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RESEARCH ARTICLE

Identification of *Attheyella nordenskioldii* (Copepoda: Harpacticoida) in Lake Baikal using molecular genetic methods

Идентификация *Attheyella nordenskioldii* (Copepoda: Harpacticoida) в озере Байкал с использованием методов молекулярной генетики

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Abstract. The results of molecular genetic analysis of the widespread holarctic harpacticoid species *Attheyella nordenskioldii* (Lilljeborg, 1902) from Lake Baikal are presented for the first time. Until recently, this species was recorded from Baikal and the rivers flowing into the lake as its junior synonym *Canthocamptus gibba* Okuneva, 1983, which was considered endemic to Baikal. Our research is based on the material from samples of meiobenthos collected from Lake Baikal (including the type locality of *C. gibba*), waterbodies of the Baikal area, from other regions of Siberia (delta of the Lena River, Putorana Plateau, Western Sayan Mountains, Transbaikalia) and Europe (Bolshezemelskaya tundra). A comparison of the Baikalian specimens of *A. nordenskioldii* with those from other above-mentioned regions by COI nucleotide sequences showed that they belong to the same species (genetic distances between the specimens from different populations were 0.0016–0.065). Variability is shown in the length of the copulatory duct of *A. nordenskioldii*, previously indicated to differentiate this species from *C. gibba*, as well as in other characters of the fifth leg of female.

Резюме. Впервые представлены результаты молекулярно-генетического анализа широко распространенного в Голарктике вида гарпактикоиды *Attheyella nordenskioldii* (Lilljeborg, 1902) из озера Байкал. До недавнего времени этот вид был указан для Байкала и для впадающих в него рек под названием его младшего синонима *Canthocamptus gibba* Okuneva, 1983, считавшегося эндемиком Байкала. Материалом для нашего исследования послужили гарпактикоиды из проб мейобентоса, собранных в озере Байкал (в том числе из типового местонахождения *C. gibba*), в водоемах Байкальского региона и в других регионах Сибири (дельта реки Лены, плато Путорана, Западный Саян, Забайкалье) и Европы (Большеземельская тундра). Сравнение байкальских экземпляров *A. nordenskioldii* с особями из других регионов, упомянутых выше, по нуклеотидным последовательностям COI показало их принадлежность к одному виду (генетические дистанции между особями из разных популяций составляли 0.0016–0.065). Описаны пределы изменчивости длины семяприемника (выводковой трубки) – морфологического признака *A. nordenskioldii*, ранее указанного для дифференциации этого вида от *C. gibba*, а также других признаков, касающихся строения пятой пары ног самки.

Key words: harpacticoids, Lake Baikal, nucleotide sequences, COI, phylogenetic tree, morphological variability, Copepoda, Canthocamptidae, *Canthocamptus gibba*, *Attheyella nordenskioldii*

Ключевые слова: гарпактикоиды, озеро Байкал, сиквенсы, COI, филогенетическое дерево, морфологическая изменчивость, Copepoda, Canthocamptidae, *Canthocamptus gibba*, *Attheyella nordenskioldii*

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Introduction

The harpacticoid copepod *Attheyella nordenskioldii* (Lilljeborg, 1902) of Canthocamptidae is widespread in the Holarctic. In particular, it was found in the North Europe (Fefilova, 2007, 2015; Loskutova et al., 2022), northern Siberia (Putorana Plateau, delta of the Lena River) (Novikov et al., 2021; Chertoprud et al., 2022), Transbaikalia (Takhteev et al., 2010), Honshu Island of Japan (Ishida, 1987), Mongolia (Erdenezul & Narangarvuu, 2020), and northern United States (Reed, 1962; Shiozawa, 1991; Connolly et al., 2022). The biology of *A. nordenskioldii* depends on temperature conditions: in the Arctic and Subarctic zones, it inhabits waterbodies of various types (rivers, wetlands), while south of the Arctic and Subarctic the species occurs only in cold habitats, i.e. springs, mountain lakes and rivers (Borutzky, 1952; Fefilova, 2010; Takhteev et al., 2010).

