

The family Margaritiferidae (Mollusca: Bivalvia) in Russia

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ABSTRACT. The taxonomic review of the family Margaritiferidae was based on shell and soft tissues morphology. Russian pearl mussels are found to belong to 14 species in 3 genera: *Margaritifera* Schumacher, [1815], *Dahurinaia* Starobogatov, 1970 and *Kurilinaia* Zatravkin et Bogatov, 1988, which was originally described as a subgenus of the genus *Dahurinaia*. The genus *Margaritifera* is distributed in the Russian north-west and is represented by 3 species: *M. margaritifera* (L., 1758), *M. elongata* Lamarck, 1819 and *M. borealis* Westerlund, 1871. The two last ones are new to Russia. The genus *Dahurinaia* inhabits the Amur River drainage, southern Primorye Territory and the north-western part of Sakhalin Island. This genus includes 6 species, 3 of which are new to science: *D. dahurica* (Middendorff, 1850), *D. tiunovae* Bogatov et Zatravkin, 1988, *D. suifunensis* Moskvicheva, 1973, *D. komarovi* Bogatov, Prozorova et Starobogatov sp. nov., *D. ussuriensis* Bogatov, Prozorova et Starobogatov sp. nov., *D. prozorovae* Bogatov et Starobogatov sp. nov. The genus *Kurilinaia* occurs on the Kuril Archipelago, Kamchatka Peninsula and Sakhalin Is. (except the north-western regions of the island) and Hokkaido. The genus is represented by 5 species, 2 of which are new to science: *K. laevis* (Haas, 1910), *K. kurilensis* (Zatravkin et Starobogatov, 1984) (syn. *D. shigini* Zatravkin et Bogatov, 1987), *K. middendorffi* (Rosen, 1926), *K. kamchatica* Bogatov, Prozorova et Starobogatov sp. nov. и *K. zatravkini* Bogatov, Prozorova et Starobogatov sp. nov. Diagnoses of the new species and key to the genera and species of the Russian representatives of the family Margaritiferidae are presented.

The family Margaritiferidae, pearl mussels, is a group of large freshwater Bivalvia (naiades) not rich in species and genera. It includes now three subfamilies, two of which are divided into 2 tribes each [Starobogatov, 1970]. More often, however, the family under discussion is not divided into subfamilies. The representatives of the family as generally accepted (subfamily Margaritiferinae sensu Starobogatov, 1970) are: *Ctenodesma* Simpson, 1900; *Ptychorhynchus* Simpson, 1900; *Heudeana* Frierison, 1922; *Schepmania* Haas, 1912; *Margaritanopsis* Haas, 1913; *Dahurinaia* Starobogatov, 1970; *Margaritifera* Schumacher, "1816"; *Cumberlandia*

Ortman, 1911; *Pseudunio* Haas, 1913; *Schaliennaia* Starobogatov, 1970. The first six genera are distributed in the North and Southwest Pacific drainage area. The last four genera (*Margaritifera* — *Schaliennaia*) are present in the Atlantic (including Barents and White seas) drainage area.

The group maintains some ancestral characters owing to its ecological preferences. Inhabitants of pure cold-water springs and small rivers saturated with oxygen, these rare mollusks are very susceptible to the deterioration of external conditions and they are in most regions included in Red Books, international or regional.

It should be mentioned that two competing names of the family type genus exist: *Margaritifera* Schumacher, "1816" and *Margaritana* Schumacher, 1817. The name *Margaritana* was widely used in the literature until 1940-1945 but then forced out by *Margaritifera*, which has priority. To resolve this problem with Margaritiferidae nomenclature, Opinion 495 of the International Commission on Zoological Nomenclature was issued [1957]. This Opinion reinstated the genus group name *Margaritifera* Schumacher, "1816" and rejected its junior objective synonym *Margaritana* Schumacher, 1817. The name *Margaritifera* Schumacher, "1816" is declared an invalid original spelling of *Margaritifera*. Unfortunately, the reference to the original publication of *Margaritifera* Schumacher in Opinion 495 contains two errors. Opinion 495 [1957] gives the volume number of the journal containing Schumacher's paper as 7, but this is not evident from the journal itself; no other author quotes a volume number. The second inaccuracy is that Schumacher's article was apparently published in 1815. The facts of the case have been supplied by D. Kadolsky and are listed below.

The volume does not bear a number, and the publication date of 1816 is only printed on the last page, i.e. p. 42. According to Gosch [1878: 217] the actual publication date of Schumacher's article is 1815, and the "last two years" in the journal title refer to 1813-1815. The latest date mentioned in the journal text is 1814 (p. 5, 6, 9, 30). Possibly the last part (pp. 31-42) of this volume was actually published later (i.e. 1816) than the first part, or the date of 1816 was printed in anticipation of the intended distribution date early in 1816, but actual publication

was achieved earlier. Subsequent authors, including the authors of Opinion 495 [1957] most probably did not consult Gosch [1878], but took the publication date 1816 from p. 42 of the journal.

Confusingly, Schumacher's article was reprinted in another issue of the same journal, which, according to the title page, contains an overview of the works of the Society's members from 1814 to 1822, but actually reports on the period until 31 May 1824 (p. XXXVI). The article is reprinted literally on p. VI, except that *Margaritifera* is now misspelt *Margartifera*. This is a subsequent erroneous spelling without nomenclatural standing. It is quoted in the nomenclator of Schulze et al. [1929, p. 1972] with a publication date of 1823, but according to the foregoing it must have been published post 31 May 1824. So, the generic name is *Margaritifera* Schumacher, [1815] with *Margartifera* Schumacher, [1815] as an incorrect original spelling, and *Margartifera* Schumacher, 1824 as an incorrect subsequent spelling.

