

Publication

A review of myrmecophily in paussines (Coleoptera: Carabidae) : linking early knowledge with recent findings

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Author(s) Geiselhardt, S; Peschke, K; Nagel, P;

Author(s) at UniBasel [Nagel, Peter](#) ;

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Myrmecophily provides various examples of how social structures can be overcome to exploit vast and well-protected resources. Ant nest beetles (Paussinae) are particularly well suited for ecological and evolutionary considerations in the context of association with ants because life habits within the subfamily range from free-living and predatory in basal taxa to obligatory myrmecophily in derived Paussini. Adult Paussini are accepted in the ant society, although parasitising the colony by preying on ant brood. Host species mainly belong to the ant families Myrmicinae and Formicinae, but at least several paussine genera are not host-specific. Morphological adaptations, such as special glands and associated tufts of hair (trichomes), characterise Paussini as typical myrmecophiles and lead to two different strategical types of body shape: while certain Paussini rely on the protective type with less exposed extremities, other genera access ant colonies using glandular secretions and trichomes (symphyle type). We compare these adaptations with other taxonomic groups of insects by joining contemporary research and early sources and discuss the possibility of an attracting or appeasing effect of the secretion. Species that are ignored by their host ants might use chemical mimicry instead. Furthermore, vibrational signals may contribute to ant-beetle communication, and chemical signals have proven to play a role in host finding. The powerful defense chemistry of paussines as "bombardier beetles" is not used in contact with host ants. We attempt to trace the evolution of myrmecophily in paussines by reviewing important aspects of the association between paussine beetles and ants, i.e. morphological and potential chemical adaptations, life cycle, host specificity, alimentation, parasitism and sound production.

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