

Diversity of the subgenus *Disparalona* (*Mixopleuroxus*) Hudec, 2010 (Crustacea: Cladocera) in the New and Old World

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Abstract

© 2018 Informa UK Limited, trading as Taylor & Francis Group. During the last three decades, strong progress was made in the taxonomy of the family Chydoridae (Crustacea: Cladocera), and the results of these revisions have become a valuable confirmation of the non-cosmopolitanism in the cladoceran distribution. But, to date, delineation between several chydorid genera (*Pleuroxus* Baird, 1843, *Picripleuroxus* Frey, 1993, *Alonella* Sars, 1862 and *Disparalona* Fryer, 1968) has been intuitive rather than based on careful diagnostics. *Disparalona* is a cladoceran genus with a complicated and confused taxonomy. We compiled a checklist of all formal taxa belonging to this genus in current understanding. Our study comprises a taxonomic revision of the North American, African and East Asian populations of *D. cf. hamata* with the aim of clarifying their species and generic status. We redescribe *D. hamata* (Birge, 1879) based on material from North America and *D. chappuisi* (Brehm, 1934) based on material from Africa. The latter is common in tropical-subtropical Asia, with a distribution range reaching the Far East of Russia. The second taxon from Africa is provisionally identified as *D. cf. striatoides* (Šrámek-Hušek, 1946), which was described initially from the Czech Republic. Further comparison is needed for a final conclusion on conspecificity of European and African populations provisionally placed to this taxon. At the current level of knowledge *Mixopleuroxus* Hudec, 2010 must be accepted as a subgenus of the genus *Disparalona*. The diagnoses of *Disparalona* s. str. and *D. (Mixopleuroxus)* are provided. *Disparalona* s. str. includes *D. ikarus* Kotov and Sinev, 2011, *D. leei* (Chien Shing-ming, 1970), *D. rostrata* (Koch, 1841) and *D. smirnovi* Sinev, 2015, while *D. (Mixopleuroxus)* includes *D. hamata*, *D. chappuisi* and *D. striatoides*. *D. leptorhyncha* (Daday, 1905) and *D. caudata* Smirnov, 1996 are not described adequately, but they also probably belong to the latter subgenus. The status of *D. acutirostris* (Birge, 1879) must be clarified in the future. www.zoobank.org/urn:lsid:zoobank.org:pub:971811AE-DF72-47E9-AED9-DEE835D1D412.

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Keywords

Chydoridae, continental endemism, morphology, redescription, taxonomy

References

- [1] Alonso M., 1996. Crustacea, Branchiopoda. Fauna Iberica 7. Crustacea Branchiopoda. Madrid: Museo Nacional de Ciencias Naturales. Consejo Superior de Investigaciones Científicas; p. 1-486.

- [2] Alonso M, Kotov AA. 2017. A new species of *Alonella* Sars, 1862 (Crustacea: Cladocera: Chydoridae) from the Ecuadorian Andes. *Zootaxa*. 4290:581–590.
- [3] Baird W. 1834. List of Entomostraca found in berwickshire. *Hist Berwicksh Nat Club*. 1:95–100.
- [4] Baird W. 1843. The Natural History of the British Entomostraca. VI. *Ann Mag Nat Hist*. 11:81–95.
- [5] Bauret L, Gaudeul M, Sundue MA, Parris BS, Ranker TA, Rakotondrainibe F, Hennequin S, Ranaivo J, Selosse M, Rouhan G. 2017. Madagascar sheds new light on the molecular systematics and biogeography of grammitid ferns: new unexpected lineages and numerous long-distance dispersal events. *Mol Phylogenet Evol*. 111:1–17.
- [6] Bekker EI, Kotov AA, Taylor DJ. 2012. 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. *Zootaxa*. 3206:1–40.
- [7] Belyaeva M, Taylor DJ. 2009. Cryptic species within the *Chydorus sphaericus* species complex (Crustacea: Cladocera) revealed by molecular markers and sexual stage morphology. *Mol Phylogenet Evol*. 50:534–546.
- [8] Berner DB. 1997. The cladoceran collection of the National Museum of Natural History, Smithsonian Institution, Washington, D.C. *P Biol Soc Wash*. 110:560–568.