The first keys to identification of freshwater Mollusca of the USSR were written by W.I. Shadin [1938, 1952]. These keys contain species belonging at that time to the genus *Margaritifera*. Those 4 species are: *M. margaritifera* (Linnaeus, 1758) — North West Europe; *M. dahurica* (Middendorff, 1850) — Amur drainage area; *M. middendorffi* (Rosen, 1926) = *Unio complanatus* Middendorff, 1851 (not Dillwyn, 1817; nor Barnes, 1823) — Kamchatka; *M. sachalinensis* Shadin, 1938 = *Ptychorhynchus laevis* Haas, 1910 — South Sakhalin.

Later the Far Eastern species were separated in the genus *Dahurinaia* Starobogatov, 1970, to which 4 more species were later added: *D. sufjunensis* Moskvicheva, 1973 — Razdolnaya (Sujfun) River drainage area, *D. kurilensis* Zatravkin et Starobogatov, 1984 — southern Kuril Islands, *D. schigini* Zatravkin et Bogatov, 1987 — Kunashir Island (southern Kuril Islands); *D. tiunovae* Bogatov et Zatravkin, 1988 — Amur River drainage.

The genus *Dahurinaia* in its turn was divided into two subgenera: *Dahurinaia* s. str. and *Kurilinaia* Zatravkin et Bogatov, 1988. It is important that members of the subgenus *Dahurinaia* s. str. are completely devoid of posterior ("pseudolateral") teeth contrary to *Margaritifera* and the subgenus *Dahurinaia* (*Kurilinaia*) in which rudimentary posterior teeth are present.

Repeated study of the collections of the Zoological Institute of Russian Academy of Sciences, St.-Petersburg (ZISP) and the Institute of Biology and Soil Science of the Far East Branch of Russian Academy of Sciences, Vladivostok (IBSS) allowed to review the taxonomy of eastern Margaritiferidae based on both shell characters, including the dentition (about 600 specimens), and soft part morphology (about 180 specimens). A special attention was paid to shell shape, curve of frontal section, degree of development of anterior and posterior teeth in the dentition, external and internal sculpture (impressions on valve surface in places of attachment of small

mantle muscles — scars of small mantle muscles), morphology of siphons and posterior margin of foot. The study of conchological characters demonstrated that the Far Eastern and North European specimens may be easily divided into three groups. The first group, *Dahurinaia* s. str., is distributed in the Amur drainage and the Razdolnaya (former Sujfun) drainage (South Primorye) areas and characterized by a complete reduction of posterior teeth combined with a reinforcement of the anterior teeth. The dentition of European *Margaritifera* and Far Eastern *Kurilinaia* is characterized by the presence of 1-2 small ridges in the left valve, which may be interpreted as a rudimentary posterior teeth. However, the degree of development of anterior teeth in the two mentioned groups of pearly mussels is sufficiently different because the dentition of the European forms is weaker than that of the forms inhabiting the Kuril Archipelago, Sakhalin, and the Kamchatka Peninsula. Further, there are evident scars of small mantle muscles in the middle part of each valve in *Margaritifera*; such scars are absent in *Dahurinaia* and *Kurilinaia*, although the mantle muscles scars are visible as very small dots over the entire interior surface (except for the margins) of the shell. Based on our conchological study, we interpret the studied species of Margaritiferidae as representing three genera: *Margaritifera*, *Dahurinaia* and *Kurilinaia*.

The structure of the soft body and especially siphons permits us to divide our pearl mussels into the same three groups: *Margaritifera*, *Dahurinaia* and *Kurilinaia*. As can be seen in Fig. 1 (A, B) the interior margin of inhalant siphon in European *Margaritifera* is armed by one to three (or sometimes more) acute or blunt finger-like structures. Margins of exhalant siphons are represented by external and internal skinny folds. The lateral surface of the folds is decorated by small papilliform knobs. These outgrowths (Fig. 1 C, D) are visible also between external folds of the exhalant siphon and mantle (Fig. 1 E). Insular species (Fig. 1 F, G) have large multifingered folds, which transform in adults into structures similar to those from the Amur — Primorye area and are devoid of finger-like processes. When such processes are present they are localized only in the lower part of the inhalant siphon. The exhalant siphon mantle border is devoid of papilliform processes (Fig. 1 H). It is established that all European Margaritiferidae (uncertain: *Pseudunio*), contrary to the Far Eastern ones, are characterized by the presence of a pedal carina — a lamellar plate disposed along the posterior margin of the foot and between the gills (Fig. 1 I-L).

A morphological study of about 90 shells of European pearl mussels from the collection of ZISP from the Leningrad Region and the Kola Peninsula, previously identified as *Margaritifera margaritifera*, revealed 3 species: *M. margaritifera* proper, of which a drawing is presented in Shadin's monographs [1938; 1952: 249], *M. elongata* Lamarek, 1819 (Fig. 2 A, D) and *M. borealis* Westerlund, 1871 (Fig. 2 B, C). These species are well distinguished

