

Abstract*

Cognitive aspects of division of labour and information transfer at the individual level in group-retrieving *Formica* ants

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In group-retrieving *Formica* species colony organisation is based on relatively small working groups of constant composition. Long-term laboratory experiments revealed a complex communication system in *F. polyctena* and *F. sanguinea* based on sophisticated distribution of cognitive responsibilities within stable teams of scouts and foragers. Scouts are able to memorise and pass “abstract” information to foragers in their working teams, in particular, the information about a sequence of turns on the way to a feeder (REZNIKOVA 2008). Scouts are also capable of extracting rules in order to optimise and shorten “messages”, whereas foragers are not able to transmit information (REZNIKOVA and RYABKO 2011). Perhaps not less astonishing result is that the sophisticated system of information transmission in group retrieving *Formica* is based on individual inter-relations within “teams” that remain stable for several days and even weeks. In Table 1 one can see on which day since the start of the main experiment each one of 13 scouts appeared on the maze (and then attracted its team). This is one series of experiments with one of two colonies of *F. sanguinea*, as an example of stability of teams. Different scouts visited the maze from 1 to 11 out of 20 experimental days of the presented series of experiments. A field model of the situation in which ants act collectively to perform a specific task could be the organisation of honey dew collection in the tree crown. In red wood ants *F. polyctena* groups of aphid tenders include members of different “professions” (shepherds, guards, transporters and scouts) which stay in stable cohesion for some weeks (REZNIKOVA 2011). Ants belonging to different professions possess stable sets of distinct behavioural features that can be considered a “behavioral syndrom”, that is, a suite of correlated behaviours across different contexts and situations (Fig. 1). In general, group-retrieving *Formica* species enjoy flexible and rational communication based on cognitive specialisation at the individual level.



Fig. 1. A guard reacts aggressively to the stuffed blue tit, while a shepherd milks an aphid and another shepherd transfers a drop of honey dew to a transporter

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Table 1. Visits to the maze by different teams of *Formica sanguinea*.

Team index (symbols of teams correspond to symbols of scouts)	Number of days after the start of the main experiment
I	1, 3, 5, 7, 9, 11, 19
II	1, 3, 5, 7, 9, 11, 19, 21, 30, 34
III	3, 5, 7, 9, 11, 19, 21, 23, 30
IV	3, 7, 9, 11, 13, 15, 19, 23, 30, 34, 40
V	1, 3, 5, 7, 9, 11, 23, 32
VI	1, 3, 9, 13, 19, 21, 23, 25, 32, 37
VII	7, 9, 11, 21, 23, 32, 34
VIII	7, 9, 11, 13, 19, 21, 25
IX	19, 23, 25, 27, 29, 34, 37
X	19, 25, 29, 32, 34, 37, 40, 42, 45
XI	13, 29, 34
XII	21, 32, 34, 37, 40, 42
XIII	27, 32, 37, 42, 45
XIV	32, 37, 42, 45
XV	45

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