



<http://dx.doi.org/10.11646/zootaxa.3814.3.7>

<http://zoobank.org/urn:lsid:zoobank.org:pub:CA85230A-29A1-4687-AF97-39EFA9E6E5A6>

A new species of *Leydigia* Kurz, 1875 (Cladocera: Chydoridae) from Colombia

ALEXEY A. KOTOV^{1,3} & JUAN MANUEL FUENTES-REINÉS²

¹A. N. Severtsov Institute of Ecology and Evolution, Leninsky Prospekt 33, Moscow 119071, Russia.

E-mail: alexey-a-kotov@yandex.ru

²Universidad del Magdalena, Grupo de investigación en Limnología Neotropical, A.A 731 Santa Marta, Magdalena, Colombia.

E-mail: juanmanuel FuentesReines@yahoo.com

³Corresponding author

Abstract

A new species of *Leydigia* Kurz, 1875 (Cladocera: Chydoridae) is described based on the material from Ciénaga Grande de Santa Marta, Magdalena Department, Colombia. *L. lourdesae* sp. nov. is a member of the subgenus *Leydigia* (*Neoleydia*) Kotov, 2009, having all diagnostic characters of the latter. It could be the closest relative to *L. iberica* Kotov & Alonso, 2010, having five setae on exopodite III, a unique for the genus character. But new taxon differs from the latter in a series of characters of the head pores, armature of valve ventral margin, postabdomen, antenna I and II, and limbs I–III. We believe that the basal taxa of *L. (Neoleydia)* (including *L. lourdesae* sp. nov.) are remains of an antique pan-continental group, probably of Mesozoic age, partly survived after the mass extinction and represented now by a series of locally distributed taxa in very distant localities of the planet.

Key words: Cladocera, Anomopoda, taxonomy, new species, South America

Introduction

The Cladoceran (Crustacea: Brachiopoda) fauna of the Neotropics is among best studied in the world. But wide territories of South America still may contain undescribed species, what means that the real diversity of the cladocerans is significantly higher than it is accepted recently (Forró *et al.* 2008). Highlands of South America seem to be rich in locally distributed endemics (Kotov *et al.* 2010; Aranguren *et al.* 2010), but lowlands with truly tropical climate could also be a source of newly created taxa of species and even generic rank (Brandorff *et al.* 1982; Smirnov *et al.* 1995; Van Damme *et al.* 2005; Elmoor-Loureiro *et al.* 2013). Recent intensive studies of the cladoceran fauna of the Neotropical lowlands are concentrated on Brazil (Elmoor-Loureiro 2000; Van Damme & Dumont 2010; Elmoor-Loureiro *et al.* 2013), Argentina (Paggi 1993, 1996, 1999; Adamowicz *et al.* 2004) and tropical Mexico (Elías-Gutiérrez *et al.* 2008a–b). In contrast, the northernmost portion of the South America continent attracted less attention of the cladoceran investigators (Palacios-Cáceres & Zoppi de Roa 1998; Zoppi de Roa & López 2008).

Although the studies of the Cladocera in Colombia started about a century ago (Stingelin 1913, Pearse 1915), there are still many problems with their identifications. Recently the Ciénaga Grande de Santa Marta, located in Magdalena department, Colombia, became to be the most studied water body regarding to Cladoceran fauna in this region and a source of some interesting findings (Fuentes-Reinés & Elmoor-Loureiro 2011; Fuentes-Reinés *et al.* 2012; Fuentes-Reinés & Zoppi de Roa 2013).

The aim of this paper is to describe a new species of the genus *Leydigia* Kurz, 1875 (Anomopoda: Chydoridae: Aloninae) found in this water body and discuss its phylogenetic position and biogeographic consequences of its finding. The graphical part of our description has had to be limited to photos because the very limited available material. Fortunately, in this case the photos are good enough illustrating the necessary taxonomical characteristics, which allowed to complete the description of the new species without necessity of line drawings.

distributed species. Also this is a rare species even in its type locality since only 3 specimens were found as a result of several sampling campaigns. Endemism and rarity are characteristic signs of the relict taxa.

Cladoceran taxa of generic rank could be very old, of Mesozoic origin before the disruption of recent continents (Kotov & Taylor 2011). Korovchinsky (2006) proposed that many cladoceran taxa passed through a mass extinction in Caenozoic due to strong climate changes, first of all, aridization of large territories on the planet. We believe that the basal taxa of *L. (Neoleydigia)* are remains of an antique pan-continental group, probably of Mesozoic age, partly surviving after the mass extinction and represented now by a series of locally distributed taxa in very distant localities of the planet (Kotov & Alonso 2010).

