

Supporting information

TABLE S1. Overview of GenBank Accession numbers for the 18S and 28S rDNA sequences from outgroup and tardigrade taxa used in the current study. Tardigrade classification according to Degma & Guidetti (2023). (–) indicates no available sequence.

Taxon	Sequence		Outgroup taxa
	18S	28S	
<i>Acanthocnemus nigricans</i>	KF703707	KX077909	Coleoptera
<i>Placopecten magellanicus</i>	X53899	KX713422	Mollusca
<i>Acanthopharynx dormitata</i>	KX077908	KP419337	Nematoda
Heterotardigrada, “Arthrotardigrada”			Family
<i>Archechiniscus</i> sp.	–	GQ849031	Archechiniscidae
<i>Batillipes mirus</i>	GQ849016	GQ849027	Batillipedidae
<i>Batillipes pennaki</i>	–	GQ849028	
<i>Batillipes similis</i>	–	GQ849029	
<i>Batillipes</i> sp.	LC103163	LC103143	
<i>Batillipes</i> sp.	–	LC103144	
<i>Batillipes tubernatis</i>	–	GQ849030	Coronarctidae
<i>Coronarctus</i> sp.	–	LC103145	
<i>Dipodarctus</i> sp.	–	GQ849032	
<i>Florarctus</i> sp.	GQ849017	GQ849034	Halechiniscidae
<i>Florarctus</i> sp.	–	LC103146	
<i>Florarctus</i> sp.	–	LC103147	
<i>Halechiniscus churakaagii</i>	–	LC103148	
<i>Halechiniscus perfectus</i>	GQ849018	GQ849035	Renaudarctidae
<i>Halechiniscus remanei</i>	AY582118	–	
<i>Orzeliscus</i> sp.	LC103164	LC103150	
<i>Orzeliscus</i> sp.	–	LC103151	Stygarctidae
<i>Nodarctus hallucis</i>	–	LC103157	
<i>Renaudarctus</i> sp.	–	LC103156	
<i>Parastygarctus</i> sp.	–	LC103158	Stygarctidae
<i>Parastygarctus</i> sp.	–	LC103159	
<i>Stygarctus ayatori</i>	LC103165	LC103160	
<i>Stygarctus goubaultae</i>	–	LC103161	Styraconyxidae
<i>Cyaegharctus kitamurai</i>	–	LC103153	
<i>Raiarctus colurus</i>	GQ849020	GQ849037	
<i>Raiarctus</i> sp.	–	LC103152	Tanarctidae
<i>Styraconyx</i> sp.	–	GQ849038	
<i>Styraconyx takeshii</i>	–	LC488165	
<i>Tetrakentron synaptae</i>	–	GQ849039	Echiniscidae
<i>Actinarctus doryphorus</i> no 08	OP901695	OP882620	
<i>Actinarctus doryphorus</i> no 10	OP901696	OP882621	
<i>Tanarctus diplocerus</i>	–	LC103154	
<i>Tanarctus</i> sp.	–	LC103155	
Heterotardigrada, Echiniscoidea			Family
<i>Acanthechiniscus victor</i>	KT226096	KT226107	Echiniscidae
<i>Antechiniscus lateromamillatus</i>	HM193370	HM193386	
<i>Barbaria bigranulata</i> ¹	HM193373	JX114855	
<i>Bryodelphax parvulus</i>	HM193371	HM193387	
<i>Claxtonia wendti</i> ¹	MK529669	JX114868	
<i>Cornechiniscus lobatus</i>	HM193372	HM193388	
<i>Diploechiniscus oihonnae</i> ²	MW136887	JX114869	
<i>Echiniscus testudo</i>	GQ849022	MK529716	
<i>Hypechiniscus flavus</i> ³	HM193377	HM193394	
<i>Mopsechiniscus granulosus</i>	HM193379	HM193396	
<i>Parechiniscus chitonides</i>	HM193380	HM193397	

