



Associative learning of recognition templates

Author(s): Volker Nehring, Christina Raudies , Rebecca Endermann

Institution(s): Ecology & Evolution, Freiburg University, Germany ; Ecology & Evolution, Freiburg University, Germany ; Ecology & Evolution, Freiburg University, Germany

Elaborate division of labour is stable only when groups can be closed off to the outside. In eusocial species with often thousands of individuals per colony, the discrimination of nestmates from non-nestmates is thus a crucial process that needs to be precise and quick. Discrimination is based on colony-specific blends of cuticular chemicals. These are “labels” that are evaluated by e.g. guards at a nest entrance, in what is often described as a label-template-matching process. The template, some sort of neural representation of the nest-specific odour, is not yet well understood. New theoretical models of the template and its formation have been proposed based on existing data, but specific tests of the models are rare. The models range from simplistic ones that propose nestmate recognition to be a mere filter in the neural periphery, to models that favour complex templates in the brain that are learned by experience. We conducted a set of experiments testing the latter hypothesis in *Lasius* ants and found that (non)-nestmate recognition templates are learned associatively, which explains much of the inter-individual variation that has been observed in nestmate recognition behaviour.