



<http://dx.doi.org/10.11646/zootaxa.3948.1.10>

<http://zoobank.org/urn:lsid:zoobank.org:pub:8D6304E3-335A-4DAF-8EC9-10F12B03467B>

***Quisarctus yasumurai* gen. et sp. nov. (Arthrotardigrada: Halechiniscidae) from a submarine cave, off Iejima, Ryukyu Islands, Japan**

SHINTA FUJIMOTO

Department of Zoology, Division of Biological Science, Graduate School of Science, Kyoto University, Kitashirakawa-Oiwakecho, Sakyo-ku, Kyoto 606-8502, Japan. E-mail: shinta.f@water-bears.com

Abstract

Quisarctus yasumurai gen. et sp. nov. (Arthrotardigrada: Halechiniscidae) is described from the submarine cave ‘Daidokutsu’, off Iejima, Okinawa Islands, Ryukyu Islands, Japan. It is characterised by a cylindrical body, long primary clava and shorter lateral cirrus inserted on a common cirrophore, and simple digits of unequal lengths (without folds, peduncles, proximal pads, pretarsi, or wrinkles) that terminate in a sheathed, small, crescent-shaped claw with a minute calcar. Quisarctinae subfam. nov. is erected for this unique new genus.

Key words: Heterotardigrada, marine, meiobenthos, phylogeny, Quisarctinae subfam. nov., Tardigrada, taxonomy

Introduction

Halechiniscidae (Heterotardigrada: Arthrotardigrada) is a marine tardigrade family, which is probably polyphyletic (Jørgensen *et al.* 2010), with 29 genera in seven subfamilies. It is characterised by the presence of a complete set of cephalic cirri, primary clavae, four digits with claws on each leg, and the absence of sclerotized plates.

In this paper, I describe a new genus and subfamily of this probable ‘rag bag family’, which is erected based on a unique new species, with a cylindrical body, long primary clavae and simple digits, that was collected from a submarine cave in Japan.

Material and methods

Tardigrades were obtained from three litres of grey calcareous mud collected from the depth of 29 m in the submarine cave ‘Daidokutsu’, off the eastern coast of Iejima, Okinawa Islands, Ryukyu Islands, Japan (26°43'18"N, 127°50'00"E) on 6th November 2013 by Koshin Yasumura. The mud sample was fixed in 3% buffered formaldehyde. To concentrate the sample, it was rinsed with distilled water to remove formaldehyde, stirred with water-diluted Ludox® HS-40 colloidal silica (density ca. 1.20 g cm⁻³), kept still for at least 15 min. to allow the mud particles to settle. Any animals trapped in the supernatant were retained on a 32 µm mesh net (modified from Burgess (2001) density separation method). This procedure was repeated four times to increase the recovery. The specimens were sorted under a stereomicroscope and mounted in glycerol for phase-contrast microscopy (Olympus BX53). All micrographs were taken at 1000× magnification and multiple micrographs were composited with Adobe Photoshop CS6 (Adobe Systems Incorporated) for full view of objects larger than field of view.

Systematics

Order Arthrotardigrada Marcus, 1927

Acknowledgments

The author's thanks are to Koshin Yasumura for collection of the sediment sample, Tomoki Kase for facilitating the collection and Tsutomu Hikida for his helpful comments on the manuscript. This work was supported by Japan Society for the Promotion of Science Grant-in-Aid for JSPS fellows (Grant No. 25987).

