
Bivalve molluscs of the subfamily Sphaeriinae in the Kama region waterbodies (the Middle Urals, Russia)

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ABSTRACT. An annotated and illustrated check-list of species of the subfamily Sphaeriinae (family Sphaeriidae) of the Kama region (the Middle Urals, Russia), with enumeration of species' localities, is presented. After examination of own collections and critical assessment of published data, 8 species from two genera (*Musculium* and *Sphaerium*) have been included into the final list. One of these species, *Sphaerium asiaticum*, is recorded for the first time from the studied area. The ecological characteristics of all species as well as remarks on their distribution within the region are provided. From the zoogeographical point of view most sphaeriine species of the studied area belong to the European-Siberian faunistic group.

Introduction

The Kama River region (or Prikamye) – a geographical region of European Russia formed by the upper and middle parts of the Kama River basin; its borders coincide with those of Perm Krai (Perm Territory) [Komlev, Chernykh, 1984]. The territory of Prikamye belongs to the Russian (or the East European) Plain and the Ural Mountains. It stretches for about 600 km in the north-south direction, and for over 400 km in the west-east direction [Sigov, 1969].

The actual knowledge on freshwater Bivalvia of Prikamye, especially belonging to the family Sphaeriidae Deshayes, 1855, remains incomplete. The faunistic information available from the literature is based on various and sometimes outdated taxonomic approaches that makes it difficult to compare the species lists provided by different authors. Though some preliminary data on the fauna and ecology of sphaeriid molluscs of Prikamye have recently been presented in a series of papers [Shadrin, Pan'kov, 1994, 2000; Leshko *et al.*, 2001; Ovchankova, 2013, 2015, 2016, 2017; Ovchankova *et al.*, 2015], a more or less complete annotated list of species is still absent. Besides, the previously published records

of certain species [*Musculium creplini* (Dunker, 1845), *M. ryckholti* (Normand, 1844), *Sphaerium draparnaldii* Clessin in Westerlund, 1873, *S. galitzini* Clessin, 1875] need a confirmation. The taxonomic position of some species is to be re-evaluated in accordance with the recent achievements in systematics of freshwater Bivalvia.

The aim of this research is to provide an inventory of the Sphaeriinae of the Kama Region in the form of an annotated check-list, with information on habitats and distribution of particular species.

Material and methods

The sphaeriine clams of the waterbodies of Prikamye were collected by the author during 2013–2018 field seasons. Some additional samples obtained from the same area in 2013, 2014, and 2016 were kindly provided for this study by S.V. Vlasov, A.B. Krashennikov, N.N. Pan'kov, A.V. Tiunov, A.V. Laptev, and V.N. Shilov.

The sampling of the macrozoobenthos was conducted using method of Mordukhay-Boltovskoy [1975]. The samples were collected from the riverbeds and reservoirs using a Peterson grab, and from the shallow zones of lakes and rivers by a scraper. In addition, clams were picked from the shoals and coastal sediments by hand. In total, 689 specimens of clams were studied. Taxonomic identification of sampled molluscs was made using keys of Korniushev [1996, 2001] and Bogatov and Kijashko [2016]. I followed the system of Korniushev [2001] for the genera *Sphaerium* Scopoli, 1777 and *Musculium* Link, 1817, and the system of Bouchet and Rocroi [2010] for the higher taxa. All available faunistic information about the Sphaeriinae of Prikamye has been used after its critical assessment. The data on sphaeriine species distribution in the Middle Ural presented in Krasnogorova [2011] PhD thesis (mistakenly interpreted by Ovchankova *et al.* [2015] as pertaining to the Kama River region) are excluded from the final annotated list.

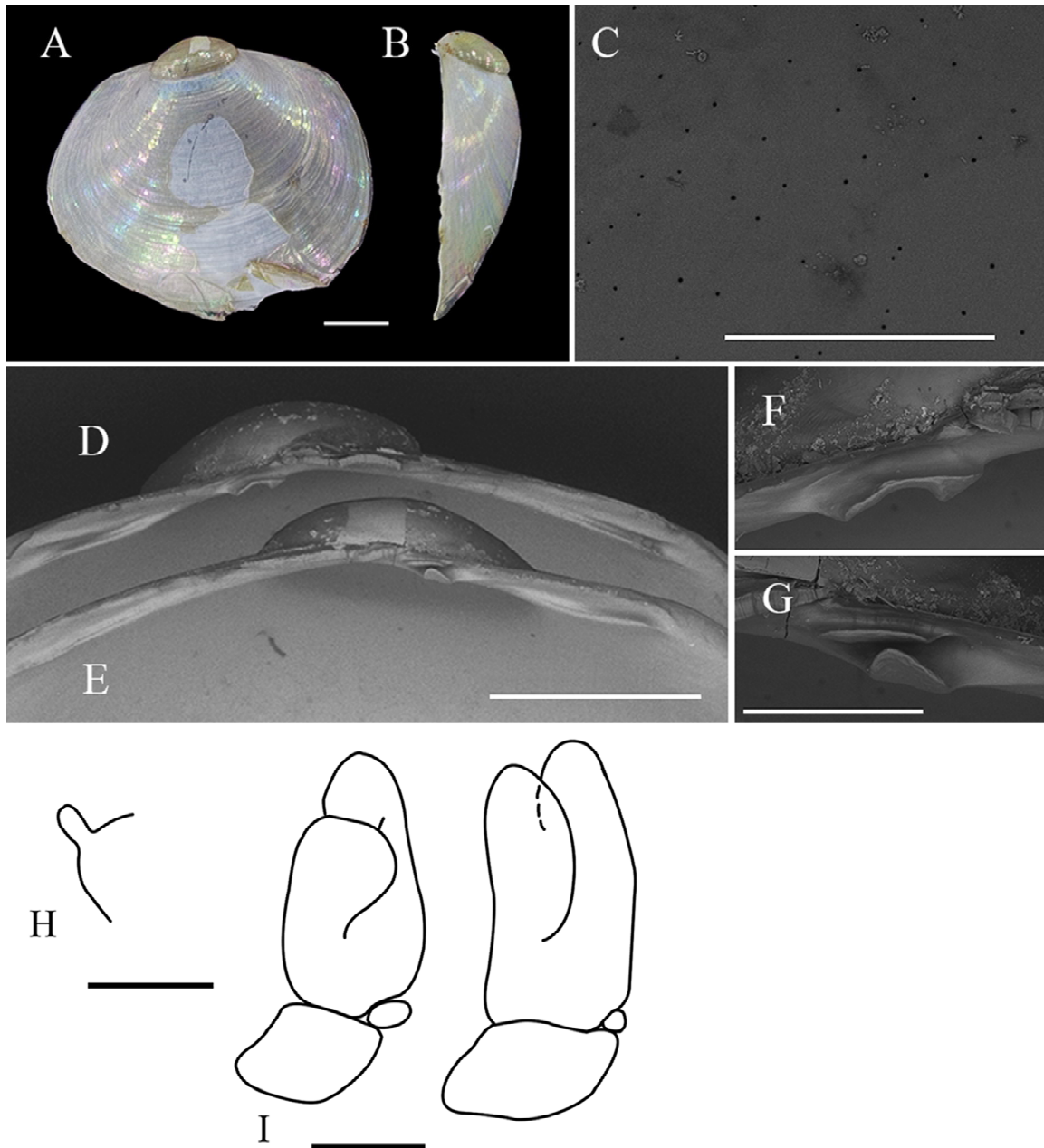


FIG. 1. *Musculium lacustre* (from an unnamed lake, MCO-7454). A, B. Shell. C. Shell pores. D, E. Hinge (D – the right valve, E – the left valve). F, G. Cardinal teeth of the hinge (F – on the right valve, G – on the left valve). H. Scars of the posterior adductor and siphonal retractor. I. Nephridium dorsally. Scale bars 1 mm (A, B, D, E, H, I), 0.3 mm (C, F, G). A-G – original illustrations, H, I – after Korniushev, 2001.

РИС. 1. *Musculium lacustre* (из безымянного озера, MCO-7454). А, В. Раковина. С. Поры раковины. D, E. Замок (D – правая створка, E – левая створка). F, G. Кардинальные зубы замка (F – на правой створке, G – левой створке). H. Отпечатки заднего аддуктора и сифонального ретрактора. I. Нефридий дорсально. Шкала 1 мм (A, B, D, E, H, I), 0,3 мм (C, F, G). A-G – оригинальные снимки, H, I – по: Korniushev, 2001.

The morphology of shells was examined under a Hitachi TM3000 scanning electron microscope with a BSE (back-scattered electron) detector at 15 kV accelerating voltage. The size and clarity of images was adjusted by using Adobe Photoshop CS6 Version 13.0 software. The same software was applied for assembling separate images into plates. The mapping of sampling sites of molluscs was realized

using software *QGIS 2.18.25 «Las Palmas»* on the cartographic basis taken from <http://nextgis.ru/>.

The studied samples are stored in the author's collection.

Abbreviations: MCO – malacological collection of Ovchankova; coll – collected by; sp – specimen(s); ZIN – Zoological Institute of Russian Academy of Sciences, Saint-Petersburg; SPBU – St. Petersburg University; PSU – Perm

State University; Kama-Ural Branch of the FSBI – the Kama-Ural Branch of the Federal State Budgetary Institution «The Main Basin Department for Fisheries and Conservation of Aquatic Biological Resources».

Taxonomic account

Family Sphaeriidae Deshayes, 1855 (1820)
Subfamily Sphaeriinae Deshayes, 1855 (1820)

Genus *Musculium* Link, 1817
Subgenus *Musculium* s. str.
Musculium (Musculium) lacustre
(O.F. Müller, 1774)
(Figs 1, 9)

Tellina lacustris O.F. Müller, 1774: 204.

Previous records from the studied region:

Musculium lacustre. – Tauson, 1947: 105 (Ochyorsky pond).
Sphaerium compressum. – Shadrin, Pan'kov, 1994: 87 (middle Sylva River).

Material examined. Sherya River, 57°59.96'N, 55°11.22'E, coll. I.V. Pozdeev, 31.05.2013, MCO-7967 (3 sp), 10.06.2013, MCO-7982 (3 sp). Kisloe Lake, 57°22.1'N, 57°14.62'E, coll. A.V. Tiunov, July 2016, MCO-7134 (3 sp). Zaostrovka District, Perm City, unnamed lake, 58°00.78'N, 56°02.98'E, coll. N.B. Ovchankova, S.V. Vlasov, 12.06.2017, MCO-7454 (7 sp).

In total – 16 specimens examined.

Distribution. Eurasia and North America [Vinarski, Kantor, 2016]. According to Korniuschin [2001], the genus in Europe and Siberia is represented by a single species.

Distribution in Prikamye. The species has been recorded in the southern part of the studied region. In Prikamye, *M. lacustre* is a rare species.

Morphology. The specimens of *M. lacustre* from Prikamye are morphologically similar to those described in the literature [Piechocki, 1989; Korniuschin, 2001]. It is characterized by a relatively small shell; the nepionic cap is clearly set off (see Fig. 1 A, B). Siphonal retractors scars are usually fused with the scars of the posterior adductors (see Fig. 1H). Nephridium is usually of the closed type (see Fig. 1I). Dorsal lobe conspicuously elongated in adult specimens. The cardinal tooth of the right valve in the shape of a thin, usually bent plate (see Fig. 1 D, F); cardinal teeth of the left valve are usually parallel, the lower one being somewhat displaced posterad. Lateral teeth in the form of long and thin folds, ligament pit narrow. According to our observations, the lower cardinal tooth of the left valve may be bent (see Fig. 1 E, G); shells of this species have the low density of pores.

Ecology in the studied region. *M. lacustre* has been recorded from shallow (depth under 1.5 m) of floodplain waterbodies, with high density of macrophytes; the clams are living on muddy substrate.

Genus *Sphaerium* Scopoli, 1777
Subgenus *Cyrenastrum* Bourguignat, 1854
Sphaerium (Cyrenastrum) asiaticum
(Martens, 1864)
(Figs 2, 9)

Cyclas asiatica Martens, 1864: 349, fig. 5.