<i>Proechiniscus hanaeae</i>	HM193381	HM193398	
<i>Pseudechiniscus facettalis</i>	FJ435720	FJ435788	
<i>Testechiniscus spitsbergensis</i>	EU266967	JX114870	
<i>Viridiscus viridissimus</i> ¹	AF056024	HM193393	
<i>Echiniscoides sigismundi</i>	GQ849021	JX114887	
<i>Isoechiniscoides sifae</i>	OP908042	KX363637	Echiniscoididae
<i>Neoechiniscoides aski</i> ⁴	OP908048	KX363643	
Eutardigrada, Apochela			Family
<i>Milnesium</i> sp.	MK484086	AY210826	Milnesiidae
<i>Milnesium</i> sp. ⁵	GQ925685	MH079477	
Eutardigrada, Parachela			Family, Superfamily
<i>Calohypsibius ornatus</i>	MH279652	MH079505	Calohypsibiidae, Hypsibioidea
<i>Doryphoribius macrodon</i>	HQ604942	KT778611	Doryphoribiidae, Isohypsibioidea
<i>Bertolanius nebulosus</i>	GQ849023	GQ849046	Eohypsibiidae, Eohypsibioidea
<i>Diphascon pingue</i>	FJ435736	FJ435776	Hypsibiidae, Hypsibioidea
<i>Hypsibius convergens</i>	FJ435726	FJ435771	Hypsibiidae, Hypsibioidea
<i>Halobiotus crispae</i>	EF620402	MH079510	Halobiotidae, Isohypsibioidea
<i>Macrobiotus hufelandi</i>	FJ435738	FJ435755	Macrobiotidae, Macrobiotoidea
<i>Ramazzottius</i> sp. ⁶	FJ435728	FJ435768	Ramazzottiidae, Hypsibioidea
<i>Richtersius</i> sp. ⁷	DQ839604	KT778702	Richtersiusidae, Macrobiotoidea

¹⁻⁷Species names differ from the names under which the sequences were deposited in GenBank according to:

¹Gąsiorek, P., Morek, W., Stec, D. & Michalczyk, Ł. (2019) Untangling the *Echiniscus* Gordian knot: paraphyly of the “arctomys group”(Heterotardigrada: Echiniscidae). *Cladistics*, 35 (6), 633–653. <https://doi.org/10.1111/cla.12377>

²Vicente, F., Fontoura, P., Cesari, M., Rebecchi, L., Guidetti, R., Serrano, A., Bertolani, R. (2013) Integrative taxonomy allows the identification of synonymous species and the erection of a new genus of Echiniscidae (Tardigrada, Heterotardigrada). *Zootaxa*. 14; 3613:557-572. <https://doi.org/10.11646/zootaxa.3613.6.3>

³Gąsiorek, P., Oczkowski, A., Blagden, B., Kristensen, R. M., Bartels, P. J., Nelson, D. R., Suzuki, A.C. & Michalczyk, Ł. (2021) New Asian and Nearctic *Hypechiniscus* species (Heterotardigrada: Echiniscidae) signalize a pseudocryptic horn of plenty. *Zoological Journal of the Linnean Society*, 192 (3), 794–852. <https://doi.org/10.1093/zoolinnean/zlaa110>

⁴Møbjerg, N., Jørgensen, A. & Kristensen, R. M. (2020) Ongoing revision of Echiniscoididae (Heterotardigrada: Echiniscoidea), with the description of a new interstitial species and genus with unique anal structures. *Zoological Journal of the Linnean Society*, 188 (3), 663–680. <https://doi.org/10.1093/zoolinnean/zlz122>

⁵Morek, W., Stec, D., Gąsiorek, P., Surmacz, B. & Michalczyk, Ł. (2019) *Milnesium tardigradum* Doyère, 1840: The first integrative study of interpopulation variability in a tardigrade species. *Journal of Zoological Systematics and Evolutionary Research*, 57 (1), 1–23. <https://doi.org/10.1111/jzs.12233>

⁶Stec, D., Morek, W., Gąsiorek, P. & Michalczyk, Ł. (2018) Unmasking hidden species diversity within the *Ramazzottius oberhaeuseri* complex, with an integrative redescription of the nominal species for the family Ramazzottiidae (Tardigrada: Eutardigrada: Parachela). *Systematics and Biodiversity*, 16(4), 357–376. <https://doi.org/10.1080/14772000.2018.1424267>

⁷Stec, D., Krzywański, Ł., Arakawa, K. & Michalczyk, Ł. (2020) A new redescription of *Richtersius coronifer*, supported by transcriptome, provides resources for describing concealed species diversity within the monotypic genus *Richtersius* (Eutardigrada). *Zoological Letters*, 6, 1–25. <https://doi.org/10.1186/s40851-020-0154-y>