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Gomphosphenia stoermeri Kociolek et Thomas (*Bacillariophyta*) is a new species for the flora of Russia∗

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ABSTRACT: During the SEM study of diatoms in phytoplankton of aquatic ecosystems of the Mordyyakha River basin (Yamal Peninsula, Russia) interesting record was observed. *Gomphosphenia stoermeri* is a new species for the flora of Russia. Until now, *G. stoermeri* was known only from a type location in the USA and few rivers in northern Sweden. Morphological observations of the Mordyyakha population of the species revealed the coincidence of the valve dimensions and difference in the number of striae in 10 μm comparing to published data. The paper presents supplemented description of *G. stoermeri* illustrated by SEM micrographs.

KEY WORDS: diatoms, new record, *Gomphosphenia stoermeri*, morphology, SEM, Yamal Peninsula, Mordyyakha River basin, Russia.

INTRODUCTION

The genus *Gomphosphenia* Lange-Bert. was described in 1995 using *Gomphonema lingulatiforme* Lange-Bert. et Reichardt as basyonim. Six other taxa from *Gomphonema* were attributed to new genus (Lange-Bertalot, 1995). One of them, *G. lingulatum* Hust., was recorded in Western Siberia, Baikal region and Primorye Territory (Sheshukova-Poretskaya and Korotkevich, 1962; Cheremisinova, 1968; Moiseeva, 1968; Rubina, 1968; Endrikhinskiy and Cheremisinova, 1970), another species, *G. tackei* Hust., was cited from the European North-East of Russia (Loseva et al., 2004). Later, as a result of diatom studies in Great Smoky Mountains (USA) a new representative of genus *Gomphosphenia* was rescribed: *G. stoermeri* (Thomas et al., 2009). Later specimens of *G. stoermeri* were found

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in several rivers of northern Sweden but never in large numbers (Van de Vijver et al., 2012). Thus, up till now data on geographical distribution of this species included type locality in the USA and Sweden. Our paper reports a first record of *G. stoermeri* in Russia.

MATERIALS AND METHODS

The material for our research were phytoplankton samples collected in the water bodies of the Mordyyakha River basin (Yamal Peninsula, Russia) during 2005–2009 (Table 1).

TABLE 1: Some features of the studied water bodies of the Mordyyakha River basin

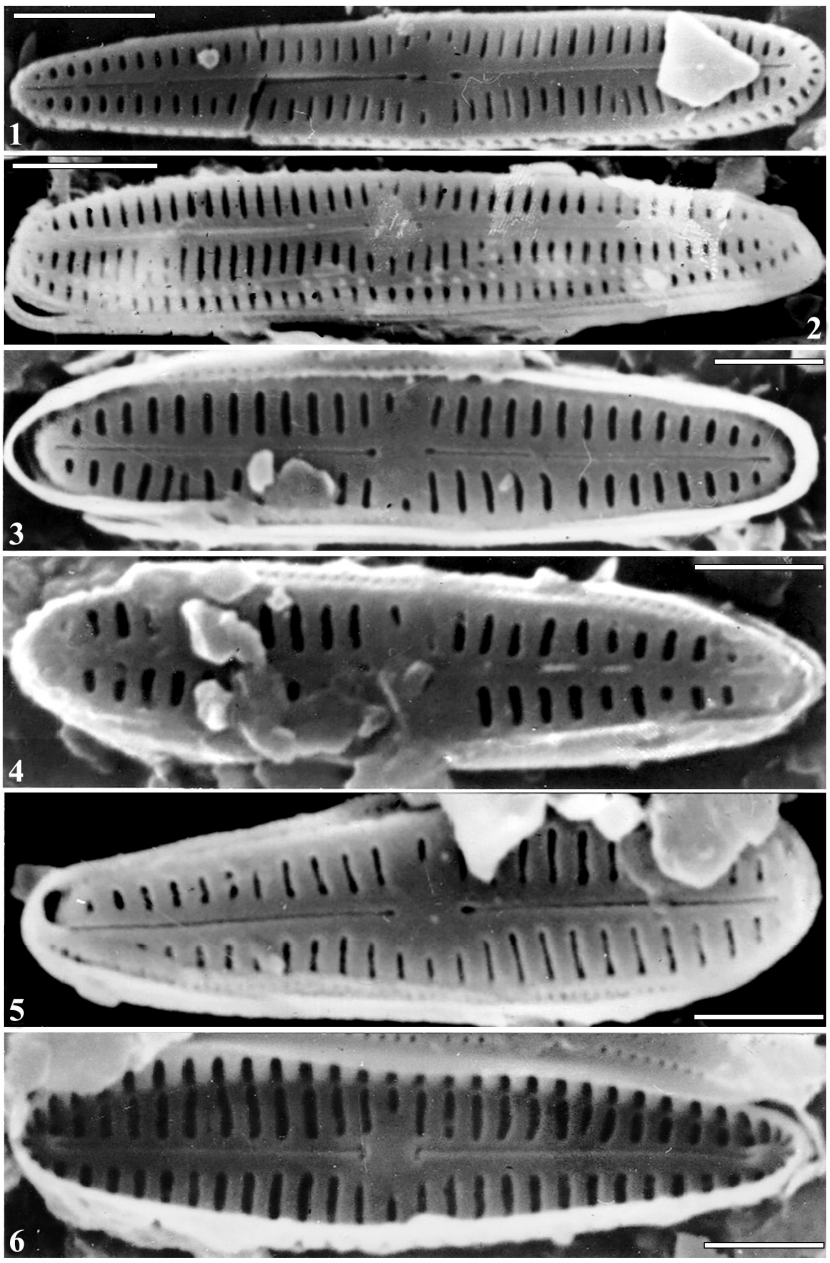
Water body	Coordinates	Length, km	Width, km
Nameless lake on the left bank of the Pelkhatose River	N 70º24'25" E 68º25'00"	0.364	0.351
Nerotelto Lake on the right bank of the Pelkhatose River	N 70º24'36" E 68º27'40"	1.60	0.756
Nameless flow between two lakes in the basin of the Hangolovayaha River	N 70º21'37" E 68º31'17"	1.0	5–7 m

