

Palaeontological history of the ants (Hymenoptera)

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Four stages could be identified in the palaeontological history of the ants: the ancient (latest Early and Late Cretaceous), the old (Palaeocene and Early Eocene), formation of the modern fauna (Middle Eocene through Middle Oligocene), and the modern stage (Miocene – now). During the ancient stage the ants were rare and the extinct subfamilies dominated, although the main extant subfamilies appeared during the Late Cretaceous as well. The old stage is the least known; the ants were still rare but represented mainly by the extant subfamilies and occasionally by the living genera. At the third stage ants became numerous, species belonging to the living genera were common, and those with highly populated colonies are recorded for all better-known ant faunas. The modern stage shows essentially a modern structure of the ant assemblages, although the majority of the species are extinct.

Oil-producing flowers, oil-collecting bees and their parasites (Hymenoptera): volatiles as mediator?

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The oil-flower, oil-bee interaction is an interesting pollination system. While most of the bees (excluding the parasitic ones) collect pollen and nectar for their larvae, about 420 bee species collect fatty oil from oil-flowers, mainly to mix it with pollen and to feed their larvae. Oil-producing flowers and flower-oil collecting bees are most abundantly found in the neotropics. In Europe, only species of *Macropis* (Mellitinae) specialise on flower-oil producing plants. They collect pollen and oil from different species of *Lysimachia* (Myrsinaceae). In the present study I analysed the flower scents of different *Lysimachia* species and found differences in floral scent between species. Some compounds are emitted especially by the flower-oil. Electroantennographic detections (GC-EAD) with different *Macropis* species revealed several active compounds in the scent of *Lysimachia*, which could be used by these bees for host-plant finding. Interestingly, some of these compounds can electrophysiologically also be detected by *Epeoloides coecutiens*, a specialised parasitic bee of *Macropis* spp. As these compounds can also be found in the mixture of pollen and oil in cells of *Macropis* nests, these compounds could further be used by *E. coecutiens* to find nests of *Macropis*.

Molecular phylogeny of the Braconidae (Hymenoptera)

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The Braconidae is an extremely large family of parasitic Hymenoptera currently divided into more than 40 subfamilies. Extensive work over the last few decades has focused on elucidating the phylogenetic relationships among braconid subfamilies, but no real consensus has been achieved. Morphological characters have often been used for phylogeny reconstruction, but problems of convergence, especially among features involved in the parasitic lifestyle, have led some to question the utility of this dataset for higher-level questions. Molecular



Sixth International Conference of Hymenopterists

Programme and Abstracts

Editor: Denis J. Brothers

22nd – 27th January 2006

**Sun City
SOUTH AFRICA**