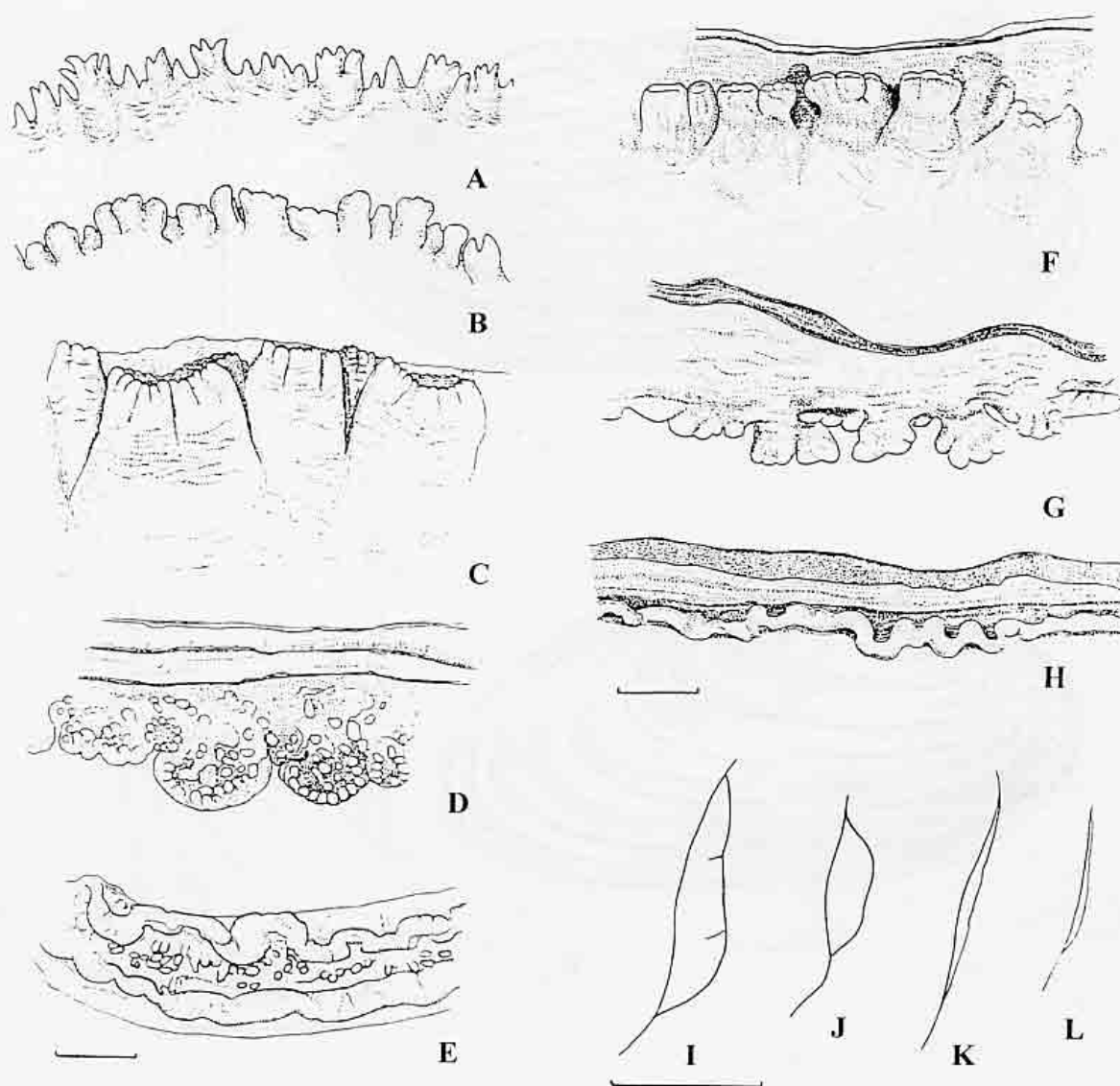


FIG. 1. Morphology of siphons (A-H) and posterior margin of foot with a pedal carina (I-M) in different species and genera of Margaritiferidae: A - *Margaritifera margaritifera* from Ba River, Scotland (inhalant siphon, inner view); B - *M. borealis* from Gladyshevka River near Sosnovaya Polyana settlement, Leningrad region, Russia (inhalant siphon, inner view); C, D - *Dahurinaia suffunensis* from Komarovka River, Primorye Territory, Russia (inhalant siphon, inner and lateral views); E - *D. suffunensis* from Komarovka River, Primorye Territory (exhalant siphon, lateral view); F, G - *Kurilinaia kurilensis* from Iturup Island, Kuril Archipelago, Russia (inhalant siphon, inner and lateral views); H - *K. kurilensis* from Iturup Island (exhalant siphon, lateral view); I - *Margaritifera margaritifera* from Ba River; J - *M. borealis* from Gladyshevka River; K - *Dahurinaia dahurica* from Bolshaya Ussurka River, Primorye Territory; L - *Kurilinaia kurilensis* from Iturup Island. Scale bar: 1 cm.

РИС. 1. Морфология сифонов (A-H) и заднего края ноги, снабженного педальным килем (I-M) у разных видов и родов Margaritiferidae: A - *Margaritifera margaritifera* из р. Ба, Шотландия (вводной сифон, вид изнутри); B - *M. borealis* из р. Гладышевка вблизи пос. Сосновая Поляна, Ленинградская область (вводной сифон, вид изнутри); C, D - *Dahurinaia suffunensis* из р. Комаровка, Приморский край (вводной сифон, вид изнутри и сбоку); E - *D. suffunensis* из р. Комаровка (выводной сифон, вид сбоку); F, G - *Kurilinaia kurilensis* с о-ва Итуруп, Курильские о-ва (вводной сифон, вид изнутри и сбоку); H - *K. kurilensis* с о-ва Итуруп (выводной сифон, вид сбоку); I - *Margaritifera margaritifera* из р. Ба; J - *M. borealis* из р. Гладышевка; K - *Dahurinaia dahurica* из р. Большая Уссурка, Приморский край; L - *Kurilinaia kurilensis* с о-ва Итуруп. Масштаб: 1 см.

from each other by the curvature of frontal section of the valves and by the ratio of shell width (prominence) to its height (see key to identification). Complete treatises of European pearl mussels (with reduced posterior teeth) may be found in Locard [1893] and Westerlund [1890].

