

Getting a grip: 'Velcro'-like structure helps bees stick to flowers (w/Videos)

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When bees collect nectar, how do they hold onto the flower? Cambridge University scientists have shown that it is down to small cone-shaped cells on the petals that act like 'velcro' on the bees' feet.

New research, published online in today's [Current Biology](#), shows that bumblebees can recognise the texture of petal surfaces by touch alone. More importantly, they choose to land on petals with conical cells that make it easier to grip, rather than on flat, smooth surfaces. With this extra grip, they can extract [nectar](#) from the flower more efficiently.

In the natural world, bees can take visual or olfactory cues without needing to land on the flower itself. Their ability to identify conical-celled surfaces by touch would therefore seem to be of limited use in terms of flower recognition. The researchers, led by Beverley Glover, wondered whether the conical cells play a different role by providing better grip on an otherwise slippery plant surface, thereby making nectar collection easier for the bees.

To test this, the researchers used artificial [flowers](#) cast from epoxy resin, half with conical cells and half with flat surfaces. When these casts were horizontal, the bees showed no preference, visiting each type roughly half the time. However, once the angle of the cast increased, so did the bees' preference for the conical cells. When these casts were vertical, the bees visited the conical-celled ones over 60% of the time.

The researchers, who were funded by the Natural Environment Research

Council (NERC), were able to visualise why the bees preferred conical cells. Using high-speed video photography they saw that when bees attempted to land on the flat-celled epoxy petals they would scramble for grip, rather like a climber struggling to find a foothold on an ice-covered cliff. However, on the conical-celled casts the bees were always able to find grip, stop beating their wings and feed on the flower.

The next step was to establish whether bees in the natural world actually preferred real flowers with conical cells. To test this, the researchers used snapdragon plants, which have conical petal cells, and mutant snapdragons, lacking such cells. When the flowers were horizontal and required little handling the bees would visit the conical-celled flowers 50% of the time. However when the flowers were vertical and required complex handling the bees learnt to recognise the conical-celled flowers and landed on them 74% of the time.

Around 80% of flowers have these conical cells and the researchers believe that all pollinators that land on flowers (such as butterflies, flies and other kinds of bee) may have a preference for petals with a rough surface.

Beverley Glover said: "For bees to maintain their balance and hold onto a flower is no easy task, especially in windy or wet conditions. It's great to see that evolution has come up with the simple solution of equipping flowers with a Velcro-like surface that bees can get a grip on".

More information: The article, 'Conical Epidermal Cells Allow [Bees](#) to Grip Flowers and Increase Foraging Efficiency', is published online on the 14 May 2009 in the journal *Current Biology*.

Source: University of Cambridge ([news](#) : [web](#))

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