In the lists of harpacticoid species of Baikal (Okuneva, 1989; Okuneva & Evstigneeva, 2001) *A. nordenskioldii* was not previously mentioned, which could be explained by a taxonomic reason: before the revision of the genus *Canthocamptus* Westwood, 1836 (Novikov & Sharafutdinova, 2022), *A. nordenskioldii* was recorded from Baikal, as well as the rivers flowing into it, as a Baikalian endemic species *Cantocamptus gibba* Okuneva, 1983. The nearshore zone of the southern Baikal near the Bolshie Koty Village where the Chernaya River flows into the lake is a type locality of *C. gibba* (Okuneva, 1983). At the same time, both *A. nordenskioldii* and *C. gibba* were previously recorded as two different species from the mountain waterbodies of the Baikal-Lena Nature Reserve, situated at the northeastern coast of Lake Baikal (Okuneva, 2009). Close morphological similarity of both species was mentioned (Okuneva, 2009), as well as the differences in the structure of the antennae and in the length of the copulatory duct of the female genitalia. Recently Novikov & Sharafutdinova (2022) supposed that *C. gibba* is a junior synonym of *A. nordenskioldii*. However, it was not entirely convincing because no material from Lake Baikal (type specimens or original material) was used for this analysis.

The aim of this study is to provide for the first time the comparative data on the genetics and morphology of *A. nordenskioldii* from Lake Baikal, Baikal area and other regions, including the type locality of its junior synonym, *C. gibba*.

Material and methods

Specimens of *A. nordenskioldii* from samples of meiobenthos were used for molecular genetic and morphological analyses. The samples were collected from Lake Baikal and the Baikal area in 2022, as well as from other regions in 2010, 2021 and 2022 (Table 1). The samples were taken from the depths of 0.1–0.5 m except for a sample from Lake Baikal near the Sukhaya Village, which was collected from the depth of 14 m. Samples were collected with a hand net or a drag (100 μm mesh). Samples used only for morphological analysis were fixed in 4% formalin. Harpacticoids for molecular genetic analysis were sorted out from non-fixed fresh samples in the field and preserved in vials with 96% non-denatured ethanol at -20 °C.

Harpacticoids were identified according to Borutzky (1952), Wells (2007) and Fefilova (2015).

For molecular genetic analysis, a fragment of subunit I of mitochondrial cytochrome oxidase (COI mtDNA or COI) gene was analysed using the protocol described by Kochanova et al. (2018). The following universal primers were used during the polymerase chain reaction (PCR): COIH 2198 (5' TAAACTTCAGGGTGACCAAAAAATCA 3') and COIL 1490 (5' GGTCAACAAATCATAAAGATATTGG 3') (Folmer et al., 1994). Sequencing was carried out in both directions, using the BigDye Terminator v3.1 (Life Technology) reagent kit in an ABI PRISM 310 Genetic Analyzer (Applied Biosystems, Waltham, Massachusetts, USA) in the "Genome" Centre for Collective Use (Engelhardt Institute of Molecular Biology, Russian Academy of Sciences, Moscow) or in the Syntol Company (Moscow).

The obtained nucleotide sequences were aligned using the ClustalW algorithm and analysed in MEGA 11 software. The bootstrap test (10000 replicates) was used to check the branch support. The tree was constructed by the UPGMA method and the Tamura-Nei model (Tamura & Nei, 1993). The genetic distances were computed using the Tamura-Nei method (Tamura & Nei, 1993). The original nucleotide sequences have been deposited in the NCBI GenBank database (https://www.ncbi.nlm.nih.gov/genbank/) under accession numbers OP903365, OQ401014, OQ401015, OQ401016, OP903362, OP903363, and OP903364. For phylogenetic analysis, we also used the sequences of *Attheyella nordenskioldii* from Lake Ontario, USA (Connolly et al., 2022), *A. crassa* (G.O. Sars, 1862) from Lake Sognsvann, Norway (Kochanova & Gaviria, 2018), *A. dentata* (Poggenpol, 1874) from a lake in Putorana Plateau (Bakashkina et al., unpublished), *A. baikalensis* (Borutzky, 1931) (Bakashkina et al., unpublished) and *Canthocamptus longifurcatus* Borutzky, 1947 from Lake Baikal (Fefilova et al., 2022), *C. staphylinus staphylinus* Jurine, 1820 from Lake Geneva, Switzerland, and Lake Võrtsjärv, Estonia (Kochanova et al., 2018).

For morphological analysis, we examined three females and two males of *A. nordenskioldii* collected from the type locality of *C. gibba*, Lake Baikal near the mouth of the Chernaya River (Table 1). Specimens from this site were photographed using a FEI Company Quanta 200 scanning electron microscope (SEM) and a digital camera attached to an Olympus CX 21 optical microscope. For the SEM study, specimens were transferred to pure ethanol for an hour, then to hexamethyl disilazane for five minutes, and then were air-dried.

