

**Table S1.** List of *COI* and *18S rRNA* gene sequences of the Hirudinea used in this study

Taxa	COI	18S rRNA	Haplotype Code	Locality	Environment*	Reference
<b>In-group taxa (Piscicolidae)</b>						
<b><i>Acipenserobdella</i> Epshtein, 1969</b>						
<i>A. volgensis</i> (Zykoff, 1904)	OP377067	OP377087	AciVol_E	Russia: Moscow River, Volga Basin; free-living	Freshwater	This study
<i>A. volgensis</i> (Zykoff, 1904)	KR608789	N/A	AciVol_S1	Russia: Selenga River, Baikal Basin, Eastern Siberia; from <i>Coregonus migratorius</i> (Georgi, 1775) (Salmonidae)	Freshwater	Kaygorodova et al. [1]
<b><i>Aestabdella</i> Burreson, 1976</b>						
<i>A. adbitovesiculata</i> (Moore, 1952)	DQ414300	DQ414254	AesAbd	USA: Hawaii	Marine	Williams & Burreson [2]
<i>A. leiostomi</i> Burreson, 1991	DQ414305	DQ414259	AesLei	USA: Virginia	Marine	Williams & Burreson [2]
<b><i>Alexandrobdeella</i> Bolotov et al., 2020</b>						
<i>A. makhrovi</i> Bolotov et al., 2020	MN295413	MN312187	AleMak	Russia: Lake Khanka, Prymorie Region, Russian Far East	Freshwater	Bolotov et al. [3]
<b><i>Austrobdeella</i> Badham, 1916</b>						
<i>A. bilobata</i> Ingram, 1957	DQ414301	DQ414255	AusBil	Australia: Tasmania	Marine	Williams & Burreson [2]
<i>'A.' californiana</i> Burreson, 1977	DQ414304	DQ414258	AusCal	USA: California	Marine	Williams & Burreson [2]
<i>A. translucens</i> Badham, 1916	DQ414306	DQ414260	AusTra	Australia: South Australia	Marine	Williams & Burreson [2]
<b><i>Baicalobdeella</i> Dogiel &amp; Bogolepova, 1957</b>						
<i>B. torquata</i> Grube, 1871	AY336018	N/A	BaiTor	Russia: Lake Baikal	Freshwater	Utevsky & Trontelj [4]
<b><i>Bathybdella</i> Burreson, 1981</b>						
<i>B. sawyeri</i> Burreson, 1981	DQ414311	DQ414265	BatSaw	Pacific Ocean: East Pacific Rise	Marine	Williams & Burreson [2]
<b><i>Beringobdeella</i> Caballero, 1974</b>						
<i>B. rectangulata</i> (Levinsen, 1881)	DQ414310	DQ414264	BerRec	Pacific Ocean: Bering Sea	Marine	Williams & Burreson [2]
<b><i>Branchellion</i> Savigny, 1822</b>						
<i>B. lobata</i> Moore, 1952	DQ414307	DQ414261	BraLob	USA: California	Marine	Williams & Burreson [2]
<i>B. parkeri</i> Richardson, 1949	DQ414308	DQ414262	BraPar	Australia: Tasmania	Marine	Williams & Burreson [2]
<i>B. ravenelii</i> (Girard, 1851)	DQ414309	DQ414263	BraRav	USA: Gulf of Mexico	Marine	Williams & Burreson [2]
<i>B. torpedinis</i> Savigny, 1822	AF003265	AF115993	BraTor	USA: Virginia	Marine	Siddall & Burreson [5]
<b><i>Calliobdeella</i> van Beneden &amp; Hesse, 1863</b>						
<i>C. lophii</i> Van Beneden & Hesse, 1863	DQ414314	DQ414268	CalLop	Norway	Marine	Williams & Burreson [2]
<b><i>Caspiobdeella</i> Epshtein, 1966</b>						
<i>C. fadejewi</i> (Epshtein,	AY336020	N/A	CasFad	Ukraine: Kharkiv	Freshwater	Utevsky &

