Flowers' polarization patterns help bees find food

June 5 2014

Honeybee (Apis mellifera) landing on a milk thistle flower (Silybum marianum). Credit: Fir0002/Flagstaffotos/ Wikipedia/GFDL v1.2

Like many other insect pollinators, bees find their way around by using a polarization sensitive area in their eyes to 'see' skylight polarization patterns. However, while other insects are known to use such sensitivity to identify appropriate habitats, locate suitable sites to lay their eggs and find food, a non-navigation function for polarization vision has never

been identified in bees – until now.

Professor Julian Partridge, from Bristol's School of Biological Sciences and the School of Animal Biology at the University of Western Australia, with his Bristol-based colleagues investigated whether bumblebees (*Bombus terrestris*) can learn the polarization patterns of artificial 'flowers' in order to obtain a food reward.

They found that freely foraging bumblebees soon learnt to differentiate between rewarding (sucrose solution providing) and aversive (quinine solution providing) artificial 'flowers' with two different polarization patterns. However, the bees could only discriminate between the two targets when the targets were viewed from below.

Polarization patterns occur on the petals of real flowers but are invisible to us and thus may be a hitherto overlooked component of floral signalling. Around 53 per cent of flower species face downwards and thus their polarization patterns are presented in such a way as to be visually accessible to the region of the bee's eye which includes the polarization sensitive Dorsal Rim Area. Light reflected from downward facing flowers also has the potential to contrast with skylight polarization patterns, potentially helping the bee to detect and identify such flowers.

Professor Partridge said: "Both pollinator and plant fitness is greatly dependent on the ability of pollinators to discriminate flowers accurately, and bees have been shown to be able to use a wide range of floral cues, including colour, shape, texture, certain chemical compounds and temperature, to improve the identification and recognition of flowers.

"Recent findings have added floral humidity and electric fields as additional methods with which pollinators can discriminate flowers, and it is advantageous for a plant to produce a number of different signals

that a pollinator can utilise effectively. Our findings suggest polarisation vision may provide sensory access to an additional floral cue for bees."

More information: 'Bees learn polarisation patterns' by James J Foster, Camilla R Sharkey, Alicia VA Gaworska, Nicholas W Roberts, Heather M Whitney and Julian Partridge in *Current Biology*.

Provided by University of Bristol

Citation: Flowers' polarization patterns help bees find food (2014, June 5) retrieved 26 April 2024 from https://phys.org/news/2014-06-polarization-patterns-bees-food.html