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Fossil Hydrophilid Beetles (Coleoptera: Hydrophilidae) of the Late Oligocene Rott Formation (Germany)

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Abstract: Fossil water scavenger beetles (Coleoptera: Hydrophilidae) of the latest Oligocene Rott Formation are revised, based on the examination of the type specimens, as well as numerous additional material from Statz (Los Angeles) and Kastenholz (Bonn) collections. Seven hydrophilid species are recognized, five of which are reliably attributed to the following genera: *Berosus morticinus* (von Heyden and von Heyden, 1866), *Paracymus excitatus* (von Heyden and von Heyden, 1866), *Paracymus* sp., *Hydrobiomorpha fraterna* (von Heyden, 1859), and *Hydrophilus rottensis* (Statz, 1939). *Coccinella? protogaeae* Germar 1837 is attributed to the subtribe Hydrophilina, and *Cymbiodyta? austera* Statz 1939 to the subfamily Hydrophilinae. *Hydrous ebeninus* Statz 1939 and *Paracymus excitatus* (form 3) are excluded from the Hydrophiloidea. *Berosus capitatus* Statz 1939 is synonymized with *Berosus morticinus*, and *Hydrous neptunus* von Heyden and von Heyden 1866 with *Hydrobiomorpha fraterna*. Lectotypes of *Philydrus morticinus* von Heyden and von Heyden 1866 and *Hydrous ebeninus* Statz 1939 are designated. The significance of the hydrophilid fossils for paleoecological reconstructions of the former Rott Lake is briefly discussed.

Key words: morphology, taxonomy, paleontology, Coleoptera, Hydrophiloidea, Tertiary

1 Introduction

The hydrophiloid beetles form a monophyletic clade comprising approximately 3200 recent species divided into six families (Hansen, 1999; Short and Hebauer, 2006). Although the hydrophiloid beetles inhabit a wide range of habitats, they are especially well known due to the species inhabiting aquatic habitats. Aquatic habits seem to be an ancestral condition for the whole superfamily, with terrestrial groups representing several secondary shifts outside water (Bernhard et al., 2006; Short and Liebherr, 2007), and aquatic forms comprising approximately 70% of all known recent species of the superfamily. Aquatic habits also seem to be the reason for the rich fossil record of the Hydrophiloidea. The vast majority of the approximately 180 fossil species originally described within the superfamily, or subsequently assigned there, belong to the aquatic groups (M. Fikáček, unpubl. data; Alfred. F. Newton, pers. comm., 2009). Published data on the fossil record of the Hydrophiloidea are unfortunately very scattered; most of the taxa were described in the 19th century and at the beginning of the 20th century. Moreover, many of these papers were published in geological journals not excerpted in zoological reference databases. This makes the published data extremely difficult to use for modern studies, even though the fossil record provides very important information about the past biodiversity and might facilitate age estimates of particular clades.

A project started recently by the first author is particularly focused on solving these problems; the goal of the project is to revise the material on which the previous publications are based using an adequate, character-based, taxonomic treatment and to provide a reliable source of data on the fossil hydrophiloid taxa. This contribution is the first of the series of revisionary papers resulting from these studies, addressing the fossils from the late Oligocene Rott Formation in Germany. The first fossil from this locality referred today to the Hydrophilidae was described already by Germar (1837); five additional hydrophilid species were added later by Heyden (1859) and Heyden and Heyden (1866), and a comprehensive revision based on the newly collected material was performed later by Statz (1939), unfortunately without examining the previously described historical type specimens. For this paper, we have re-examined the type specimens of all hydrophilid taxa described from the locality, as well as the additional material studied by the previous authors, and provide redescriptions, photographs, and drawings for all previously described taxa. All hydrophilid taxa are also compared with recent representatives.

2 Locality and Stratigraphy

The Tertiary locality of Rott is situated east to the city of Bonn

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