

P170*Fertility-related volatiles in higher termites*

Klara Dolejsova, Jana Krasulova, Romain Fougeyrollas, David Sillam-Dusses, Robert Hanus, Yves Roisin

Fertility signalling is at the heart of the debate on the evolution and maintenance of social hierarchy and reproductive division of labour in insect societies. While in social Hymenoptera, non-volatile cues on the body surface, the cuticular hydrocarbons, receive an increasing support, the situation in termites is much less clear. In primitive termites, living in small societies with a direct mutual contact among nestmates, the cuticular hydrocarbons are likely to be involved in fertility signalling as well. However, in populous colonies of advanced termites, the queens more probably announce their presence using volatiles, as evidenced by the recent discovery of the volatile queen pheromone in *Reticulitermes speratus* 1. Therefore, it is likely that in higher termites, the signal of queen presence will also be conveyed by volatiles. Here, we report on the identification of a volatile compound emitted by queens of the Neotropical higher termite *Embiratermes neotenicus* (Termitidae: Syntermitinae). Primary and secondary queens produce large amounts of (E)-nerolidol, a sesquiterpene alcohol, which is absent in all other castes. The quantity of the compound emitted by the queens appears to be correlated with their reproductive status; it increases with the level of physogastry and thus fertility of the queens while it is absent in young non-breeding queens. Interestingly, we identified this same compound also in the extract of eggs. Moreover, we observed similar volatiles being produced by the primary and/or secondary queens of two other syntermitine species. Multiple functions can be hypothesized for the observed volatiles, ranging from queen and egg recognition signal to primer pheromone function preventing the nestmates from reproduction. Nevertheless, these putative functions are not mutually exclusive and should all be considered in future research. 1. Matsuura, K., Himuro, C., Yokoi, T., et al. 2010. Identification of a pheromone regulating caste differentiation in termites. PNAS 107: 12963-12968.