



Poster presentations

Living fossils among aquatic beetles: fossil record and phylogeny of the Helophoridae (Coleoptera: Hydrophiloidea)

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A detailed revisional study of the Mesozoic fossils of the genera *Hydrophilopsia* Ponomarenko, 1987, *Mesosperchus* Ponomarenko, 1977, *Mesohelophorus* Ponomarenko, 1977 and *Cretotaenia* Ponomarenko, 1977 (Coleoptera: Hydrophiloidea) revealed that these genera may belong to the family Helophoridae represented in modern fauna by ca. 190 species of the single genus *Helophorus* Fabricius, 1775. A phylogenetic study of the modern representatives of Helophoridae has been performed in order to understand the phylogenetic position of the fossils: the analysis contains 22 modern species of *Helophorus* representing all recognized subgenera, and selected representatives of other hydrophiloid families and the histeroid family Synteliidae as outgroups; it is based on 96 characters (karyotype: 1; larval morphology: 30; adult morphology: 65 characters). Apart from modern taxa, eight Mesozoic fossil species have been included into the analysis (ordered according to the age): an undescribed species of *Mesohelophorus* from the locality of Shar-Teg (late Jurassic, Mongolia), *Hydrophilopsia longitarsalis* Ponomarenko, 1987 and *Mesosperchus tarsalis* Ponomarenko, 1977 from Unda and Daya (late Jurassic, Russia), *Hydrophilopsia shatrovskiyi* Prokin et al., 2010 and *H. hydraenoides* Prokin et al., 2010 from Yixian Formation (Jurassic – Cretaceous boundary, China), and *Mesohelophorus sibiricus* Ponomarenko, 1977, *Cretotaenia pallida* Ponomarenko, 1977 and *Hydrophilopsia baisensis* Ponomarenko, 1987 from Baissa (early Cretaceous, Russia). The resulting topologies show that (i) *Hydrophilopsia longitarsalis* (adult form) and *Cretotaenia pallida* (larval form) represent either the basal group of the Helophoridae or the basal-most known representatives of the Hydrophiloidea; (ii) the genera *Mesohelophorus* and *Mesosperchus* belong to the Recent genus *Helophorus* and represent both its aquatic and terrestrial subgroups; (iii) the species of the genus *Hydrophilopsia* except *H. longitarsalis* are either sister-group to *Helophorus* or its inner group. The modern genus *Helophorus* dates back to the late Jurassic and represents a living fossil among aquatic beetles. Although the precise topology of the trees is highly sensitive to the inclusion/exclusion of the Georissidae and Epimetopidae among outgroups, the results suggest that the basal-most hydrophiloid taxa including the basal Helophoridae may have already been aquatic.