Material examined. Malaya Mel'nichnaya River, 57°48.03'N, 56°18.84'E, coll. N.B. Ovchankova, A.V. Laptev, 28.08.2014, MCO-3149 (2 sp). Votkinsk Reservoir near Okhansk, shoal of the right bank, 57°43.71'N, 55°23.18'E, coll. N.B. Ovchankova, 17.08.2014, MCO-3369 (1 sp), 13.09.2014, MCO-3374 (1 sp), 17.10.2014, MCO-3379 (1 sp). Syuz'va River near Bol'shoe Shilovo, 58°01.77'N, 55°37.48'E, coll. S.V. Vlasov, A.V. Laptev, 16.10.2014, MCO-3307 (1 sp). Ocher River near Ocher Town, 57°52.61'N, 54°43.85'E, coll. S.V. Vlasov, 12.06.2016, MCO-6641 (1 sp). Saigatka River, 56°45.38'N, 54°22.27'E, coll. N.B. Ovchankova, S.V. Vlasov, 04.10.2016, MCO-7208 (15 sp).

In total – 22 specimens examined.

Distribution. According to the previous authors [Korniuschin, 2001; Vinarski, Kantor, 2016], the range of species covers Siberia and the Pechora River basin. *Sph. asiaticum* is for the first time recorded here for the Prikamye Region (no available literature recordings).

Distribution in Prikamye. A rare species; its scanty findings have been made mainly in small rivers in the central and southern parts of the region.

Morphology. The specimens of *Sph. asiaticum* from Prikamye are morphologically similar to those described in Korniuschin [2001]. The shell of this species is prominently elongated and angulate, with broad and non-protruding umbo, relatively broad hinge plate, weak surface sculpture (see Fig. 2 A, B), and separated scars of siphonal retractors and adductors (see Fig. 2H). Nephridium is of the open type (see Fig. 2I), its dorsal lobe is considerably elongated. The cardinal teeth of the right valve and lower one of the left valve in the shape of bent plates (see Fig. 2 D-G). The upper cardinal tooth of the left valve was straightened (see Fig. 2 E, G). Shells of this species have the low density of pores (see Fig. 2C).

Ecology in the studied region. *Sph. asiaticum* has been recorded from slowly flowing streams, where it lives on silted rocky substrates, among the macrophytes. This species has been observed to co-occur with *Sph. solidum* and *Sph. rivicola*.

Sphaerium (Cyrenastrum) solidum
(Normand, 1844)
(Figs 3, 10)

Cyclas solida Normand, 1844: 6, figs. 3, 4.

Previous records from the studied region:

Sphaerium solidum. – Graevsky, Pogankin, 1937: 100 (Kama River, several localities); Gromov, 1947: 182 (Kama River); Tauson, 1947: 197 (upper and middle Kama River,

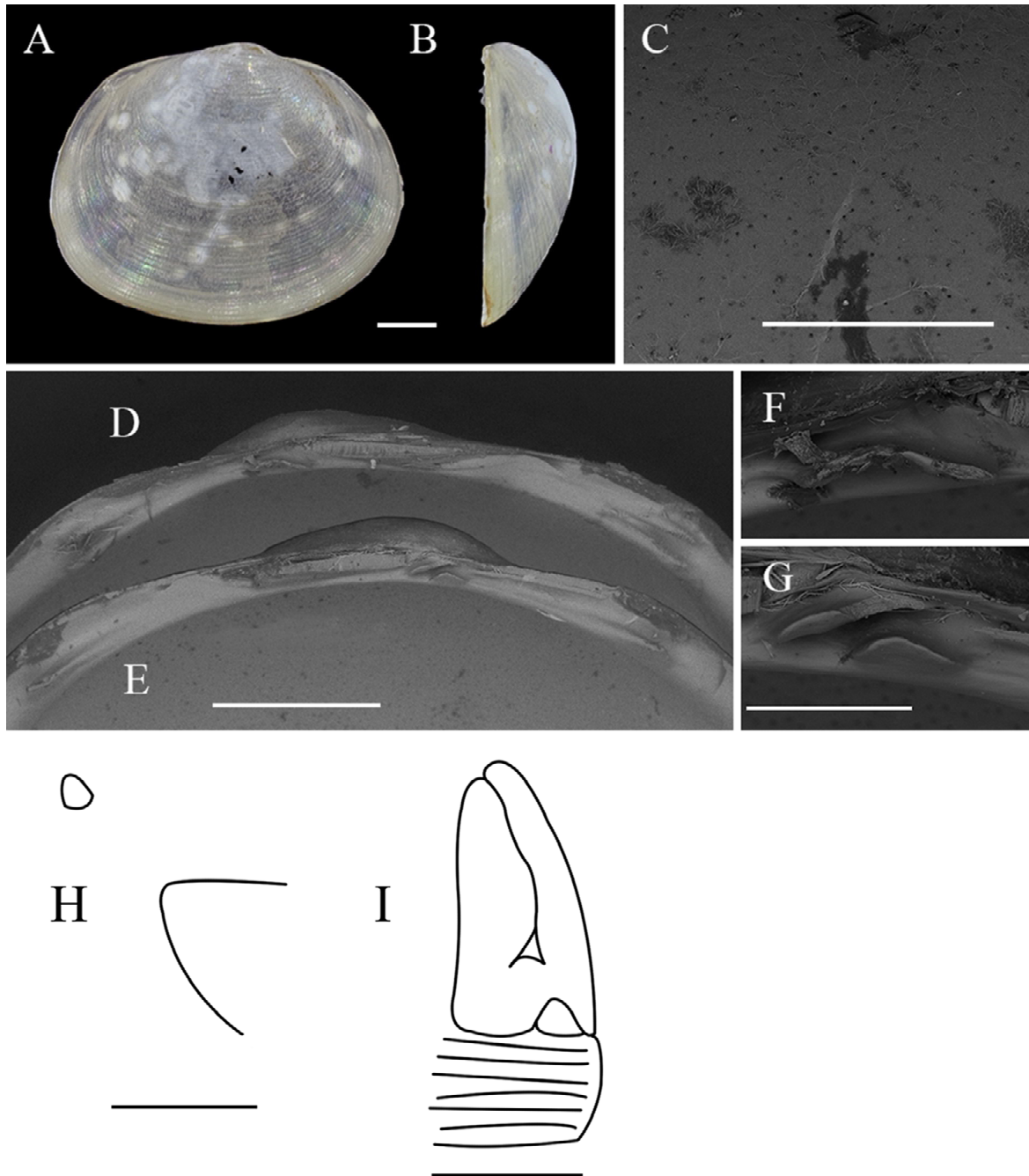


FIG. 2. *Sphaerium asiaticum* (Syuz'va River, MCO-3307). **A, B.** Shell. **C.** Shell pores. **D, E.** Hinge (**D** – the right valve, **E** – the left valve). **F, G.** Cardinal teeth of the hinge (**F** – on the right valve, **G** – on the left valve). **H.** Scars of posterior adductor and siphonal retractor. **I.** Nephridium dorsally. Scale bars 1 mm (**A, B, D, E, H, I**), 0.5 mm (**C**), 0.3 mm (**F, G**). **A-G** – original illustrations, **H, I** – Korniushev, 2001.

РИС. 2. *Sphaerium asiaticum* (р. Сюз'ва, МСО-3307). **A, B.** Раковина. **C.** Поры раковины. **D, E.** Замок (**D** – правая створка, **E** – левая створка). **F, G.** Кардинальные зубы замка (**F** – на правой створке, **G** – левой створке). **H.** Отпечатки заднего аддуктора и сифонального ретрактора. **I.** Нефридий дорсально. Шкала 1 мм (**A, B, D, H, I**), 0.5 мм (**C**), 0.3 мм (**F, G**). **A-G** – оригинальные снимки, **H, I** – по: Korniushev, 2001.

Chusovaya River); Gromov, 1949: 134 (Kama River near Okhansk); Gromov, 1953: 60 (Kama River, numerous localities in different parts of the basin); Vershinin, 1953: 527 (Kama River in riparian lakes); Gromov, 1954: 896 (lower Chusovaya River); Demidova, 1965: 110 (Kama Reservoir, in two localities); Bobrova, 1969: 203 (Ocher River); Gromov, Ponomaryova, 1969: 183 (Votkinsk Reservoir, upper and middle parts).

Amesoda solida. – Gorelikova, 1982: 184 (Votkinsk Reservoir, Kama River); Aleksevina, Gorelikova, 1988: 164 (Votkinsk Reservoir); Aleksevina, Presnova, 2001: 11 (Votkinsk Reservoir); Pozdeev *et al.*, 2008: 44 (Kama Reservoir in Chermozsky Bay); Ovchankova, 2013: 133; Ovchankova, 2015: 75 (Votkinsk Reservoir near Okhansk); Aleksevina, Presnova, 2013b: 67 (Votkinsk Reservoir); Ovchankova *et al.*, 2015: 128 (the Kama River basin).

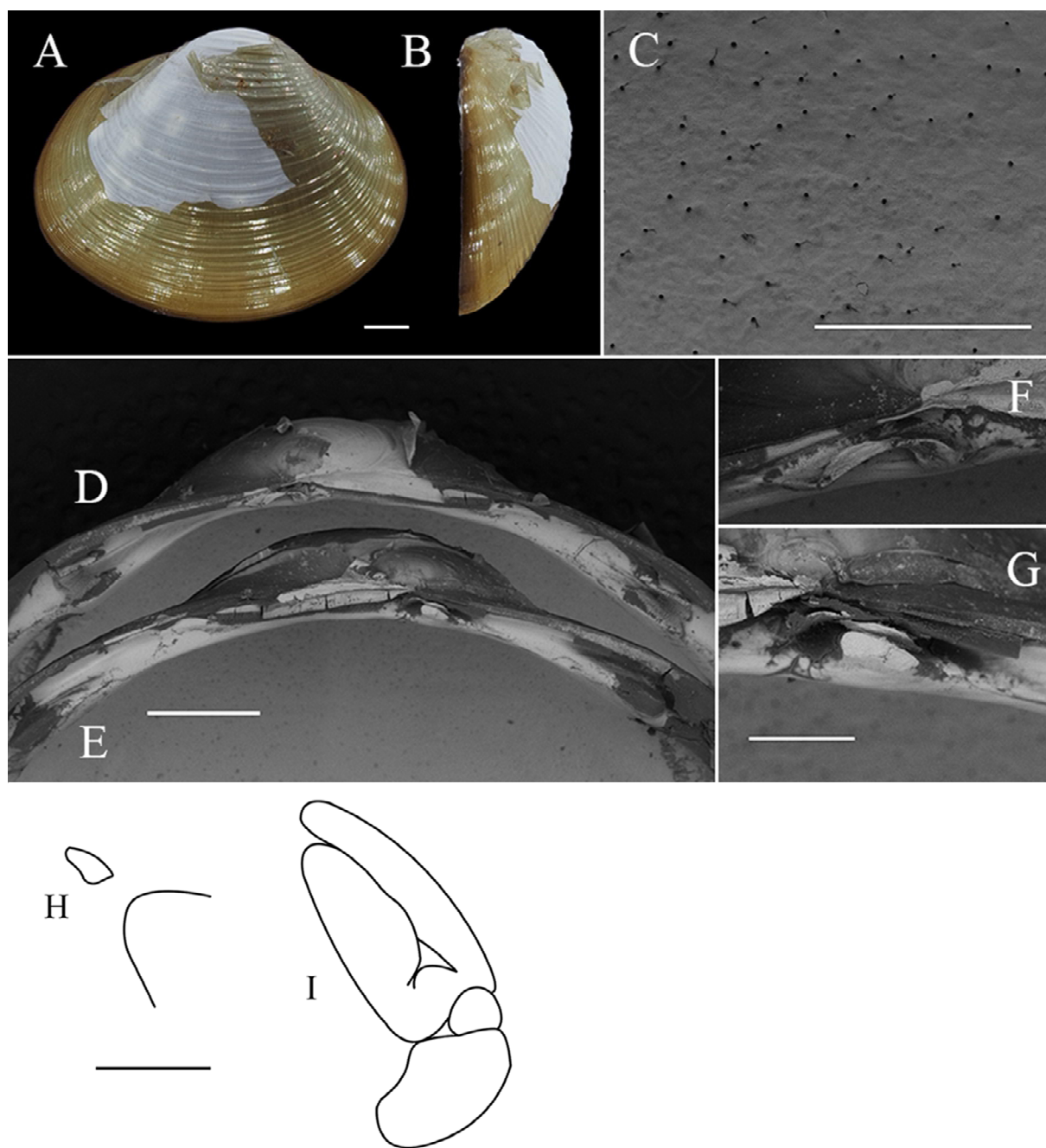


FIG. 3. *Sphaerium solidum* (Votkinsk Reservoir, MCO-3385). **A, B.** Shell. **C.** Shell pores. **D, E.** Hinge (**D** – the right valve, **E** – the left valve). **F, G.** Cardinal teeth of the hinge (**F** – on the right valve, **G** – on the left valve). **H.** Scars of the posterior adductor and siphonal retractor. **I.** Nephridium dorsally. Scale bars 1 mm (**A, B, D, E, H, I**), 0.5 mm (**C**), 0.3 mm (**F, G**). **A-G** – original illustrations, **H, I** – after Korniushev, 2001.

