

Plasticity of behaviors in relation with social environment.

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Division of labour was studied on the ant *Lasius niger* L. (Formicidae). Behaviours related to foraging, food-sharing and tending the brood have been noted. Each worker was marked by a figure or a number stuck to the gaster (technique developed in our laboratory : Verron and Barreau, 1974). A newly founded colony consisting of a queen, 42 workers and brood was observed during 5 days in artificial nest. Workers were characterized by 2 indexes

-situation index ( $k_s$ ) : ratio between time spent on brood and outside the nest (the situation is considered independantly of activity)

-activity index ( $k_e$ ) : ratio between time involved in the tending of the brood and food-sharing to workers.

It was possible to recognize 2 specialized groups : nurses and permanent foragers with all intermediaries (Fig. 1). Members of the colony were then separated into 4 groups : A (very active foragers), B (less active foragers), C (nurses) and D (intermediary between B and C). Each group was also observed during the 5 following days (without the queen). The results are :

- A : workers have some tendency to stay in the nest near the brood, but do not become nurses. Larvae are not fed and mortality is high.
- B : some workers become good foragers and others care actively of brood which does not seem efficient as larvae are not very much turgescent.
- C : a real division of labour appears. Some workers present a total modification of behavior and become foragers, others are simultaneously foragers and nurses, a third group keeps on nursing (Fig. 2).
- D : Same results as for C.

Conclusion : In an ant colony workers which are specialized in outside activities do not have a plastic behavior and are unable to tend the brood. On the other side nurses show a great plasticity and can quickly become foragers when permanent foragers disappear. Only young workers can adapt their behavior to the modifications of social environment, and react in fonction of individual characteristics. The plasticity depends on age, it diminishes when workers grow older.

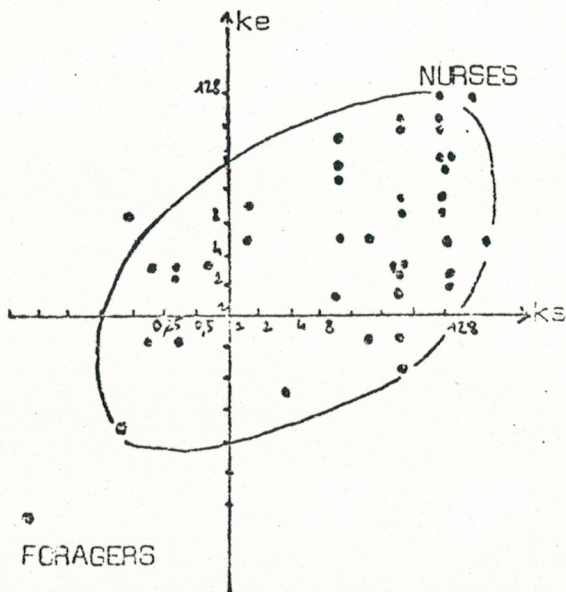


Fig. 1 : Entire colony (42 ♀) before separation

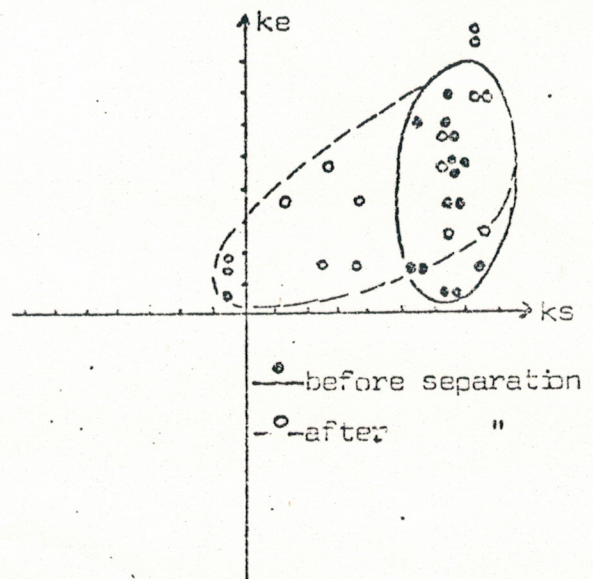


Fig. 2 : group C