- [9] Birge EA. 1879. Notes on Cladocera. *Trans Wisc Acad Sci Arts Lett*. 4:77–109.
- [10] Brehm V. 1934. II. Cladoceren. *Voyage de Ch. Alluaud and P.A. Chappius en Afrique Française*. *Arch Hydrobiol*. 26:50–90.
- [11] Brehm V. 1937. Brasilianische Cladoceren gesammelt von Dr. O. Schubart. *Intern Rev Ges Hydrobiol Hydrograph*. 35:497–512.
- [12] Brehm V. 1951. Über einen vermutlich neuen Fall amphiatlantischer Disjunktion bei Cladoceren. *Zool Anz*. 147:260–261.
- [13] Chatterjee T, Kotov AA, Van Damme K, Chandrasekhar SVA, Padhye S. 2013. An annotated checklist of the Cladocera (Crustacea: Branchiopoda) from India. *Zootaxa*. 3667:1–89.
- [14] Chiambeng GY, Dumont HJ. 2004. The genus *Pleuroxus* Baird, 1843 (Crustacea: Anomopoda: Chydoridae) in Cameroon, Central-West Africa. *Ann Limnol*. 40:211–229.
- [15] Chiang SC, Du NS. 1979. Freshwater Cladocera. *Fauna Sinica. Crustacea*. Peking: Science Press, Academia sinica; p. 1–297.
- [16] Crandal KA, Harris DJ, Fetzner JW. 2000. The monophyletic origin of freshwater crayfish estimated from nuclear and mitochondrial DNA sequences. *P Roy Soc Lond B Biol*. 267:1679–1686. <https://doi.org/10.1098/rspb.2000.1195>
- [17] Daday E. 1905. Untersuchungen über die Süßwasser Mikrofauna Paraguays. *Zoologica Ser*. 18(44):1–374.
- [18] Daniels SR, Cumberlidge N, Pérez-Losada M, Marijnissen SA, Crandall KA. 2006. Evolution of Afrotropical freshwater crab lineages obscured by morphological convergence. *Mol Phylogenet Evol*. 40:227–235.
- [19] De Meester L, Gómez A, Okamura B, Schwenk K. 2002. The Monopolization hypothesis and the dispersal-gene flow paradox in aquatic organisms. *Acta Oecol*. 23:121–135.
- [20] Dumont HJ. 1981. Cladocera and free-living Copepoda from the Fouta Djallon and adjacent mountain areas in West Africa. *Hydrobiologia*. 85:97–116.
- [21] Dumont HJ, Negrea SV. 2002. Introduction to the class Branchiopoda. In: Dumont HJ, editor. *Guides to the identification of the microinvertebrates of the continental waters of the world 19*. Leiden: Backhuys Publishers; p. 1–398.
- [22] Dumont HJ, Silva-Briano M. 2000. *Karualona* n.gen. (Anomopoda: Chydoridae), with a description of two new species, and a key to all known species. *Hydrobiologia*. 435:61–82.
- [23] Dybowski B, Grochowski M. 1898. O czutkach drugiej pary u Tonewek (Lynceidae) i Eminków (Eurycercidae). *Kosmos*. 23:25–73.
- [24] Elías-Gutiérrez M, Suárez Morales E, Gutiérrez Aguirre M, Silva Briano M, Granados Ramírez JG, Garfias Espejo T. 2008. Cladocera y Copepoda de las aguas continentales de México. *Guía ilustrada*. México (D.F): Unam, Conabio, Ecosur, Semarnat-Conacyt; p. 1–322.
- [25] Eskov KY. 1984. Continental drift and problems of historical biogeography. In: Chernov YI, editor. *Faunogenez i filocenogenez*. Moskva: Nauka; p. 24–92. Russian.
- [26] Fischer S. 1854. Abhandlung über einige neue oder nicht genau Bekannte Arten von Daphniden und Lynceiden als beitrage zur Fauna Russlands. *Bull Soc Nat Moscou*. 27:423–434.
- [27] Floessner D. 2000. Die Haplopoda und Cladocera (ohne Bosminidae) Mitteleuropas. Leiden: Backhuys; p. 1–428
- [28] Frey DG. 1961. Differentiation of *Alonella acutirostris* (Birge, 1879) and *Alonella rostrata* (Koch, 1841). *T Am Microsc Soc*. 80:129–140.