РИС. 3. *Sphaerium solidum* (Воткинское водохранилище, МСО-3385). **A, B.** Раковина. **C.** Поры раковины. **D, E.** Замок (**D** – правая створка, **E** – левая створка). **F, G.** Кардинальные зубы замка (**F** – на правой створке, **G** – левой створке). **H.** Отпечатки заднего аддуктора и сифонального ретрактора. **I.** Нефридий дорсально. Шкала 1 мм (**A, B, D, H, I**), 0.5 мм (**C**), 0.3 мм (**F, G**). **A-G** – оригинальные снимки, **H, I** – по: Korniushev, 2001.

Cyrenastrum solidum (Normand, 1844). – Pan'kov, 2000: 37 (Obva River); Shadrin, Pan'kov, 2000: 258 (Perm krai); Pan'kov, 2004: 25 (middle and lower Sylva River).

Material examined. Votkinsk Reservoir near Okhansk, 57°43.93'N, 55°23.65'E, coll. N.B. Ovchankova, 2013, 2014, MCO-3385 (7 sp). Votkinsk Reservoir near Okhansk in the course, 57°43.86'N, 55°23.35'E, coll. N.B. Ovchankova, 08.07.2014, MCO-3361 (18 sp), 18.07.2014, MCO-3365 (1

sp). Votkinsk Reservoir near Okhansk, the right bank shoal, coll. N.B. Ovchankova, 26.08.2014, MCO-3371 (5 sp). Verhnyaya Mulyanka River near Koyanovo, 57°48.04'N, 56°18.95'E, coll. N.B. Ovchankova, A.V. Laptev, 28.08.2014, MCO-3161 (6 sp). Syuz'va River near Chaikovskaya, 58°08.43'N, 55°31.18'E, coll. S.V. Vlasov, A.V. Laptev, 16.10.2014, MCO-3299 (1 sp). Vicinity of Berezniki, unnamed pond, 59°23.34'N, 56°44.3'E, coll. N.B. Ovchanko-

va, 06.05.2015, MCO-3547 (4 sp). Sylva River, 57°33.17'N, 56°50.66'E, coll. N.B. Ovchankova, S.V. Vlasov, 03.06.2015, MCO-3464 (1 sp). Chusovaya River, 58°11.41'N, 57°07.77'E, coll. N.B. Ovchankova, A.V. Laptev, 26.08.2015, MCO-3504 (10 sp). Kama Reservoir in Khokhlovka Bay, 58°15.05'N, 56°15.05'E, coll. N.B. Ovchankova, V.N. Shilov, 21.10.2015, MCO-3518 (3 sp). Kama River near Gainy, 60°17.66'N, 54°21.55'E, coll. N.B. Ovchankova, S.V. Vlasov, 30.08.2017, MCO-7481 (61 sp). Kama River near Syoiva, 60°10.71'N, 53°45.73'E, coll. N.B. Ovchankova, S.V. Vlasov, 01.09.2017, MCO-7566 (1 sp).

In total – 118 specimens examined.

Distribution. Europe, Western Siberia [Vinarski, Kantor, 2016].

Distribution in Prikamye. The species has been recorded chiefly from the Kama and Votkinsk Reservoirs and the upper Kama River. According to our data, *Sph. solidum* is quite common in the studied region.

Morphology. The specimens of *Sph. solidum* from Prikamye are morphologically similar to those described in the literature [Ellis, 1978; Piechocki, 1989; Korniushev, 2001]. Shell elongated and thick-walled (see Fig. 3A), with strong hinge (see Fig. 3 D, E) and concentric ribs. The scars of siphonal retractors lie close to those of the posterior adductor but are always separate (see Fig. 3H). Nephridium is of the open type, its dorsal lobe is considerably elongated, usually only a small part of the proximal portion of the nephridium is visible between its branches (see Fig. 3I). The lateral loop is completely covered [Korniushev, 2001]. The cardinal tooth of the right valve (see Fig. 3 D, F) is distinctly bent, in its anterior part tapered, in its posterior part knob-like thickened; the cardinal teeth of the left valve (see Fig. 3 G, E) short, the upper one being somewhat larger and situated parallel to the hinge-plate margin, the lower tooth is situated obliquely above the upper tooth. Lateral teeth distinct and strong, of approximately equal size in the anterior and posterior part of the shell, ligament pit short and not very wide [Piechocki, 1989]. The pore density is low (see Fig. 3C).

Ecology in the studied region. The species is found mainly in larger rivers, bays and reservoirs; it inhabits riverbeds where lives on sandy substrates. Also *Sph. solidum* was registered from streams with slow current and in the riverheads where lives among macrophytes, on soft substrates with phytodetritus deposition. This species may co-occur with *Sph. asiaticum* and *Sph. rivicola*.

Remarks. Earlier *Sph. solidum* was recorded from the region under the name *Amesoda solida* [see, for example, Gorelikova, 1982; Ovchankova, 2013]. In this paper I no longer use this binomen since, according to Korniushev [2001], the genus *Amesoda* is a Nearctic taxon not distributed in Eurasia.

Subgenus *Rivicoliana* Servain, 1888

Sphaerium (Rivicoliana) rivicola (Lamarck, 1818)

(Figs 4, 11)

Cyclas rivicola Lamarck, 1818: 558.

Sphaerium bourguignati Lallemand, Servain, 1869: 46.

Sphaerium boettgerianum Servain, 1882: 18.

Sphaerium morini Servain, 1882: 11.

Previous records from the studied region:

Cyclas rivicola. – Rozen, 1879: 21 (Kama River).

Sphaeriastrum rivicola. – Krulikovskiy, 1889: 4 (vicinity of Osa); Gromov, Ponomaryova, 1969: 183 (Votkinsk Reservoir); Gorelikova, 1982: 33 (Votkinsk Reservoir); Aleksevina, Gorelikova, 1988: 164 (Votkinsk Reservoir); Aleksevina, Presnova, 2001: 11 (Votkinsk Reservoir).

Sphaerium rivicola. – Boettger, 1890: 166 (Sylva River near Kungur); Behning, 1928: 256 (Kama River near Il'insky); Tauson, 1947: 190 (middle Kama River); Gromov, 1947: 182 (Kama River); Gromov, 1949: 124 (Kama River near Okhansk); Gromov, 1953: 58 (Kama River, numerous localities in different parts of the basin); Shadrin, Pan'kov, 1994: 87 (middle Sylva River).

Rivicoliana rivicola. – Shadrin, Pan'kov, 2000: 258 (Kama River basin); Pan'kov, 2000: 35 (Veslyana River and lower Sylva River); Pan'kov, 2004: 25 (middle and lower Sylva River); Pozdeev, 2006: 51 (middle Chusovaya River, upper Kama River); Pozdeev, Aleksevina, 2008: 160 (Chusovaya River); Ovchankova, 2013: 133 (Votkinsk Reservoir near Okhansk); Aleksevina, Presnova, 2013b: 67 (Votkinsk Reservoir); Ovchankova, 2015: 75 (Votkinsk Reservoir near Okhansk); Ovchankova *et al.*, 2015: 128 (Kama River basin).

Rivicoliana morini (Servain, 1882). – Ovchankova *et al.*, 2015: 128 (Kama River basin).

Material examined. Votkinsk Reservoir near Okhansk, coll. N.B. Ovchankova, 2013, 2014, MCO-3384 (5 sp). Sylva River, coll. N.B. Ovchankova, S.V. Vlasov, 03.06.2015, MCO-3462 (6 sp). Ocher River near Ocher, 57°52.61'N, 54°43.83'E, coll. S.V. Vlasov, 12.06.2016, MCO-6616 (1 sp). Saigatka River, coll. N.B. Ovchankova, S.V. Vlasov, 04.10.2016, MCO-7212 (2 sp). Kama River near Gainy, 60°17.65'N, 54°21.39'E, coll. N.B. Ovchankova, S.V. Vlasov, 30.08.2017, MCO-7533 (12 sp). Veslyana River near Sosnovaya, 60°21.34'N, 53°50.49'E, coll. N.B. Ovchankova, S.V. Vlasov, 31.08.2017, MCO-7576 (3 sp). Kama River near Syoiva, 60°10.74'N, 53°45.76'E, coll. N.B. Ovchankova, S.V. Vlasov, 01.09.2017, MCO-7568 (1 sp).

In total – 30 specimens examined.

Distribution. Europe, Western Siberia [Vinarski, Kantor, 2016].

Distribution in Prikamye. Most of the examined specimens have been collected from the Votkinsk Reservoir, Sylva River and the upper Kama River basin.

Morphology. The specimens of *Sph. rivicola* from Prikamye correspond morphologically to the literature data [Ellis, 1978; Piechocki, 1989; Korniushev, 2001]. The shell of this species is distinguished by a relatively large size (length up to 23 mm, height up to 18, and width up to 14 mm) and strong hinge (see Fig. 4 A, B, D, E). Due to strong development of siphonal musculature, the scars of

