Zootaxa 5051 (1): 101–116
https://www.mapress.com/j/zt/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

https://doi.org/10.11646/zootaxa.5051.1.9
http://zoobank.org/urn:lsid:zoobank.org:pub:FC1E4C59-C9A9-48F3-8C4A-662FA13A25A7

A new species of *Maraenobiotus* Mrázek, 1893 (Copepoda: Harpacticoida: Canthocamptidae) from Colombian Andean mosses, with an identification key for the American species

SANTIAGO GAVIRIA[1*] & DANIELLE DEFAYE[2]
[1]*University of Vienna, Dept. of Limnology and Bio-Oceanography & Technisches Büro für Biologie, Fred-Raymond-Gasse 19/2/4, A-1220 Vienna, Austria.* *santiago.gaviria@gmx.at;* *https://orcid.org/0000-0002-5959-7919*
[2]*27 rue Gaston Charlet, F-87000 Limoges, France.* *danielle.defaye@mnhn.fr;* *https://orcid.org/0000-0002-1524-6973.*
[*]*Corresponding author.*

Abstract

Maraenobiotus wellsi **sp. nov.** (Canthocamptidae) is described based on material collected in mosses in the "páramo" region of the Andean Cordillera of Colombia. The new species is closely related to *M. australis* Apostolov, 2001 from Tierra de Fuego in Argentina, but can be distiguished by the shape of the caudal rami, the insertion point of its terminal seta IV, and the chaetotaxy of distal segments of legs 3 and 4. We discuss morphological differences with other congeners inhabiting South America (Peru), *i.e. M. naticochensis* Delachaux, 1917*, M. fontinalis* Harding, 1955 and *M. fontinaloides* Löffler, 1960. Major distinguishing features were observed in the chaetotaxy of legs 2 and 3, the morphology and size of the caudal rami, and the ornamentation of the anal operculum. We also discuss morphological characters that distinguish the new species from those living exclusively in mosses, such as *M. cuspidatus* Štěrba, 1968 and *M. canadensis* Flössner, 1992, and those reported from mosses and other habitats *i.e.. M. vejdovskyi* Mrázek, 1893, *M. brucei brucei* (Richard, 1898), *M. zschokkei* Kreis, 1920, *M. brucei himalayensis* Chappuis, 1928b, *M. truncatus* (Gurney, 1932)*, M. insignipes elgonensis* Chappuis, 1936, *M. insignipes nepalensis* Löffler, 1968 and *M. kinabaluensis* Löffler, 1973. A distribution map of American species and an identification key for females are provided.

Key words: Crustacea, geographical distribution, morphology, taxonomy, tropical high mountains

Introduction

The harpacticoid copepod genus *Maraenobiotus* Mrázek, 1893 was proposed for a new species, *Maraenobiotus vejdovskyi* Mrázek, 1893, collected from groundwaters of the Czech Republic. Today, *Maraenobiotus* comprises 28 species (Walter & Boxshall 2019) with two of them containing several subspecies: *Maraenobiotus insignipes* (Lilljeborg, 1902) with six subspecies besides the nominal species (*M. i. alpinus* Keilhack, 1909; *M. i. indicus* Chappuis, 1928b, *M. i. elgonensis* Chappuis, 1936; *M. i. altissimus* Löffler, 1968; *M. i. nepalensis* Löffler, 1968 and *M. i. kysylcumicus* Borutzky, 1972) and *Maraenobiotus brucei* (Richard, 1898) with six subspecies besides the nominal species (*M. b. carpathicus*, Chappuis, 1928a; *M. b. himalayensis* Chappuis, 1928b; *M. b. malayicus* Chappuis, 1931; *M. b. caucasicus* Borutzky, 1934; *M. b. africanus* Chappuis, 1936 and *M. b. estonicus* Fefilova, 2010).

Additions to the species list were published by Brancelj & Karanovic (2015), who described *Maraenobiotus slovenicus* **n. sp.**, from groundwaters in Slovenia. In the same publication, they also proposed two new species, *M. galassiae* Brancelj & Karanovic, 2015 and *M. pescei* Brancelj & Karanovic, 2015 for previously reported "populations" of *M. vejdovskyi* from Italy, and *M. ishidai* Brancelj & Karanovic, 2015 for a "population" of *M. vejdovskyi* from Japan. Based on their analysis of morphological differences between subspecies, Brancelj & Karanovic (2015) elevated four subspecies of *M. vejdovskyi* to species rank, namely *M. anglicus* Gurney, 1932, *M. arctica* Keilhack, 1909, *M. tenuispina* Roy, 1924 and *M. truncatus* Gurney, 1932. As they argued for abandoning subspecific divisions of *M. vejdovskyi*, the subspecies *M. vejdovskyi zschokkei* Kreis, 1920 can be re-established with its original species rank as *M. zschokkei* Kreis, 1920.