Based on shell and soft parts morphology of Far East Margaritiferidae, 3 new species of *Dahurinaia* were recognized: *D. komarovi* from the southern Primorye (Fig. 3 A, D), *D. ussuriensis* (Fig. 3 B, G) and *D. prozorovae* (Fig. 3 C, I) from the Ussuri River drainage. Based on shell morphology from

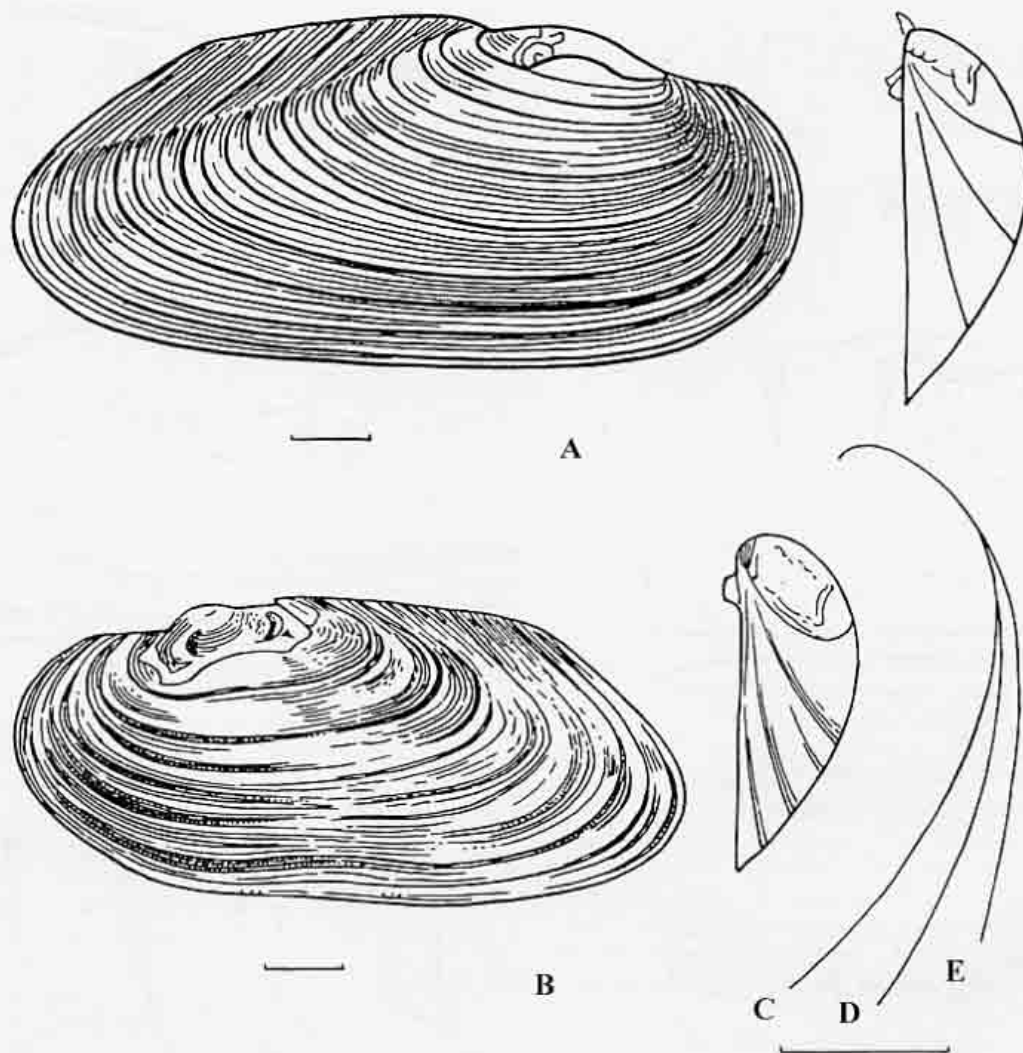


FIG. 2. Genus *Margaritifera*. Shell of 2 species (A-B) and frontal section curves of right valves of 3 species (C-E): A, D — *M. elongata* from small river near Vyborg, Leningrad Region, Russia; B, C — *M. borealis* from Gladyshevka River near Sosnovaya Polyana settlement, Leningrad Region, Russia; E — *M. margaritifera* from Ba River, Scotland. Scale bar: 1 cm.

РИС. 2. Род *Margaritifera*. Раковины двух видов (А-В) и контуры фронтального сечения правых створок трех видов (С-Е): А, D — *M. elongata* из малой реки вблизи Выборга, Ленинградская область; В, С — *M. borealis* из р. Гладышевка вблизи пос. Сосновая Поляна, Ленинградская область; Е — *M. margaritifera* из р. Ба, Шотландия. Масштаб 1 см.

Kamchatka, one new species, *Kurilinaia kamchatica*, was found (Fig. 4 A, C), of which a diagnosis is given below. Like *K. middendorffi* the new species has well visible rudimental posterior teeth. This fact demonstrates the relationship of *K. kamchatica* sp. nov. to *Kurilinaia* species from the southern Kuril Islands and South Sakhalin, while representatives of *Dahurinaia* are characterized by absence of these teeth.

