Chimaerocyon gen. nov., a morphologically aberrant myrmecophilous genus of water scavenger beetle (Coleoptera: Hydrophilidae: Sphaeridiinae)

MARTIN FIKÁČEK1,2, MUNETOSHI MARUYAMA3, DOMINIK VONDRÁČEK2 & ANDREW E. Z. SHORT4

1Department of Entomology, National Museum, Kunratice 1, CZ-14800 Praha 4 – Kunratice, Czech Republic. E-mail: mfikacek@gmail.com
2Department of Zoology, Faculty of Sciences, Charles University in Prague, Viničná 7, CZ-12843 Praha 2, Czech Republic. E-mail: dom.von@seznam.cz
3The Kyushu University Museum, Fukuoka, 812-8581 Japan. E-mail: dendrolasius@gmail.com
4Department of Ecology & Evolutionary Biology and Division of Entomology, Biodiversity Institute, University of Kansas, Lawrence, KS, 66045. E-mail: aezshort@ku.edu

Abstract

A new hydrophilid genus Chimaerocyon gen. nov. containing two species, C. shimadai sp. nov. (Malaysia: Pahang) and C. sumatranus sp. nov. (Indonesia: Sumatra), is described. Specimens of C. shimadai were collected from brood cells in a nest of Pheidole singaporensis Özdikmen, 2010. The biology of C. sumatranus remains unknown. A molecular phylogeny based on four genes (cox1, cox2, 18S and 28S) supports the placement of the genus as deeply nested within the Cer-cyon-group of the tribe Megasternini. This position is supported by the subdistal position of the median spur in the hind wing (unique to Megasternini) and the presence of sucking disc on male maxilla (unique for Megasternini+Sphaeridiini). The remaining external morphology differs substantially from other representatives of Megasternini. The hypothesis that the aberrant morphology of Chimaerocyon gen. nov. is a consequence of myrmecophily is discussed.

Key words: Sphaeridiinae, Megasternini, multigene phylogeny, Bayesian analysis, inquilines

Introduction

The beetle family Hydrophilidae (the water scavenger beetles) contains ca. 2900 species (Short & Fikáček 2011) of which the majority are found in various aquatic habitats. However, nearly a third of the known species are terrestrial, in all cases belonging to clades that are deeply nested within aquatic groups (Short & Fikáček 2013). They are most frequently found in leaf litter in various kinds of forests or in excrement of herbivorous mammals. Only a handful of species are known to be associated with ants. Spangler (1962) described an Oosternum species inhabiting the refuse piles of Atta mexicana (see also Márquez-Luna & Navarrete-Heredia 1995), and Fikáček & Short (2010) demonstrated that the genus Sacosternum is associated with ecitonine army ants. A few species of the genera Paromicrus, Australocyon and Pachysternum (all belonging to the subfamily Sphaeridiinae) have been collected in association with various ant species and are awaiting description (Fikáček et al., in prep.). None of them exhibit apparent morphological adaptations parallel to those known in other beetle myrmecophiles (see e.g. Kistner 1982; Hölldobler & Wilson 1990; Melver & Stonedahl 1993), even though at least some morphological autapomorphies of Sacosternum have been hypothesized as possible defensive structures (Fikáček & Short 2010). The surprising recent discovery of a morphologically unusual hydrophilid from the brood cells of Pheidole singaporesis Özdikmen represents the first known myrmecophilous hydrophilid for which tribal and generic placement remained unclear even after initial morphological study. The combined analysis of molecular and morphological data revealed that, despite its unusual morphology not matching any known group of the Hydrophilidae, it is a representative of the tribe Megasternini, which is the largest, but morphologically rather uniform, clade of terrestrial hydrophilids. The results of our studies are summarized here, along with a discussion on the limits of the use of morphological characters for systematics of myrmecophilous insects.