Accepted by R. Huys: 25 Nov. 2019; published: 12 Oct. 2021

Species of the genus *Maraenobiotus* are mainly inhabitants of cold-water environments such as those located at middle to high latitudes in the Northern (Gurney 1932; Borutzky 1964; Flössner 1988, 1992; Fefilova 2010; Novikov & Sharafutdinova 2020) and Southern (Apostolov 2001) Hemispheres, on high mountains of temperate (Thiébaud 1927; Chappuis 1928a, Gaviria 1998, Jersabek *et al*. 2001) and tropical (Delachaux 1917; Chappuis 1928b, 1936; Harding 1955; Löffler 1960, 1965, 1968, 1973; present study) regions, and in groundwater environments of Europe (Mrázek 1893; Flössner 1988; Bassamakov & Apostolov 1989; Pesce *et al*. 1994; Janetzky *et al*. 1996; Gaviria 1998; Brancelj & Karanovic 2015). Groundwaters are well known to be cold habitats (Griebler & Mösslacher 2003).

Löffler (1968) already called attention to the distribution of *Maraenobiotus* in tropical mountain region, the genus being apparently absent in habitats with permanently warm temperatures. At tropical latitudes, the lowermost limit of species of the genus is 2,000 m altitude in running waters and 3,000 m in lentic water-bodies (Löffler 1968). From an evolutionary perspective, Löffler already analyzed the trend of speciation of the genus in cold regions of tropical high mountain regions such as the Ruwenzori, Mount Kenya and Mount Elgon in eastern Africa (Löffler 1965), where populations of very closely related subspecies were established in habitats located close to one another.

Some species, such as *M. australis* Apostolov, 2001, *M. canadensis* Flössner, 1992 and *M. cuspidatus* Štěrba, 1968, are semi-terrestrial and have been found exclusively in wet mosses, whereas other (sub)species such as *M. brucei brucei*, *M. brucei himalayensis*, *M. insignipes elgonensis*, *M. insignipes nepalensis*, *M. zschokkei*, *M. kinabaluensis* Löffler, 1973, and *M. vejdovskyi* live in aquatic environments but have also been reported from wet mosses. *Maraenobiotus truncatus* is semi-terrestrial, inhabiting wet leaves and mosses (Janetzky *et al.* 1996).

During a faunistic survey of microcrustaceans in the "páramo" region of the Andean Cordillera, corresponding to the humid zone above the Andean forest, we found three species of harpacticoid copepods inhabiting wet mosses in the Boyacá State, Colombia. Those species were identified as the parastenocaridid *Colombocaris isabellae* Gaviria, Defaye & Corgosigno, 2017 and two canthocamptid copepods. One of the canthocamptids corresponds to *Epactophanes richardi* Mrázek, 1893, the second one to the genus *Maraenobiotus*. The tabular key provided by Wells (2007) did not lead to any known species of the genus. As its morphological characters could not be assigned to any known species, it here described as a new species based on the study of a single female and one copepodid V stage. No males were found in the sample.

Material and methods

The sample containing harpacticoid copepods was collected by S. Gaviria, N. Aranguren and C. Motta in wet mosses growing on stones in the Páramo de Cómbita, Boyacá, Colombia (5°45‘00‘‘N, 73°20‘29‘‘W) at 3,039 m.a.s.l. (Fig. 1). The sample was processed in the laboratory, and live animals were sorted and fixed in 70% ethanol. Specimens were transfered to glycerine and then to lactic acid to clear the tissues. Copepods for taxonomic study were dissected using sharpened tungsten needles or studied undissected. Two specimens of the genus *Maraenobiotus* were found, one of them a stage V copepodid. The temporarily mounted adult specimen was used for drawings of body parts, mouth appendages and legs.

Animals were examined under a Leica DMLB compound microscope equipped with a drawing tube. Illustrations were further completed by examining the adult female with a Nikon Ellypse 200 microscope. Final plates were produced with digital inking using a Wacom Intus Protablet and the Adobe Photoshop CS3 program after scanning the drawings.

Finally, both specimens were transferred into lactophenol, each on a separate slide, and sealed with varnish. Specimens were deposited in the limnological collection of the Universidad Pedagógica y Tecnológica de Colombia UPTC, Tunja, Boyacá, Colombia (UPTC-L). Descriptive terminology follows Huys & Boxshall (1991).