Thus it is revealed that the continental part of the Russian Far East (Amur River drainage and Primorye — drainage to the Sea of Japan) is inhabited by 6 species of the genus *Dahurinaia*, and the insular territory (Sakhalin except for the northern

part, Kuril Archipelago, Kamchatka Peninsula) is inhabited by 5 species of the genus *Kurilinaia*.

Studies of type material of *Kurilinaia kurilensis* and *K. shigini* demonstrated that *K. shigini* is a mixture of moderately large specimens belonging to different species. The holotype of *K. shigini* [Bogatov, Zatravkin, 1988: 22] belongs to *K. kurilensis* (Bogatov, 1987), which renders *K. shigini* a junior synonym of *K. kurilensis*. Specimens from southern Kuril Islands must be described as a new species, *K. zatravkini* sp. nov. (Fig. 4 B, F). This new species is easily distinguished by the shape of frontal section of the valve (Fig. 4 F). *K. zatravkini* inhabits, together with *K. kurilensis*, 3 southern islands of the Kuril

Archipelago. The new species is distributed a little wider and spreads to the Tym' River (collected by F.Ya. Taranetz, 1934; Labay, Shulga, September 1996; preserved in ZISP).

Formerly *K. laevis* was assumed to inhabit the entire Sakhalin [Zatravkin, Bogatov, 1987]. We found this species only among specimens from the Tym' River (collected by F.Ya. Taranetz, 1934; Labay, Shulga, September 1996; preserved in ZISP). In these localities *K. laevis* was found together with *K. zatravkini*. Another interesting finding from northeastern Sakhalin was made in the Langry River near the Neolithic site "North-Sakhalinsk-1". In this site two Margaritiferidae species widely distributed in the Amur River drainage were found: 2 separated valves of *Dahurinaia dahurica*, and 1 intact shell and 2 separated valves of *D. tinovae* (collected by A.S. Kolosovsky, 1980; preserved in IBSS). These shells we consider as Recent, not fossil because there are dried mantle patches on the shells. As is generally known, this part of Sakhalin belonged to the Lower Amur River drainage in Holocene, which explains the presence of Amurian Margaritiferidae species in the Langry River. Many other species of the Amur River freshwater fauna still occur in northern drainages on the island [Nikiforov, Grishin, 1989; Chershevnev, 1998; Bogatov, 2001; Prozorova, 2001].

In the course of this study all type specimens of Margaritiferidae kept in the ZISP collection were examined to establish their identity. Lectotypes of 3 species described long ago and some doubtful species were identified from syntypes to ensure proper and consistent use of the names (ICZN, article 74.7.3). Data on the lectotypes are presented below.

1. Current name: *Dahurinaia dahurica* (Middendorff, 1850)

Middendorff, 1851: 275, Tab. XXVI, figs. 3-5.

Original name: *Unio dahuricus* Middendorff, 1850.

Lectotype (designated here, in order to ensure proper and consistent use of the name): No. 7a (complete shell) in taxonomic catalogue of ZISP.

Locality: Argun' River at the place of its joining the Shylka River.

Paralectotype: No. 7b (unpaired valve), from the type locality.

Dimensions of lectotype (in cm): length of shell 10.5; width 2.3; height at umbones 3.4; height at ligament 3.8.

2. Current name: *Kurilinaia middendorffi* (Rosen, 1926)

Original name: *Margaritana middendorffi* Rosen, 1926: 269.

Synonym: *Unio complanatus* Middendorff, 1851 (: 151) (not *Mya complanata* Dillwyn, 1817: 51; nor *Alasmodonta complanata* Barnes, 1823; the latter was placed in *Margaritana* by Lea [1836: 43], and in *Unio* by Deshayes [1835]).

Lectotype (designated here, in order to ensure proper and consistent use of the name): No. 6 (com-

plete shell) in taxonomic catalogue of ZISP (Fig. 4 D).

Locality: Kamchatka, Mekeshino Lake, south part of the peninsula (Lopatka Cape), collected by I. G. Voznesensky, 1847.

Paralectotypes: 15 complete shells and one unpaired valve, from the same locality as lectotype.

Dimensions of lectotype (in cm): length of shell 6.5; width 2.3; height at umbones 3.8; height at ligament 3.4.

3. Current name: *Kurilinaia laevis* (Haas, 1910)

Original name: *Ptychorhynchus laevis* Haas, 1910 (p. 498) (2 syntypes in Senckenberg-Museum, Frankfurt a.M., Germany. Measurements given by Haas: L. 59, H. 31, diameter 16 mm. Type locality: "Saghalin Island", collected by Admiral Keppel, obtained from Sowerby & Fulton).

Synonym: *Margaritana sachalinensis* Shadin, 1938: 114, fig. 37.

Syntypes of *M. sachalinensis*: 25 complete shells and 28 separate valves from Sakhalin (Tym' River near Voskresenskoye and sea shore near Due settlement).

Lectotype of *Margaritana sachalinensis* (designated here, in order to ensure proper and consistent use of the name): No. 1 (complete shell) in taxonomic catalogue of ZISP (Fig. 4 G).

Locality: Sakhalin, Tym' River, collected by F. Ya. Taranetz, 1934.

Paralectotypes of *Margaritana sachalinensis*: 26 complete shells and 28 separate valves from 3 localities in Sakhalin.

Dimensions of lectotype (in cm): length of shell 7.9; width 1.75; height at umbones 3.4; height at ligament 3.8.

Diagnoses of new species are given below.

Dahurinaia komarovi

Bogatov, Prozorova et Starobogatov, sp. nov.