- [29] Frey DG. 1982. Questions concerning cosmopolitanism in Cladocera. *Arch Hydrobiol*. 93:484–502.
- [30] Frey DG. 1986. Comparison of *Chydorus faviformis* from North America with honeycombed taxa from other continents (Cladocera, Chydoridae). *Philos Trans Roy Soc B*. 315:353–402.

- [31] Frey DG. 1987. The taxonomy and biogeography of the Cladocera. *Hydrobiologia*. 145:5–17.
- [32] Frey DG. 1991. The species of *Pleuroxus* and of three related genera (Anomopoda, Chydoridae) in Southern Australia and New Zealand. *Rec Aus Mus*. 43:291–372.
- [33] Frey DG. 1993. Subdivision of the genus *Pleuroxus* (Anomopoda, Chydoridae) into subgenera worldwide. *Hydrobiologia*. 262:133–144.
- [34] Fryer G. 1957. Freelifving freshwater Crustacea from Lake Nyassa and adjoining waters. Part II. Cladocera and Conchostraca. *Arch Hydrobiol*. 53:223–239.
- [35] Fryer G. 1968. Evolution and adaptive radiation in the Chydoridae (Crustacea: Cladocera): a study in comparative functional morphology and ecology. *Philos Trans Roy Soc B*. 254:221–385.
- [36] Fryer G. 1971. Allocation of *Alonella acutirostris* (Birge) (Cladocera, Chydoridae) to the genus *Disparalona*. *Crustaceana*. 21:221–222.
- [37] Goulden CE. 1968. The systematics and evolution of the Moinidae. *Trans Am Philos Soc*. 58:1–101. Held at Philadelphia, new series.
- [38] Harding JP. 1957. The South African Cladoceran *Euryalona colletti* (Sars) and another African species. *Ann S Afr Mus*. 42:245–247.
- [39] Hebert PDN, Finston TL. 1993. A taxonomic reevaluation of North American *Daphnia* (Crustacea: Cladocera): I. The *Daphnia similis* complex. *Can J Zool*. 71:908–925.
- [40] Herr O. 1917. Die Phyllopodenfauna der preussischen Oberlausitz und der benachbarten Gebiete. *Abhand Naturf Gesellsch Görlitz*. 28:1–162.
- [41] Herrick CL. 1884. A final report on the Crustacea of Minnesota. Geological and natural history survey of Minnesota, 12th Annual Report. 1–191.
- [42] Huang JF, Li L, van der Werff H, Li H-W, Rohwer J-G, Crayn DM, Meng -H-H, Van Der Merwe M, Conran JG, Li J. 2016. Origins and evolution of cinnamon and camphor: a phylogenetic and historical biogeographical analysis of the *Cinnamomum* group (Lauraceae). *Mol Phylogenet Evol*. 96:33–44.
- [43] Hudec I. 2010. Anomopoda, Ctenopoda, Haplopoda, Onychopoda (Crustacea: Branchiopoda). *Fauna Slovenska III*. Bratislava: VEDA; p. 1–496. Slovak.
- [44] Idris BAG, Fernando CH. 1981. Cladocera of Malaysia and Singapore with new records, redescription and remarks on some species. *Hydrobiologia*. 77:233–256.
- [45] Illyová M, Hudec I. 2004. *Disparalona hamata* (Birge, 1879) (Crustacea, Anomopoda)–the second record from Europe. *Biologia*. 59:287–288.
- [46] Incagnone G, Marrone F, Barone R, Robba L, Naselli-Flores L. 2014. How do freshwater organisms cross the “dry ocean”? A review on passive dispersal and colonization processes with a special focus on temporary ponds. *Hydrobiologia*. 750:103–123.
- [47] International Commission on Zoological Nomenclature (ICZN). 2000. International code of zoological nomenclature. 4th ed. London: The Natural History Museum; p. 1–306.
- [48] Jeong HG. 2013. Diversity of freshwater Cladocera (Crustacea: Branchiopoda) in the South Korea. Ph.D. Thesis, Dept. of Life Science: Hanyang University. p. 1–249.
