



## Spider mites avoid caterpillar traces to prevent intraguild predation\*

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The phytophagous spider mites *Tetranychus kanzawai* and *Tetranychus urticae* (Acari: Tetranychidae) can be as small as < 0.5 mm; thus, they are often incidentally consumed along with food plant leaves by voracious lepidopteran larvae (hereafter, ‘caterpillars’; Shiotsuka and Yano, 2012). Therefore, the ability to avoid such intraguild predation should confer a selective advantage to mites. We experimentally demonstrated that adult females of both mite species avoided settling on food plant leaves with traces of all tested caterpillar species (*Bombyx mori*, *Papilio xuthus*, *Spodoptera litura*, and *Theretra oldenlandiae*). We examined additional interactions using *B. mori* and *T. kanzawai* and found that *B. mori* trace avoidance by *T. kanzawai* lasted for more than 48 h. *Tetranychus kanzawai* also avoided *B. mori* traces on plant stems, along which mites access leaves. Moreover, *T. kanzawai* avoided acetone extracts of *B. mori* traces applied to filter paper, indicating that chemical substances of caterpillar traces are responsible for the avoidance. This study is the first demonstration of a repellent effect of herbivore trace chemicals on heterospecific herbivores. Although spider mites have developed resistance against many synthetic pesticides (Attia et al., 2013; Van Leeuwen et al., 2010), this study showed the potential of using natural compounds simulating caterpillar traces in repelling spider mites from agricultural crops.

**Keywords:** caterpillar, Spider mites, coincidental intraguild predation, trace, natural repellent, behavioral ecology

### References

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