For morphometric analysis, we used 29 adult females of *A. nordenskioldii* from formalin and ethanol samples taken from nine localities (Table 1), which are situated in the European (Bolshezemelskaya tundra) and Asian Russia (Ergaki Mountain Range, Balei graben, delta of the Lena River, Putorana Plateau), including the Baikal area (Lake Baikal, the Chernaya River, the Zhilishche River). The length of copulatory duct (from its anterior edge to anterior side of copulatory pore), the length of the first inner seta on the endopodal lobe of the fifth leg (P5), and the length of the endopodal lobe (from attachment point of the first inner seta to its anterior side) were measured. In addition, we paid attention to the structure of the antenna (A2) exopod of these individuals. Morphometry of the harpacticoids stored in solution was analysed after the DNA extraction with exoskeleton preservation and obtaining the sequences (OP903365, OP903363 and OP903364). The Principal Component Analy sis (PCA) in the PAST4 program was used to visualise the results of harpacticoids morphometry.

Results

Subclass **Copepoda** Milne Edwards, 1840

Superorder **Podoplea** Giesbrecht, 1882

Order **Harpacticoida** Sars, 1903

Family **Canthocamptidae** Brady, 1880

Subfamily **Canthocamptinae** Brady, 1880

Genus ***Attheyella*** Brady, 1880

Subgenus ***Neomrazekiella*** Chappuis, 1929

Attheyella nordenskioldii (Lilljeborg, 1902) (Fig. 2)

Canthocamptus nordenskiöldii Lilljeborg, 1902: 8, Table 1 (fig. 7), Table 2 (figs 1–7).

Table 1. Sampling localities and examined specimens.

Sampling localities *	Abbreviation	Specimens taken for genetic analysis **	Specimens taken for morphological analysis **
Baikal region (Irkutsk Province and Republic of Buryatia)			
Lake Baikal near Sukhaya Village	SuhV	1 female (OP903365)	1 female (OP903365)
Lake Baikal near Bolshie Koty Village and mouth of Chernaya River		–	3 females, 2 males ***
Mouth of Chernaya River at Baikal	ChR	3 females (OQ401014, OQ401015, OQ401016)	4 females
Zhilishche River, Baikal area	ZhR	–	3 females
Other regions			
Lake Oiskoe, Ergaki Mountain, Western Sayan Range (Krasnoyarsk Territory, southern Siberia)	OiL	2 females (OP903362, OP903363), 1 copepodite (OP903364)	2 females (OP903362, OP903363)
Small pool in Bolshezemelskaya tundra (Komi Republic, northeastern Europe)	BT	–	6 females
Stream in the Balei graben (Chita Province, Transbaikalia)	BlGr	–	3 females
Water bodies near Tiksi, Lena River Delta (Republic of Sakha, northern Siberia)	LDlt	–	9 females
Lake Keta, Putorana Plateau (Krasnoyarsk Territory, northern Siberia)	PtrP	–	1 female

* For full label data, see Material.
** GenBank accession numbers are given in parentheses.
*** Specimens examined under SEM.

Canthocamptus nordenskjöldi: Brehm, 1913: 586; Borutzky, 1926: 211.
Attheyella (*Bremiella*) *nordenskjöldi*: Chappuis, 1929: 488; Borutzky, 1931: 207; Okuneva, 2009: 114.
Attheyella (*Bremiella*) *nordenskjöldii*: Ishida, 1987: 78.
Attheyella (*Bremiella*) *nordenskjöldi nordenskjöldi*: Borutzky, 1952: 276; Fefilova, 2007: 68.
Attheyella (*Mrazekiella*) *nordenskioldi*: Wells, 2007: 228.
Attheyella (*Neomrazekiella*) *nordenskioldii nordenskioldii*: Özdikmen & Pesce, 2006: 212.
Neomrazekiella nordenskioldi nordenskioldi: Fefilova, 2015: 147.
Attheyella (*Neomrazekiella*) *nordenskioldi*: Novikov et al., 2021: 1465.
Attheyella (*Neomrazekiella*) *nordenskioldii*: Novikov & Sharafutdinova, 2022: 34.
Atteyella nordenskioldii: Reed, 1962: 41; Connolly et al., 2022: 416; Chertoprud et al., 2022: 19; Loskutova et al., 2022: 352.
Atteyella nordenskjoldii: Erdenezul & Narangarvuu, 2020: 47.
Canthocamptus gibba Okuneva, 1983: 1343.
Canthocamptus gibba: Okuneva, 1989: 26; Okuneva & Evstigneeva, 2001: 472; Wells, 2007: 208; Okuneva, 2009: 115; Novikov & Sharafutdinova, 2022: 34 (synonymised with *Attheyella nordenskioldii*).

