

Fast learning bumblebees reap greater nectar rewards

January 16 2008



Colonies which learn colours quickly are more successful.

The speed with which bees learn affects their ability to collect food from flowers, according to a new study from Queen Mary, University of London.

As nectar levels in flowers change from minute-to-minute, faster learning bees are more likely to keep track of which blooms are most rewarding, and thrive as a result.

Dr Nigel Raine and Professor Lars Chittka from Queen Mary's School of Biological and Chemical Sciences presented twelve bumblebee (*Bombus terrestris*) colonies with flight arenas containing blue and yellow artificial flowers, which were stocked with different amounts of nectar reward. The bees were challenged to overcome their natural preference for 'blue' flowers, and to learn that the 'yellow' flowers were more rewarding. The team found that the colonies which learned colours

quickly, were more successful foragers.

The colonies' learning speeds varied by a factor of nearly five; those colonies which learnt to associate the yellow, nectar-rich flowers, with rewards fastest in the laboratory, went on to harvest 66 per cent more nectar than the slowest learning colonies, from real flowers under field conditions.

Dr Raine explains: "It is often assumed that the learning abilities of animals are adapted to the environments in which they live and that faster learning animals should be at an advantage. Our study is the first to go out and test this assumption looking at an animal in the wild. We indeed find that faster learning bees appear to have an advantage when looking for food."

Foraging bees use a variety of cues, including floral colour, pattern and scent, to recognize, discriminate and learn the flowers from which they collect food. As bees naturally forage in an environment in which the most rewarding flower type often changes, it seems likely that bees which learn quickly have the flexibility to keep track of the most rewarding flowers.

The team's findings, which will be published online in the journal *Proceedings of the Royal Society B*, suggest that differences in learning performance have important evolutionary consequences for animal foraging and fitness under natural conditions.

"Rather like us, some bees learn from their mistakes more quickly than others. These faster learning bees also collect more nectar from flowers, which ultimately means their colony will be more successful," explains Raine.

Source: Queen Mary, University of London

Citation: Fast learning bumblebees reap greater nectar rewards (2008, January 16) retrieved 30 April 2024 from <https://phys.org/news/2008-01-fast-bumblebees-reap-greater-nectar.html>

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