L. lourdesae **sp. nov.** is morphologically similar to *L. iberica*. We cannot understand now, whether *L. iberica* species is a monophyletic group? The final conclusion could be done only as a result of a molecular genetic study of the genus *Leydigia*. But it is a very difficult task as most hydrobiologists deal with the plankton only, and benthic species are collected mainly occasionally. Apparently the hydrobiologists around the world need to pay more attention to benthic cladocerans, which are a source of unrecorded taxa, as it was demonstrated once more in present paper.

Acknowledgments

We are very grateful to Prof. N. N. Smirnov for constructive comments on the earlier draft. The study is supported by the Russian Science Foundation (project 14-14-00778).

References

- Adamowicz, S.J., Hebert, P.D.N. & Marinone, M.C. (2004) Species diversity and endemism in the *Daphnia* of Argentina: a genetic investigation. *Zoological Journal of the Linnean Society*, 140, 171–205.
<http://dx.doi.org/10.1111/j.1096-3642.2003.00089.x>
- Aranguren, N., Monroy, D. & Gaviria, S. (2010) *Eurycercus (Bullatifrons) norandinus* (Crustacea: Branchiopoda: Eurycercidae), a new species of Cladocera in the Neotropical Region. *Zootaxa*, 2550, 58–68.
- Brandorff, G.O., Koste, W. & Smirnov, N.N. (1982) Structure of rotiferan and crustacean communities of the lower Rio Nhamundá, Amazonas, Brazil. *Studies on Neotropical Fauna and Environment*, 17, 69–121.
<http://dx.doi.org/10.1080/01650528209360604>
- Eliás-Gutiérrez, M., Martínez Jerónimo, F., Ivanova, N.V., Valdez Moreno, M. & Hebert, P.D.N. (2008a) DNA barcodes for Cladocera and Copepoda from Mexico and Guatemala, highlights and new discoveries. *Zootaxa*, 1839, 1–42.
- Eliás-Gutiérrez, M., Suárez-Morales, E., Gutiérrez-Aguirre, M., Silva-Briano, M., Granados-Ramírez, J.G. & Garfias-Espejo, T. (2008b) *Cladocera y Copepoda de las aguas continentales de México. Guía ilustrada*. UNAM, CONABIO, ECOSUR, SEMARNAT-CONACYT. México, D.F., 322 pp.
- Elmoor-Loureiro, L.M.A. (2000) Brazilian cladoceran studies: where do we stand? *Nauplius*, 8, 117–131.
- Elmoor-Loureiro, L.M.A., Santos-Wisniewski, M.J. & Rocha, O. (2013) Redescription of *Alonella lineolata* Sars, 1901 (Crustacea, Cladocera, Chydoridae) and its translocation to the subfamily Aloninae and to the new genus *Bergamina* gen. nov. *Zootaxa*, 3630 (3), 571–581.
<http://dx.doi.org/10.11646/zootaxa.3630.3.11>
- Forró, L., Korovchinsky, N.M., Kotov, A.A. & Petrusek, A. (2008) Global diversity of cladocerans (Cladocera; Crustacea) in freshwater. *Hydrobiologia*, 595, 177–184.
<http://dx.doi.org/10.1007/s10750-007-9013-5>
- Fuentes-Reinés, J.M. & Elmoor-Loureiro, L.M.A. (2011) Occurrence of *Guernella raphaelis* Richard, 1892 (Crustacea: Cladocera: Macrothricidae) in Ciénaga Grande de Santa Marta, Colombia. *Check list*, 7, 817–819
- Fuentes-Reinés, J.M. & Zoppi de Roa, E. (2013) New additions to the cladoceran fauna of Ciénaga Grande de Santa Marta and Colombia. *Check List*, 9, 9–24.
- Fuentes-Reinés, J.M., Zoppi de Roa, E., Morón, E., Gámez, D. & López, C. (2012) Conocimiento de la fauna de Cladocera (Crustacea: Branchiopoda) de la Ciénaga Grande de Santa Marta, Colombia. *Boletín de Investigaciones Marinas y Costeras*, 41, 121–164.
- Fryer, G. (1968) Evolution and adaptive radiation in the Chydoridae (Crustacea: Cladocera): a study in comparative functional morphology and ecology. *Philosophical Transactions of the Royal Society of London, Series B, Biological Sciences*, 254, 221–385.
- Korovchinsky, N.M. (2006) The Cladocera (Crustacea: Branchiopoda) as a relict group. *Zoological Journal of the Linnean Society*, 147, 109–124.