References

- Burgess, R. (2001) An improved protocol for separating meiofauna from sediments using colloidal silica sols. *Marine Ecology Progress Series*, 214, 161–165.
<http://dx.doi.org/10.3354/meps214161>
- Bussau, C. (2005) New deep-sea Tardigrada (Arthrotardigrada, Halechiniscidae) from a manganese nodule area of the eastern South Pacific. *Zoologica Scripta*, 21, 79–92.
<http://dx.doi.org/10.1111/j.1463-6409.1992.tb00311.x>
- Cantacuzène, M.A. (1951) Tardigrade marin nouveau, commensal de *Limnoria lignorum* (Rathke). *Compte Rendu de l'Academie des Sciences*, 232, 1699–1700.
- Grimaldi de Zio, S., D'Addabbo Gallo, M. & Morone De Lucia, M.R. (1990) Revision of the genus *Halechiniscus* (Halechiniscidae, Arthrotardigrada). *Cahiers de Biologie Marine*, 31, 271–279.
- Gross, V., Miller, W.R. & Hochberg, R. (2014) A new tardigrade, *Mutaparadoxipus duodigifinis* gen. nov., sp. nov. (Heterotardigrada: Arthrotardigrada), from the Southeastern United States. *Zootaxa*, 3835 (2), 263–272.
<http://dx.doi.org/10.11646/zootaxa.3835.2.6>
- Jørgensen, A., Boesgaard, T.M., Møbjerg, N. & Kristensen, R.M. (2014) The tardigrade fauna of Australian marine caves: With descriptions of nine new species of Arthrotardigrada. *Zootaxa*, 3802 (4), 401–443.
<http://dx.doi.org/10.11646/zootaxa.3802.4.1>
- Jørgensen, A., Faurby, S., Hansen, J.G., Møbjerg, N. & Kristensen, R.M. (2010) Molecular phylogeny of Arthrotardigrada (Tardigrada). *Molecular Phylogenetics and Evolution*, 54, 1006–1015.
<http://dx.doi.org/10.1016/j.ympev.2009.10.006>
- Kristensen, R.M. (1984) On the biology of *Wingstrandartus corallinus* nov. gen. et spec., with notes on the symbiotic bacteria in the subfamily Florarctinae (Arthrotardigrada). *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening*, 145, 201–218.
- Kristensen, R.M. & Higgins, R.P. (1984) Revision of *Styraconyx* (Tardigrada: Halechiniscidae), with description of two new species from Disko Bay, West Greenland. *Smithsonian Contributions to Zoology*, 391, 1–40.
<http://dx.doi.org/10.5479/si.00810282.391>
- Kristensen, R.M. & Renaud-Mornant, J. (1983) Existence d'arthrotardigrades semi-benthiques de genres nouveaux de la sous-famille des Styraconyxinae subfam. nov. *Cahiers de Biologie Marine*, 24, 337–353.
- Noda, H. (1986) Seminal receptacles as a taxonomical character in the family Halechiniscidae (Arthrotardigrada). *Zoological Science*, 3, 1111. [published conference abstract]
- Pollock, L.W. (1979) *Angursa* n. g., n. sp., a marine Arthrotardigrada from the western North Atlantic. *Transactions of the American Microscopical Society*, 98, 558–562.
<http://dx.doi.org/10.2307/3225907>
- Pollock, L.W. (1995) New marine tardigrades from Hawaiian beach sand and phylogeny of the family Halechiniscidae. *Invertebrate Biology*, 114, 220–235.
<http://dx.doi.org/10.2307/3226877>
- Renaud-Mornant, J. (1980) Description de trois espèces nouvelles du genre *Tanarctus* Renaud-Debyser, 1959, et création de la sous-famille des Tanarctinae subfam. nov. (Tardigrada, Heterotardigrada). *Bulletin du Muséum National d'Histoire Naturelle, Paris*, Série 4e, 2, 129–141.
- Renaud-Mornant, J. (1982) Sous-famille et genre nouveaux de Tardigrades marins (Arthrotardigrada). *Bulletin du Muséum National d'Histoire Naturelle, Paris*, Série 4e, 4, 89–94.
- Renaud-Mornant, J. (1983) Tardigrades abyssaux nouveaux de la sous-famille des Euclavarctinae n. subfam. (Arthrotardigrada, Halechiniscidae). *Bulletin du Muséum National d'Histoire Naturelle, Paris*, Série 4e, 5, 201–219.
- Schulz, E. (1963) Über die Tardigraden. *Zoologischer Anzeiger*, 171, 3–12.
- Steiner, G. (1926) *Bathyechiniscus tetronyx* n.g. n.sp. Ein neuer mariner tardigrade. *Deutschen Südpolar-Expedition*, 18, 477–481.
- Thulin, G. (1928) Über die phylogenie und das system der Tardigraden. *Hereditas*, 11, 207–266.
<http://dx.doi.org/10.1111/j.1601-5223.1928.tb02488.x>
- Thulin, G. (1942) Ein neuer mariner Tardigrad. *Meddelanden från Göteborgs musei Zoologiska avdelning*, 99, 1–10.
- Villora-Moreno, S. (1998) Deep-sea Tardigrada from South Shetland Islands (Antarctica) with description of *Angursa Antarctica* sp. nov. (Arthrotardigrada, Halechiniscidae). *Polar Biology*, 19, 336–341.
<http://dx.doi.org/10.1007/s0030000050255>