Taxa	COI	18S rRNA	Haplotype Code	Locality	Environment*	Reference
1961)				Region, Pechenegi Reservoir		Trontelj [4]
<b><i>Cystobranchnus</i> Diesing, 1859</b>						
<i>C. respirans</i> (Troschel, 1850)	AY336021	N/A	CysRes	Slovenia: Sava River near Ljubljana	Freshwater	Utevsky & Trontelj [4]
<b><i>Gonimosobdella</i> Williams &amp; Burreson, 2005</b>						
<i>G. klemmi</i> Williams & Burreson, 2005	DQ414318	DQ414272	GonKle	USA: Arkansas	Freshwater	Williams & Burreson [2]
<i>G. salmositica</i> (Meyer, 1946)	DQ414316	DQ414270	CysSal	Canada: British Columbia	Freshwater	Williams & Burreson [2]
<i>G. virginica</i> (Hoffman, 1964)	DQ414317	DQ414271	CysVir	USA: North Carolina	Freshwater	Williams & Burreson [2]
<i>G. vivida</i> (Verrill, 1872)	AF003260	AF115992	CalViv	USA: Virginia	Brackish to freshwater	Siddall & Burreson [5]
<b><i>Heptacyclus</i> Vasilejev, 1939</b>						
<i>H. buthi</i> (Burreson & Kalman, 2006)	DQ414322	DQ414276	MalBut	USA: California	Marine	Williams & Burreson [2]
<i>H. scorpii</i> (Malm, 1863)	DQ414326	DQ414280	MalSco	Canada: New Brunswick	Marine	Williams & Burreson [2]
<b><i>Johanssonia</i> Selensky, 1914</b>						
<i>J. artica</i> (Johansson, 1898)	DQ414320	DQ414274	JohArc	Canada: Newfoundland	Marine	Williams & Burreson [2]
<b><i>Limnotrachelobdella</i> Epshtein, 1968</b>						
<i>L. okae</i> (Moore, 1924)	AY336022	N/A	LimOka	Russia: Nevelskoy Strait between the Sakhalin Island and mainland	Marine to freshwater	Utevsky & Trontelj [4]
<i>L. sinensis</i> (Blanchard, 1896)	LC275140	LC275139	LimSin	Japan: Shiga	Brackish to freshwater	NCBI's Genbank
<b><i>Myzobdella</i> Leidy, 1851</b>						
<i>M. lugubris</i> Leidy, 1851	AF003269	AF115994	MyzLug	USA: Virginia	Marine to freshwater	Siddall & Burreson [5]
<b><i>Notostomum</i> Levinsen, 1882</b>						
<i>N. cyclostomum</i> Johansson, 1898	DQ414327	DQ414282	NotCyc	Pacific Ocean: Bering Sea	Marine	Williams & Burreson [2]
<b><i>Notobdella</i> Benham, 1909</b>						
<i>N. nototheniae</i> Benham, 1909	DQ414330	DQ414285	NotNot	Antarctica: South Sandwich Island	Marine	Williams & Burreson [2]
<b><i>Oceanobdella</i> Caballero, 1956</b>						
<i>O. khani</i> Burreson & Williams, 2004	DQ414331	DQ414286	OceKha	Pacific Ocean: Bering Sea	Marine	Williams & Burreson [2]
<i>O. sexoculata</i> (Malm, 1863)	DQ414332	DQ414287	OceSex	Canada: New Brunswick	Marine	Williams & Burreson [2]
<b><i>Oxytonostoma</i> Malm, 1863</b>						
<i>O. typica</i> Malm, 1863	DQ414333	DQ414288	OxyTyp	Canada: New Brunswick	Marine	Williams & Burreson [2]
<b><i>Piscicola</i> Blainville, 1818</b>						
<i>P. cf. annae</i> Bielecki, 1997	AY336016	N/A	PisAnn	Germany: Ehingen	Freshwater	Utevsky & Trontelj [4]
<i>P. geometra</i> (Linnaeus, 1761)	AY336014	AF099946	PisGeo	Germany: Neckar-Altarm, Pleidelsheim	Freshwater	Utevsky & Trontelj [4]
<i>P. milneri</i> (Verrill, 1874)	DQ414337	DQ414292	PisMil	Canada: Quebec	Freshwater	Williams &

