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A revision of the subgenus *Eurycercus* (*Eurycercus*) Baird, 1843 emend. nov. (Cladocera: Eurycercidae) in the Holarctic with the description of a new species from Alaska

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Abstract

Frey (1975) subdivided the genus *Eurycercus* Baird, 1843 (Cladocera: Eurycercidae) into three subgenera: *E*. (*Eurycercus*) s.str., *E*. (*Bullatifrons*) Frey, 1975 and *E*. (*Teretifrons*) Frey, 1975. We conducted a revision of the subgenera *Eurycercus* (*Eurycercus*) and *E*. (*Bullatifrons*) in the Holarctic based on the morphology of parthenogenetic females and a phylogeny of cytochrome c oxidase subunit I (*COI*) sequences. The following six species are found to be valid: *E. lamellatus* (O. F. Müller, 1776); *E. macracanthus* Frey, 1973; *E. pompholygodes* Frey, 1975; *E. microdontus* Frey, 1978; *E. longirostris* Hann, 1982; *E. nipponica* Tanaka & Fujuta, 2002. The separation of *E. vernalis* Hann, 1982 from *E. longirostris* lacks morphological and genetic justification, so *E. vernalis* is a junior synonym of *E. longirostris*. A new species, *E. beringi* **sp. nov**., was found in several localities in Alaska, U.S.A. Its characters are intermediate between two subgenera sensu Frey (1975): a median keel is expressed, but only in the posterior portion of the carapace dorsum (while it is absent in *E*. (*Bullatifrons*) and passes through all the dorsum in *Eurycercus* s.str.); the dorsal head pores are located on the bubble-like projection (a character of the subgenus *E* (*Bullatifrons*), but the latter is sitting on a prominent transverse fold (character of the subgenus *Eurycercus* s.str.). The COI tree also does not support separation of the subgenus *E*. (*Bullatifrons*) from *E*. (*Eurycercus*), while separation of *E*. (*Teretifrons)* is well-supported. So, we propose to avoid a separation of *E*. (*Bullatifrons*) and regard all the species previously placed there as belonging to the subgenus *E*. (*Eurycercus*) emend. nov. We also demonstrated that *E. macracanthus*, *E. pompholigodes*, *E. longirostris* and *E. nipponica* have much broader distributional ranges than previously known.

Key words: Branchiopoda, Anomopoda, taxonomy, new species, revision

Introduction

Understanding biodiversity is among the central problems of current applied biology (Dumont 2005). Many studies have aimed to estimate the number of species in regions and in the world (e.g. the FADA project attempted to calculate a general species number for different freshwater groups in the major biogeographical zones (Balian *et al.* 2008)). But reliable estimates of species diversity are made difficult by taxonomic problems. Cladocerans (Crustacea: Branchiopoda), for example, are a typical arthropod group with such taxonomic problems - a fact that may have contributed to the underestimation of species diversity by 2–4 times (Forró *et al.* 2008). Cladoceran species are the most poorly studied of the taxonomic ranks (Korovchinsky 1996). Nevertheless, progress has been made by recent detailed revisions based on morphology (Korovchinsky 2004; Van Damme & Dumont 2008; Kotov 2009; Sinev 2009; Kotov *et al.* 2010a, 2011; Van Damme *et al.* 2011) and on a combined morphological-molecular approach (Kotov *et al.* 2006, 2009).

The family Eurycercidae Kurz, 1875 sensu Dumont & Silva-Briano, 1998 (Cladocera: Anomopoda) is comprised of a single genus *Eurycercus* Baird, 1843 with three subgenera. Individuals from this genus are the largest in size for the anomopods — up to 6 mm in length. For most of the twentieth century, *Eurycercus* was regarded to be comprised of only two species: *Eurycercus lamellatus* O. F. Müller, 1785 and *Eurycercus glacialis* Lilljeborg, 1887

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