- [49] Jocqué M, Fiers F, Romero M, Martens K. 2013. Crustacea in phytotelmata: a global overview. *J Crustacean Biol*. 33:451–460.
- [50] Kim SI, Farrell BD. 2015. Phylogeny of world stag beetles (Coleoptera: Lucanidae) reveals a Gondwanan origin of Darwin’s stag beetle. *Mol Phylogenet Evol*. 86:35–48.
- [51] Kiser RW. 1950. The occurrence of the male generation in the Cladocerans, *Pleuroxus procurvatus* Birge, and *Pleuroxus hamulatus* Birge. *T Am Microsc Soc*. 69:243–247.
- [52] Klimovsky AI, Sinev AY, Bekker EI, Kotov AA. 2015. Cladocera (Crustacea, Branchiopoda) of Central Yakutia 2. Some representatives of the families Bosminidae, Euryceridae and Chydoridae. *Zool Zh*. 94:1009–1022. Russian.
- [53] Koch CL. 1841. Deutschlands Crustaceen, Myriapoden und Arachniden, ein Beitrag zur deutschen Fauna. Regensburg: F. Bubset; p. 1–35.
- [54] Korall P, Pryer KM. 2014. Global biogeography of scaly tree ferns (Cyatheaceae): evidence for Gondwanan vicariance and limited transoceanic dispersal. *J Biogeogr*. 41:402–413.
- [55] Kořínek V. 1999. A guide to limnetic species of Cladocera of African inland waters (Crustacea, Branchiopoda). Occasional Publications SIL. 1:1–57.
- [56] Kořínek V, Hebert PDN. 1996. A new species complex of *Daphnia* (Crustacea, Cladocera) from the Pacific northwest of the United States. *Can J Zool*. 74:1379–1393.
- [57] Korovchinsky NM. 2006. The Cladocera (Crustacea: Branchiopoda) as a relict group. *Zool J Linn Soc*. 147:109–124.
- [58] Kotov AA. 2009. A revision of *Leydigia* Kurz, 1875 (Anomopoda, Cladocera, Branchiopoda), and subgeneric differentiation within the genus. *Zootaxa*. 2082:1–68.

- [59] Kotov AA. 2013. Morphology and phylogeny of Anomopoda (Crustacea: Cladocera). Moscow: KMK; p. 1-638. Russian.
- [60] Kotov AA. 2015. A critical review of the current taxonomy of the genus *Daphnia* O. F. Müller, 1785. *Zootaxa*. 3911:184-200.
- [61] Kotov AA, Bekker EI. 2016. Cladocera: family Eurycercidae (Branchiopoda: Cladocera: Anomopoda). In: Dumont HJ, editor. Identification guides to the plankton and benthos of inland waters (Vol. 25). Weikersheim: Backhuys Publishers, Leiden and Margraf Publishers; p. 1-89.
- [62] Kotov AA, Ferrari FD. 2010. The taxonomic research of Jules Richard on Cladocera (Crustacea: Branchiopoda) and his collection at the National Museum of Natural History, U.S.A. *Zootaxa*. 2551:37-64.
- [63] Kotov AA, Forró L, Korovchinsky NM, Petrusek A, 2013a. World checklist of freshwater Cladocera species. World Wide Web electronic publication. Available from: <http://fada.biodiversity.be/group/show/17> [June, 25 of 2017]
- [64] Kotov AA, Jeong HJ, Lee W. 2012. Cladocera (Crustacea: Branchiopoda) of the south-east of the Korean Peninsula, with twenty new records for Korea. *Zootaxa*. 3368:50-90.
- [65] Kotov AA, Karabanov DP, Bekker EI, Neterina TV, Taylor DJ. 2016. Phylogeography of the *Chydorus sphaericus* group (Cladocera: Chydoridae) in the Northern Palearctic. *PLoS ONE*. 11(12):e0168711.
- [66] Kotov AA, Korovchinsky NM. 2006. First record of fossil Mesozoic Ctenopoda (Crustacea, Cladocera). *Zool J Linn Soc*. 146:269-274.
