WARMING IMPACTS PEST RESPONSE TO THE CUES OF BIOLOGICAL CONTROL AGENTS

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Abstract

The net effect of climate warming on a species depends on both the direct effects of increasing temperatures, but also the indirect effects that arise by altering interspecific interactions. A growing body of literature has demonstrated that warming can affect prey by altering predator consumption of prey. However predators also affect prey through non-consumptive effects that arise when prey alter their traits in response to a predator cue. Understanding how warming influences the trait-mediated effects of predators is necessary for evaluating the net effect of predation on prey in the future. To this end, we investigated prey avoidance of substrate previous exposed to predators in different warming scenarios. First, we conducted a selection experiment that allowed pea aphids (*Acyrthosiphon pisum*) to choose between fava bean leaves that had previously been exposed to predators (Asian lady beetles; *Harmonia axyridis* or Convergent lady beetles; *Hippodamia convergens*) or those that had never been exposed to predators.

With *Harmonia*, after 4 hours at 24°C, we found significantly more aphids on leaves that had not been exposed to predators, which suggests that aphids avoided a predator cue. However, we found no avoidance when the experiment was conducted at 28°C. To identify the mechanism driving this pattern we evaluated volatile organic compounds (VOCs) released from predators at the two temperatures. While the VOC analysis was inconclusive, our study provides evidence that warming temperatures can alter non-consumptive effects of predators by altering prey detection and avoidance of predators.