Oviposition induced plant volatiles act as warning cues of herbivory to neighbouring plants

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Abstract

Plants can respond to environmental cues that predict impending herbivory by priming appropriate defences; yet, we have limited knowledge about how priming cues that change plant defence phenotype, can also influence plant fitness. Here we show that volatiles induced by herbivore eggs-prior to any feeding damage-can prime defences in neighbouring plants. Working with both an annual, black mustard (*Brassica nigra*), and a perennial, Brussel sprouts (*Brassica oleracea*), we found that volatiles induced by the eggs of a specialist herbivore, the large cabbage white butterfly *Pieris brassicae,* elicited enhanced defence responses to subsequent herbivory that reduced herbivore performance. Interestingly, *Brassica nigra* plants exposed to oviposition-induced plant cues also showed significantly higher flower and seed numbers compared to non-exposed plants, indicating that priming cues can also influence plant fitness. These findings provide evidence for an unexplored role of plant-insect interactions to fitness benefits from insect-derived olfactory cues, even before actual herbivory is present.

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