<http://dx.doi.org/10.1111/j.1096-3642.2006.00217.x>

- Kotov, A.A. (2006) Adaptations of the Anomopoda (Cladocera) for benthic mode of life. *Zoologicheskii Zhurnal*, 85, 1043–1059.
- Kotov, A.A. (2009) A revision of *Leydigia* Kurz, 1875 (Anomopoda, Cladocera, Branchiopoda), and subgeneric differentiation within the genus. *Zootaxa*, 2082, 1–68.
- Kotov, A.A. & Alonso, M. (2010) Two new species of *Leydigia* Kurz, 1875 (Chydoridae, Cladocera) from Spain. *Zootaxa*, 2673, 39–55.
- Kotov, A.A., Sinev, A.Y. & Berrios, V.L. (2010) The Cladocera (Crustacea: Branchiopoda) of six high altitude water bodies in the North Chilean Andes, with discussion of Andean endemism. *Zootaxa*, 2430, 1–66.
- Kotov, A.A. & Taylor, D.J. (2011) Mesozoic fossils (>145 Mya) suggest the antiquity of the subgenera of *Daphnia* and their coevolution with chaoborid predators. *BMC Evolutionary Biology*, 11, 129.
<http://dx.doi.org/10.1186/1471-2148-11-129>
- Paggi, J.C. (1993) Análisis preliminar de la distribución geográfica de los cladóceros sudamericanos. In: Boltovskoy, A. & López, H.L. (Eds), *Conferencias de Limnología*. Instituto de Limnología "Dr. R. A. Ringuelet", La Plata. pp. 107–113.
- Paggi, J.C. (1996) *Daphnia* (*Ctenodaphnia*) *menucoensis* (Anomopoda; Daphniidae): a new species from athalassic saline waters in Argentina. *Hydrobiologia*, 319, 137–147.
<http://dx.doi.org/10.1007/bf00016882>
- Paggi, J.C. (1999) Status and phylogenetic relationships of *Daphnia sarsi* Daday, 1902 (Crustacea: Anomopoda). *Hydrobiologia*, 403, 27–37.
- Palacios-Cáceres, M. & Zoppi de Roa, E. (1998) Variations in zooplankton richness in a flooding savanna of Venezuela. *Verhandlungen der Internationalen Vereinigung der Limnologie*, 26, 1989–1993.
- Pearse, A.S. (1915) An account of the Crustacea collected by the Walker Expedition to Santa Marta - Colombia. *Proceedings of the United States National Museum*, 49, 530–556.
<http://dx.doi.org/10.5479/si.00963801.49-2123.531>
- Smirnov, N.N. (1996) Cladocera: the Chydorinae and Sayciinae (Chydoridae) of the world. Guides to the identification of the microinvertebrates of the Continental Waters of the world. Vol. 11. SPB Academic Publishing, Amsterdam, 197 pp.
- Smirnov, N.N., Alvarez, H. & Castillo, M.M. (1995) *Streblocerus superserricaudatus* sp. nov. from Venezuela. *Hydrobiologia*, 312, 167–170.
<http://dx.doi.org/10.1007/bf00015509>
- Smirnov, N.N. & Kotov, A.A. (2010) The morphological radiation of setae of the Cladocera (Crustacea) and their potential for morphogenesis. *International Review of Hydrobiology*, 95, 482–519.
<http://dx.doi.org/10.1002/iroh.201011244>
- Stingelin, T. (1913) Cladoceren aus den Gebirge von Kolumbien. *Mémoires de la Société Neuchâteloise des Sciences Naturelles*, 5, 600–638.
- Van Damme, K. & Dumont, H.J. (2010) Cladocera of the Lençóis Maranhenses (NE – Brazil): faunal composition and a reappraisal of Sars' Method. *Brazilian Journal of Biology*, 70, 755–779.
<http://dx.doi.org/10.1590/s1519-69842010000400008>
- Van Damme, K., Kotov, A.A. & Dumont, H.J. (2005) Redescription of *Leydigia parva* Daday, 1905 and assignment to *Parvalona* gen. nov. (Cladocera: Anomopoda: Chydoridae). *Journal of Natural History*, 39, 2125–2136.
<http://dx.doi.org/10.1080/00222930500060884>
- Van Damme, K. & Sinev, A.Y. (2013) Tropical Amphi-Pacific disjunctions in the Cladocera (Crustacea: Branchiopoda). *Journal of Limnology*, 72 (s2), 209–244.
<http://dx.doi.org/10.4081/jlimnol.2013.s2.e11>
- Van Damme, K., Sinev, A.Y. & Dumont, H.J. (2011) Separation of *Anthalona* gen.n. from *Alona* Baird, 1843 (Branchiopoda: Cladocera: Anomopoda): morphology and evolution of scraping stenothermic alonines. *Zootaxa*, 2875, 1–64.
- Zoppi de Roa, E. & López, C. (2008) An updated checklist of inland Cladocera (Crustacea: Orders Ctenopoda and Anomopoda) from Venezuela. *Zootaxa*, 1919, 45–57.