



## **Megalomyrmex social parasite ants manage peace with their host through weaponry**

Author(s): Stefanie Neupert, Stefanie Neupert , Alex DeMillo , Falko Drijfhout , Simon Speller , Rachelle M M Adams

Institution(s): Department of Biology, University of Konstanz, Konstanz, Germany ; The Ohio State University, Columbus, OH, USA ; Keele University, Keele, Staffordshire, UK ; Keele University, Keele, Staffordshire, UK ; The Ohio State University, Columbus, OH, USA ; Department of Biology, University of Konstanz, Konstanz, Germany

In social insects, defending a nest of resources against foreign individuals ultimately benefits the survival and fitness of the colony. An efficient nestmate recognition enables social insects to discriminate between colony members and members from foreign colonies resulting in aggressive defense behavior against the latter. Yet, social parasites manage a way through the defenses to exploit the resources of their host. In ants, the discrimination between nestmates and non-nestmates is based on mixtures of low-volatile cuticular hydrocarbons (CHCs) on the body surfaces of individuals. CHCs are species-specific and colony-specific varying in composition and abundance. Social parasites fool their host by producing host-specific CHCs (mimicry), acquiring host CHCs (camouflage), producing few CHCs in low quantity (insignificance) and/or by utilizing volatile chemicals to confuse or disrupt the host's nestmate recognition system (weaponry). In this study, we investigate the host-social parasite system of the fungus-growing ant *Sericomyrmex amabilis* and its social parasite *Megalomyrmex symmetochus* that consumes the hosts' brood and fungus. To reveal the parasite's integration strategy, we analyzed the CHC profiles of both species and performed behavioral experiments. Our results show that the parasite ants express different and fewer CHCs than host ants, suggesting a chemical insignificance strategy. Furthermore, volatile alkaloids produced by parasite ants likely elicit submission in host ants indicating that parasite ants use weaponry to pacify host ants. Although the parasites' CHC profiles seem insignificant, we conclude that the ants are not chemically invisible because they are attacked by *S. amabilis* ants that are not familiar with parasites. Our study supports the idea that social parasites utilize chemicals to manipulate host ants' behavior and that host ants can learn to accept parasite-specific odorants.