus (DWV) and the fungal parasite *Nosema ceranae* - both of which have major negative impacts on honeybee health - can infect worker bumblebees and, in the case of DWV, reduce their lifespan.

Honeybees and bumblebees were then collected from 26 sites across the UK and screened for the presence of the parasites. Both parasites were widespread in bumblebees and honeybees across the UK.

Dr Fürst explained: "One of the novel aspects of our study is that we show that deformed wing virus, which is one of the main causes of honeybee deaths worldwide, is not only broadly present in bumblebees, but is actually replicating inside them. This means that it is acting as a real [disease](#); they are not just carriers."

The researchers also looked at how the diseases spread and studied genetic similarities between DWV in different pollinator populations. Three factors suggest that honeybees are spreading the parasites into

wild bumblebees: honeybees have higher background levels of the virus and the fungus than bumblebees; bumblebee infection is predicted by patterns of honeybee infection; and honeybees and bumblebees at the same sites share genetic strains of DWV.



This is a bumblebee drinking a virus inoculum as part of the research. Credit: Matthias Fuerst

"We have known for a long time that parasites are behind declines in honeybees," said Professor Brown. "What our data show is that these same pathogens are circulating widely across our wild and managed pollinators. Infected honeybees can leave traces of disease, like a fungal spore or virus particle, on the flowers that they visit and these may then infect wild bees."

While recent studies have provided anecdotal reports of the presence of honeybee parasites in other pollinators, this is the first study to determine the epidemiology of these parasites across the landscape. The results suggest an urgent need for management recommendations to reduce the threat of emerging diseases to our wild and managed bees.

Professor Brown added: "National societies and agencies, both in the UK and globally, currently manage so-called honeybee diseases on the basis that they are a threat only to honeybees. While they are doing great work, our research shows that this premise is not true, and that the picture is much more complex. Policies to manage these diseases need to take into account threats to wild pollinators and be designed to reduce the impact of these diseases not just on managed honeybees, but on our wild bumblebees too."

More information: Fürst M, McMahon D, Osborne JL, Paxton RJ, Brown MJF (2014) Disease associations between honeybees and bumblebees as a threat to wild pollinators. *Nature* DOI: doi/10.1038/nature12977

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