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A new species of the water mite genus *Hygrobates* Koch, 1837 (Acari: Hydrachnidia: Hygrobatidae) from the ancient Lake Ohrid

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Abstract

A new water mite species, *Hygrobates zawali* n. sp., is described from material collected in the ancient Lake Ohrid on the Balkan Peninsula. This species has been confused for a long time with the rhithrobiontic *H. diversiporus* Sokolow, 1927, known from the Caucasus (Russia) and Turkey. The new species closely resembles *H. quanaticola* Schwoerbel & Sepasgozarian, 1976, a little documented species described from Iran, which is here illustrated based on re-examination of the type material. Furthermore, a key for the identification of species of the subgenus *Rivobates* Thor, 1897, from the Western Palaearctic is given.

Key words: Acari, new species, *Rivobates*, taxonomy, Lake Ohrid

Introduction

The subgenus *Rivobates* Thor, 1897 is in first line characterized by the genital field with more than three, often numerous pairs of acetabula. All species of the subgenus have in common a preference for detritus-rich habitats, most of them inhabit spring habitats of various types or cold water streams. Stanković (1931) was the first to report a *Rivobates* population from the lacustrine habitat of the ancient Lake Ohrid in Macedonia. Based on the identification done by the Swiss acarologist Charles Walter (Basel), he assigned the population in question to *Hygrobates (Rivobates) diversiporus* Sokolow, 1927. Later on, records of *H. diversiporus* from Lake Ohrid were reported by K. Viets (1936), Bader (1955), Georgiev (1957), Stanković (1960) and Pešić (2003).

The first description of *H. diversiporus* was based on one male and one female from a first order stream in the Caucasus (Sokolow 1927). Since then, the species was reported and illustrated only once again, based on specimens from a first order stream in Turkey (Esen *et al.* 2013). The latter authors stated that the record of this probably rhithrobiontic species from a lacustrine habitat like Lake Ohrid should find confirmation by a reinvestigation.

Examination of additional material collected in the Macedonian parts of Lake Ohrid revealed that the *Rivobates* specimens from this habitat in fact do not represent *H. diversiporus*, but a previously unknown species, which is described in the present paper.

Material and methods

The material examined (1 male, 12 females) collected in August 1955 in the Macedonian portion of Lake Ohrid by T. Petkovski was preserved in ethanol, but later on transferred in Koenike's fluid. The type series is deposited in the Museum of Natural History of Montenegro, Podgorica (MNHP).

All measurements are given in µm. The following abbreviations are used: Ac-1 = first acetabulum; Cx-I = first coxae; dL = dorsal length; H = height; I-L-4–6 = fourth-sixth segments of first leg; L = length, n = number of specimens examined; P-1–P-5 = palp segment 1–5; W = width.

Discussion

Taking into account the surface area of 358 km² and the rate of endemism adjusted for all taxa to 36%, the fauna of the oligotrophic, karstic Lake Ohrid appears to be the most diverse amongst the ancient lakes worldwide (see Albrecht & Wilke, 2008 and references therein). From all the animal groups endemic to this lake, water mites are amongst the most scarcely known in terms of diversity and phylogenetic relationships (Baker *et al.* 2008). *Hygrobates zavali n. sp.* is actually the first endemic water mite species which is apparently endemic for Lake Ohrid. It was not encountered by the author of the present paper in samples collected from other Balkan waterbodies, including Prespa, Dojran and Skadar Lakes.

The new species for a long time has been confused with *Hygrobates diversiporus*, a species originally described from a first order stream in the Caucasus (Sokolow 1927). The occurrence of a species in both lakes and streams is reported for a number of water mite species (Martin *et al.* 2010). However, some recent studies showed that some of the species which were commonly recorded in both habitat types (e.g. *Mideopsis orbicularis* (Müller, 1776), *Hygrobates nigromaculatus* Lebert, 1879) in reality represent species which are similar in morphology, but ecologically and genetically clearly separated (Biesiadka & Kowalik 1979, Martin & Davids 2002).

Martin *et al.* (2010) stated that lake-living populations of *Hygrobates nigromaculatus* tends to have a proportionally larger gonopore, as compared with the rhithrobiont *H. setosus*. The lake-living *H. zavali n. sp.* fits this pattern: a larger gonopore is found in its relative *H. quanaticola*. *Hygrobates quanaticola* was described from a small channel which issues from a qanat near Rezayeh (= Urmia) in West Azerbaijan, Iran. Qanats are artificial irrigation channels that tap groundwater through adits (Coad 1996). Later on, this species was reported from Turkey (see Esen *et al.* 2010 and references therein) but without additional information on its morphology. Boyaci & Özkan (2004) reported *H. quanaticola* as the only species of the genus living in the Lake Çapalı (SW Turkey). The records from Turkey should be verified by the additional sampling and morphological analysis.

Preadult stages and life cycle of *H. diversiporus* and *H. quanaticola* are unknown, but the larvae of widespread crenobiont *H. norvegicus* (Thor, 1897) are parasitic on a wide range of Chironomidae (Martin & Stur 2006). Martin & Davids (2002) showed that individuals of lake-dwelling *H. nigromaculatus* lack larval parasitism, whereas specimens of its stream-dwelling relative (*H. setosus*) produce parasitizing larvae. They stated that non-parasitic females (in this case, *H. nigromaculatus*) tend to be smaller and produce fewer but larger eggs. The egg diameter of lake-living *H. zavali n. sp.* (266–272, up to 300 µm, Bader 1955) is significantly larger than the diameter of eggs of the stream-dwelling *H. diversiporus* (egg maximum diameter 170–175 µm, data taken from Sokolow 1927, and Esen *et al.* 2013). This fact could suggest a loss of parasitism also in *H. zavali n. sp.*, a question open to further studies.

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