



## **Age polyethism in the tropical primitively eusocial wasp, *Ropalidia cyathiformis***

Author(s): Sruthi Unnikrishnan, Raghavendra Gadagkar , Sruthi Unnikrishnan

Institution(s): Centre for Ecological Sciences, Indian Institute of Science, Bangalore, India ; Centre for Ecological Sciences, Indian Institute of Science, Bangalore, India ; Ecology and Evolution Department, National Centre for Biological Sciences, TIFR, Bangalore , India

Division of labour is an integral part of all eusocial insects and enable the efficient functioning of the colony. Division of labour is based on age in most advanced insect societies. Primitively eusocial insects on the other hand are believed to have a weak age polyethism although it has not been as extensively studied as in highly eusocial species. We investigated the role of age in division of labour in the tropical primitively eusocial wasp, *Ropalidia cyathiformis*. We analysed specifically the performance of four functionally significant tasks of the colony, two within nest tasks - feed larva and build and two outside nest tasks - bring food and bring building material. By analysing the age of the first performance and sequence of tasks, we found that there was a significant effect of age on the tasks performed, with the tasks being initiated at significantly older ages. Both absolute and relative age of the wasps were measured. Probability of the performance of a task relative to other tasks (PTP) as well as the absolute frequency of tasks performed (FTP) were also analysed and showed age dependant patterns. The amount of variation explained for both FTP and PTP was significantly higher with absolute age than with relative age. Similarly, the amount of variation explained for absolute and relative age was significantly higher with FTP than with PTP, indicating the presence of a rigid age polyethism. When compared with the well-studied congeneric species *Ropalidia marginata* which is the only primitively eusocial species with evidence for a strong age polyethism, we found that the converse is true, with models based on relative age and PTP better explaining the variation in data than absolute age and FTP, indicating a more flexible age polyethism. Taken together our findings show an evolution of age polytheism between the two species.