(Fig. 3 A, D)

Material. Holotype from Komarovka (Suputinka) River near the Komarov's house, Ussurijsky Nature Reserve, Razdolnaya (Sujfun) River drainage, Primorye Territory (collected by L.A. Prozorova, 01.07.1999; ZISP, No. 1 in taxonomic catalogue). Paratypes: 1 specimen from the same locality (collected by V.K. Abramov 18.10.1995; IBSS); 11 specimens being paratypes of *D. suffunensis* (collected by I.M. Likharev, 1947, Komarovka (Suputinka) River near the former base of the reserve; ZISP).

Dimensions of holotype (in cm): Shell length 14.3; shell width 4.10; shell height at umbones 6.32; shell height at ligament 6.90.

Diagnosis. Shell irregularly ovate, moderately inflated, not thick-walled. Ratio of shell width to its maximum height is 0.54-0.60 for medium-sized shells. Anterior margin widely rounded, smoothly passing into ventral margin and forming an obtuse rounded angle with dorsal margin. Dorsal margin

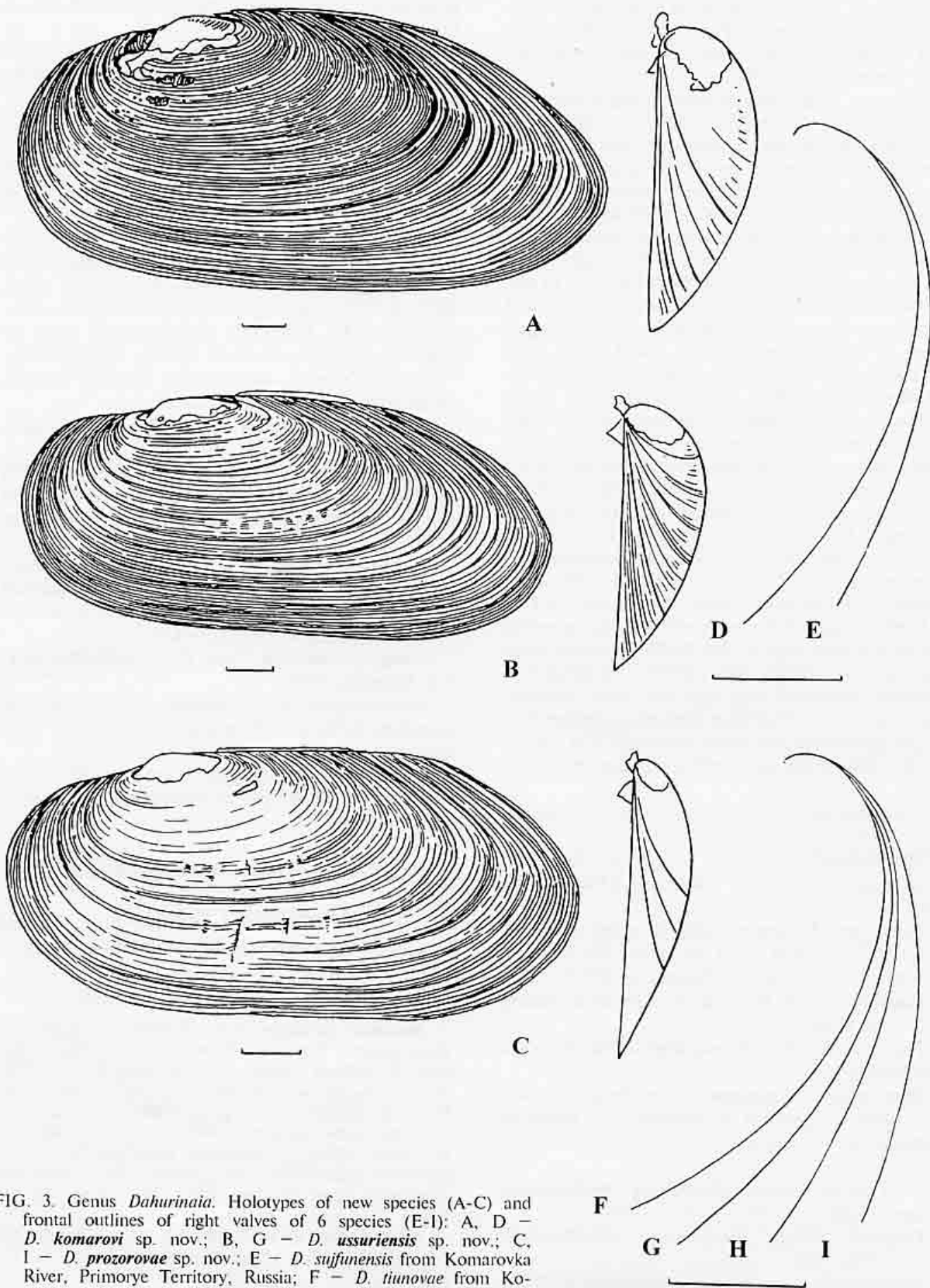


FIG. 3. Genus *Dahurinaia*. Holotypes of new species (A-C) and frontal outlines of right valves of 6 species (E-I): A, D - *D. komarovi* sp. nov.; B, G - *D. ussuriensis* sp. nov.; C, I - *D. prozorovae* sp. nov.; E - *D. suffunensis* from Komarovka River, Primorye Territory, Russia; F - *D. tiunovae* from Komissarovka River, Primorye Territory; H - *D. dahurica* from Bolshaya Ussurka River, Primorye Territory. Scale bar: 1 cm.

