

## **Social Environment and Nest Volatiles Underlying Nestmate Recognition in the Carpenter Ant *Camponotus fellah***

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Nestmate recognition is a process whereby social insects recognize alien conspecific insects and prohibit their entry to another nest. In ant colonies, workers carry a colony-specific signal, which can include heritable 'discriminators' from the queen and/or workers as well as acquired cues from the environment. Cuticular hydrocarbons are believed to be nestmate recognition signals. In order to underline the respective role of the social and physical environment, we isolated workers from their nest and/or queen and studied the effect on their behavior and hydrocarbon profile. Both queenright (QR) and queenless (QL) groups reject individually isolated workers, but not QR or QL nestmates. Accordingly, hydrocarbon profiles of the isolated ants, but not of the grouped ants, diverged. This suggests that social environment is important for nestmate recognition, but the queen does not contribute to recognition cues in this species. Notwithstanding, the queen affects worker aggression towards alien ants by reducing social motivation. Next we tested whether nest volatiles affect nestmate recognition. Workers were isolated within their own nest by confining them in small cages equipped with either a single (SM) or double (DM) mesh. SM workers had limited contacts with their nestmates, whereas DM workers were exposed to nest volatiles only. SM workers were treated as nestmates, while aggression towards DM workers was intermediate. The cuticular hydrocarbon profiles of SM, DM and totally isolated ants were very similar, but differed from the profile of non-isolated ants. We propose that nest volatiles modulate the ants' aggressive behavior either by affecting their motivation or by affecting nestmate recognition cues in the ant colony. (*L*)