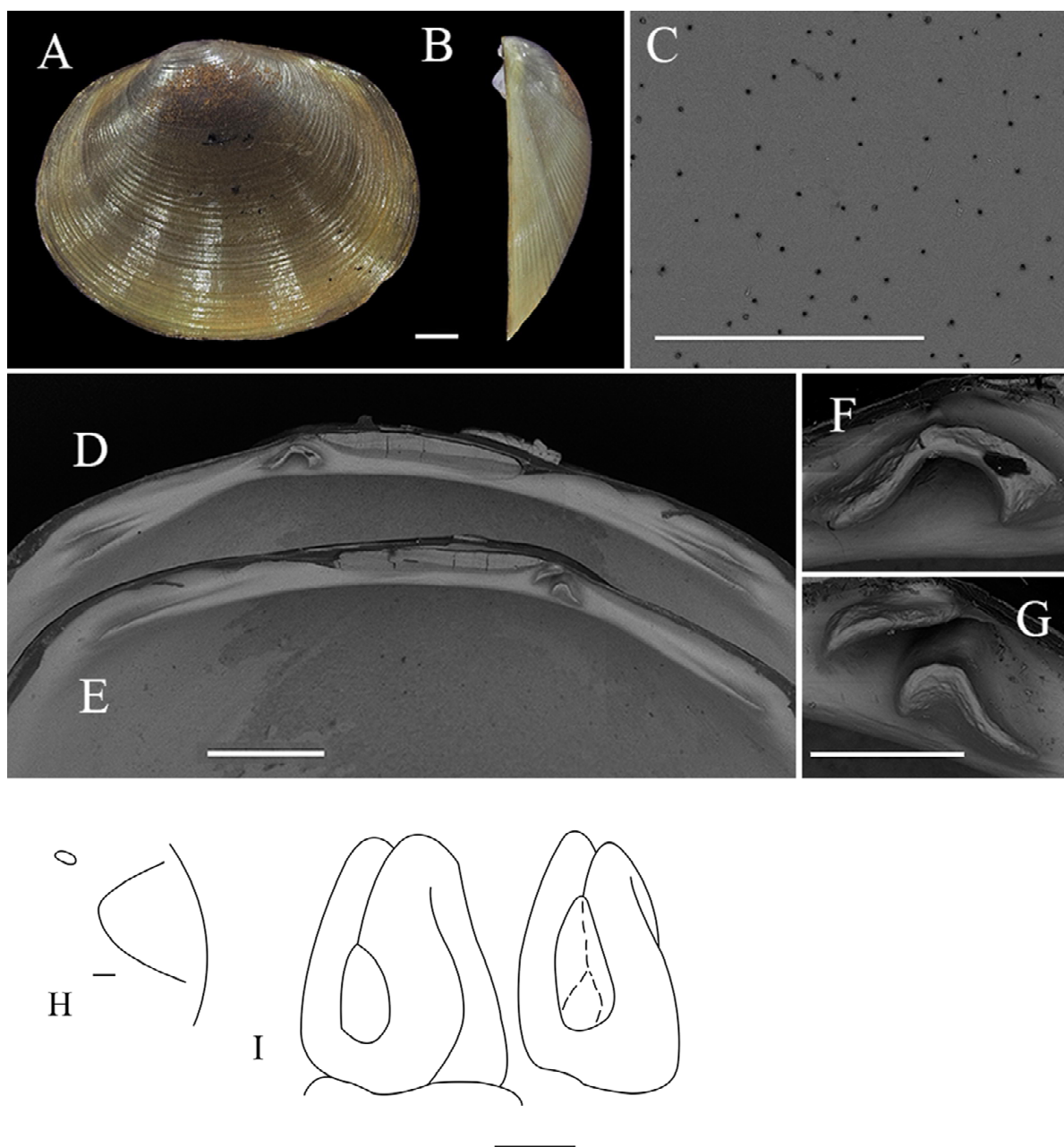


FIG. 4. *Sphaerium rivicola* (Kama River near Gayny settlement, MCO-7533). **A, B.** Shell. **C.** Shell pores. **D, E.** Hinge (**D** – the right valve, **E** – the left valve). **F, G.** Cardinal teeth of the hinge (**F** – on the right valve, **G** – on the left valve). **H.** Scars of the posterior adductor and siphonal retractor. **I.** Nephridium dorsally. Scale bars 1 mm (**A, B, D, E, H, I**), 0.3 mm (**C, F, G**). **A-G** – original illustrations, **H, I** – after Korniushtin, 2001.

РИС. 4. *Sphaerium rivicola* (р. Кама, окрестности пос. Гайны, МСО-7533). **A, B.** Раковина. **C.** Поры раковины. **D, E.** Замок (**D** – правая створка, **E** – левая створка). **F, G.** Кардинальные зубы замка (**F** – на правой створке, **G** – левой створке). **H.** Отпечатки заднего аддуктора и сифонального ретрактора. **I.** Нефридий дорсально. Шкала 1 мм (**A, B, D, H, I**), 0.3 мм (**C, F, G**). **A-G** – оригинальные снимки, **H, I** – по: Korniushtin, 2001.

the siphonal retractors lie apart from those of the posterior adductor (see Fig. 4H). Nephridium is of the open type (see Fig. 4I). Cardinal tooth of the right valve hooklike bent, in its posterior part thickened and usually divided; cardinal teeth of the left valve short and thick, situated obliquely (see Fig. 4 D-G). Lateral teeth small, ligament pit long and wide (see Fig. 4 D, E). In contrast to adult speci-

mens, the shells of younger ones have the low density of pores (see Fig. 4C).

Ecology in the studied region. According to our data, the species inhabits chiefly riverbeds and reservoirs where it lives on silted sandy substrates. *Sph. rivicola* may co-occur with *Sph. asiaticum* and *Sph. solidum*.

Remarks. According to Korniushtin [2001], the

generic name *Sphaeriastrum* is not available because it originally included the type species of the genus *Sphaerium* [Bourguignat, 1854] and thus is a younger objective synonym of the later.

Subgenus *Sphaerium* s. str.
Sphaerium (*Sphaerium*) *corneum*
(Linnaeus, 1758)
(Figs 5, 10)

Tellina cornea Linnaeus, 1758: 678.

Sphaerium corneum var. *mamillanum* Westerlund, 1871: 154.

Sphaerium westerlundii Westerlund, 1873: 508.

Sphaerium levinodis Westerlund, 1876: 67.

Sphaerium capiduliferum Lindholm, 1909: 81, pl. 2, fig. 51.

Sphaerium dybowskii Lindholm, 1909: 82

Sphaerium kozhovi Starobogatov & Korniushev, 1986 [1987]: 38.

Previous records from the studied region:

Corneola cornea. – Krulikovsky, 1889: 4 (vicinity of Osa).

Sphaerium corneum. – Boettger, 1890: 166 (Sylva River near Kungur); Tauson, 1935: 30 (Dikoe Lake); Tauson, 1947: 84 (upper and middle Kama River, Polomsky and Chermozskiy Ponds); Tauson, 1949: 111 (Chermozskiy Pond); Gromov, 1949: 124 (Kama River near Okhansk); Gromov, 1953: 59 (Kama River, numerous localities in different parts of the basin); Vershinin, 1953: 533 (the first above-floodplain terrace of Kama River, in lakes); Gromov, 1954: 899 (lower Chusovaya River); Chirvinskaya, 1961: 101 (Elovsky and Chastinsky districts, in ponds); Shadrin, Pan'kov, 1994: 86 (middle Sylva River); Pan'kov, 2004: 141 (middle and lower Sylva River); Aleksevina *et al.*, 2011: 22 (the pond at Malaya Usolka River); Aleksevina, Presnova, 2013a: 37 (middle part of Votkinsk Reservoir); Ovchankova *et al.*, 2015: 128 (Kama River basin).

Sphaerium westerlundii (Clessin in Westerlund, 1873). – Ovchankova *et al.*, 2015: 128 (Kama River basin).

Material examined. Sher'ya River, coll. N.N. Pan'kov, 08.05.2013, MCO-3328 (3 sp). Malaya Mel'nichnaya River, coll. N.B. Ovchankova, A.V. Laptev, 28.08.2014, MCO-3146 (5 sp). Verhnyaya Mulyanka River near Koyanovo, coll. N.B. Ovchankova, A.V. Laptev, 28.08.2014, MCO-3162 (1 sp), coll. N.B. Ovchankova, S.V. Vlasov, 14.05.2017, MCO-7607 (1 sp), MCO-7609 (14 sp). Babka River, 57°28.11'N, 56°01.77'E, coll. N.B. Ovchankova, S.V. Vlasov, 07.10.2014, MCO-3231 (6 sp). Syuz'va River, coll. S.V. Vlasov, A.V. Laptev, 16.10.2014, near Chaikovskaya, MCO-3298 (2 sp), near Grigor'evskoe, 58°12.1'N, 55°23.42'E, MCO-3296 (12 sp). Votkinsk Reservoir in Syuz'va Bay, 58°01.49'N, 55°37.32'E, coll. S.V. Vlasov, A.V. Laptev, 16.10.2014, MCO-3308 (1 sp). Votkinsk Reservoir near Okhansk, the right bank shoal, coll. N.B. Ovchankova, 17.10.2014, MCO-3378 (1 sp). Dobryanka River near Fominka, coll. S.V. Vlasov, A.V. Laptev, 20.10.2014, 58°33.68'N, 56°39.02'E, MCO-3268 (29 sp), 58°33.66'N, 56°38.95'E, MCO-3285 (6 sp). Sylva River, 57°13.83'N, 57°54.99'E, coll. N.B. Ovchankova, S.V. Vlasov, 02.06.2015, MCO-3441 (1 sp). Kama Reservoir in Khokhlovka Bay, 58°15.12'N, 56°14.87'E, coll. N.B. Ovchankova, V.N. Shilov, 21.10.2015, MCO-3523 (1 sp). Ocher River near Ostrozhka, the right bank shoal, 57°40.61'N, 55°10.85'E, coll. S.V. Vlasov, 11.06.2016, MCO-6594 (4 sp), 30.06.2016, MCO-7311 (1 sp). Ocher River near Gryaznovo, 57°49.31'N, 54°54.56'E, coll. S.V. Vlasov, 11.06.2016, MCO-6596 (7 sp), 09.07.2016, MCO-7354 (5 sp),

01.10.2016, MCO-7415 (1 sp), 30.11.2016, MCO-7301 (3 sp). Ocher River near Ocher, coll. S.V. Vlasov, 12.06.2016, MCO-6614 (5 sp), 22.08.2016, MCO-7386 (1 sp), 01.10.2016, MCO-7398 (5 sp), 30.11.2016, MCO-7179 (8 sp). Ocher River near Ocher, the right bank shoal, in thickets of macrophytes, 57°52.61'N, 54°43.85'E, coll. S.V. Vlasov, 12.06.2016, MCO-6642 (7 sp). Seminskiy Pond, 59°23.08'N, 56°49.53'E, coll. N.B. Ovchankova, A.V. Laptev, 18.07.2016, MCO-6991 (1 sp). Kisloe Lake, coll. A.V. Tiunov, July, 2016, MCO-7135 (1 sp). Saigatka River, coll. N.B. Ovchankova, S.V. Vlasov, 04.10.2016, MCO-7205 (17 sp). Lys'va River, coll. S.V. Vlasov, V.N. Shilov, 17.10.2016, near Kormovishche, 57°52.26'N, 58°01.89'E, MCO-7141 (13 sp), near Zarikhino, 58°09.72'N, 57°46.05'E, MCO-7157 (11 sp). Verhnyaya Mulyanka River near Gorbunovo, 57°50.41'N, 56°22.53'E, coll. N.B. Ovchankova, S.V. Vlasov, 14.05.2017, MCO-7614 (4 sp). Ilty (Ulaushnoe) Lake, coll. N.B. Ovchankova, S.V. Vlasov, 31.08.2017, 60°16.09'N, 53°59.08'E, MCO-7510 (2 sp), 60°16.01'N, 53°59.14'E, MCO-7522 (1 sp). Alauzhenskoe (Osinovoe) Lake, 60°16.77'N, 53°58.72'E, coll. N.B. Ovchankova, S.V. Vlasov, 31.08.2017, MCO-7564 (1 sp). Dikie Shekty Lake, 60°12.39'N, 53°48.98'E, coll. N.B. Ovchankova, S.V. Vlasov, 01.09.2017, MCO-7498 (126 sp).

In total – 307 specimens examined.

Distribution. Widely distributed in northern Eurasia; introduced to the Laurentian Great Lakes in North America [Vinarski, Kantor, 2016].

Distribution in Prikamye. It is the most widespread sphaeriine species in Prikamye distributed throughout the region.

Morphology. The specimens of *Sph. corneum* from Prikamye are morphologically similar to those described in Korniushev [2001]. This species is characterized by the thin-walled shell (see Fig. 5 A, B), narrow hinge plate with almost straight cardinal teeth (see Fig. 5 C-F), merged scars of siphonal retractors and adductors (see Fig. 5G), relatively scarce pores (see Fig. 5H) and moderately elongated nephridium with clearly visible proximal portion (see Fig. 5I).

Ecology in the studied region. *Sph. corneum* has been recorded from rivers (in parts with slowed current) and floodplain lakes (found chiefly on sandy substrates with varying level of silt). It co-occurs with *Sph. scaldianum*.

Sphaerium (*Sphaerium*) *nucleus*
(Studer, 1820)
(Figs 6, 10)

Cyclas nucleus Studer, 1820: 93.

