

Abstract*

Early development of complex hunting behaviour in ants (Hymenoptera: Formicidae)

Sofia N. PANTELEEVA

Dr. Sofia N. Panteleeva, Institute of Animal Systematics and Ecology of Animals, Siberian Branch Russian Academy Sciences, Frunze ul. 11, 630091 Novosibirsk, Russia. E-mail: psofia@mail.ru

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The role of individual and social experience in the scenarios of predatory behaviour has been studied for only a few species of vertebrates. Most researchers do not consider invertebrates to be able to demonstrate flexible behaviour and social learning. Ants are known to possess complex hunting behaviour, including catching difficult-to-handle prey and even group hunting. However, nothing is known about the early development of hunting behaviour in ants or the roles of flexible behaviour and social learning. We recently revealed the hunting technique utilized by ants of the genus *Myrmica* for jumping springtails (Collembola), and found that ants are able to switch to springtails as mass prey (REZNIKOVA & PANTELEEVA 2001, REZNIKOVA & PANTELEEVA 2005).

In order to investigate the early development of hunting in ants we compared one control "wild" colony of *Myrmica rubra* (LINNAEUS, 1758), and four completely naïve (laboratory-reared) colonies. To observe the interactions of the ants with the active prey, we put live jumping springtails (*Tomocerus sibiricus* REUTER, 1891) into glass boxes containing transparent "splints" made out of plastic bottles (mimicking forest litter). The ants were placed into the containers in array for 15-minute tests and their responses to the prey were timed and video-recorded. In the experimental colony, 123 individually labelled ants were tested 2, 7, 14, 30, and 60 days after hatching from pupae. The naïve ants treated the springtails peacefully as conspecifics rather than as potential prey, whereas nearly all the members of the control colony caught springtails and transported them to the nest as prey. We observed numerous antennal contacts of naïve ants with springtails. Fewer than 10 % of the naïves demonstrated hunting behaviour to-

wards the springtails. All of them exhibited an "at once and entirely" fixed action pattern during the final act of the hunt and there were no noticeable differences from the adults. One of them caught prey at the age of 7 days and the others at the age of 14 days. The naïve ants did not use the killed prey to feed the larvae. When transferred to the nest together with their prey, they left the springtail near the brood, but other members of the naïve colony removed the prey from the nest.

Further laboratory and field experiments demonstrated that the scenario of the development of hunting behaviour is based on the multistage maturation, which includes elements of social learning. The colony members possessing "at once and entirely" behavioural patterns favour the "release" of the set of behavioural patterns in conspecific observers. The dependence of the activity of hunting for springtails on their abundance in ants' feeding areas suggests that the frequency of hunter-prey encounters affects the formation of the stereotype based on social facilitation.

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References

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