

Parasitoids use chemical footprints to 'sniff out' present and future hosts

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Parasitoids are extremely important agents in the biological control of herbivorous insects. Thus, the behavioural mechanisms and chemical cues that parasitoids use to locate their hosts have been well studied since the 1930s. Nevertheless, little attention has been paid to chemical footprints that host insects leave behind on the substrate while moving over leaf surfaces. The mechanisms of how these chemicals may serve as host searching cues (kairomones) for parasitoids was explored. We compared two tritrophic systems involving the larval parasitoid *Cotesia marginiventris* (Braconidae) and the egg parasitoid *Trissolcus basalis* (Scelionidae). Bioassays confirmed that both species exploit chemical footprints from caterpillars and adult bugs, respectively, and that in the latter case, footprints of female bugs carrying eggs were more attractive than those of males. Chemical and behavioural experiments showed that in both hosts, kairomones consisted of a range of cuticular hydrocarbons with n-nonadecane playing a key role in host sex recognition by *T. basalis*. Using mutant plants with alterations in their epicuticular wax compositions, we furthermore demonstrated that the physicochemical property of the leaf plays a role in the perception of insect footprints by parasitoids. We speculate that the host finding efficiency of natural enemies may also depend on the epicuticular wax chemistry of crop plants.

