

# Bees and flowers communicate using electrical fields, researchers discover

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Photo: Annemarie Mountz

Flowers' methods of communicating are at least as sophisticated as any devised by an advertising agency, according to a new study, published today in *Science Express* by researchers from the University of Bristol. The research shows for the first time that pollinators such as bumblebees are able to find and distinguish electric signals given out by flowers. However, for any advert to be successful, it has to reach, and be perceived by, its target audience.

Flowers often produce bright colours, patterns and enticing fragrance to attract their pollinators. Researchers at Bristol's School of Biological Sciences, led by Professor Daniel Robert, found that flowers also have their equivalent of a neon sign – patterns of electrical signals that can communicate information to the insect pollinator. These [electrical signals](#) can work in concert with the flower's other attractive signals and

enhance flower power, or floral advertising power.

Plants are usually charged negatively and emit weak electric fields. On their side, bees acquire a positive charge, up to 200 Volts, as they fly through the air. No spark is produced as a charged bee approaches a charged flower, but certainly a small electric force builds up that can potentially convey information. Placing [electrodes](#) in the stems of Petunias, the researchers showed that when a bee lands, the flower's potential changes and remains so for several minutes. Could this be a way by which flowers tell bees another bee has recently been visiting? To their surprise, the researchers discovered that [bumblebees](#) can detect and distinguish between different floral electric fields. Also, when bees are given a learning test, they are faster at learning the difference between two colours when [electric signals](#) are also available. How then do bees detect electric fields? This is not yet known, although the researchers speculate that hairy bumblebees bristle up under the [electrostatic force](#), just like one's hair in front of an old television screen.

## **Bumblebees and flowers have an electric relationship**

The discovery of such electric detection has opened up a whole new understanding of insect perception and flower communication. Dr. Heather Whitney, a co-author of the study commented: "This novel communication channel reveals how flowers can potentially inform their pollinators about the honest status of their precious nectar and pollen reserves". Professor Robert said: "the last thing a flower wants is to attract a bee and then fail to provide nectar; a lesson in honest advertising since bees are good learners and would soon lose interest in such unrewarding flower".

"The co-evolution between flowers and bees has a long and beneficial history, so perhaps it's not entirely surprising that we are still discovering

today how remarkably sophisticated their communication is", added Robert.

**More information:** 'Detection and learning of floral electric fields by bumblebees' by Dominic Clarke, Heather Whitney, Gregory Sutton and Daniel Robert in *Science Express*.

Provided by University of Bristol

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