- [67] Kotov AA, Sinev AY. 2011. Cladocera (Crustacea, Branchiopoda) of the Zeya basin (Amurskaya Area, Russian Federation). 2. Descriptions of new taxa. *Zool Zh*. 90:272-284. Russian.
- [68] Kotov AA, Sinev AY, Glagolev SM, Smirnov NN. 2010. Water fleas (Cladocera). In: Alexeev VR, Tsalolokhin SY, editors. Key book for zooplankton and zoobenthos of fresh waters of European Russia. Moscow: KMK; p. 151-276. Russian.
- [69] Kotov AA, van Damme K, Bekker EI, Siboualipha S, Silva-Briano M, Adabache Ortiz A, Galván De La Rosa R, Sanoamuang L. 2013b. Cladocera (Crustacea: Branchiopoda) of Vientiane province and municipality. *Laos J Limnol*. 72(s2):81-108.
- [70] Laforsch C, Tollrian R. 2000. A new preparation technique of daphnids for Scanning Electron Microscopy using hexamethyldisilazane. *Arch Hydrobiol*. 149:587-596.
- [71] Lilljeborg W. 1853. De crustaceis ex ordinibus tribus: Cladocera, Ostracoda et Copepoda in Scania occurrentibus. Lund: Berlingska Boktryckeri; p. 1-222
- [72] Methuen PA. 1910. On a collection of freshwater Crustacea from the Transvaal. *Proceedings of The Zoological Society of London*. 80:148-166. doi:10.1111/j.1096-3642.1910.tb01889.x
- [73] Michael RG, Frey DG. 1984. Separation of *Disparalona leei* (Chien, 1970) in North America from *D. rostrata* (Koch, 1841) in Europe (Cladocera, Chydoridae). *Hydrobiologia*. 114:81-108.
- [74] Murphy NP, Austin CM. 2005. Phylogenetic relationships of the globally distributed freshwater prawn genus *Macrobrachium* (Crustacea: Decapoda: Palaemonidae): biogeography, taxonomy and the convergent evolution of abbreviated larval development. *Zool Scr*. 34:187-197.
- [75] Nan-Shan D. 1973. Cladocera of China. Peking: Science Press, Academia Sinica; p. 1-93. Chinese.
- [76] Neretina AN, Kotov AA. 2015. A new species of *Acroperus* Baird, 1843 (Cladocera: Chydoridae) from Africa. *Zootaxa*. 4039:516-528.
- [77] Neretina AN, Kotov AA. 2017. Old World-New World differentiation of so-called "circumtropical" taxa: the case of rare genus *Grimaldina* Richard, 1892 (Branchiopoda: Cladocera: Macrothricidae). *Zootaxa*. 4291:295-323.
- [78] Neretina AN, Sinev AY. 2016. A revision of the genus *Leberis* Smirnov, 1989 (Cladocera: Chydoridae) in the Old World and Australia. *Zootaxa*. 4079:501-533.
- [79] Nie ZL, Deng T, Meng Y, Sun H, Wen J. 2013. Post-Boreotropical dispersals explain the pantropical disjunction in *Paederia* (Rubiaceae). *Ann Bot*. 111:873-886.
- [80] Page TJ, Baker AM, Cook BD, Hughes JM. 2005. Historical transoceanic dispersal of a freshwater shrimp: the colonization of the South Pacific by the genus *Paratya* (Atyidae). *J Biogeogr*. 32:581-593.
- [81] Popova EV, Petrusek A, Kořínek V, Mergeay J, Bekker EI, Karabanov DP, Galimov YR, Neretina TV, Taylor DJ, Kotov AA. 2016. Revision of the Old World *Daphnia* (*Ctenodaphnia*) *similis* group (Cladocera: Daphniidae). *Zootaxa*. 4161:1-40.
- [82] Rajapaksa R, Fernando CH. 1986. Tropical species of *Kurzia* (Crustacea, Cladocera), with a description of *Kurzia brevilabris* sp. nov. *Can J Zool*. 64:2590-2602.
- [83] Rajapaksa R, Fernando CH. 1987a. Redescription and assignment of *Alona globulosa* Daday, 1898 to a new genus *Notoalona* and a description of *Notoalona freyi* sp. nov. *Hydrobiologia*. 144:131-153.