Material examined (see also Table 1). **Russia**: *Republic of Buryatia*, Lake Baikal nr. Sukhaya Vill., 52.558°N 107.097°E, 1 August 2022, 1 female, coll. I.O. Velegzhaninov & E.I. Popova; *Irkutsk Prov.*: Lake Baikal nr. Bolshie Koty Vill., 51.889°N 105.038°E, 25 July 2022, 3 females, 2 males, coll. I.O. Velegzhaninov & E.I. Popova; Chernaya River nr. Bolshie Koty Vill., 51.888°N 105.037°E, 25 July 2022, 4 females, coll. I.O. Velegzhaninov & E.I. Popova; Zhilishche River nr. Bolshie Koty Vill., 51.901°N 105.064°E, 27 September 2022, 3 females, coll. T.M. Alekseeva; *Krasnoyarsk Terr.*: Western Sayan Mts., Ergaki Mountain Range, Lake Oiskoe, 52.841°N 93.248°E, 24 July 2021, 2 females, 1 copepodite, coll. E.B. Fefilova; Putorana Plateau, Lake Keta, 68.808°N 89.656°E, 19 August 2021, 1 female, coll. E.S. Chertoprud; *Komi Republic*, Bolshezemelskaya tundra, small pool, 67.6°N 62.95°E, 29 July 2010, 6 females, coll. E.B. Fefilova; *Chita Prov.*, Balei graben, stream, 51.5°N 116.783°E, 22 August 2022, 3 females, coll. E.Yu. Afonina; *Republic of Sakha* (*Yakutia*), delta of Lena River nr. Tiksi, 71.630°N 128.911°E, 19 July 2021, 11 August 2022, 9 females, coll. A.A. Novikov.

DNA sequences. Nucleotide sequences of 639–670 bp COI mtDNA gene region were obtained from seven specimens of *A. nordenskioldii*: three from the Chernaya River mouth (at Lake Baikal), one from Lake Baikal (depth of 14 m), and three from a lake in the Western Sayan Mountains (Table 1). In the phylogenetic tree, these seven sequences and a sequence of a specimen from Lake Ontario formed a clade (Fig. 1). The genetic distances between sequences in this clade were 0.0016–0.065; the distances among *A. nordenskioldii* from the Baikal area including Lake Baikal and from the Western Sayan Mountains were 0.0016–0.034, while the distances between *A. nordenskioldii* and other *Attheyella* species (from Lake Baikal and other regions) were no less than 0.238. The genetic distances among the COI sequences of different *Attheyella* species and several *Canthocamptus* species varied from 0.228 to 0.297.

Morphological analysis (n = 29). The body length of the examined specimens of *A. nordenskioldii* was 1.0–1.2 mm (Fig. 2a). The structure of caudal rami was characteristic for the species (Fig. 2b, c, f): oval and angled with respect to the longitudinal axis of the anal somite. Caudal apical setae were diverging to the outside; outer apical setae were curved relative to the middle (Fig. 2a, b, c, f), particularly prominent in females (Fig. 2a, b, c). Females and males had a row of spinules on the dorsal side of the caudal rami near the dorsal seta (Fig. 2b, f). The exopod of A2 was one-segmented, with four setae and two or three thin spinules. The endopodal lobe of P5 in females had six setae, of which the inner was the longest and the outer was the shortest (Fig. 2d). The exopod of P5 in females protruded beyond the posterior margin of the endopodal lobe by half of its length and had five setae. The exopod of P5 in males was armed similarly (Fig. 2e); the endopodal lobe of P5 in males has three spines.

The length of the copulatory duct of *A. nordenskioldii* females from the Baikal area (Lake Baikal, the Chernaya River and the Zhilishche River) varied from 109 to 147 μm (averaged 125.4 ± 4.6 μm), the length of the first inner seta on the basendopodal lobe of P5 was 117–137 μm (averaged 127.6 ± 2.7 μm), the length of the basendopodal lobe (from the attachment point of the first inner seta to its anterior side) fluctuated in the range 80–107 μm (averaged 96.6 ± 3.3 μm).

The comparison of the average values of morphometric features of *A. nordenskioldii* from the Baikal area with those of the specimens from other regions showed their similarity, for example, for the specimens from the Chernaya River and from Bolshezemelskaya tundra, as well as those from the Zhilishche River and from the delta of the Lena River (in the copulatory duct length) (Table 2). It is significant that the female with the longest copulatory duct and the P5 endopodal lobe from Lake Baikal had a similar COI structure to females with the shortest copulatory duct from Lake Oiskoe in the Western Sayan Mountains.

A visualisation of the integrative index of variability including all three morphometric characteristics of *A. nordenskioldii* is shown in Fig. 3. Females from the Baikal area did not stand out against the general pool of the species variability.