Previous records from the studied region:

Nucleocyclas nucleus (Studer, 1820). – Pozdeev, 2006: 51 (middle Chusovaya River).

Material examined. Malaya Sher'ya River, 57°57.09'N, 55°13.54'E, coll. N.N. Pan'kov, 08.05.2013, MCO-3322 (2 sp). Verhnyaya Mulyanka River near Koyanovo, coll. N.B. Ovchankova, A.V. Laptev, 28.08.2014, MCO-3160 (7 sp). Pyzh River, 57°49.88'N, 56°06.99'E, coll. N.B. Ovchankova, A.V. Laptev, 02.09.2014, MCO-3179 (1 sp). Syuz'va River near Grigor'evskoe, coll. S.V. Vlasov, A.V. Laptev,

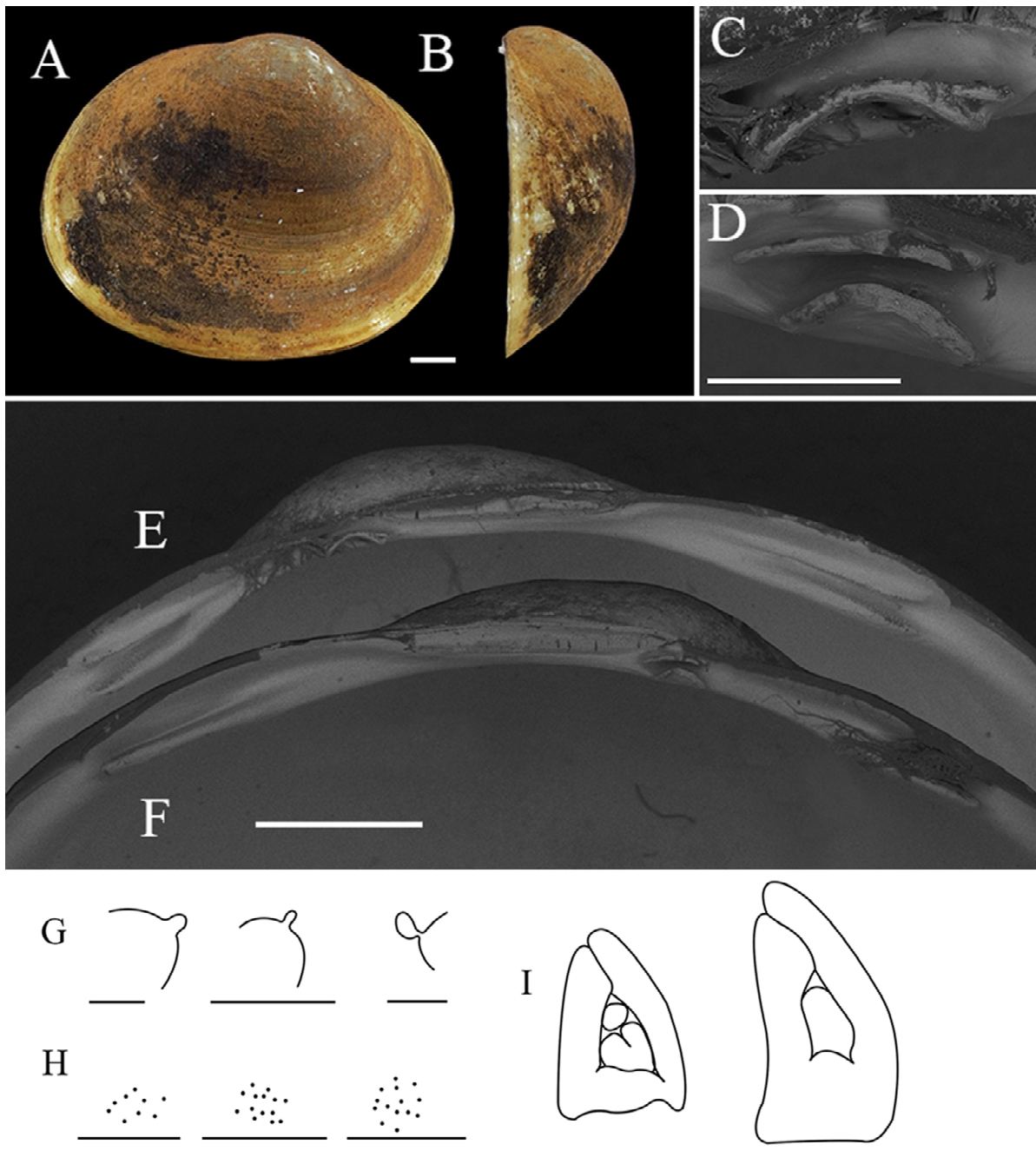


FIG. 5. *Sphaerium corneum* (Saigatka River, MCO-7205). A, B. Shell. C, D. Cardinal teeth of the hinge (C – on the right valve, D – on the left valve). E, F. Hinge (E – the right valve, F – the left valve). G. Variability of the posterior adductor and siphonal retractor scars. H. Pores. I. Nephridium dorsally. Scale bars 1 mm (A, B, E, F, G, H, I), 0.3 mm (C, D). A-F – original illustrations, G-I – after Korniushev, 2001.

РИС. 5. *Sphaerium corneum* (р. Сайгатка, МСО-7205). А, В. Раковина. С, D. Кардинальные зубы замка (С – на правой створке, D – левой створке). Е, F. Замок (Е – правая створка, F – левая створка). G. Варианты форм отпечатков заднего аддуктора и сифонального ретрактора. H. Поры. I. Нефридий дорсально. Шкала 1 мм (А, В, D, G, H, I), 0.3 мм (С, D). А-F – оригинальные снимки, G-I – по: Korniushev, 2001.

16.10.2014, MCO-3297 (2 sp). Ocher River near Ocher, coll S.V. Vlasov, 12.06.2016, MCO-6612 (4 sp).

In total – 16 specimens examined.

Distribution. Europe, Western Siberia [Vinarski, Kantor, 2016].

Distribution in Prikamye. A relatively rare spe-

cies known from a handful of findings made from small rivers of the middle Kama River basin.

Morphology. The specimens of *Sph. nucleus* from Prikamye are morphologically similar to those described in Korniushev [2001]. This species is characterized by convex and thick-walled shell (see Fig.

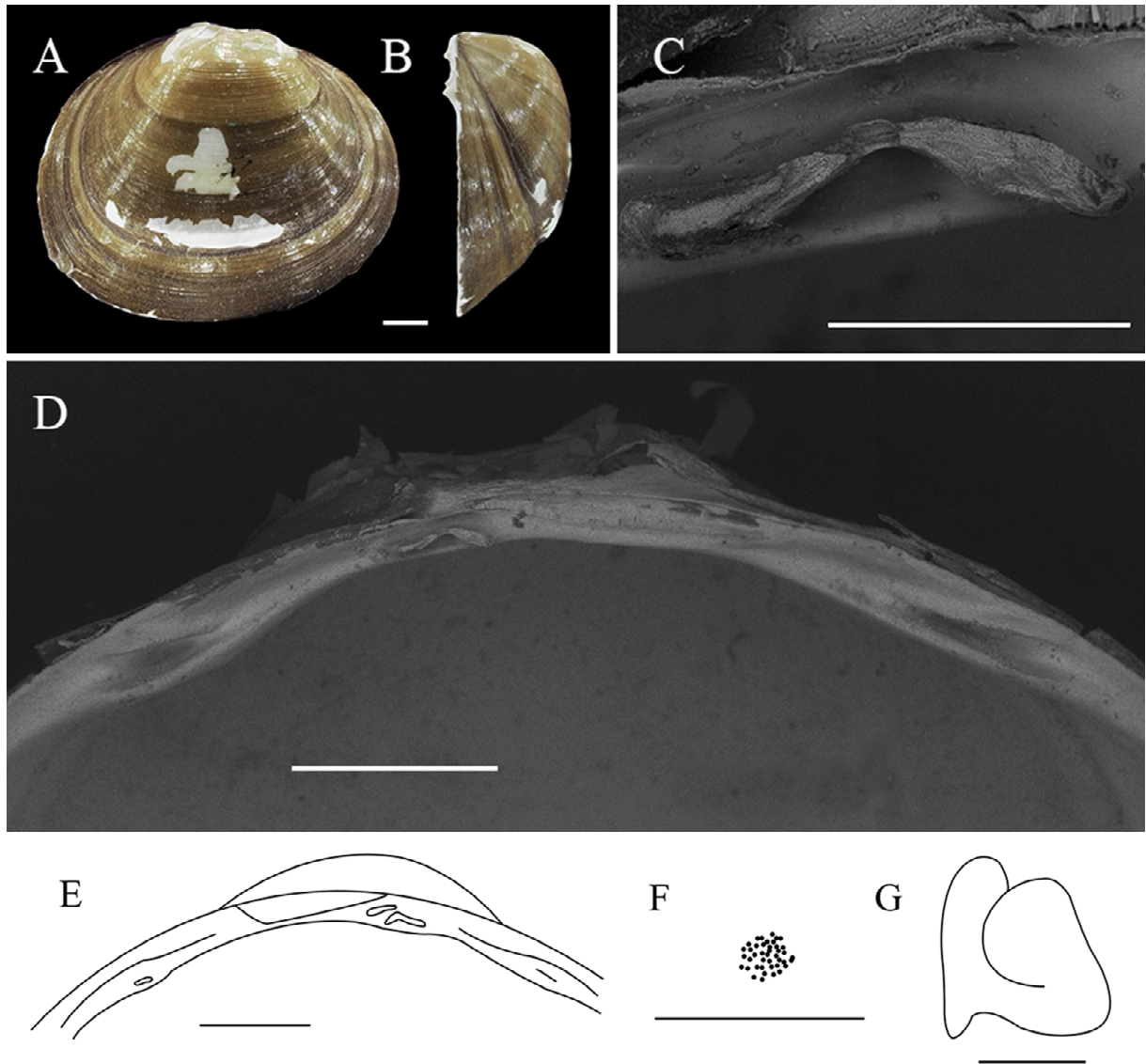


FIG. 6. *Sphaerium nucleus* (Malaya Sher'ya River, MCO-3322). **A, B.** Shell. **C.** Cardinal teeth on the right valve. **D.** Hinge of the right valve. **E.** Hinge of the left valve. **F.** Pores. **G.** Nephridium dorsally. Scale bars 1 mm (**A, B, D, E, F, G**), 0.3 mm (**C**). **A-D** – original illustrations, **E-G** – after Korniushev, 2001.

РИС. 6. *Sphaerium nucleus* (р. Малая Шерья, МСО-3322). **A, B.** Раковина. **C.** Кардинальный зуб правой створки. **D.** Замочная площадка правой створки. **E.** Замочная площадка левой створки. **F.** Поры. **G.** Нефридий дорсально. Шкала 1 мм (**A, B, D, E, F, G**), 0.3 мм (**C**). **A-D** – оригинальные снимки, **E-G** – по: Korniushev, 2001.

6 A, B), relatively broad hinge plate (see Fig. 6D), smoothly bent cardinal tooth of the right valve (see Fig. 6 C, D), hooked inner cardinal tooth of the left valve (see Fig. 6E), dense porosity (see Fig. 6F) and closed type of nephridium with square dorsal lobe (see Fig. 6G).

Ecology in the studied region. *Sph. nucleus* was recorded from shallows of small rivers where it lives on silted sandy-gravel substrates among macrophytes.

Sphaerium (Sphaerium) ovale
(Férussac, 1807)
(Figs 7, 11)

Cyclas ovalis Férussac, 1807: 128.

Amesoda falsinucleus Novikov in Starobogatov, Korniushev, 1986 [1987]: 37.

