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Dataset Paper

An Illustrated Checklist of Leech Species from Lake Baikal (Eastern Siberia, Russia)

Irina Kaygorodova

Limnological Institute, Siberian Branch of Russian Academy of Sciences, 3 Ulan-Batorskaja Street, Irkutsk 664033, Russia

Correspondence should be addressed to Irina Kaygorodova; irina@lin.irk.ru

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New data on Lake Baikal fauna of Hirudinida (Annelida, Clitellata) are presented. The species composition of Baikal leeches extends to 20 species belonging to two orders, four families, and 12 genera. An updated checklist includes information on five species recorded in Eastern Siberia for the first time. All specimens from author's collection are provided with illustration.

1. Introduction

Lake Baikal is situated in the northeast of Central Asia. It is one of the most ancient (25–30 MY), the deepest (1637 m), and the largest (volume of 23 000 km^3, length of 636 km, width up to 80 km, catchment area of 540 000 km^2, and coastline of 1800 km) repository of single volume of unfrozen fresh water of the planet (20% of the global supply) [1]. Transparency of the Baikal water reaches 40–50 m with extremely poor mineralization and higher oxygen saturation. The oxygen content at the bottom even in the deepest areas is no lower than 70%–80% of saturation. The combination of these factors, together with numerous other ones, has resulted in the fact that the lake has a unique complex of living organisms (1550 animal species and over 1000 species of plants) [2]. Lake Baikal now holds the largest number of described metazoan species of all known lakes and can be considered as a centre of megadiversity. The organisms inhabiting the lake adapted to a variety of environmental conditions, having mastered and repopulating the diversity of habitats from interstitial zone to maximal depths. The pronounced endemism and specific wealth of its fauna (82% of known species) has attached a keen interest of biologists and biogeographers worldwide. A start of Lake Baikal studies occurred at the middle of the eighteenth century, but they have been carried out with the greatest intensity in the twentieth century. Despite a 200-year history of limnological studies, Lake Baikal is still full of white spots; one of them is the fauna of parasitic annelids.

Baikal leeches demonstrate a high level of biological diversity and endemism, both at the genus level and at the species level. By 2001, there were 13 leech species stated in Lake Baikal [2]. These species are adapted to living in cold, clean, oxygenated water and fed by Baikal endemic animals: bullheads, amphipods, and perhaps other groups. Unfortunately, there is still no clear idea on their preferences to a host.

The aim of this paper is to update knowledge on leech species composition of Lake Baikal fauna.

2. Methodology

The previously published information and an extensive material collected by the author in the period from 2002 to 2012 were used in this paper. Species definition was done with identification keys [3–5] and the original descriptions [6–8] according to the modern classification of the group. Morphological analysis has been conducted using a stereomicroscope MSP-2 var. 2 (LOMO). All images were taken with

a camera NIKON D700. Seventeen of 20 species are provided with color illustrations principally of living animals that can contribute to easier identification of the taxon in the future. The three missing species of our collection are as follows.

(1) *Theromyzon maculosum* (Rathke, 1862). Palaearctic species is known as bloodsucker of birds inhabiting warmed shallow bays of Lake Baikal [1].

(2) *Acipencerobdella volgensis* (Zykoff, 1903) (synonym *Piscicola volgensis* (Zykoff, 1903)). This fish leech is specific parasite of *Acipenser baeri*. It is distributed in Volga River, Angara River, indicated in Poland. Snimschikova showed the *A. volgensis* in Baikal [1].

(3) *Codonobdella zelenskiji* (Finogenova & Snimschikova, 1991) (synonym *Dagarobdella zelenskiji* (Finogenova & Snimschikova, 1991)). It is endemic to Lake Baikal. Very small leeches (2.7–3.4 mm) were found in hydrobiological samples of the northern Baikal and described by specialists in oligochaetes [9]. Nobody found them later.

3. Dataset Description

The dataset associated with this Dataset Paper consists of 18 items which are described as follows.

Dataset Item 1 (Table). An updated list of species of leeches inhabiting Lake Baikal, composed of 20 species. The exact systematic position is stated for all leech species. Each involved species has a brief taxonomic characteristic.

Column 1: Species

Column 2: Genus

Column 3: Subfamily

Column 4: Family

Column 5: Suborder

Column 6: Order

Column 7: Subclass

Column 8: Class

Column 9: Phylum

Dataset Item 2 (Image). Intravital colour of *Theromyzon tessulatum* (Muller, 1774). Palaearctic species was found in the Gulf Posolsky Sor (eastern part of Middle Basin of the lake). Individuals were located at underside of the stones at a depth of 0.5-1 m. The species is known as bloodsucker of birds inhabiting warmed shallow bays of Lake Baikal [1]. Specimens are 10–12 mm in length and about 2 mm in width and can stretch up to 15–17 mm, becoming 1 mm in width.

