

Bees able to spot which flowers offer best rewards before landing

July 30 2014



Credit: Elizabeth Nicholls

Bumblebees are able to connect differences in pollen quality with floral features, like petal colour, and so land only on the flowers that offer the best rewards, according to a new study by researchers at the University of Exeter.

Unlike nectar, [bees](#) do not ingest pollen whilst foraging on flowers, and so until now it has been unclear whether they are able to form associative relationships between what a flower looks like and the quality of its pollen.

The study used bumblebee foragers housed under controlled conditions to test whether they do learn about flowers during pollen collection.

Their results show that bumblebees can individually assess pollen samples and discriminate between them during collection, quickly forming preferences for a particular type of pollen.

The findings, published today in the *Journal of Experimental Biology*, indicate that pollen foraging behaviour involves learning and individual decision-making, which may allow bees to quickly learn which flowers provide the most nutritious pollen rewards for rearing their young.



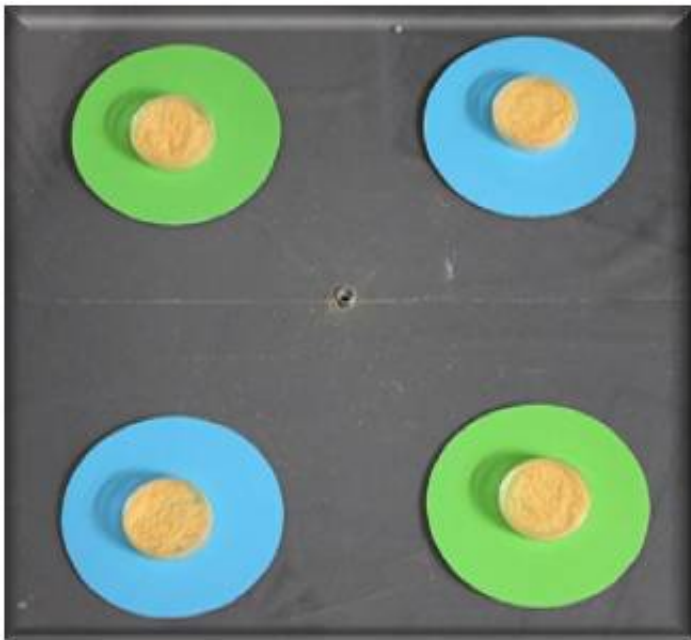
Credit: Elizabeth Nicholls

Dr Natalie Hempel de Ibarra, Senior Lecturer in Neuroethology at the University of Exeter, said: "There is still very little known about how bees decide which flowers to visit for pollen collection. Easily learning floral features based on pollen rewards, without needing any nectar rewards, is a fast and effective way to recognise those flower species which bees have previously experienced to be the best ones."

Dr Elizabeth Nicholls, a former PhD student at The University of Exeter

and now a Post Doctoral Research Fellow at the University of Sussex, said: "Bees need to be able to select flowers providing the most nutritious food for rearing their young. Since bumblebees don't eat pollen when foraging, it was unclear if or how they might be able to assess differences in quality. Here we've shown that they are able to detect differences in pollen, even before landing, which means they may be able to tell, just from the colour of the petals, which flowers are worth visiting.

"We already know a lot about how and what bees learn when collecting nectar from flowers, but since bees don't eat pollen when foraging, we were interested to see whether they could still learn which [flowers](#) to visit when collecting this resource."



The experiments involved manipulating the quality of pollen offered to the bees by diluting the samples. The researchers examined what they preferred to collect, if they could differentiate quality before landing by only letting the bees smell and see the pollen rather than probing it; and presenting the bees with four different colored discs containing stronger and less diluted pollen to record

preferences and change of preferences over time. Credit: Elizabeth Nicholls

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Provided by University of Exeter

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