2 Summary

Harpagoxenus sublaevis is a small slavemaking ant that is common throughout the boreal regions of Western Eurasia. As an obligate parasite it is dependant on the occurrence of its host species *Leptothorax acervorum* and *Leptothorax muscorum*. Regular raids are conducted by *H. sublaevis* workers, during which they steal especially the pupae of their host colonies to raise them as a slave workforce. Slavemaker colonies can contain slaves of either host species, or even of both host species at the same time.

Colonies of each of the three species were collected in Bavaria, Germany, as well as in South Tyrol, Italy. Former studies have ascertained local adaptation for *H. sublaevis* and its larger host species, *L. acervorum*. Until now, however, co-evolutional interactions between *H. sublaevis* and its smaller host species *L. muscorum* have not been investigated.

Therefore, three experimental series were conducted, analysing raiding behaviour and defences, effectiveness of the Dufour's gland secretion, and cuticular hydrocarbon profiles. The main aim was to look for local adaptation in this host-parasite system with regard to the smaller host species, *L. muscorum*. Additionally, the adaptations of both host species to their sympatric slavemaker were compared.

Raiding experiments were conducted in a cross-fostering design. Comparisons with respect to the smaller host species *L. muscorum* showed that German colonies fared better than Italian colonies during raids conducted by either German or Italian slavemaker colonies. Moreover, German slavemaker colonies were more successful at acquiring brood than Italian slavemaker colonies. Contrary to former studies with *L. acervorum*, no interaction effects between slavemaker and host origins were detected. Thus, local adaptation for this host-parasite system cannot be assumed.

The larger host species *L. acervorum* turned out to be a stronger adversary for the slavemaker than *L. muscorum*, regardless of population. Contrary to *L. muscorum* colonies, which reacted to the invasion by a slavemaker mainly by fleeing, *L. acervorum* colonies attacked the slavemakers, thus killed or severely injured more of them than *L. muscorum* colonies.

H. sublaevis queens and workers can daub host workers with a secretion from their Dufour's gland. This secretion causes the host workers to attack each other and thus distracts them from the invading slavemaker. As this manipulation of host behaviour should be under strong selection pressure, trials were conducted to ascertain the effectiveness of this gland secretion. Again, a cross-fostering design was used.

As expected, aggressive behaviour increased, while peaceful interactions occurred less often. German *L. muscorum* exhibited stronger reactions to the gland secretion than Italian *L. muscorum*, indicating that they were less well adapted to this chemical attack. The German gland secretion provoked more behavioural changes than the Italian gland secretion and thus was more effective. As in the raiding experiments, no local adaptation was found.

Contrary to *L. muscorum* workers, who primarily showed an increase in flight behaviour, *L. acervorum* workers showed a strong increase in aggressive behaviour. Still, both host species were manipulated by the gland secretion.

These two experimental series indicated the occurrence of universal co-evolution of the host-parasite system regarding *H. sublaevis* and the smaller host species *L. muscorum*. Co-evolution of the German host-parasite system appeared to be further advanced, showing adaptations superior to those in the Italian system.

Demographic data suggested that, in Germany, a shift from the larger host species *L. acervorum* to the smaller host species was taking place, while the Italian system revealed no such changes.

Finally, the cuticular hydrocarbon profiles of workers from all three species were analysed and compared. The two host species *L. acervorum* and *L. muscorum* differed significantly in their profiles, even when enslaved. Still, *H. sublaevis* workers were able to imitate the profiles of either host species. Therefore, it was sometimes possible for a slavemaker worker or queen to enter a host colony without being detected, indicating that it could even overcome the enemy recognition of the host species.

The only difference between the populations was marked by non-enslaved *L. muscorum* workers. German profiles differed significantly from Italian profiles. However, there was no indication that the interactions between slavemaker and host workers during the raiding experiments were influenced by this difference in any way.