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RESUMENES

COLONIAL RECOGNITION IN CATAGLYPHIS ANTS

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Abstract

Altruism is a characteristic of animal societies with a high level of relatedness, particularly in insect societies. Therefore altruistic behaviour must be oriented toward kin which are members of the colony, and it is necessary to recognise and discriminate nestmates from alien individuals which are rejected or killed. Discrimination is achieved through the perception of non volatile chemical signals that reside on the cuticular surface and constitute the colonial odour.

Cataglyphis cursor was chosen to study colonial recognition in ants as they were observed in the field to exploit simultaneously and peacefully food sources and they do not defend territories. It was surprising for a monogynous species, which form generally very closed colonies. The following experiments were realised in the laboratory : 1) Adoption of a worker in an alien colony was possible according to the geographical distance separating the two colonies from the Var in France and Barcelona in Spain, the adoptions are always impossible. In the same habitat adoptions are easy between neighbouring colonies because they can be related. It is a consequence of the especial mode of colony foundation of C. cursor which reproduce by fission. 2) With lures impregnated with a pentane extract, it was demonstrated that cuticular substances are concerned with colonial recognition. 3) The substances were identified by gas chromatography - mass spectrometry, they are mainly hydrocarbons. The possibilities of adoption are correlated with the cuticular hydrocarbon profiles. 4) Adoptions of newly emerged ants in an alien colony is possible during a few days, indicating the possibility of a callow cuticular profile. 5) The queen is not determinant in the closure of societies, adoptions are not easier in orphan colonies nevertheless the workers are able to recognise their own queen (Lenoir, Nowbahari and Berton).

aggressiveness is low. Variation between hydrocarbon profiles was also correlated with aggression. It was found that the postpharyngeal gland has congruent hydrocarbon profile with the cuticle. The role of the glandular secretion in modifying the aggressive behaviour was demonstrated in *C. niger* and *Manica rubida*. It was further demonstrated that the gland serves as a storage organ, and that the unified colonial odour is achieved by constant exchanges of secretion through trophallaxis and mutual grooming, therefore constituting a "Gestalt odour" and the postpharyngeal gland a "Gestalt organ" (Soroker, Vienne, Nowbahari, Errard and Hefetz).

Cataglyphis iberica was chosen as a sample of monogynous and polycallic species. Colonies are extremely closed, and never tolerate heterocolonial individuals. The cuticular profiles of neighbouring colonies are colony specific. The different nests of a colony hibernate separately, and in spring mutual adult transport are observed between the different nests of the colony, decreasing in frequency in summer. This behaviour can be explained as a means to maintain a uniform colonial odour after hibernation, in a species with multiple nests. Callows have a particular cuticular profile, with a low postpharyngeal content (this was also found in *C. niger*) and some hydrocarbons which disappear in the mature ants and can be characteristic of the callow profile (Lenoir, Dahbi, Cerda and Hefetz). Finally we will discuss the postpharyngeal gland chemistry and its implication for the phylogeny of iberian *Cataglyphis* species (Dahbi, Lenoir, et al.)