Discussion

Previous misidentifications of *A. nordenskioldii* from Lake Baikal were mainly related to the peculiarities of harpacticoid diversity in this ancient lake, which makes them difficult to identify. Baikal has an unusually high number of harpacticoid species for a fresh waterbody, most of which are endemic (Okuneva, 1989; Okuneva & Evstigneeva, 2001). Endemic Baikalian species of the family Canthocamptidae inhabit only the lake depression, mainly from 2 m to the maximum depths (ca. 1640 m), and were not found in numerous rivers flowing into the lake and other water bodies of the Baikal area (Okuneva & Evstigneeva, 2001; Fefilova et al., 2023). There are eight genera of Canthocamptidae in Lake

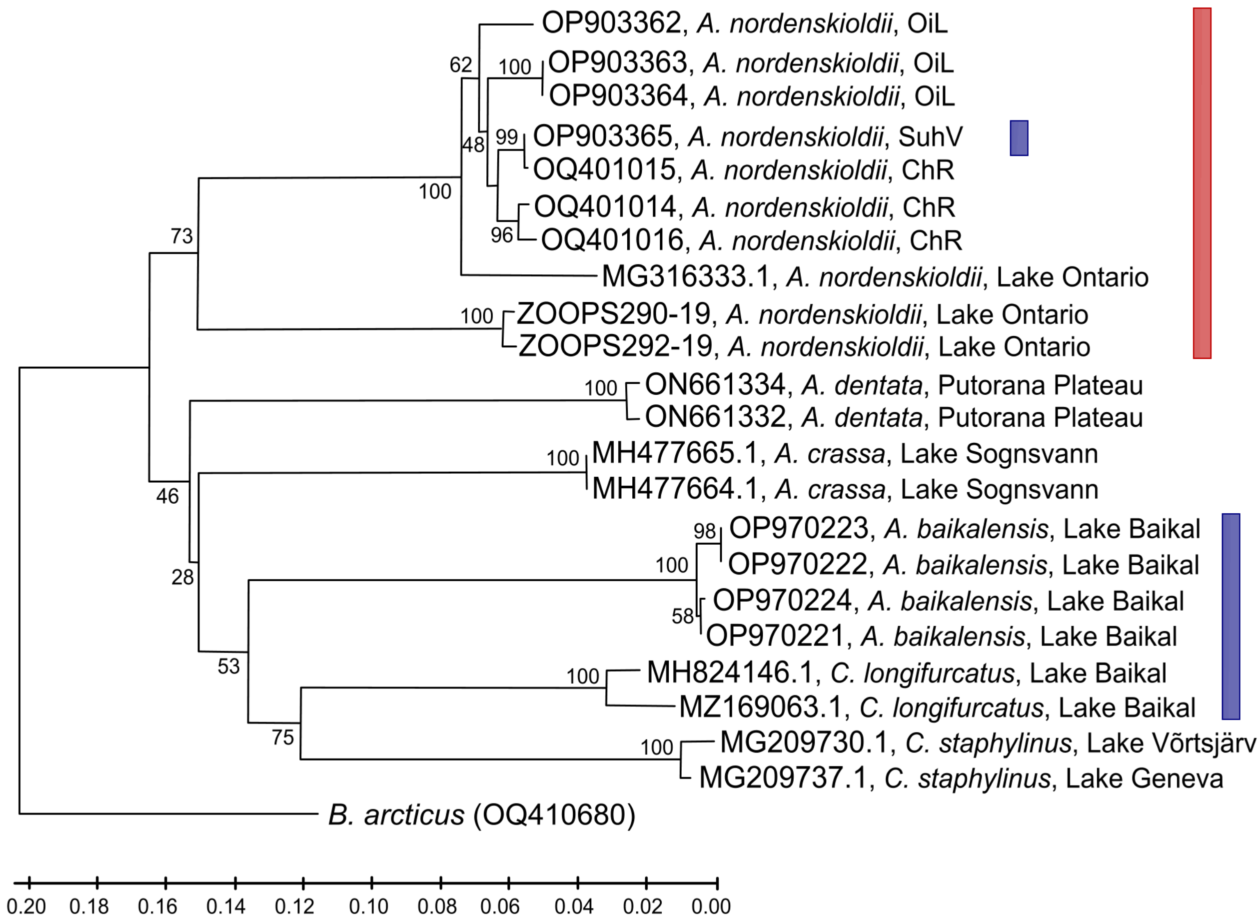


Fig. 1. Maximum likelihood tree based on the sequences of COI mitochondrial DNA gene of *Attheyella nordenskioldii* (Lilljeborg, 1902) and related species. Accession numbers of GenBank or BOLDSystems are presented. Numbers at the nodes are bootstrap values. *Bryocamptus arcticus* (Lilljeborg, 1902) was used as an outgroup. Red colour, *A. nordenskioldii*; blue colour, sequences of specimens from Lake Baikal.