РИС. 3. Род *Dahurinaia*. Голотипы новых видов (А-С) и контуры фронтального сечения правых створок шести видов (Е-І): А, D - *D. komarovi* sp. nov.; B, G - *D. ussuriensis* sp. nov.; C, I - *D. prozorovae* sp. nov.; E - *D. suffunensis* из р. Комаровка, Приморский край; F - *D. tiunovae* из р. Комиссарова, Приморский край; H - *D. dahurica* из р. Большая Уссурка, Приморский край. Масштаб 1 см.

evidently strongly curved. The distance between apex of dorsal margin and the anterior margin is 0.70–0.71 of the shell length. Posterior margin of the shell rounded in lower part, smoothly passing into ventral margin, weakly curved in middle part. Umbones moderately corroded. Distance between umbones and anterior margin is 0.24 of the shell length. Growth lines sharp, graded. Ligament well expressed, curved. Lateral sculpture of the valves is represented by weak transverse impressions in the central part of the shell. Periostracum dark brown. Anterior teeth not high, pyramidal; posterior teeth absent. Nacre rose-white with greenish-brown "oil spots" near umbones.

Диагноз. Раковина неправильно-овальная, умеренно вздутая, не толстостенная. Отношение ширины раковины к ее максимальной высоте для среднеразмерных раковин составляет 0,54–0,60. Передний край широкий, округлый, плавно переходит в брюшной край и с образованием тупого округленного уголка — в спинной край. Спинной край заметно выгнут. Его вершина отстоит от переднего края раковины на 0,70–0,71 ее длины. Лигамент также выгнутый, хорошо выраженный. Задний край раковины в нижней части закруглен, плавно переходит в слегка вогнутый в срединной части брюшной край. Макушки выступающие, умеренно коррозированные, отстоят от переднего конца раковины на 0,24 ее длины. Линии роста четкие, грубые. Боковая скульптура представлена слабыми поперечными вдавлениями в центральной части створок. Перистракум темно-коричневый. Передние зубы невысокие, пирамидальные, задние зубы отсутствуют. Перламутр розовато-белый с зеленовато-коричневыми масляными пятнами в примакушечной области.]

Remarks. The species differs from *D. suffunensis* in its more inflated shell (Fig. 3 D, E) and from *D. dahurica* and *D. tiunovae* in the evidently curved dorsal margin and the more elongate and lowered posterior margin.

Etymology. The species is named to the memory of the famous Russian biologist and one of the founders of the Ussuriysky Nature Reserve, V.L. Komarov.

Dahurinaia ussuriensis

Bogatov, Prozorova et Starobogatov, sp. nov.

(Fig. 3 B, G)

Material. Holotype from Komissarovka River (Sintukha) near the Barabash-Levada settlement, Khanka Lake drainage, Primorye Territory (collected by L.A. Prozorova, 09.05.1998; ZISP, No. 1 in taxonomic catalogue). Paratypes: 3 specimens from the same locality (IBSS); 1 specimen from Komissarovka River near Dvoryanka settlement (collected by V.V. Bogatov, 01.08.1986; ZISP); 4 specimens from Komissarovka River between settlements Dvoryanka and Barabash-Levada (collected by A.V. Ermolenko, 29.05.1993; IBSS); 5 specimens from Ilistaya (Bolshoye Lefu) River near Nikolaevka settlement, Khanka Lake drainage (collected by A.V. Ermolenko, 08.07.1994; IBSS); 6 specimens from Arsenjevka (Daubikhe) River between settlements Smolnoye and Vinogradovka, Ussuri River drainage (collected M.B. Shed'ko, 1997; IBSS);

1 specimen from Bolshya Ussurka (Iman) River near the locality Orochensky Bog, Ussuri River drainage (collected by L.A. Prozorova, 15.07.1990; ZISP); 2 specimens from Kabarga River near the road Vladivostok-Khabarovsk, Ussuri River drainage (collected by T.M. Tiunova, 14.07.2000; IBSS); 1 specimen from Nercha River (Amur River tributary) (collected by L. Schrenck; ZISP); 1 specimen from the shore of Onon River, Amur River drainage, East Mongolia (collected by E.V. Devyatkin, 1972; ZISP); 3 specimens and 1 separated valve from Ingoda River near Atamanovka settlement, Amur River drainage, Chita Region (collected by B. Schtegman, 27.04.1925; ZISP).

Dimensions of the holotype (in cm): Shell length 12.6; shell width 3.52; shell height at umbones 5.42; shell height at ligament 5.91.

Diagnosis. Shell elongate-ovate, moderately inflated, not thick-walled. Ratio of shell width to its maximum height for medium-sized shells is 0.54–0.62. Anterior margin widely rounded, smoothly passing into ventral margin and, with an obtusely rounded angle, into the straight dorsal margin. Wing weakly raised. Distance between apex of wing and anterior margin is 0.73–0.75 of the shell length. Posterior margin of the shell evidently rounded in its middle part and smoothly passing into straight or weakly curved ventral margin. Umbones moderately corroded. Distance between umbones and anterior margin is 0.24–0.25 of the shell length. Ligament straight, well developed. Growth lines clear, not sharp. Lateral sculpture of the valves is represented by well-expressed transverse and dot-like impressions in the central subumbonal parts of the valves. Periostracum dark brown. Anterior teeth not high, pyramidal; posterior teeth absent. Nacre rose-white with greenish-brown "oil spots" near umbones.