Previous records from the studied region:

Nucleocyclas radiatum. – Shadrin, Pan'kov, 2000: 258 (Perm Region); Pan'kov, 2004: 25 (middle and lower Sylva River and floodplain waterbodies of Sylva River basin);

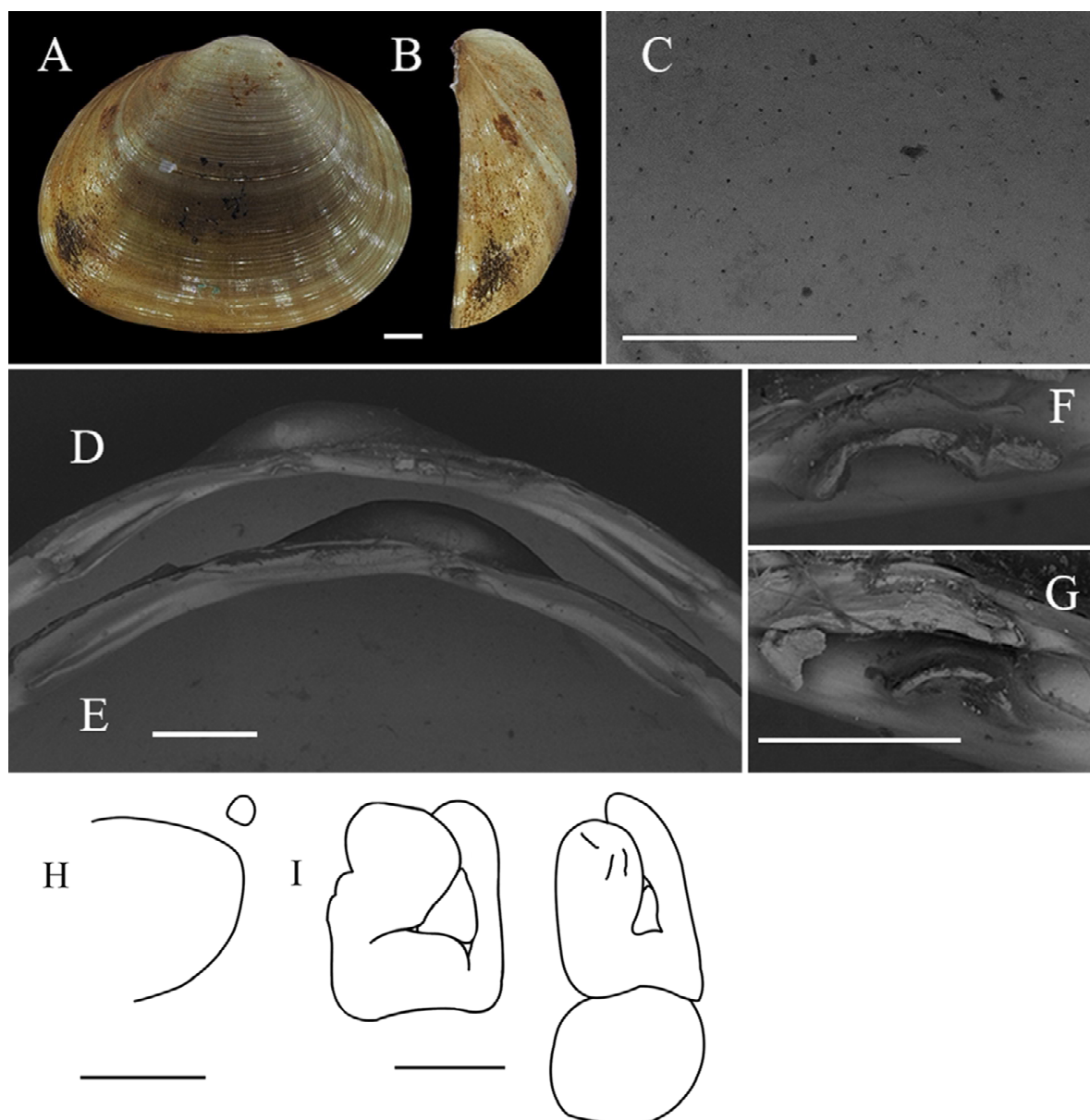


FIG. 7. *Sphaerium ovale* (Saigatka River, MCO-7632). **A, B**. Shell. **C**. Shell pores. **D, E**. Hinge (**D** – the right valve, **E** – the left valve). **F, G**. Cardinal teeth of the hinge (**F** – on the right valve, **G** – on the left valve). **H**. Scars of the posterior adductor and siphonal retractor. **I**. Nephridium dorsally. Scale bars 1 mm (**A, B, D, E, H, I**), 0.5 mm (**C**), 0.3 mm (**F, G**). **A-G** – original illustrations, **H, I** – after Korniushev, 2001.

РИС. 7. *Sphaerium ovale* (р. Сайгатка, МСО-7632). **A, B**. Раковина. **C**. Поры раковины. **D, E**. Замок (**D** – правая створка, **E** – левая створка). **F, G**. Кардинальные зубы замка (**F** – на правой створке, **G** – на левой створке). **H**. Отпечатки заднего аддуктора и сифонального ретрактора. **I**. Нефридий дорсально. Шкала 1 мм (**A, B, D, E, H, I**), 0.5 мм (**C**), 0.3 мм (**F, G**). **A-G** – оригинальные снимки, **H, I** – по: Korniushev, 2001.

Pozdeev, 2006: 51 (middle and lower Chusovaya River); Pan'kov, 2008: 38 (middle Sylva River); Starova, Pan'kov, 2009: 64 (in small rivers of the central part of Solikamsk depression); Pan'kov, 2013: 45 (Yaz'va River); Ovchankova *et al.*, 2015: 128 (Kama River basin).

Material examined. Nytvya River near Dvoretz, 58°00.85'N, 54°56.67'E, coll. N.N. Pan'kov, 08.05.2013, MCO-7588 (1 sp). Malaya Sher'ya River, coll. N.N. Pan'kov, 08.05.2013, MCO-3564 (1 sp). Bartevka River near Nytvya, 57°55.81'N, 55°19.00'E, coll. N.N. Pan'kov, 25.05.2013,

MCO-7589 (1 sp). Sher'ya River, coll. N.N. Pan'kov, 25.05.2013, MCO-3565 (1 sp). Verhnyaya Mulyanka River near Koyanovo, coll. N.B. Ovchankova, A.V. Laptev, 28.08.2014, MCO-3562 (4 sp). Votkinsk Reservoir near Okhansk, the right bank shoal, coll. N.B. Ovchankova, 17.10.2014, MCO-3567 (3 sp). Dobryanka River near Fominka, 58°33.68'N, 56°39.02'E, coll. S.V. Vlasov, A.V. Laptev, 20.10.2014, MCO-3563 (1 sp). Ocher River near Gryaznovo, coll. S.V. Vlasov, 11.06.2016, MCO-6598 (2 sp). Ocher River near Ocher, coll. S.V. Vlasov, 12.06.2016, MCO-6615

(3 sp), 30.11.2016, MCO-7182 (1 sp). Saigatka River, coll. N.B. Ovchankova, S.V. Vlasov, 04.10.2016, MCO-7632 (1 sp).

In total – 19 specimens examined.

Distribution. Northern Palaearctic (Europe, Siberia) [Vinarski, Kantor, 2016].

Distribution in Prikamye. The findings of *Sph. ovale*, few in number, have been made in the middle part of the Votkinsk Reservoir basin (in small rivers of the western part of Prikamye).

Morphology. The specimens of *Sph. ovale* from Prikamye are morphologically similar to those described in Korniushev [2001]. As compared to *Sph. nucleus*, shell of this species is larger and more compressed (see Fig. 7 A, B). The hinge is characterized by smoothly bent cardinal tooth in the right valve (see Fig. 7 D, F), curved inner cardinal tooth and straightened outer one in the left valve (see Fig. 7 E, G). Species has a peculiar type of nephridium intermediate between those of *S. corneum* and *S. nucleus* but distinct from both of them: the dorsal lobe is as broad as in *S. nucleus*, but a small proximal portion is constantly visible between its branches (see Fig. 7I). The scar of the siphonal retractor is separated from the posterior adductor scar (see Fig. 7H). Shells of this species have low density of pores (see Fig. 7C).

Ecology in the studied region. The species has been recorded from rivers (in parts with slowed current) and floodplain lakes (chiefly living on sandy substrates with varying level of silt).

Sphaerium (Sphaerium) scaldianum
(Normand, 1844)
(Figs 8, 9)

Cyclas scaldiana Normand, 1844: 5, figs. 1, 2.

Previous records from the studied region:

Sphaerium corneum var. *scaldianum*. – Gromov, 1947: 182 (Kama River from Galevo to the Belaya River); Tauson, 1947: 58 (Pokrovsky and Aleksandrovsky Ponds middle Kama River); Gromov, 1949: 126 (Kama River near Okhansk); Vershinin, 1953: 527 (floodplain of the Kama River, in lakes); Gromov, 1954: 898 (lower Chusovaya River).

Sphaerium scaldianum. – Gromov, 1953: 59 (Kama River basin, a number of localities); Gromov, 1959: 73 (lower Sylva River from Kungur to Ser'ga); Demidova, 1965: 108-109 (Kama Reservoir, in several localities); Shadrin, Pan'kov, 1994: 87 (middle Sylva River from Shamary to Kungur).

Amesoda scaldiana. – Gorelikova, 1982: 92 (Kama River, Votkinsk Reservoir); Pozdeev, 2006: 51 (middle Chusovaya River); Aleksevina *et al.*, 2011: 22 (Malaya Usolka River, in a pond); Ovchankova, 2013: 133 (Votkinsk Reservoir near Okhansk); Aleksevina, Presnova, 2013b: 70 (Votkinsk Reservoir, near Okhansk, in mainstream); Ovchankova, 2015: 75 (Votkinsk Reservoir near Okhansk); Ovchankova *et al.*, 2015: 128 (Kama River basin).

Cyrenastrum scaldianum. – Pan'kov, 2000: 124 (Obva River near Karagay); Shadrin, Pan'kov, 2000: 258 (Perm Region; Kama River basin); Pan'kov, 2004: 25 (middle and

lower Sylva River, and its floodplain); Pan'kov, 2008: 38 (middle Sylva River).

Material examined. Malaya Mel'nichnaya River, coll. N.B. Ovchankova, S.V. Vlasov, 28.08.2014, MCO-3144 (17 sp). Pyzh River, 57°55.83'N, 56°06.14'E, coll. N.B. Ovchankova, A.V. Laptev, 02.09.2014, MCO-3189 (1 sp). Nizhnaya Mulyanka River, 57°56.01'N, 55°54.32'E, coll. N.B. Ovchankova, A.V. Laptev, 30.09.2014, MCO-3221 (1 sp). Babka River, 57°27.86'N, 56°52.62'E, coll. N.B. Ovchankova, S.V. Vlasov, 07.10.2014, MCO-3249 (1 sp). Syuz'va River, 58°08.34'N, 55°32.11'E, coll. S.V. Vlasov, A.V. Laptev, 16.10.2014, MCO-3303 (2 sp). Dobryanka River near Fominka, 58°33.68'N, 56°39.02'E, coll. S.V. Vlasov, A.V. Laptev, 20.10.2014, MCO-3274 (3 sp). Sylva River, coll. N.B. Ovchankova, S.V. Vlasov, 03.06.2015, MCO-3463 (1 sp). Ocher River near Gryaznovo, coll. S.V. Vlasov, 11.06.2016, MCO-6597 (4 sp), 01.10.2016, MCO-7414 (4 sp). Ocher River near Ostrozhka, coll. S.V. Vlasov, 11.06.2016, MCO-6637 (1 sp), 21.08.2016, MCO-7369 (19 sp), 02.10.2016, MCO-7426 (10 sp), 30.11.2016, MCO-7310 (4 sp). Ocher River near Ocher, in the right bank shallow, among macrophytes, coll. S.V. Vlasov, 12.06.2016, MCO-6638 (11 sp). Ocher River near Ocher, coll. S.V. Vlasov, 12.06.2016, MCO-6613 (8 sp), 09.07.2016, MCO-7347 (2 sp), 22.08.2016, MCO-7380 (7 sp), 01.10.2016, MCO-7397 (13 sp), 30.11.2016, MCO-7181 (12 sp). Ocher River near Kipri-no, 57°53.96'N, 54°29.96'E, coll. S.V. Vlasov, 09.07.2016, MCO-7344 (1 sp). Syominskiy Pond, 59°23.43'N, 56°49.42'E, coll. N.B. Ovchankova, A.V. Laptev, 18.07.2016, MCO-7072 (2 sp). Saigatka River, coll. N.B. Ovchankova, S.V. Vlasov, 04.10.2016, MCO-7207 (27 sp). Sylva River near Koshelevo, 57°09.46'N, 57°25.29'E, coll. A.B. Krash-eninnikov, 15.04.2017, MCO-7445 (1 sp). Verhnyaya Mulyanka River coll. N.B. Ovchankova, S.V. Vlasov, 14.05.2017, near Koyanovo, MCO-7610 (26 sp), near Zamulyanka, 57°54.3'N, 56°16.23'E, MCO-7619 (1 sp). Kama Reservoir in the right bank shallow near Stepkovka, 59°07.18'N, 56°10.71'E, coll. S.V. Vlasov, 12.05.2017, MCO-7600 (1 sp).