- [84] Rajapaksa R, Fernando CH. 1987b. Redescription of *Dunhevedia serrata* Daday, 1898 (Cladocera, Chydoridae) and a description of *Dunhevedia americana* sp. nov. from America. *Can J Zool*. 65:432-440.
- [85] Renner SS, Clausen G, Meyer K. 2001. Historical biogeography of Melastomataceae: the roles of Tertiary migration and long-distance dispersal. *Am J Bot*. 88:1290-1300.

- [86] Rey J, Vásquez E. 1986. Cladocères de quelques corps d'eaux du bassin moyen de l'Orénoque (Vénézuéla). *Ann Limnol.* 22:137-168.
- [87] Rogers DC. 2014. Larger hatching fractions in avian dispersed anostracan eggs (Branchiopoda). *J Crust Biol.* 34:135-143.
- [88] Romero JM, Silva-Briano M, Van Damme K, Adabanche-Ortiz A, Mondragón D, 2011. Cladocera in Mexican bromeliads. 9th International Cladocera Symposium; 2-8 October; Verbania, Italy.
- [89] Sacherová V, Hebert PDN. 2003. The evolutionary history of the Chydoridae (Crustacea: Cladocera). *Biol J Linn Soc Lond.* 79:629-643.
- [90] Sánchez-Ramírez S, Tulloss RE, Amalfi M, Moncalvo JM. 2015. Palaeotropical origins, boreotropical distribution and increased rates of diversification in a clade of edible ectomycorrhizal mushrooms (*Amanita* section *Caesareae*). *J Biogeogr.* 42:351-363.
- [91] Sars GO. 1862. Hr. studios medic. G.O. Sars fortsatte sit foredrag over de af ham i Omegnen af Christian iaagttagne Crustacea cladocera. *Forh. Vidensk.-Selsk. Kristiania.* 1861:250-302.
- [92] Sars GO. 1901. Contributions to the knowledge of the fresh-water Entomostraca of South America, as shown by artificial hatching from dried material. 1. Cladocera. *Arch Math Naturv.* 23:1-102.
- [93] Scheben A, Bechteler J, Lee GE, Pócs T, Schäfer-Verwimp A, Heinrichs J. 2016. Multiple transoceanic dispersals and geographical structure in the pantropical leafy liverwort *Ceratolejeunea* (Lejeuneaceae, Porellales). *J Biogeogr.* 43:1739-1749.
- [94] Sharma P, Kotov AA. 2015. Establishing of *Chydorus sphaericus* (O.F. Muller) s.str. (Crustacea: Cladocera) in Australia: consequences of mass fish stock from Northern Europe? *J Limnol.* 74:225-233.
- [95] Shiel RJ, Dickson JA. 1995. Cladocera recorded from Australia. *Trans Roy Soc South Aust.* 119:29-40.
- [96] Shing-Ming C. 1970. *Allonella fitzpatricki* sp. n. and *A. leei* sp. n.: new Cladocera from Mississippi. *T Am Microsc Soc.* 89:532-538.
- [97] Sinev AY. 1997. Review of the affinis-group of *Alona* Baird, 1843, with the description of a new species from Australia (Anomopoda Chydoridae). *Arthropoda Sel.* 6(3-4):47-58.
- [98] Sinev AY. 2009. Discrimination between two sibling species of *Acroperus* (Baird, 1843) from the Palearctic (Cladocera: Anomopoda: Chydoridae). *Zootaxa.* 2176:1-21.
- [99] Sinev AY. 2015. Revision of the pulchella-group of *Alona* s. lato leads to its translocation to *Ovalona* Van Damme et Dumont, 2008 (Branchiopoda: Anomopoda: Chydoridae). *Zootaxa.* 4044:451-492.
- [100] Sinev AY, Atroschenko MM. 2011. Revision of the genus *Alonopsis* Sars, 1862 and its position within *Aloninae* (Cladocera: Anomopoda: Chydoridae). *Zootaxa.* 2800:1-17.
- [101] Sinev AY, Elmoor-Loureiro LMA. 2010. Three new species of chydorid cladocerans of subfamily *Aloninae* (Branchiopoda: Anomopoda: Chydoridae) from Brazil. *Zootaxa.* 2390:1-25.
