each month (except June) with worker only groups placed in a 28°C incubator in total darkness and found that the number of days needed for soldier formation of the Formosan subterranean termite, *Coptotermes formosanus* Shiraki, varied depending on the time of the year (month). In March, just prior to the major swarming exodus for alates of this species (April), 9 days was required before a worker molted to presoldier. All other months took longer before such a molt occurred, with the longest required time to molt being in December (30 d); a time of reduced egg laying and caste-dependent duties for most natural colonies. The number of days required for soldier formation was closely aligned with the formation time of presoldiers. The length of time that termites were kept in the laboratory before being used for the bioassays (7 d – 1 yr) did not affect this annual rhythm. This is the first demonstrated evidence of an environment-independent circannual clock in a social insect.

525 - ROPALIDIA MARGINATA: MALE WASPS FEED LARVAE, GIVEN AN OPPORTUNITY

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A striking feature of hymenopteran societies is the absence of male workers. Nevertheless, there are some reports of males feeding larvae in natural colonies of some primitively eusocial wasps. In the extensively studied primitively eusocial wasp *Ropalidia marginata* however, males have never been observed to feed larvae in natural colonies. This may be either because male *R. marginata* are incapable of feeding larvae or because they do not have opportunities to do so due to limited access to food and/or superior efficiency of females in feeding larvae. Here we have investigated the possible reasons for males not to feed larvae. By providing excess food and by removing the females, we have eliminated the potential reasons for males not to feed larvae. We find that under these conditions males feed larvae with probabilities and rates more than, or comparable to, those of females, suggesting, that lack of preadaptation to feed larvae does not explain the absence of male workers in social Hymenoptera. Although males are not as efficient as females in feeding larvae, they seem to be capable of doing enough for natural selection to have promoted the evolution of male workers if there were not other factors to prevent such evolution. Genetic relatedness asymmetry may be one such factor. A recent hypothesis concerning the increased susceptibility of haploid hymenopteran males to infection, is not supported because males handle and masticate prey for their own consumption and otherwise interact with the larvae. Since explanations based on relatedness asymmetries are believed to be inadequate, the absence of male workers remains a challenging unsolved problem in insect sociobiology.

526 - THE GEOGRAPHICAL VARIABILITY OF THE SECRETIONS OF THE CEPHALIC LABIAL GLANDS OF BOMBUS PRATORUM L. MALES

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The southern populations of arcto-alpine species of bumblebees, isolated at the tops of mountains, suffer from a very weak connectivity. It is likely a major constraint in spite of a high floral diversity. It could result in the very intense phenomena of phylogenetic differenciation (speciation and subspeciation). On the contrary, these phenomena of insulation seem very reduced in the Arctic in spite of the low biotic diversity. he main tool used by the bumblebees for recognizing themselves within the species is the marking with pheromones secreted by the cephalic labial glands of the males. We hypothesize that the phylogenetic differentiation could be perceived in the complex composition of this secretions. We determined (by GCMS analysis and multivariate statistics) that there are differences within secretions which make possible the distinction between five populations of *Bombus pratorum* coming from different areas of Europe. This intraspecific pheromonal geographic variability is identified here for the first time for a bumblebee species.