Baikal (including endemic species), including *Canthocamptus* and *Attheyella*. Moreover, the genus *Canthocamptus* is represented in Lake Baikal exclusively by its endemics (Fefilova et al., 2022), while the genus *Attheyella* is represented by the lake endemic *A. baikalensis* and the more widespread *A. dogieli* Rylov, 1923. The latter species is included in the list of widespread palaearctic harpacticoid taxa previously known from Lake Baikal, which also includes *Pesceus schmeili* (Mrazek, 1893), *Maraenobiotus insignipes* Lilljeborg, 1902 (with two subspecies), *Moraria duthiei* Scott, 1896, *M. mrazeki* Scott, 1903, and *Epactophanes richardi* Mrazek, 1893. These harpacticoids not only inhabit the waterbodies of the Baikal area, but also are present in the communities of the lake together with endemic species at depths of up to 20 m (Okuneva & Evstigneeva, 2001). This is another phenomenon of the Baikalian biota manifested in the harpacticoids – an "immiscibility" of Baikalian and non-Baikalian invertebrate faunas. The reason for this is thought to be a narrower ecological valence of endemic Baikalian species compared to widespread palaearctic species: a higher preference for cold and oxygen (Kozhov, 1963). At the same time, experiments have often shown that Baikalian and non-Baikalian species of invertebrates have similar environmental requirements (Stom et al., 2005, 2007).

Attheyella nordenskioldii is known to be cold stenothermic. This is manifested, for instance, in

Table 2. Measurements of morphological structures of *Attheyella nordenskioldii* females (μ ± σ, μm) from Lake Baikal, Chernaya River and other sampling localities.

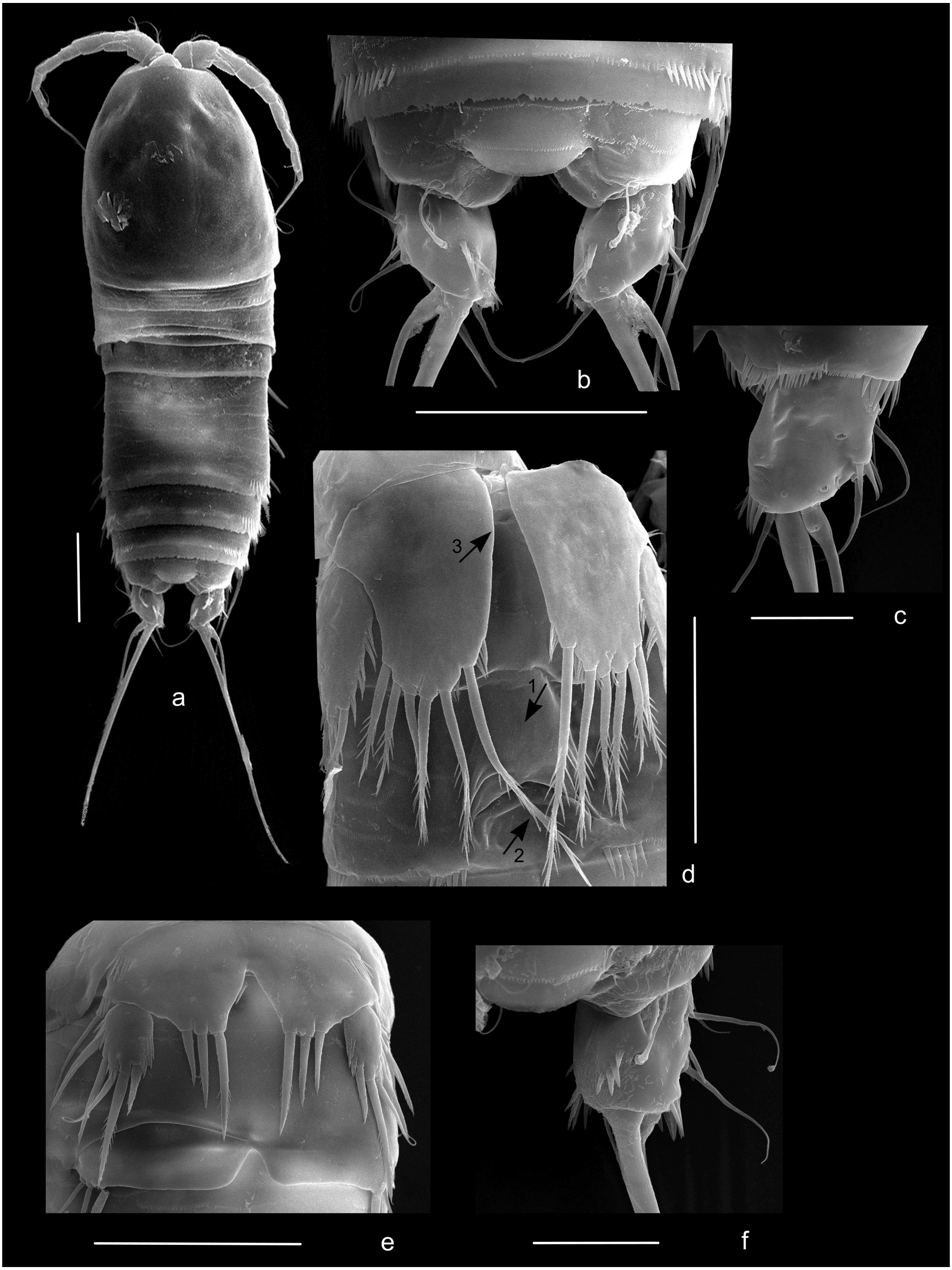
	Length of copulatory duct	Length of the first inner seta on endopodal lobe of P5	Length of endopodal lobe of P5
OiL (n = 2)	110.0 ± 3.0	133.5 ± 6.5	95.0 ± 2.0
BlGr (n = 3)	121.0 ± 4.2	141.0 ± 6.1	94.3 ± 4.7
BT (n = 6)	125.2 ± 2.5	140.0 ± 4.2	98.0 ± 1.5
LDlt (n = 9)	117.3 ± 1.7	118.9 ± 3.1	84.5 ± 2.3
PtrP (n = 1)	130.0	133.0	97.0
SuhV (n = 1)	140.0	133.0	106.0
ChR (n = 4)	127.0 ± 7.8	126.3 ± 4.5	90.5 ± 4.4
ZhR (n = 3)	117.3 ± 2.7	127.7 ± 4.7	101.7 ± 2.7
All (n = 29)	121.4 ± 1.7	129.4 ± 2.2	92.8 ± 1.6