Dataset Item 3 (Image). Hemiclepsis marginata (Muller, 1774): left is live leech and right are fixed specimens dorsally (upper) and ventrally (lower). It is widespread Palaearctic species and bloodsucker of fishes, tadpoles, and amphipods [1, 10]. The species was found in the Zmeinaya Gulf of the Chivyrkuy Bay (eastern side of North Basin of the lake) on stones at a depth of 0.3–0.7 m. Alive leeches were green with length of 14–16 mm and width of 3 mm. Alcohol-fixed specimens rapidly lost a beautiful intravital coloring.

Dataset Item 4 (Image). Helobdella stagnalis (Linnaeus, 1758) takes care of numerous progeny. This species is considered one of the most common freshwater leeches in the world. This species is cosmopolite. Within Baikal, *H. stagnalis* inhabits shallow bays and salinas. Our collection has samples from the Maloe More, the Chivyrkuy Gulf, and the Gulf Posolsky Sor. It cannot swim; it crawls on aquatic plants and other objects, using its suckers as organs of attachment. Most suck the hemolymph of freshwater invertebrates like oligochaetes, larvae of insects, and freshwater snails [1]. Freshwater jawless leeches are remarkable for their parental care. They produce a membranaceous bag to hold the eggs, which is carried on the underside. The young attach to the parent's belly after hatching and are thus ferried to their first meal.

Dataset Item 5 (Image). Helobdella nuda (Moore, 1924): alive animal (left) and fixed sample (right). Until now, the species was known from China and the Amur River basin. We found *H. nuda* in shallow part of Chivyrkuy Bay. Minor size leeches are 5–8 mm at a moderate tension. It has more than two eyes as opposed to *H. stagnalis*. Life style is similar to the sister species. As *H. stagnalis*, it cannot swim and feeds with the hemolymph of freshwater invertebrates.

Dataset Item 6 (Image). Glossiphonia complanata (Linnaeus, 1758): leech attacks mollusc (right). Holarctic species is widespread in Siberia [3]. Specimens of our collection were caught in littoral zone of the Chivyrkuy Bay. The leeches have a flattened body. Life cycle of *G. complanata* is typical for the majority of the genus. It prefers to sit on the rocks or slowly crawling. When resting, it looks like a small leaf but during the move it can be quite drawn out. This leech feeds almost exclusively on mollusks and sometimes worms or larvae of insects. With elastic proboscis, *G. complanata* pierces delicate covers of the victim and sucks its blood. The size is about 10–25 mm. On the dorsal side, there are three pairs of longitudinal rows of papillae. *G. complanata* like other glossiphoniids takes care of nurture.

Dataset Item 7 (Image). Alboglossiphonia heteroclita (Muller, 1774): dorsal view (left) and with babies (right). It is Holarctic species. It spreads over a vast area irregularly [3]. *A. heteroclita* is a suctorial freshwater sit-and-wait predator, feeding mainly on gastropods, isopods, and oligochaetes. It inhabits shallow places of Lake Baikal such as the Gulf Posolsky Sor. As typical, glossiphoniid shows touching parental care.

Dataset Item 8 (Image). Alboglossiphonia weberi (Blanshard, 1897). The species belongs to the usual components of the Indo-Malayan fauna but extended beyond the northern borders of the area [3]. First *A. weberi* is indicated in Eastern Siberia and Lake Baikal in particular. A few specimens were found in the Gulf Posolsky Sor. This species has three pairs of

eyes typical for the genus location and papillae on dorsal part of body similar to *G. complanata*. Its length is 5-6 mm.

Dataset Item 9 (Image). Paratorix baicalensis (Stschegolew, 1922): ethanol-fixed specimens. It is endemic to Lake Baikal and parasitized by Cottoid fishes [1]. We collected this species in littoral of Middle and North basin of the lake (the Gulf Semisisennaja, 20 m; near the B. Ushkany Island, 7–10 m; close to the cape Tonkiy, 12-13 m). Specimens were found in benthic samples. Glossiphoniids are medium size with length of 10–12 mm and width of 5–7 mm.

Dataset Item 10 (Image). Baicaloclepsis echinulata (Grube, 1871): ethanol-fixed specimens. It is endemic to Lake Baikal. *B. echinulata* inhabits the open waters of Lake Baikal at a depth of 14–300 m. This species is easily distinguished from other Baikal Toricinae by the presence of small papillae on the ventral side of the body. Feeding details are unknown.

Dataset Item 11 (Image). Baicaloclepsis grubei Lukin et Epstein, 1959: ethanol-fixed specimen from dorsal (left) and ventral (right) projections. It is endemic to Lake Baikal. They are sizeable leeches (length of 30–40 mm, width of 10–15 mm). *B. grubei* was found only in the Maloye Morye Bay at relatively shallow depths of 14–40 m. All specimens were collected from benthic samples. The question of a potential host of the bloodsucking leech remains open.

