



<http://dx.doi.org/10.11646/zootaxa.3796.3.8>

<http://zoobank.org/urn:lsid:zoobank.org:pub:5DC6D761-D857-49B8-A88C-29DEC44E30F7>

Five new species of *Camelobaetidius* Demoulin, 1966 (Ephemeroptera: Baetidae), and redescription of *Camelobaetidius mexicanus* (Traver & Edmunds, 1968)

R. BOLDRINI¹ & A.M.O. PES²

¹Universidade Federal de Roraima (UFRR), Campus Paricarana, Centro de Estudos da Biodiversidade (CBio), CEP 69310-000, Boa Vista, Roraima, Brazil. E-mail: rafaelboldrini.2@gmail.com

²Coordenação de pesquisa em Biodiversidade (CBio), Instituto Nacional de Pesquisas da Amazônia (INPA), CEP 69060-001, Manaus, Amazonas, Brazil. E-mail: anampes@gmail.com

Abstract

The genus *Camelobaetidius* Demoulin, 1966 has 38 species distributed throughout the Neotropical Region, being one of the most studied genera of the family Baetidae. Based on material from Brazil, the aim of the present paper is to describe five new species of *Camelobaetidius* with the terminal filament as long as cerci, and to redescribe the nymph of *C. mexicanus* (Traver & Edmunds, 1968) based on a paratype from Mexico.

Key words: taxonomy, Macroinvertebrate, South America, Neotropics

Introduction

The genus *Camelobaetidius* Demoulin, 1966 (Ephemeroptera: Baetidae) is currently comprised of 38 species (Jacobus & McCafferty, 2005; Salles & Serrão, 2005; Domínguez *et al.*, 2006; Boldrini *et al.* 2012a, b; Boldrini *et al.* 2013), and it has a wide geographic distribution in the Western Hemisphere, ranging from Argentina and Uruguay in the south (Traver & Edmunds, 1968) to Saskatchewan, Canada, in the north (Lehmkuhl, 1976).

Despite the large number of papers dealing recently with the genus (e.g., Boldrini *et al.* 2012a, b; Boldrini *et al.* 2013), many undescribed species are being continuously found in South America, especially in Brazil. Some of the earlier described species, on the other hand, need to be better studied, illustrated or even redescribed in order to better understand their intraspecific limits as well as the relationship between the species of the genus. The goals of the present paper, therefore, are to describe five new species of *Camelobaetidius* based on nymphs from Brazil and to redescribe and illustrate the nymph of *C. mexicanus* (Traver & Edmunds, 1968).

Material and methods

Pictures were taken using a Leica (M165C) stereomicroscope with a DFC420 digital camera; a series of partially focused images were processed with the program Leica Application Suite V3.4.1. (Version 2009) to produce final images with enhanced quality. Line drawings were made with the aid of a camera lucida, photographs, or both. Final illustrations were prepared according to Coleman (2003, 2006). The slides were prepared with Euparal®. The material examined is housed in Coleção Zoológica Norte Capixaba, (CZNC), São Mateus, Brazil; in the Invertebrate Collection of the Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, Brazil; in the Museum of Aquatic Entomology at Florida A&M University (FAMU); and in Zoological Collection of the Universidade Federal de Roraima, Boa Vista, Brazil (UFRR).

Acknowledgements

We would like to express our gratitude to CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico, processes number 479967/2013-0 and 150423/2013-6), to FAPEAM (Fundação de Apoio a Pesquisa do Estado do Amazonas), and to CAPES Pro-Equipamentos (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior) for financial and technical support. The authors would like to thank Dr. Neusa Hamada (Instituto Nacional de Pesquisas da Amazônia) for logistic support and Dr. Janice Peters for loaning the type material of *C. mexicanus*.

