

Wild bumblebees are capable of logical reasoning, study finds

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Wild bumblebees are capable of logical reasoning, new research by a University of Stirling psychologist has found. The pioneering study

tasked bees with spontaneously finding corresponding sugar-coated strips of paper. The paper, "[Spontaneous relational and object similarity in wild bumblebees](#)," was published in the journal *Biology Letters*.

The positioning and color of the strips was varied, and analysis shows the bees searched in the correct location significantly above chance in both conditions.

This is the first time insects have been shown to be capable of inferential [reasoning](#), which is one of the hallmarks of human cognition.

Lead researcher Dr. Gema Martin-Ordas, a senior lecturer in the University of Stirling's Faculty of Natural Sciences, said, "My studies examine the ability to make a decision by excluding alternatives, known as inferential reasoning, which is usually considered uniquely human and language dependent.

"Critically, inferential reasoning is a type of logical reasoning that allows organisms to solve problems with incomplete information.

"For example, if I am presented with two cups and I am told that one of them hides a nice reward, when lifting one of them and seeing that it's empty, I will be able to infer that it is the cup that was not lifted that hides the reward.

"This is the first time that this ability is shown in invertebrates, specifically in insects, and questions whether language or big brains are required for this ability.

"The results are very robust because bees' performance was consistent across the experiments."

Conservation efforts

Bumblebees are in decline in the UK—two species have become extinct and eight of the remaining 24 species are currently listed as conservation priority species due to large-scale declines in their distribution, according to the Bumblebee Conservation Trust.

Dr. Martin-Ordas said, "Bee decline has become a very public symbol of environment deterioration, which has galvanized conservation efforts through public appreciation.

"This conservation effort has been further propelled by many of the fascinating discoveries about bees' cognition. I hope the results of my study will also contribute to these [conservation efforts](#)."

The [wild bumblebees](#) used in the experiments were caught in Stirlingshire in summer 2023. The experiments were carried out in a transparent plastic tube over a two-hour period, before the bees were released unharmed.

More information: Gema Martin-Ordas, Inferential reasoning abilities in wild-caught bumblebees, *Biology Letters* (2024). [DOI: 10.1098/rsbl.2023.0561](#)

Provided by University of Stirling

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