In total – 161 specimens examined.

Distribution. Europe and Western Siberia [Vinarski, Kantor, 2016].

Distribution in Prikamye. This species is widespread in the central part of Prikamye (most of its reliable findings were made in the Votkinsk Reservoir basin).

Morphology. The specimens of *Sph. scaldianum* from Prikamye are morphologically similar to those described in the literature [Alimov, Starobogatov, 1968; Piechocki, 1989; Korniushev, 2001]. This species can be distinguished from the typical *S. corneum* by its larger size, elongated shell and narrower umbo (see Fig. 8 A, B). The scar of the siphonal retractor is separated from those of the posterior adductor (see Fig. 8H). The nephridium shape of *S. scaldianum* is the same as in *S. corneum* s. str. (see Fig. 8I). The number of pores is intermediate between *S. corneum* and *S. nucleus* (see Fig. 8C).

Ecology in the studied region. The species has been recorded chiefly from riverbeds (on sandy and mixed substrates with varying level of silt). We observed this species to live together with *Sph. corneum*.

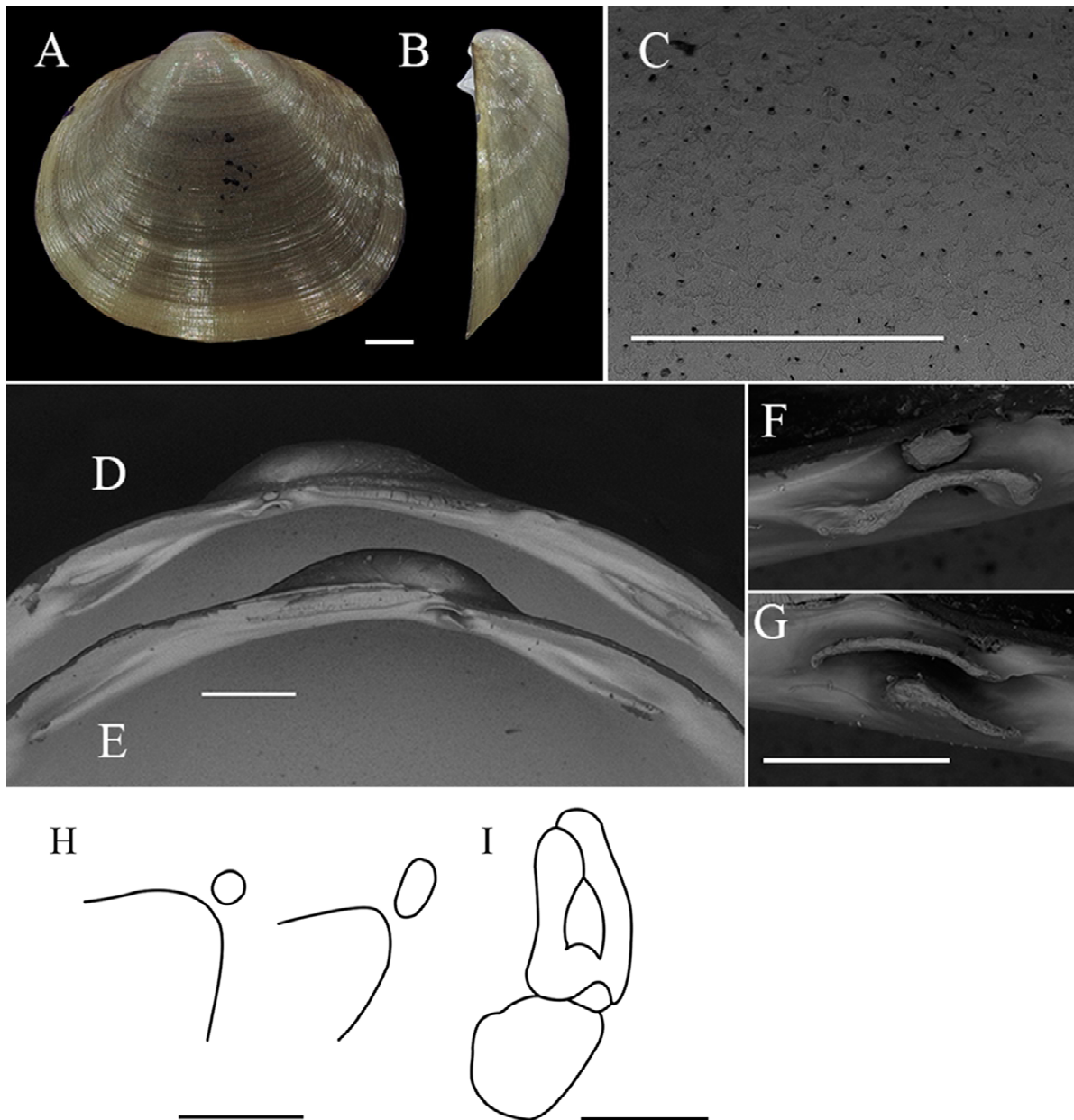


FIG. 8. *Sphaerium scaldianum* (Saigatka River, MCO-7207). A, B. Shell. C. Shell pores. D, E. Hinge (D – the right valve, E – the left valve). F, G. Cardinal teeth of the hinge (F – on the right valve, G – on the left valve). H. Scars of the posterior adductor and siphonal retractor. I. Nephridium dorsally. Scale bars 1 mm (A, B, D, E, H, I), 0.5 mm (C), 0.3 mm (F, G). A-G – original illustrations, H, I – after Korniushev, 2001.

РИС. 8. *Sphaerium scaldianum* (р. Сайгатка, МСО-7207). А, В. Раковина. С. Поры раковины. D, E. Замок (D – правая створка, E – левая створка). F, G. Кардинальные зубы замка (F – на правой створке, G – на левой створке). H. Отпечатки заднего аддуктора и сифонального ретрактора. I. Нефридий дорсально. Шкала 1 мм (A, B, D, E, H, I), 0.5 мм (C), 0.3 мм (F, G). A-G – оригинальные снимки, H, I – по: Korniushev, 2001.

Discussion

The current list of the sphaeriine bivalves of the studied area comprises 8 species belonging to the two genera – *Musculium* (1 species) and *Sphaerium* (7 species). One species, *Sphaerium asiaticum*, is recorded here for the first time from the Kama region.

The records of certain species (*Musculium crep-*

lini, *M. ryckholti*, *Sphaerium draparnaldii*, *Sph. galitzini* Clessin, 1875, and *Sph. nitidum* Clessin in Westerlund, 1876), which are known only from literature [Oparina-Kharitonova, Kharitonov, 1925; Gorelikova, 1982; Aleksevina, Gorelikova, 1988; Shadrin, Pan'kov, 1994, 2000; Shadrin, 2000; Leshko *et al.*, 2001; Pan'kov, 2004; Pozdeev, 2006; Aleksevina *et al.*, 2011; Aleksevina, Presnova, 2013a], have been excluded from the final version of the

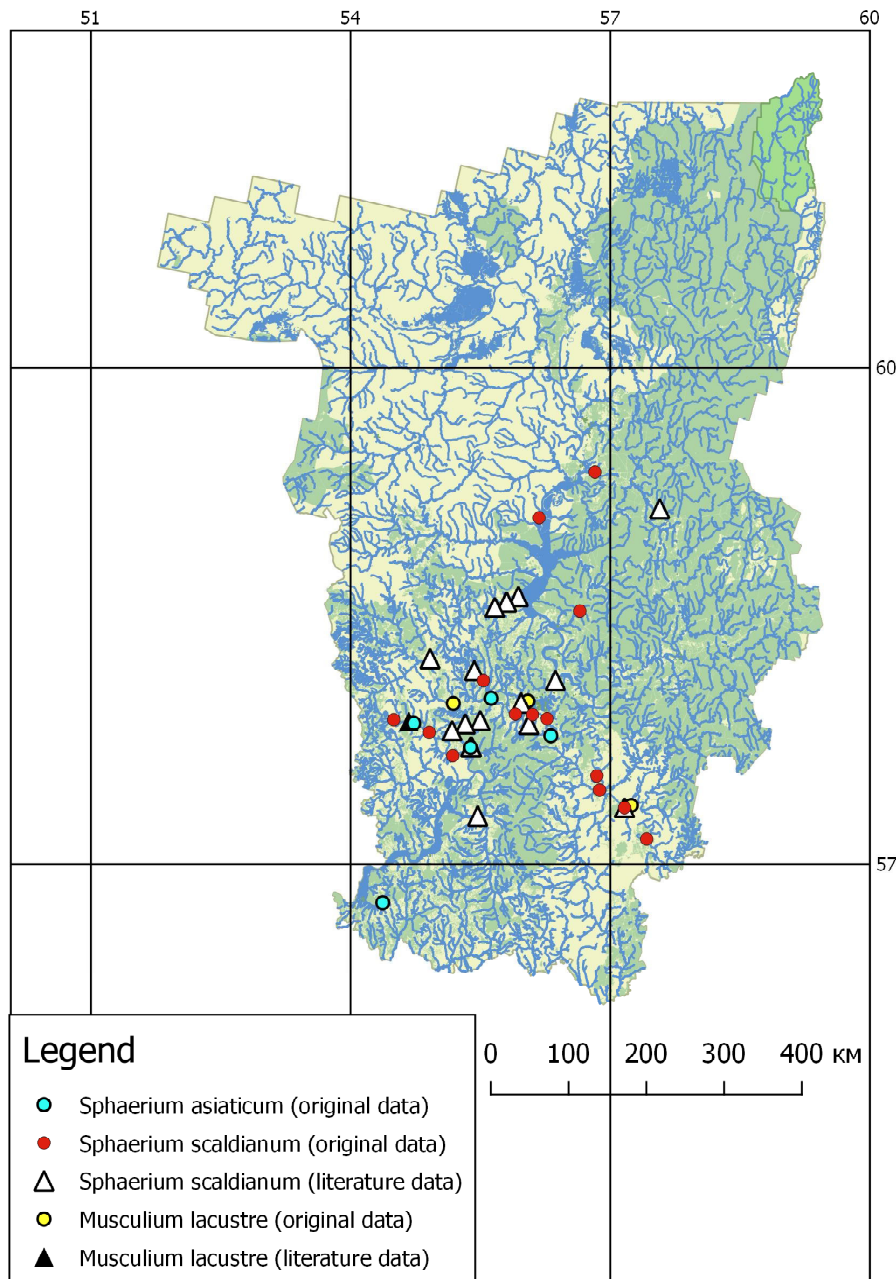


FIG. 9. Distribution of *Sphaerium asiaticum*, *Sph. scaldianum* and *Musculium lacustre* in the studied region.