- [102] Sinev AY, Garibian PG, Gu Y. 2016. A new species of *Pseudochydorus* Fryer, 1968 (Cladocera: Anomopoda: Chydoridae) from South-East Asia. *Zootaxa.* 4079:129-139.
- [103] Sinev AY, Gu Y, Han BP. 2015. Cladocera of Hainan Island, China. *Zootaxa.* 4006:569-585.
- [104] Sinev AY, Kotov AA. 2014. Revision of the Holarctic genus *Rhynchotalona* Norman, 1903 (Cladocera: Chydoridae). *Zootaxa.* 3841:188-210.
- [105] Sinev AY, Nachai S, Sanoamuang L. 2007. Occurrence of the Australian cladoceran *Armatalona macrocopa* (Sars, 1894) (Cladocera: Anomopoda: Chydoridae) in Thailand. *Invert Zool.* 4(1):25-29.
- [106] Sinev AY, Sanoamuang L. 2011. Hormonal induction of males as a method for studying tropical cladocerans: description of males of four chydorid species (Cladocera: Anomopoda: Chydoridae). *Zootaxa.* 2826:45-56.
- [107] Sinev AY, Zawisza E, Einarsson A. 2012. Unusual stable morphotype of *Acroperus harpae* (Baird, 1843) from Lake Mývatn, Iceland (Cladocera: Anomopoda: Chydoridae) revealed by palaeolimnological studies. *Stud Quatern.* 29:3-7.
- [108] Smirnov NN. 1971. Chydoridae of the world fauna. *Fauna SSSR. Rakoobraznie.* 1(2):1-531. Russian.
- [109] Smirnov NN. 1976. Macrothricidae and Moinidae of the World fauna. *Fauna SSSR, novaya seriya. Rakoobraznye.* 1(3):1-237. Russian.
- [110] Smirnov NN. 1995. Check-list of the Australian Cladocera (Crustacea). *Arthropoda Sel.* 4(1):3-6.
- [111] Smirnov NN. 1996a. 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. Amsterdam: SPB Academic Publishing; p. 1-197.
- [112] Smirnov NN. 1996b. New or rare species of the Chydoridae (Cladocera, Anomopoda). *Arthropoda Sel.* 5(3-4):3-17.
- [113] Smirnov NN. 2007. Pleuroxus-like chydorids (Crustacea: Anomopoda) from South Africa, with the description of *Dumontiellus africanus* gen. n., sp. n. *Hydrobiologia.* 575:433-439.

- [114] Smirnov NN, Kotov AA, Coronel J. 2006. Partial revision of the aduncus-like species of *Pleuroxus* Baird, 1843 (Chydoridae, Cladocera) from the southern hemisphere with comments of subgeneric differentiation within the genus. *J Nat Hist.* 40(27/28):1617-1639.
- [115] Sousa FDR, Elmoor-Loureiro LMA. 2017. ZIP code matters: *Nicsmirnovius paggii*, a new species from *fitzpatricki* complex (Cladocera: Chydoridae) does not co-occur with *Nicsmirovius incredibilis*. *J Nat Hist.* doi:10.1080/00222933.2017.1358773
- [116] Sousa FDR, Elmoor-Loureiro LMA, Santos S. 2016b. Position of the dentifera-group in the Coronatella-branch and its relocation to a new genus: *magnospina* gen. n. (Crustacea, Chydoridae, Aloninae). *ZooKeys.* 586:95-119. DOI:10.3897/zookeys.586.8209
- [117] Sousa FDR, Lma E-L, Santos S. 2015. Redescription of *Coronatella poppei* (Richard, 1897) (Crustacea, Branchiopoda, Chydoridae) and a revision of the genus in Brazil, with descriptions of new taxa. *Zootaxa.* 3955:211-244.
- [118] Sousa FDR, Lma E-L, Santos S. 2016a. New findings of Hexalona-branch representatives in Brazil, with a description of *Prenda* gen. nov. (Crustacea: Anomopoda: Aloninae). *J Nat Hist.* 50:2727-2768.
- [119] Šrámek-Hušek R. 1946. O perloočkách *Pleuroxus striatoides* n. sp. and *P. striatus* Schoedler. *Acta Soc Zool Bohem.* 10:232-240.
