

Pesticide poisoning stops bees from finding flowers, new research shows

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Credit: Lilla Frerichs/public domain

New research published today in the journal *Scientific Reports* has shown how poisoning by pesticides can affect bees' spatial memories leading them to forget where they have been, making feeding less efficient and potentially affecting navigation.

The study by scientists at Royal Holloway, University of London showed

that [bees](#) exposed to neonicotinoids (a class of insecticide based on nicotine) were less able to remember which flowers they had previously foraged from. This meant they wasted valuable resources revisiting flowers which would yield considerably less nectar.

Liz Samuelson, lead author and PhD student from the School of Biological Sciences at Royal Holloway explained, "Spatial memory is vitally important for foraging bees, which need to remember where good sources of nectar are but avoid revisiting flowers they have already depleted. Our finding that spatial memory is affected by [pesticides](#) suggests that bees exposed to these chemicals in the wild may be foraging less efficiently or even losing their way back to the nest."

"There is growing evidence that pesticides are having harmful consequences for bees, with many studies showing that these classes of insecticide based have damaging effects on bee learning and memory. This is a concerning finding as it may mean bees are struggling to forage in the wild," Ms Samuelson added.

This research comes at a significant time for the pesticide debate, with the EU restrictions on neonicotinoid use currently under review. Discovering the impact of pesticides on bees is crucial as pollination is an essential ecosystem service, and bees pollinate approximately one third of global crops.

Ms Samuelson described how the team undertook the study, "To look at the effects of pesticide on spatial memory we adapted an apparatus originally designed for rats: the radial-arm maze. In the lab, a bee is allowed into a foraging arena to feed on an array of artificial flowers. To avoid wasting time and energy revisiting flowers she has already emptied (all [worker bees](#) are female), she must remember which ones she has visited and avoid revisits. The fewer mistakes she makes, the better her spatial memory."

"We are continuing to study how humans may be having positive or negative effects on bee populations, by researching how the spread of urban areas might impact bees. We are particularly interested in whether bees are finding enough to eat in cities, and how the amount of food (nectar and pollen from flowers) available affects their colony growth." Ms Samuelson concluded.

More information: *Scientific Reports*,
www.nature.com/articles/srep38957

Provided by Royal Holloway, University of London

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