РИС. 9. Распространение *Sphaerium asiaticum*, *Sph. scaldianum* и *Musculium lacustre* в исследуемом регионе.

check-list. The reason of this decision is that it is impossible to verify the correctness of species identifications provided by the authors quoted above due to loss of the voucher specimens. Besides, Korniushev [2001] consider these taxa (except *Sph. nitidum*) as the junior synonyms of other sphaeriine species. The records of *Sph. nitidum* in the Prikamye region (Votkinsk Reservoir, middle Sylva River and the pond on Malaya Usolka River) are rather doubtful. Korniushev [1996] stated that this species is distributed chiefly in the northern latitudes (the Arctic and Subarctic zones of Europe and Siberia)

where lives in small tundra lakes. No specimen of *Sph. nitidum* was found in examined collections, and its alleged presence in the region needs a confirmation.

The taxonomic status of *Sph. scaldianum* still remains questionable. According to Korniushev [2001], this species represents a subspecies of *Sph. corneum*. On the other hand, Graf and Cummings [2018] suppose that *Sph. scaldianum* is a synonym of *Sph. nucleus*. My observations have shown that *Sph. scaldianum* may be distinguished from *Sph. corneum* by a set of traits: the separate position of

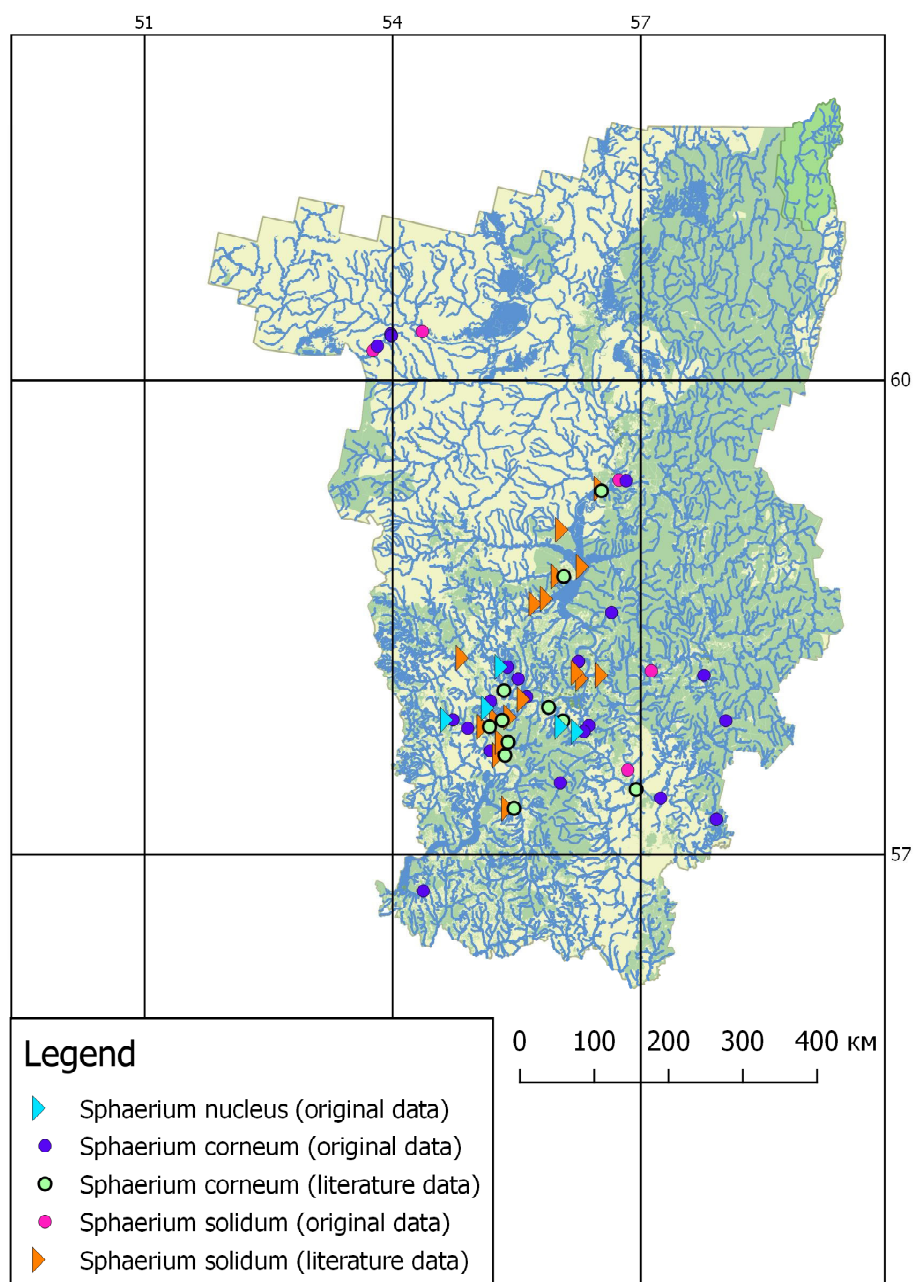


FIG. 10. Distribution of *Sphaerium nucleus*, *Sph. corneum* and *Sph. solidum* in the studied region.

РИС. 10. Распространение *Sphaerium nucleus*, *Sph. corneum* и *Sph. solidum* в исследуемом регионе.

the scars of the siphonal retractor and the posterior adductor, the higher porosity of shells, and the S-like shape of the cardinal teeth of the left valve. The differences between *Sph. scaldianum* and *Sph. nucleus* lie in the distinct pattern of shell porosity as well as in different structure of the nephridium. On the basis of our observations and the published data I think that *Sph. scaldianum* is neither a synonym of *Sph. nucleus* nor a subspecies of *Sph. corneum*.

According to my data, the sphaeriine molluscs in Prikamye may occupy a broad range of waterbodies, from small ponds and floodplain lakes to

large rivers and reservoirs. The typical rheophilic species [in accordance with ecological classification of Korniushev, 1996], *Sph. asiaticum*, *Sph. rivicola*, *Sph. scaldianum* and *Sph. solidum*, were recorded on sandy and mixed substrates. Among these clams, *Sph. asiaticum* and *Sph. solidum* may occur in slowly flowing rivers where they live on silted rocky substrates with admixture of clay; these species were found in small rivers of the middle Kama River basin living among macrophytes. In addition, *Sph. solidum* was recorded in floodplain lakes, on silty substrates with phytodetritus deposi-

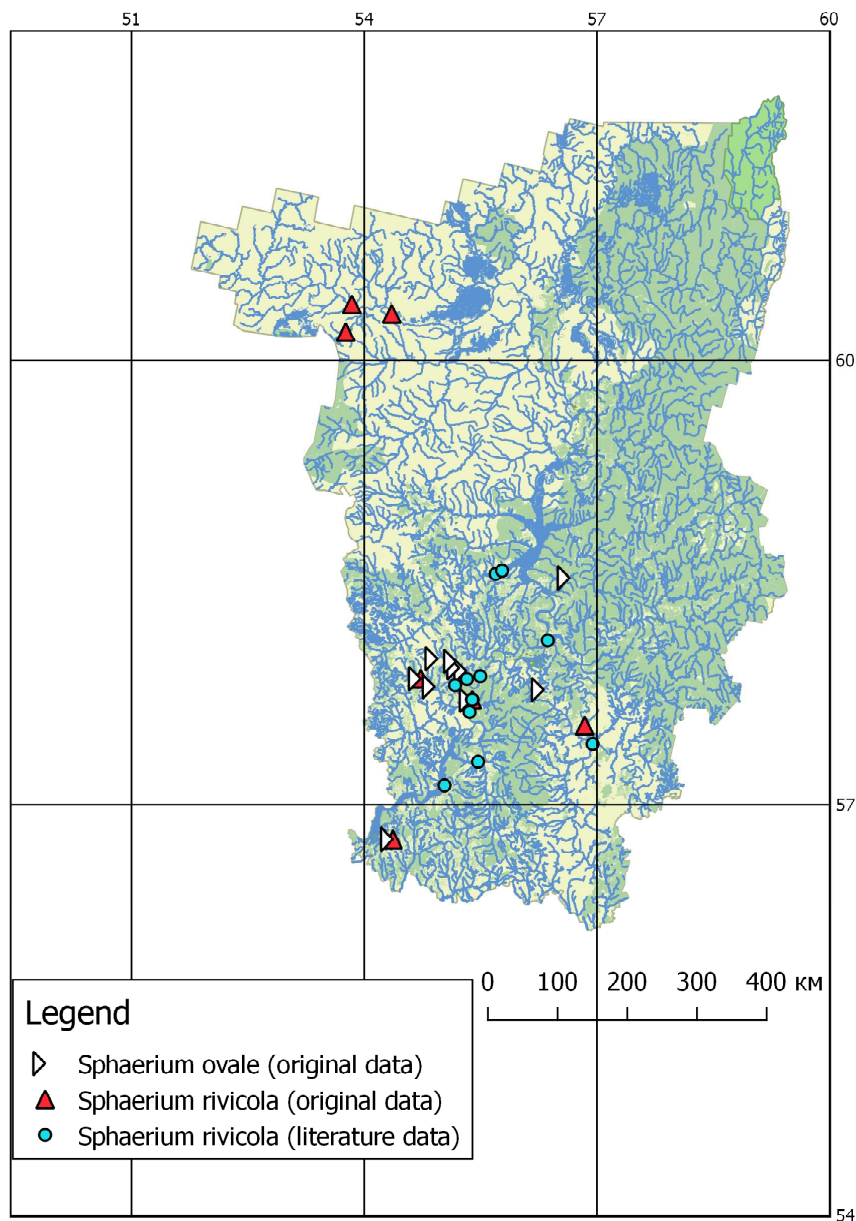


FIG. 11. Distribution of *Sphaerium ovale* and *Sph. rivicola* in the studied region.

РИС. 11. Распространение *Sphaerium ovale* и *Sph. rivicola* в исследуемом регионе.

tion. Two species, *Sph. corneum* and *Sph. ovale*, were found in slowly flowing rivers and floodplain lakes, predominantly on soft substrates (sand and silt). The few specimens of *S. nucleus* were recorded in small rivers of the middle Kama River basin, where they are living in shallows among macrophytes (on soft and sand-gravel substrates). Two taxa, rheophilic *Sph. scaldianum* and limnophilic *Sph. corneum*, are the most widespread sphaeriine species in the studied region. Rheophilic *Sph. rivicola* and *Sph. solidum* may be characterized as quite common in Prikamye. The other sphaeriine species are rare.

According to scheme of zoogeographic zonation of continental waters of Eurasia [Kruglov, Star-

obogatov, 1993], the Prikamye waterbodies belong to the Middle Volgan province of the North-European superprovince of the European-Central-Asiatic subregion of the Palaearctic region. The sphaeriine fauna of the studied area consists of Holarctic, Trans-Palaearctic and European-Siberian faunal elements. The European-Siberian group (*Sph. asiaticum*, *Sph. solidum*, *Sph. rivicola*, *Sph. nucleus* and *Sph. scaldianum*) encompasses more than half of the whole fauna (62.5%). The rest part of the malacofauna is characterized by either Trans-Palaearctic (*Sph. corneum* and *Sph. ovale*) or Holarctic (*M. lacustre*) types of distribution (25% and 12.5%, respectively). So I support opinion of Vinarski [2008, 2014] that there is a «migration corridor» in the

southern part of the Ural Ridge which facilitates the exchange of faunal elements between the European and the North Asian parts of the Palaearctic region.

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Двустворчатые моллюски подсемейства Sphaeriinae в водоёмах Прикамья (Средний Урал)

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РЕЗЮМЕ. Представлен аннотированный и иллюстрированный перечень видов моллюсков подсемейства Sphaeriinae (семейство Sphaeriidae) водоемов Прикамья (Средний Урал) с указанием конкретных местообитаний всех видов в исследуемом регионе. На основе изучения собственных сборов и критического анализа литературных данных, из региона указываются 8 видов, принадлежащих двум родам (*Musculium* и *Sphaerium*). Один из этих видов, *Sphaerium asiaticum*, впервые приводится для водоемов Прикамья. Даны экологические характеристики всех видов, а также замечания об их распространении в регионе. С зоогеографической точки зрения большинство выявленных видов принадлежит евро-сибирской фаунистической группировке.