References

- Allen, R.K. & Chao, E.S.M. (1978) Mayflies of the Southwest: New Species and Records of *Dactylobaetis* (Ephemeroptera: Baetidae). *The Pan-Pacific Entomologist*, 54, 300–304.
- Boldrini, R., Pes, A.M.O. & Salles, F.F. (2012a) Review of the genus *Camelobaetidius* Demoulin (Ephemeroptera: Baetidae) with reduced terminal filament. *Journal of Natural History*, 46, 2033–2073.
<http://dx.doi.org/10.1080/00222933.2012.708447>
- Boldrini, R., Pes, A.M.O., Francischetti, C.N. & Salles, F.F. (2012b) New species and new records of *Camelobaetidius* Demoulin, 1966 (Ephemeroptera: Baetidae) from Southeastern Brazil. *Zootaxa*, 3526, 17–30.
- Boldrini, R., Jacobus, L.M., Salles, F.F. & Pes, A.M.O. (2013) The adults of *Camelobaetidius janae* Dominique & Thomas, 2001 and *C. yacutinga* Nieto, 2003, with a new synonym for *C. leentvaari* Demoulin, 1966 (Ephemeroptera: Baetidae). *Zootaxa*, 3702 (2), 150–158.
<http://dx.doi.org/10.11646/zootaxa.3702.2.4>
- Coleman, C.O. (2003) “Digital inking”: How to make perfect line drawings on computers. *Organism, Diversity and Evolution*, Electronic Supplement. 1–14. Available from: <http://senckenberg.de/odes/03-14.htm> (accessed 23 April 2014)
- Coleman, C.O. (2006) Substituting time-consuming pencil drawings in arthropod taxonomy using stacks of digital photo graphs. *Zootaxa*, 1360, 61–68.
- Domínguez, E., Molineri, C., Pescador, M.L., Hubbard, M.D. & Nieto, C. (2006) *Ephemeroptera of South America*. In: Adis, J., Arias, J.R., Rueda-Delgado, G. & Wantzen, K.M. (Eds.), *Aquatic Biodiversity of Latin America*. Vol. 2. Pensoft, Moscow-sofia, pp. 1–646.
- Jacobus, L.M. & McCafferty, W.P. (2005) A new species and new synonym in *Camelobaetidius* Demoulin (Ephemeroptera: Baetidae). *Journal of the Kansas Entomological Society*, 78, 153–157.
<http://dx.doi.org/10.2317/0409.20.1>
- Lehmkuhl, D.M. (1976) Mayflies. *Blue Jay*, 34 (2), 70–81.
- McCafferty, W.P. & Waltz, R.D. (1990) Revisionary Synopsis of the Baetidae (Ephemeroptera) of North and Middle America. *Transactions of the American Entomological Society*, 116 (4), 769–799.
- McCafferty, W.P. & Provonsha, A.V. (1993) New species, subspecies, and stage descriptions of Texas Baetidae (Ephemeroptera). *Proceedings of the Entomological Society of Washington*, 95 (1), 59–69.
- McCafferty, W.P., Baumgardner, D.E. & Guenter, J.L. (2004) The Ephemeroptera of Central America. Part 1: Guatemala. *Transactions of the American Entomological Society*, 130, 201–219.
- Meyer, M.D., Baumgardner, D.E. & McCafferty, W.P. (2008) The Ephemeroptera of Central America. Part 2: Nicaragua. *Transactions of the American Entomological Society*, 134, 133–146.
- Salles, F.F. & Serrão, J.E. (2005) The nymphs of the genus *Camelobaetidius* Demoulin (Ephemeroptera: Baetidae) in Brazil: new species, new records, and key for the identification of the species. *Annales de Limnologie*, 41, 267–279.
<http://dx.doi.org/10.1051/limn/2005014>
- Thomas, A., Peru, N. & Horeau, V. (2003) Les Ephémères de la Guyane Française. 8. Description de *Camelobaetidius matilei* n. sp. et clé de détermination de espèces guyanensis de ce genre [Ephemeroptera: Baetidae]. *Ephemera*, 3 (2), 123–133.
- Traver, J.R. & Edmunds, G.F. Jr. (1968) A revision of the Baetidae with spatulate-clawed nymphs (Ephemeroptera). *Pacific Insects*, (10), 629–677.
- Waltz, R.D. & McCafferty, W.P. (1987) Revision of the genus *Cloeodes* Traver (Ephemeroptera: Baetidae). *Annals of the Entomological Society of America*, 80, 191–207.