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Chemical identity of the ant nest beetle *Paussus favieri*

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Ant nests house a large number of other insects, but among the 100,000 species that have myrmecophilous adaptations only the 10% are thought to be fully integrated into ant societies and act as "social parasites" that exploit colony resources. *Paussus favieri* is an example of such a myrmecophile as it is fully integrated into the colony of its host ant, *Pheidole pallidula*. For over 150 years this beetle has attracted the intense interest of researchers and collectors, probably due to its rarity, its bizarre morphological adaptations to a myrmecophilous lifestyle, and the fact that it is one of the few paussine species known from of the Mediterranean region. Myrmecophilous insects can break the recognition code of their host and integrate into the colony by being chemically insignificant and/or by using chemical mimicry or camouflage. The carabid subfamily Paussinae is among the largest myrmecophilous group but the mechanism by which they overcome the recognition code of their hosts is not known. We investigated the possible chemical adaptations of *P. favieri* living in nests of *Pheidole pallidula* from a Moroccan population by analysing the cuticular chemical profile of adult beetles and their host ants. However, the beetles possess a lower number of cuticular hydrocarbons than the ants and their chemical profile is a subset of that of the ants. Despite the incomplete chemical match, *P. favieri* is fully integrated into the ant colony. One possibility is that the hydrocarbons that beetle has in common with the ants are those responsible of nestmate recognition. Alternatively, the hydrocarbons of *P. favieri* are not involved in nestmate recognition, and thus the beetle is chemically insignificant with respect to nestmate recognition cues. In both cases, a major role in the host-parasite relation could be played by the appeasing effect of the secretions produced by the beetle's modified antennae, which are actively licked by the ants. However, the chemical compounds of these secretions are still unknown.