

# Does the interaction of host species and host's substrate affect the olfactory host search of the larval ectoparasitoid *Holepyris sylvanidis*?

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During the olfactory host search, parasitoids use volatiles that are directly associated with the host (e.g. host pheromones or volatiles released from host faeces) or derived from host's habitat or the host's food plant. Over the last decade, research revealed that the background odour (here: the host's food substrate) can affect a parasitoid's host-finding behaviour by enhancing, masking or neutralizing the attraction to host-specific compounds.

*Holepyris sylvanidis* is a polyphagous ectoparasitoid on larvae of different coleopteran species. All of its potential host species are major pests in the food processing industry, infesting diverse stored products. So far, only the interaction between *H. sylvanidis* and the confused flour beetle *Tribolium confusum* has been in detail. A previous study showed that *H. sylvanidis* females locate *T. confusum* by using volatiles derived from faeces of *T. confusum* larvae reared on wheat grist. Moreover, volatiles released from the food substrate significantly enhanced the attraction to (*E*)-2-nonenal and 1-pentadecene, two key compounds of the faecal odour.

These results raise several questions: 1) which compounds are used by *H. sylvanidis* to find larvae of alternative

host species and 2) do other food substrates (here: host's substrate) have the same effect on the host volatile composition and the parasitoid's host-finding behaviour? Therefore, we started to investigate 1) the acceptance of different host species (three *Tribolium* species and *Oryzaephilus surinamensis*) reared on the same food substrate (wheat grist) and 2) the effect of different host's substrates (sorghum, wheat and rice grist) on the host-odour composition on the standard host *T. confusum*.

Our initial results show that all three *Tribolium* species are accepted as hosts and allow complete parasitoid development. First chemical analyses via GC-MS of the cuticular hydrocarbon (CHC) profiles of the three *Tribolium* species indicated the presence of similar compounds. Of the tested *Tribolium* species, the dark flour beetle *Tribolium destructor* was a not yet described host. In further experiments, we will compare the CHC profiles and larval faeces of the respective host species as well as different host's substrates for qualitative and quantitative differences by GC-MS. In a four-field-olfactometer, we will, furthermore, test if the detected compounds can affect the host-finding behaviour of *H. sylvanidis* females.

Overall, we may thus identify compounds which are present ubiquitously in all host species or host's substrates as well as compounds which are host- or substrate-specific.

Finally, the identified compounds which have been shown to be attractive will be used to develop a suitable monitoring

trap for *H. sylvanidis*. Our results might thus not only enhance the understanding of a parasitoid's host-finding behaviour in relation to different host species and host substrates, but also improve the application of *H. sylvanidis* in Integrated Pest Management of stored products.