Caught in a trap: bumblebees vs. robotic crab spiders

September 4 2008

Bumblebees learn to avoid camouflaged predators by sacrificing foraging speed for predator detection, according to scientists from Queen Mary, University of London.

One of the bumblebee's main predators is the crab spider. Crab spiders hunt pollinating insects like bees and butterflies by lying in wait on flowers, and are particularly difficult for their prey to spot because they can change their colour to blend in with their surroundings.

Dr Tom Ings and Professor Lars Chittka from Queen Mary's School of Biological and Chemical Sciences wanted to discover whether bumblebees could learn to avoid these crab spiders. Their study, funded by the NERC and published in the journal *Current Biology,* shows how a run in with a spider affected the bees' foraging patterns.

Dr Ings and his team allowed a colony of bumblebees (Bombus terrestris) to forage in a meadow of artificial flowers in a 'flight arena' which contained 'robotic' crab spiders. Some of the spiders were well hidden, others were highly visible. Whenever a bee landed on a flower which contained a robot spider, the spider 'caught' the bee by trapping it briefly between two foam pincers, before then setting it free to continue foraging.

The team used 3D tracking software to follow the bees' movements, and found that the bees which were caught by a camouflaged spider slowed down their subsequent inspection flights. Although they lost valuable

foraging time by slowing down, they were more likely to accurately detect whether there was a hidden crab spider present.

In addition, the bees which had already been caught a few times the day before by the hidden spiders behaved as if they saw spiders where there were none i.e. they rejected foraging opportunities on safe flowers, 'just in case' and were more wary than bees which had been caught by the more conspicuous spiders.

Dr Ings commented: "Surprisingly, our findings suggest that there is no apparent benefit to the spider in being camouflaged, at least in terms of prey capture rates. Spider camouflage didn't increase the chances of a bumblebee being captured, or reduce the rate at which the bees learnt to avoid predators. But our results did show that the bees which encountered camouflaged spiders were worse off in terms of reduced foraging efficiency."

Source: Queen Mary, University of London