

The irresistible smell of high performance – insects on tansy

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Insect herbivores, especially aphids, are often major agricultural crop pests and regularly frustrate farmers' attempts to control them by their ability to spread rapidly. Thus, understanding the mechanisms that structure aphid distributions and the factors that affect their performance may help us to find management strategies to counteract them and reduce economic damage.

We used an aphid-plant model system, consisting of a patchy host plant, tansy, and an aphid species specialised in feeding on tansy. Tansy is known from its former use in natural medicine and as a natural mosquito repellent. Tansy plants, even when growing next to each other, can smell very different, which makes them an interesting study system: different scents are known to affect (i.e. attract or repel) not only herbivores like aphids, but also potential predators feeding on aphids (Figure) or aphid helpers, like ants. Ants often 'farm' aphid colonies (like dairy cows), feeding on sugary excretions offered by the aphids while protecting them from predators.

We performed a field experiment with aphid colonies on differently smelling tansy plants and simultaneously manipulated the presence of ants and predators.

We observed that predators reduced aphid numbers and colony survival, but did not reduce the initial growth rate of aphid colonies. On the contrary, ants directly benefited both initial aphid colony growth rates and aphid numbers.



Aphid colony attacked by a hoverfly larvae.

However, ants were not able to increase aphid colony survival towards the end of the experiment. Most interestingly, we found that differently smelling tansy plants had different aphid colony growth rates and final abundances, and also different abundances of tending ants and predators. Our experiment demonstrates the importance of plant scent for herbivores, their predators and helpers and thus should be considered when developing biocontrol strategies to limit aphid dispersal.