Note. Abbreviations for sampling localities as in Table 1.

the distribution of the species in the Pymvashor Natural Landmark (Bolshezemelskaya tundra), where the difference in water temperature between the habitats of hydrobionts was up to 24.2 °C according to simultaneous measurements (Loskutova et al., 2022). *Attheyella nordenskioldii* was found to be highly abundant in low-temperature springs (at 3.0–6.1 °C) and absent in warm and subthermal springs (at 19.0–27.2 °C). In the waterbody of the Bolshezemelskaya tundra examined by us, the water temperature during the sampling period was 9.9 °C. In the rivers of the Northern Urals, females with egg sacs were found from June to September at water temperature between 5 and 20 °C (Fefilova, 2007), while in the area of the Khamar-Daban Range (the Baikal area), *A. nordenskioldii* was found at 2.6 °C, and the specimens identified as *C. gibba* (junior synonym of *A. nordenskioldii*), at temperatures of 2.8 and 12.0 °C (Okuneva, 2009). Thus, the physical conditions in Lake Baikal, where the water temperature in the deep layers is stable throughout the year at about 4–5 °C (Kozhov, 1963), are favourable for the development of *A. nordenskioldii*, although, as our analysis showed, the species also develops at higher temperatures and perhaps prefers them. Probably, related to this is the fact that *A. nordenskioldii*, like other representatives of the Siberian fauna, is not widespread in Baikal: in addition to the Chernaya and Zhilishche rivers (material examined by us), *C. gibba* was previously also registered in the "Utulik–Murino" area near the mouth of the Solzan River at a depth of 14 m (Okuneva, 1989; Okuneva & Evstigneeva, 2001).

As our study has shown, the specimens of *A. nordenskioldii* from the Baikal area, in terms of morphology and morphometric characteristics analysed, did not stand out among representatives of the species in a sufficiently large part of its range. Moreover, a comparison of the COI nucleotide sequences of *A. nordenskioldii* specimens from the Baikal area, Lake Baikal, and the Western Sayan Mountains demonstrated that they belong to the same species. The genetic distances between COI of other Canthocamptidae (*Canthocamptus staphylinus staphylinus*, *Attheyella crassa*) from different parts of Europe

