Acta Neurobiol. Exp. 1995, 55: 222

Effect of early illumination conditions on illumination preferences in the ant

Julita Korczyńska[1] and **Ewa J. Godzińska**[1,2]

[1]Department of Neurophysiology, Nencki Institute of Experimental Biology, 3 Pasteur St., 02-093 Warsaw, Poland; [2]LEEC, URA CNRS 661, Université Paris Nord, 93-430 Villetaneuse, France

INTRODUCTION AND METHODS. Previous studies investigating the role of acquired factors in determining environmental preferences in the ants were focused mostly on the effects of early exposure to chemical stimuli on the subsequent choice of the nest site (2, 3, 4) and of food (1) . Presently, we investigated the effect of illumination conditions experienced during the early adult life on the illumination preferences in the ants. 30 foundress queens of *Camponotus melanocnemis* Santschi, an ant species common in Cameroon, were isolated in simple nests kept in constant darkness. After the appearance of pupae, 15 queens (group 1) continued to be kept in darkness, and 15 queens (group 2) were exposed to 12:12 LD rhythm. Newly eclosed workers (small minors) were exposed to darkness/12:12 LD during the first 3-6 weeks of their adult life; only 3 workers of the group 1 were a few days older. After a further month spent by all the ants in darkness, groups of individually marked workers descending from the same queen (2-6 ants) were tested in "double nests" (Fig. 1A) during 40 days. On each day we noted 10 times at 30 min intervals which ants were present in the illuminated half of the nest.

RESULTS AND DISCUSSION. Although the ants of both groups preferred strongly to stay in darkness, the ants of the group 2 avoided illuminated zones significantly less than the ants of the group 1 (Fig. 1B and C). Interestingly, that effect appeared only after the first ten days in the double nests (Fig. 1C). The effects of early exposure to light were retained after a month spent in darkness, which implies that they involved some phenomena more complex than simple habituation to light. Our present results demonstrate, as far as we know for the first time, that early exposure to light may lead to significant modifications of illumination preferences in the ants.

We thank A. Dejean for providing the foundress queens. Supported by the Statutable Grant of the State Committee for Scientific Research for the Nencki Institute of Experimental Biology.

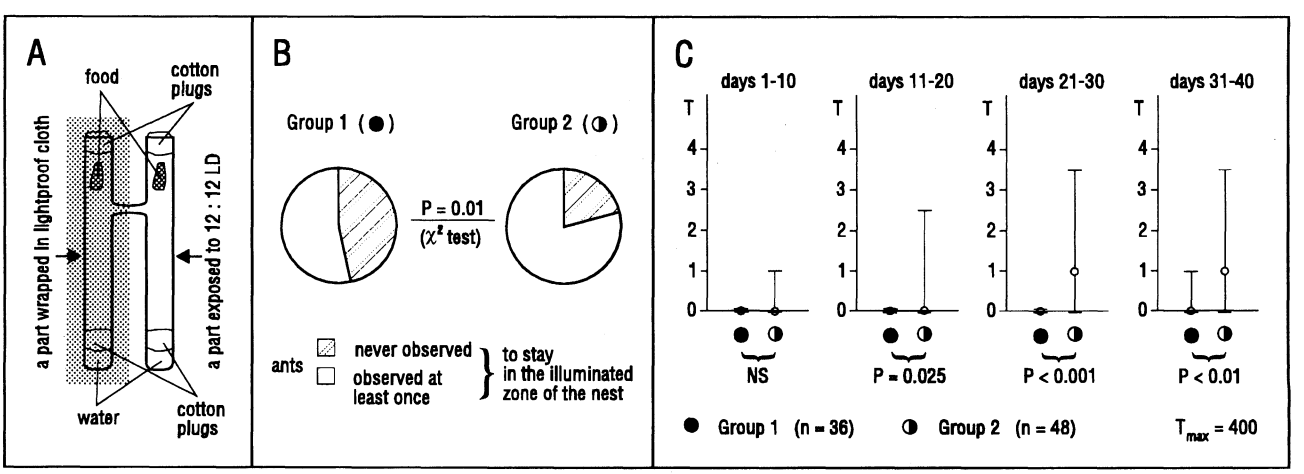

Fig. 1. A, the double nest used in the tests. B, the frequency of the ants observed/never observed to stay in the illuminated zones of the nests. C, the values (medians ± quartiles) of T (= number of the tests during which a given ant was staying in the illuminated zone). Statistics: Mann-Whitney U test.

1. Beckers R., Lachaud J. P., Fresneau D. (1994) Ethol. Ecol. Evol. 6: 159-167.
2. Dejean A. (1990) Behav. Proc. 21: 107-125.
3. Garcia-Perez (1987) Fol. Entomol. Mex. 71: 55-65.
4. Jaisson P. (1980) Nature 286: 388-389.

Accepted 12 June 1995