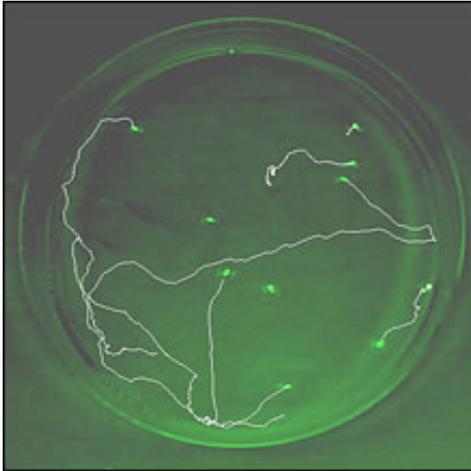


Herding aphids -- how 'farmer' ants keep control of their food

10 October 2007



The scientists used a digital camera and modified software to measure the walking speed of aphids

Chemicals on ants' feet tranquilise and subdue colonies of aphids, keeping them close-by as a ready source of food, says new research published today. The study throws new light on the complex relationship between ants and the colonies of aphids whose sugary secretions the ants eat.

Scientists had previously established that certain types of aphids live in colonies where they are used as a food source by a neighbouring colony of ants. The ants have been known to bite the wings off the aphids in order to stop them from getting away and depriving the ants of one of their staple foods: the sugar-rich sticky honeydew which is excreted by aphids when they eat plants.

Chemicals produced in the glands of ants can also sabotage the growth of aphid wings. The new study shows, for the first time, that ants' chemical footprints – which are already known to be used by ants to mark out their territory - also play a key role in manipulating the aphid colony, and keeping it

nearby.

The research, which was carried out by a team from Imperial College London, Royal Holloway University of London, and the University of Reading, used a digital camera and specially modified software to measure the walking speed of aphids when they were placed on filter paper that had previously been walked over by ants. The data showed that the aphids' movement was much slower when they were on paper that had been walked on by ants, than on plain paper.

Furthermore, when placed on a dead leaf, where the aphid's instinct is to walk off in search of healthy leaves for food, the scientists found that the presence of ants significantly slowed the aphids' dispersal from the leaf. Lead author Tom Oliver from Imperial's Department of Life Sciences explains how ants could use this manipulation in a real-life scenario:

"We believe that ants could use the tranquillising chemicals in their footprints to maintain a populous 'farm' of aphids close their colony, to provide honeydew on tap. Ants have even been known to occasionally eat some of the aphids themselves, so subduing them in this way is obviously a great way to keep renewable honeydew and prey easily available."

However, Tom points out that the relationship between the ants and the aphids might not be that straightforward: "There are some definite advantages for aphids being 'farmed' like this by ants for their honeydew. Ants have been documented attacking and fighting off ladybirds and other predators that have tried to eat their aphids. It's possible that the aphids are using this chemical footprint as a way of staying within the protection of the ants."

Professor Vincent Jansen of Royal Holloway's School of Biological Sciences, concludes:

“Although both parties benefit from the interaction, this research shows is that all is not well in the world of aphids and ants. The aphids are manipulated to their disadvantage: for aphids the ants are a dangerous liaison.”

Source: Imperial College London

APA citation: Herding aphids -- how 'farmer' ants keep control of their food (2007, October 10) retrieved 21 November 2019 from <https://phys.org/news/2007-10-herding-aphids-farmer-ants.html>

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