Taxa	COI	18S rRNA	Haplotype Code	Locality	Environment*	Reference
						Burreson [2]
<b><i>Platybdella</i> Malm, 1863</b>						
<i>P. anarrhichae</i> (Diesing, 1859)	DQ414336	DQ414291	PlaAna	Norway	Marine	Williams & Burreson [2]
<b><i>Pontobdella</i> Leach, 1815</b>						
<i>P. macrothela</i> (Schmarda, 1861)	AF116022	AF115996	StiMac	USA: Virginia	Marine	Apakupakul et al. [6]
<i>P. muricata</i> (Linnaeus, 1758)	KY659072	KY659070	PonMur	Italy: Mediterranean Sea	Marine	Bottari et al. [7]
<i>P. tasmanica</i> (Hickman, 1942)	DQ414343	DQ414298	StiTas	Australia: Tasmania	Marine	Williams & Burreson [2]
<b><i>Trachelobdellina</i> Moore, 1957</b>						
<i>T. glabra</i> Moore, 1957	EF405597	N/A	TraGla	Antarctica: Argentine Islands, Vernadsky Station	Marine	Utevsky et al. [8]
<b><i>Zeylanicobdella</i> Silva, 1963</b>						
<i>Z. arugamensis</i> de Silva, 1963	DQ414344	DQ414299	ZeyAru	Indian Ocean: Borneo	Marine	Williams & Burreson [2]
<b>Genus indet.</b>						
Gen. & sp. indet. PT-2003	AY336023	N/A	PisSp2	Russia: Tunaycha Lake on Sakhalin Island	Brackish to marine	Utevsky & Trontelj [4]
Gen. & sp. indet. HLC-30322	MG421319	N/A	PisSp1	Canada: Nunavut, Somerset Island, Creswell Bay	Marine	NCBI's Genbank
Gen. & sp. indet. Aio2018LYKM	LC460256	N/A	PisSp3	Japan: Yamaguchi, Aio	Marine	NCBI's Genbank
<b>Outgroup taxa (Ozobranchidae)</b>						
<b><i>Ozobranchus</i> Quatrefages, 1852</b>						
<i>O. branchiatus</i> (Menzies, 1791)	KF728213	KF728214	OzoBra	Hong Kong	Marine	Truong [9]
<i>O. margoi</i> (Apáthy, 1890)	KJ451407	KF728217	OzoMar	Taiwan: I-Lan	Marine	Tseng et al. [10]

N/A – not available. \*Data on environmental preferences was obtained from the IRMNG database (<https://www.irmng.org>; [11]) and published sources [3; 12–15].

## Supplementary References

1. Kaygorodova, I.; Matveenko, E.; Dzyuba, E. Unexpected discovery of an ectoparasitic invasion first detected in the Baikal coregonid fish population. *Fishes* **2022**, *7*, 298. <https://doi.org/10.3390/fishes7050298>
2. Williams, J.I.; Burreson, E.M. Phylogeny of the fish leeches (Oligochaeta, Hirudinida, Piscicolidae) based on nuclear and mitochondrial genes and morphology. *Zoologica Scripta* **2006**, *35*, 627–639. <https://doi.org/10.1111/j.1463-6409.2006.00246.x>
3. Bolotov, I.N.; Klass, A.L.; Konopleva, E.S.; Bepalaya, Y.V.; Gofarov, M.Y.; Kondakov, A.V.; Vikhrev, I.V. First freshwater mussel-associated piscicolid leech from East Asia. *Scientific Reports* **2020**, *10*, 19854. <https://doi.org/10.1038/s41598-020-76854-0>
4. Utevsky, S.Y.; Trontelj, P. Phylogenetic relationships of fish leeches (Hirudinea, Piscicolidae) based on mitochondrial DNA sequences and morphological data. *Zoologica Scripta* **2004**, *33*, 375–385. <https://doi.org/10.1111/j.0300-3256.2004.00156.x>
5. Siddall, M.E.; Burreson, E.M. Phylogeny of leeches (Hirudinea) based on mitochondrial cytochrome c oxidase subunit I. *Molecular Phylogenetics and Evolution* **1998**, *9*, 156–162. <https://doi.org/10.1006/mpev.1997.0455>

