

Caffeine enhances bee memory

May 13 2013



Bee visiting coffee flowers. Credit: G. Wright

(Phys.org) —Caffeine is the naturally occurring drug most widely used by humans. In nature, though, it is reported to act as a bitter and toxic deterrent to herbivores, preventing leaves and seeds from being eaten.

Research by a collaborative group at Kew, Newcastle University and the University of Dundee has now revealed a new and surprising ecological function of caffeine: *Coffea* and *Citrus* species secrete it into floral nectar and it functions like a drug to manipulate the memory of pollinating bees.

In an open access paper in *Science*, the researchers report experiments showing that bees drugged with caffeine in nectar were three times more likely to remember a floral scent associated with a nectar reward than those that did not receive a caffeine dose. The team argue that this mechanism has evolved to maximise pollinator fidelity. In other words, bees laden with pollen are more likely to return to flowers of the same species when the nectar contains caffeine. An increased number of flower visits to the same species improves pollination success and leads to more seeds and hence more offspring for the plant.

The research was funded under the BBSRC [Insect Pollinators](#) Initiative and contributed to a new report in *Frontiers in Ecology and the Environment* that pollinator decline is a consequence of a combination of environmental factors including [poor nutrition](#), pesticides and diseases.

Understanding how bees choose to forage and return to [food sources](#) will help inform how landscapes could be better managed and potentially reinvigorate [bee populations](#) to protect our [farming industry](#) and countryside.

More information: Wright, G. et al. (2013). Caffeine in floral nectar enhances a pollinator's memory of reward. *Science* 339: 1202-1204.
www.sciencemag.org/content/339/6124/1202.abstract

Vanbergen, A. and the Insect Pollinators Initiative (2013). Threats to an ecosystem service: pressures on pollinators. *Frontiers in Ecology and the Environment* (in press).

Provided by Royal Botanic Gardens, Kew

Citation: Caffeine enhances bee memory (2013, May 13) retrieved 17 April 2024 from

<https://phys.org/news/2013-05-caffeine-bee-memory.html>

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