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# CHEMISTRY AND BIOLOGY OF SOCIAL INSECTS

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# Adaptations of Myrmicine Ant Genus *Ocymyrmex* for Exploiting a Hot Arid Environment

Alan Marsh 1987

Department of Zoology, University of the Witwatersrand, Johannesburg, South Africa

Members of the insectivorous ant genus *Ocymyrmex* occur in hot arid and semi-arid regions of the Ethiopian zoogeographical zone where rainfall events are rare and unpredictable. These rainfall patterns affect *Ocymyrmex* species in two important ways. First, mating and colony founding conditions are rare and temporally unpredictable. Secondly food is spatially and temporally unpredictable. *Ocymyrmex* species have evolved a suite of characteristics that facilitates their survival and reproduction in these physiologically stressful and ecologically unpredictable environments.

## PROCEDURE

Field and laboratory observations were made on the foraging behaviour and social structure of ten species in southern Africa. The proportions and tasks of the different castes was determined for entire colonies and for the forager force.

## RESULTS AND DISCUSSION

Colonies comprised 200-1000 ants and included one inseminated, reproductively active ergatogyne, a few alate males and many sterile workers and reproductively inactive ergatoids. The proportion of ergatoids varied considerably; means for nine species ranged from 3.5-43.6%, with minimum values of 0-27.7% and maximum values of 5.6-58.5%. Irrespective of species or time of year, all nests contained some uninseminated, reproductively inactive ergatoids. Ergatoids are therefore produced throughout the year. Reproductively inactive ergatoids adopted worker-like roles, with large numbers occurring in the forager force. It is suggested that this caste flexibility is an energetically inexpensive way of ensuring the continuous availability of young virgin ergatoids to take advantage of irregularly occurring mating and colony founding conditions.

Foragers adjusted activity levels according to the temporal abundance and availability of prey. Through the frequent use of refuges ants scavenged dead or torpid prey items, generated by intense midday heat and desiccation, at surface temperatures of up to 68°C; conditions when no other scavengers were active. On days when termites were active, ants switched to predatory behaviour and were more active during cooler conditions. *Ocymyrmex* species were usually diffuse foragers, reflecting their spatially unpredictable food resource, but a high proportion of the normal forager force as well as young virgin foragers were recruited to rewarding areas when they were located. Pheromone mediated recruitment was equally effective over a wide range of surface temperatures (29-64°C); with approximately 80% of recruits discovering the food source. Plasticity in foraging behaviour enables ants to exploit a patchy and fluctuating food resource.

# Prey Items (Hymenoptera)

Vera Lúcia Instituto de Brazil

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