SOCIAL BEHAVIOUR DURING NEST-MOVING IN THE ANT

*MYRMICA RUBRA* L. (Hym. Form.)

M. ABRAHAM and J.M. PASTEELS

*Laboratoire de Biologie animale et cellulaire,*

*Université libre de Bruxelles, Faculté des Sciences,*

*50, av. F.D. Roosevelt, 1050 Bruxelles-Belgique*


**SUMMARY**

The colony-moving of *Myrmica rubra* L. was induced in the laboratory by worsening the microclimate of the nest.

A detailed analysis of the whole process is given; it is based both on observation and on traffic measurements between the old and the new nests. Three periods can be recognized: exploration, emigration, and final exploration. Two recruitment methods occur, initiated by distinct motor displays: group recruitment takes place first, whilst carrying behaviour becomes the main technique later.

The organization of the group is described. The recruiter extrudes its sting while returning to the old nest and while leading the group. Tracks left on soot-coated glasses are analyzed. Sticks crushed with either the poison gland or the Dufour's gland are effective in leading the ants.

Most adult carrying postures are typical for myrmicines: the occurrence of atypical postures is discussed. All the carrying acts (of brood and adults) are effected by 25% of the workers (on average); carrying activity is age-dependent. The stability of the group of carriers is tested during successive emigrations.

Social regulation potentiality is strong: even queens or callows can move with their larvae when isolated from the rest of the colony.

**RESUME**

*Etude du comportement social lors du déménagement*

*chez la fourmi Myrmica rubra* L. (Hym. Form.)

Le déménagement de sociétés de *Myrmica rubra* L. a été induit en laboratoire en dégradant le microclimat des nids.

La plupart des transports se font selon la position typique des myrmicines; la signification des transports atypiques est discutée. Le transport de compagnes ou de couvain est effectué par 25 % des ouvrières (en moyenne), dont la majorité montre une forte pigmentation cuticulaire. La stabilité de ce groupe d'ouvrières transportrices est testée au cours de déménagements successifs.

Le pouvoir de régulation sociale est élevé : des reines ou des jeunes ouvrières isolées du reste de la colonie peuvent mener un déménagement à bien.

INTRODUCTION

Nest-moving in ants is a primordial social event as it is essential for the survival of the colony whenever the ecological conditions change too drastically. For example, during the severe summer drought of 1976, numerous nest-movings of *Myrmica rubra* were observed near Brussels. Moreover, C. DE VROEY (personal communication) observed colonies of *M. rubra* driving away alien colonies of the same species or being dragged away from their nest by an expanding *L. niger* society.

Moving is a highly organized social activity, which involves the entire colony. It constitutes therefore a good opportunity for studying social behaviour.

If we exclude the peculiar case of the daily migrations of army ants, complete detailed descriptions of nest-movings have only been given recently for several species of *Leptothorax* (Möglich, 1978). Usually, the studies turn on particular aspects of emigration, such as recruitment, carrying behaviour and division of labour (Hölldobler, 1971; Möglich, 1973; Möglich and Hölldobler, 1974; Meudic, 1976, 1977).

*Myrmica rubra* L. (= *Myrmica laevinodis* Nyl) was chosen for this study because its social behaviour has been already studied in other circumstances: food recruitment (Cammaerts, 1978, Dlusky, 1978) alarm (Crew and Blum, 1970), defence (Cammaerts, 1975, De Vroey and Pasteels, 1978), brood-rearing (Brian, 1974). Moreover, *M. rubra* is known to move often in natural conditions, at least when the colonies are small (Dobrzanska and Dobrzanski, 1976).

MATERIALS AND METHOD

Our experimental societies contain around 100-200 workers, 1-5 queens, 60-100 larvae and nymphs, and 20-200 eggs. These societies were obtained by dividing large laboratory colonies. According to Wair (1958), the exit of ants caused by graded disturbances is a function of their polyethism. In order to get balanced experimental colonies, the workers were equally distributed as soon as they left their nest, the latter being tapped repeatedly. Finally, the nest was opened, and the remaining ants were also distributed.

Emigrations were induced in the laboratory by worsening the microclimate of the nest, and providing the ants with a more suitable nest at a distance of about 75 cm. The factors inducing movement were chosen according to the known facts of the biology of the species (Table I). The resulting experimental set-up is illustrated on figure 1.