- [120] Šrámek-Hušek R, Strašcraba M, Brtek J. 1962. *Lupenonožci-Branchiopoda.* Fauna ČSSR, Praha. 16:1-472. Slovak.
- [121] Subhashbabu KK, Thomas JK. 2007. Chapter 2: Freshwater Cladocera (Crustacea: Branchiopoda) from Muriyad Wetlands, Trichur, Kerala. In: Gupta VK, Verma AK, editors. *Perspectives in Animal Ecology and Reproduction*, Vol. 4. New Delhi: Daya Publishing House; p. 36-52
- [122] Toussaint EF, Bloom D, Short AE. 2017b. Cretaceous West Gondwana vicariance shaped giant water scavenger beetle biogeography. *J Biogeogr.* doi:10.1111/jbi.12977
- [123] Toussaint EF, Hendrich L, Hájek J, Michat MC, Panjaitan R, Short AE, Balke M. 2017a. Evolution of Pacific Rim diving beetles sheds light on Amphi-Pacific biogeography. *Ecography.* 40:500-510.
- [124] Uéno M. 1927. The freshwater Branchiopoda of Japan I. *Memoirs of the College of Science, Kyoto Imperial University, Series B.* 2(5):259-311.
- [125] Van Damme K, Dumont HJ. 2008. Further division of *Alona* Baird, 1843: separation and position of *Coronatella Dybowski* and *Grochowski* and *Ovalona* gen.n. (Crustacea: Cladocera). *Zootaxa.* 1960:1-44.
- [126] Van Damme K, Dumont HJ. 2010. Cladocera of the Lençóis Maranhenses (NE - Brazil): faunal composition and a reappraisal of Sars' Method. *Braz J Biol.* 70(3 suppl.):755-779.
- [127] Van Damme K, Kotov AA. 2016. The fossil record of the Cladocera (Crustacea: Branchiopoda): evidence and hypotheses. *Earth Sci Rev.* 163:162-189.
- [128] Van Damme K, Kotov AA, Dumont HJ. 2005. Redescription of *Leydigia parva* Daday, 1905 and assignment to *Parvalona* gen. nov. (Cladocera: Anomopoda: Chydoridae). *J Nat Hist.* 39:2125-2136.
- [129] Van Damme K, Kotov AA, Dumont HJ. 2010. A checklist of names in *Alona* Baird 1843 (Crustacea: Cladocera: Chydoridae) and their current status: an analysis of the taxonomy of a lump genus. *Zootaxa.* 2330:1-63.
- [130] Van Damme K, Sinev AY. 2013. Tropical Amphi-Pacific disjunctions in the Cladocera (Crustacea: Branchiopoda). *J Limnol* 72(s2):209-244.
- [131] Van Damme K, Sinev AY, Dumont HJ. 2011. Separation of *Anthalona* gen.n. from *Alona* Baird, 1843 (Branchiopoda: Cladocera: Anomopoda): morphology and evolution of scraping stenothermic alonines. *Zootaxa.* 2875:1-64.
- [132] Wei R, Xiang Q, Schneider H, Sundue MA, Kessler M, Kamau PW, Hidayat A, Zhang X. 2015. Eurasian origin, boreotropical migration and transoceanic dispersal in the pantropical fern genus *Diplazium* (Athuriaceae). *J Biogeogr.* 42:1809-1819.
- [133] Weltner W. 1899. Zur Cladocerenfauna Africas. *Zool Anz.* 22:8-9.
- [134] Ye Z, Zhen Y, Zhou Y, Bu W. 2017. Out of Africa: biogeography and diversification of the pantropical pond skater genus *Limnogonus* Stål, 1868 (Hemiptera: Gerridae). *Ecol Evol.* 7:793-802.
- [135] Yoon SM. 2010. Arthropoda: branchiopoda: anostraca, Notostraca, Spinicaudata, Laevicaudata, Ctenopoda, Anomopoda, Haplopoda Branchiopods. *Invertebrate Fauna of Korea.* 21(2):1-156.
- [136] Zoppi De Roa E, Vásquez W. 1991. Additional cladoceran records for Mantecal and new for Venezuela. *Hydrobiologia.* 225:45-62.