The Mordyyakha River originates in Yambuto Lake and flows into the Kara Sea. In the mouth, the river forms two flows. Its large portion (60–70 km) is affected by tides and wind-driven waves. The river is 300 km long, the basin occupies area of 8530 km^2. Transparency of water in the basin is low and varies from 0.5 m to zero values. In the lakes, water is fresh with low mineralized (less than 100 mg/L), and weakly acidic: pH in the range of 6.0–6.6.

Diatom valves were liberated from the organic matter by the method of cold combustion (Balonov, 1975). SEM study using JSM-25S was carried out in the CCU of electron microscopy, I.D. Papanin Institute for Biology of Inland Waters of RAS.

RESULTS AND DISCUSSION

In the studied, population valves linear-clavate with rounded ends, lower end slightly attenuated (Plate, *1, 2, 4–6*); sometimes the valves nearly symmetric (*3*). Valve length varies from 11.4 to 21.4 µm, width 2.7–3.3 µm; these dimensions coincide with protologue (Table 2). Axial area linear, rather narrow, widened in central area, with poorly visible stigma (Plate, *4*).



Scanning electron micrographs of *Gomphosphenia stoermeri* valves (SEM): *1–5* – external valve view, *6* – inner valve view. Scale: *1*, *2* – 4 µm; *3–6* – 2 µm

Raphe straight, filiform, from the outer surface the proximal ends are expanded (*1–5*), from the inner they are rounded on one side, and the distal ends are finished by small helictoglossae (*6*). Striae from parallel to the radial, 1–3 shortened striae in the center, 22–24 striae in 10 µm. Our data concerning the number of striae in 10 µm differ from the published data that is obviously due to lack of data on *G. stoermeri* morphology and interpopulation variability in diatoms (Genkal, 2005, 2014; Genkal and Kharitonov, 2010a, b).

TABLE 2: Morphological features of *Gomphosphenia stoermeri* according to original and literature data

Source	Valve length	Walve width	Striae in 10 µm
	µm		
Nerotelto Lake	11.4–13.2	2.7	23–24
Nameless lake of the Pelkhatose River	12.3–21.4	2.7–3.3	22
Nameless flow between two lakes	22.1	3	22
Thomas et al., 2009	10–21.1	1.5–3.1	28–35
Van de Vivjer et al., 2012	9.5–22.5	2–3	27–29

An updated diagnosis of the species based on the literature and original data is given below.

Gomphosphenia stoermeri. Frustules from girdle view slightly wedge-shaped with or without pseudosepta. Valves linear-clavate with rounded ends, lower end slightly attenuated; sometimes valves are nearly symmetric, 10.4–21.4 µm long, 2.7–3.3 µm broad. Axial area linear, rather narrow, widened in the center forming central area with poorly visible stigma. Raphe straight, filiform, from the outer surface the proximal ends are expanded, from the inner they are rounded on one side, and the distal ends are finished by small helictoglossae. Striae parallel to radial, 1–3 shortened striae in the center, 22–35 striae in 10 µm.

Distribution: USA, Sweden, Russia (north of Western Siberia), prefer oligotrophic water bodies.

Gomphosphenia stoermeri was found together with representatives of genera *Achnanthidium* Kütz. (*A. bioretii* (Germ.) Monnuer, Lange-Bert. et Ector, *A. daonense* (Lange-Bert.) Lange-Bert., Monnuer et Ector, *A. helveticum* (Hust.) Monnuer, Lange-Bert. et Ector, *A. kranzii* (Lange-Bert.) Round et Bukht., *A. minutissimum* (Kütz.) Czarn., *A. ackii*

Rabenh., *A. subatomoides* (Hust.) Monnuer, Lange-Bert. et Ector) and *Nupela* Vyverman et Compére P. (*N. impexiformis* (Lange-Bert.) Lange-Bert.).

CONCLUSIONS

In phytoplankton of lakes and a stream situated in the Mordyyakha River basin, *Gomphosphenia stoermeri* the new species for the flora of Russia was recorded. It is the third record of this rare species in the world. Revealed specimens differ from published data in some morphological features. An updated diagnosis of the species based on the literature and original data is given.

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