

Toxin-laden nectar poses problems for honeybees

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(PhysOrg.com) -- Honeybees can learn to avoid nectar containing natural plant toxins but will eat it when there is no alternative, scientists at Newcastle University have found.

This means that in areas dominated by these so called ‘toxic plants’ – such as almond or apple orchards – bees struggle to find an alternative food source and so are forced to eat toxic [nectar](#).

With honeybee populations already under stress, the Newcastle University team believe these toxin-laden nectars could, in some cases, be a factor affecting colony health.

It has long been known that while most plants reward pollinators for visiting their flowers, some offer nectar that is poisonous.

Honeybees – vital for crop pollination – may be susceptible to some of these nectar toxins and beekeepers and scientists have long recognized they can be poisoned by the nectar.

Now researchers in the Honeybee Lab at Newcastle University have shown for the first time that the honeybee can learn to avoid nectar containing toxins. The study showed that when bees accidentally ate nectar that made them sick, they subsequently avoided the smell of the toxic flowers.

Publishing her research today in the academic journal *Current Biology*, Dr. Jeri Wright, director of the Newcastle University Honeybee Lab, said that understanding how honeybees learn to detect these toxins could ultimately help us to breed plants that don't produce them and protect the honeybees.

“Avoiding toxins in food is as important as obtaining nutrition,” explains Dr. Wright. “What we have shown here is that – like humans – bees are not only able to taste toxins but are also capable of learning to avoid flowers with nectar that made them feel unwell after eating it.

“The problem is that despite this, bees could be feeding on ‘toxic’ nectar because there is little else around – for example, in a large orchard where they have been brought in specially to pollinate it. At a time when populations are already vulnerable and under stress, this could be crucial to their survival.” The Newcastle University Honeybee lab is one of only a handful in the UK and is playing a key role in researching the demise of the UK's honeybee populations.

In this latest research, the team found two distinct pathways in which the bees were learning to avoid the toxic nectar ; the first through taste and the second by learning after the toxic nectar had been eaten.

This second pathway was triggered by the chemical serotonin – a neurochemical that could also play a role in this form of learning in humans.

Dr. Wright said the next step was to try to understand how the consumption of toxic nectar influences colony health in agricultural settings.

“It makes absolutely no sense for plants to poison the pollinators they rely on for their survival,” she explains. “It may be the toxins are there to protect the plants against nectar robbery by ants – we just don’t know.

“What we do know is there are a number of plant species in the UK which produce toxin-laden nectar but if there is little else around it seems the honeybees are being forced to continue to feed from these plants.

“This could well be having a major impact on the UK’s [honeybees](#) and we need to understand this if we are going to protect them.”

Provided by Newcastle University

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