Dataset Item 12 (Image). Two species of Baikal leeches: (A) *Baicalobdella torquata* (Grube, 1871) and (B) *Baicalobdella cottidarum*. *B. torquata* is endemic to Lake Baikal. It is a typical component of the littoral zone of open Baikal. We found this species only in the South basin of Lake Baikal and in the Maloye Morye Bay at depths of 7–10 m. The small leeches are 5–8 mm in length and 2-3 mm in width. Body color varies from light green to pale rusty retaining a characteristic mosaic pattern on the dorsal side of urosome. *B. torquata* sucks the blood of Baikal endemic amphipods.

Dataset Item 13 (Image). Baicalobdella cottidarum Dogiel, 1957 with typical coloration. It is endemic leeches. Representatives of this species are close to *Baicalobdella torquata*, but they have smaller suckers, significant development of papillae, and another color (Dataset Item 12 (Image (B))). White clitellum is interrupted on the dorsal side. Urosome is brown, sometimes almost black. Many individuals have two light-coloured rhomboidal spots on the dorsal side of urosome. This species inhabits littoral zone (0–200 m). It is numerous in fouling of stones. We found this species in southern part of the lake from water's edge to 180 m. It is parasitized by different Baikal cottoid fish species.

Dataset Item 14 (Image). Baicalobdella sp.: ethanol-fixed specimen ventrally (left) and dorsally (right). Endemic species to Lake Baikal was found in the north entrance of the Maloye Morye Strait, on depth of 10-11 m. In contrast to the *B. torquata*, this species is larger and lacks the characteristic white clitellum.

Dataset Item 15 (Image). Codonobdella truncata (Grube, 1873): five ethanol-fixed specimens of *Codonobdella truncata*. It is endemic to Lake Baikal. This species inhabits abyssal of the South, Middle, and North Baikal basins. We found them in the range of depths from 180 to 1215 m. The worms are up to 27 mm, feeding on deep-water fishes and amphipods.

Dataset Item 16 (Image). Codonobdella sp. Six ethanol-fixed specimens of *Codonobdella* sp.; three of them are juvenile and three are mature. It is endemic to Lake Baikal. The species was found on cottoid fishes and amphipods throughout the lake on depth 40–860 m. It differs from the *Codonobdella truncata* at least by existence of a distinctive pigmentation on the dorsal side and representative shape of body. Formerly, exactly this leech was mistaken for *Piscicola geometra* [1, 11] because of some similarity of coloration and piscicola-like body shape.

Dataset Item 17 (Image). Haemopis sanguisuga (Linnaeus, 1758). It inhabits only in Palaearctic waters, where it is widespread and can be attributed even to trans-Palearctic group. It is a predator of small vertebrates and invertebrates. *H. sanguisuga* belongs to very voracious predators, which ingest their prey completely or tear to big pieces. Our specimens from the Gulf Kotovo (Chivyrkuy Bay of Lake Baikal) were up to 70 mm in length.

Dataset Item 18 (Image). Five live leeches of *Erpobdella* sp. (first time listed for Baikal). It is found everywhere in coastal zone of Chivyrkuy Bay. With a powerful pharynx, *Erpobdella* ingests completely or partially different aquatic animals, small annelids, crustaceans, insect larvae, mollusks, and even young fishes. It does not refuse dead animals and smaller specimens of own species. The big-size leeches are about 50 mm in length and 4-5 mm in width.

4. Concluding Remarks

At present, the occurrence of 20 species in Lake Baikal is documented. This species diversity includes both widespread Holarctic and Palaearctic and also endemic species from 4 families and 12 genera. Five species of the following list were noted for the first time in Eastern Siberia, of them *A. weberi*, *H. nuda*, *Baicalobdella* sp., *Codonobdella* sp., and *Erpobdella* sp. At the same time, *P. geometra* (Linnaeus, 1761) and *C. mammillatus* (Malm, 1863) were excluded from the species list of Lake Baikal. We never found these two species in Baikal. We agree with that *P. geometra* has wide distribution throughout the entire territory of the former USSR except for waters of the Kamchatka Peninsula and Lake Baikal [4] and that distribution of *C. mammillatus* is confined to northern waters including large tributaries of Lake Baikal such as the Selenga River (found in 1.5 km from the confluence of Lake Baikal) and the Upper Angara River, but never the Lake Baikal itself [12]. Both piscicolid species have been wrongly listed previously for the lake [1, 11].

Dataset Availability

The dataset associated with this Dataset Paper is dedicated to the public domain using the CC0 waiver and is available at http://dx.doi.org/10.7167/2013/261521/dataset.

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