6. Apakupakul, K.; Siddall, M.E.; Bureson, E.M. Higher level relationships of leeches (Annelida: Clitellata: Euhirudinea) based on morphology and gene sequences. *Molecular Phylogenetics and Evolution* **1999**, *12*, 350–359. <https://doi.org/10.1006/mpev.1999.0639>
7. Bottari, T.; Profeta, A.; Rinelli, P.; Gaglio, G.; La Spada, G.; Smedile, F.; Giordano, D. On the presence of *Pontobdella muricata* (Hirudinea: Piscicolidae) on some elasmobranchs of the Tyrrhenian Sea (Central Mediterranean). *Acta Adriatica: International Journal of Marine Sciences* **2017**, *58*, 225–233. <https://doi.org/10.32582/aa.58.2.3>
8. Utevsky, S.Y.; Utevsky, A.Y.; Schiaparelli, S.; Trontelj, P. Molecular phylogeny of pontobdelline leeches and their place in the descent of fish leeches (Hirudinea, Piscicolidae). *Zoologica Scripta* **2007**, *36*, 271–280. <https://doi.org/10.1111/j.1463-6409.2007.00279.x>
9. Truong, T.M. Investigating DNA barcoding potentials and genetic structure in *Ozobranchus* spp. from Atlantic and Pacific Ocean sea turtles. Master of Science (MS) Thesis, Wright State University, Dayton, Ohio, USA, 2014. [http://rave.ohiolink.edu/etdc/view?acc\\_num=wright1392769367](http://rave.ohiolink.edu/etdc/view?acc_num=wright1392769367)
10. Tseng, C.; Leu, J.; Cheng, I. On the genetic diversity of two species of the genus *Ozobranchus* (Hirudinida; Ozobranchidae) from the Atlantic and Pacific oceans. *Journal of the Marine Biological Association of the United Kingdom* **2018**, *98*, 955–960. <https://doi.org/10.1017/S0025315416001958>
11. Rees, T.; Vandepitte, L.; Decock, W.; Vanhoorne, B. IRMNG 2006–2016: 10 years of a global Taxonomic Database. *Biodiversity Informatics* **2017**, *12*, <https://doi.org/10.17161/bi.v12i0.6522>
12. Lukin, E.I. Leeches of fresh and brackish water bodies [In Russian]. *Fauna of the USSR* **1976**, *109*, 1–484.
13. Smith, D.G.; Taubert, B.D. New records of leeches (Annelida: Hirudinea) from the shortnose sturgeon (*Acipenser brevirostrum*) in the Connecticut River. *Proceedings of the Helminthological Society of Washington* **1980**, *47*, 147–148.
14. Appy, R.G.; Dadswell, M.J. Marine and estuarine piscicolid leeches (Hirudinea) of the Bay of Fundy and adjacent waters with a key to species. *Canadian Journal of Zoology* **1981**, *59*, 183–192. <https://doi.org/10.1139/z81-032>
15. Epshtein, V.M. Type Annelida. Class Hirudinea [In Russian]. In *Guide to Parasites of Freshwater Fishes of the Fauna of the USSR*; Bauer, O. N., Ed.; Zoological Institute of the USSR Academy of Sciences: Leningrad, USSR, **1987**; Volume 3, pp. 340–372.