Fig. 2. *Attheyella nordenskioldii* (Lilljeborg, 1902) from the type locality (Lake Baikal near Bolshie Koty Village and mouth of the Chernaya River) (a–d, female; e, f, male). **a** – habitus, dorsal view; **b** – furca, dorsal view; **c** – caudal ramus, ventral view; **d** – endopodal lobes of P5; **e** – P5; **f** – caudal ramus, dorsal view. Arrows show: 1 – copulatory duct, 2 – first inner seta on basaendopodal lobe of P5, 3 – inner side of endopodal lobe of P5. Scale bars: 100 μm (a, b, d, e), 50 μm (c, f). →


a
b
c
d
e
f
1
2
3

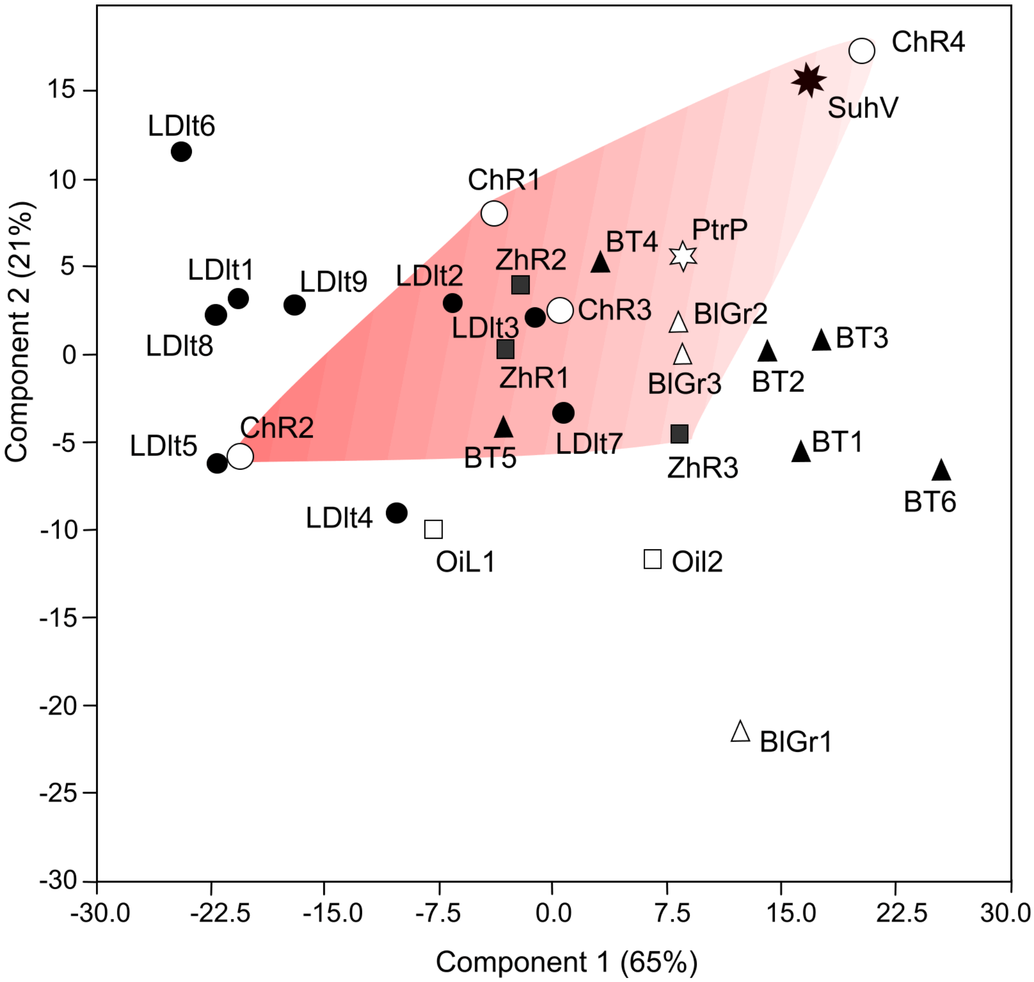


Fig. 3. First two components of PCA based on three measurements (in total, 86% of variance) of *Attheyella nordenskioldii* (Lilljeborg, 1902) females. Red area limits the specimens from Lake Baikal. Abbreviations as in Table 1.

were 0.013–0.065 (Kochanova et al., 2018, 2021; Kochanova & Gaviria, 2018), which are the values of the same order as those obtained by us for *A. nordenskioldii*. Currently, data on the Eurasian Canthocamptidae are scarce, even as compared to Baikalian taxa (Fefilova et al., 2022). Here we contribute to a necessary accumulation of data on freshwater harpacticoid species and their genetic variability.

Our study demonstrated that the examined specimens of *A. nordenskioldii* from Lake Baikal and its area, in terms of morphology and analysed morphometric characteristics, did not differ from the specimens of this species from other parts of its broad range. Moreover, a comparison of the COI nucleotide sequences of *A. nordenskioldii* from Lake Baikal, its area and the Western Sayan Mountains confirmed that the specimens belong to the same species. Hence, our study provided an additional evidence that *C. gibba* from Lake Baikal and its area is a junior synonym of *A. nordenskioldii*.

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