Диагноз. Раковина удлинненно-овальная, умеренно вздутая, не толстостенная. Отношение ширины раковины к ее максимальной высоте для среднеразмерных раковин составляет 0,54–0,62. Передний край широкий, округлый, плавно переходит в брюшной край и с образованием тупого округленного уголка — в спрямленный спинной край. Лигамент прямой, хорошо выраженный. Крыло слегка приподнятое. Его вершина отстоит от переднего края раковины на 0,73–0,75 ее длины. Задний край раковины резко закруглен в срединной части, плавно переходит в спрямленный или слегка выгнутый брюшной край. Макушки выступающие, умеренно коррозированные, отстоят от переднего конца раковины на 0,24–0,25 ее длины. Линии роста четкие, но не грубые. Боковая скульптура представлена хорошо выраженными поперечными и точечными вдавлениями в центральной и подмакушечной частях створок. Перистракум темно-коричневый. Передние зубы невысокие, пирамидальные, задние зубы отсутствуют. Перламутр розовато-белый с зеленовато-коричневыми масляными пятнами в примакушечной области.]

Remarks. The species differs from *D. tiunovae* in its less inflated shell (Fig. 3 G, F), from *D. dahurica* in its more inflated shell (Fig. 3 G, H) and more protruded umbones, from *D. suffunensis* and *D. komarovi* in its more straightened dorsal margin and shortened posterior margin of the shell.

Etymology. Species named after its occurrence in the Ussuri River drainage.

Dahurinaia prozorovae

Bogatov et Starobogatov, sp. nov.

(Fig. 3 C, I)

Material. Holotype from Bolshya Ussurka (Iman) River 30 km downstream of the Melnichnoye settlement, Ussuri River drainage, Primorye Territory (collected by V.V. Bogatov, 16.08.1988; ZISP, No. 1 in taxonomic catalogue). Paratypes: 3 specimens from the same locality (ZISP and IBSS); 1 specimen from the Pyatigorka River (a tributary of the Arsenjevka (Daubikhe) River) near the Gorny settlements, Ussuri River drainage (collected by M.B. Shed'ko, 05.06.2000; IBSS).

Dimensions of holotype (in cm): Shell length 9.53; shell width 2.05; shell height at umbones 4.27; shell height at ligament 4.83.

Diagnosis. Shell elongate-ovate, very flat, not thick-walled. Anterior margin widely rounded, smoothly passing into the ventral margin and into the dorsal margin with obtusely rounded angle. The dorsal margin is weakly inclined forward. Ratio of shell width to its maximum height for medium-sized shells is 0.42-0.45. Wing weakly raised. Distance between apex of wing and anterior margin is 0.71-0.75 of the shell length. Posterior margin of the shell evidently rounded in its middle part and smoothly passing into straight ventral margin. Umbones not protruding. Distance between umbones and anterior margin is 0.25-0.26 of the shell length. Ligament straight. Growth lines clear, not sharp. Lateral sculpture of the valves is represented by well-expressed transverse and dot-like impressions in central subumbonal parts of the valves. Periostracum dark brown. Anterior teeth not high, pyramidal; posterior teeth absent. Nacre rose-white with greenish-brown "oil spots" near umbones.

[**Диагноз.** Раковина удлинённо-овальная, очень плоская, не толстостенная. Отношение ширины раковины к её максимальной высоте для среднеразмерных раковин составляет 0,42-0,45. Передний край широкий, округлый, плавно переходит в брюшной край и с образованием тупого округленного уголка — в слегка наклонённый вперед спинной край. Лигament прямой. Крыло слегка приподнято. Его вершина отстоит от переднего края раковины на 0,71-0,75 её длины. Задний край раковины резко закруглен в срединной части, плавно переходит в спрямленный брюшной край. Макушки не выступающие, отстоят от переднего конца раковины на 0,25-0,26 её длины. Линии роста четкие, не грубые. Боковая скульптура представлена хорошо выраженными поперечными и точечными вдавлениями в центральной и подмакушечной частях створок. Перيوстракум темно-коричневый. Передние зубы невысокие, пирамидальные, задние зубы отсутствуют. Перламутр розовато-белый с зеленовато-коричневыми масляными пятнами в примакушечной области.]

Remarks. The species differs from all remaining Pacific species in its very flat shell (Fig. 3 C, F-I).

Etymology. Species named after the malacologist L.A. Prozorova.

Kurilinaia kamchatica

Bogatov, Prozorova et Starobogatov, sp. nov.

(Fig. 4 A, C)

Material. Holotype from Golygina River, Kamchatka Peninsula (collected by Rubinsky, expedition to Kamchatka sponsored by Riabushinsky, 1908-1909; ZISP, No. 1 in taxonomic catalogue). Paratypes: 7 specimens from the same place; 4 specimens and 1 unpaired valve from Mekeshino Lake, Lopatka Cape, south part of Kamchatka Peninsula (collected by I.G. Voznesensky, 1847; ZISP); right valve from a spring flowing into the Paratunka River 8 km upstream of the Paratunka settlement (collected by G.P. Borzunov, 1964; ZISP).

Dimensions of holotype (in cm). Shell length 7.94; shell width 2.61; shell height at umbones 3.88; shell height at ligament 3.9.

Diagnosis. Shell quadrangular-ovate, moderately inflated, thick-walled. Ratio of shell width to its maximum height for medium-sized shells is 0.67-0.72. Anterior margin of shell rounded, smoothly passing into ventral margin and with an obtusely rounded angle passing into weakly elongated dorsal margin. Wing lowered. Distance between apex of wing and anterior margin is about 0.85 of the shell length. Posterior margin of the shell rounded in its lower part and smoothly passing into weakly curved ventral margin. Umbones weakly protruding, strongly corroded. Distance between umbones and anterior margin is 0.28 of the shell length. Ligament well developed. Growth lines clear, well expressed. Lateral sculpture of the valves not developed. Periostracum dark brown. Anterior teeth incised, well developed, pyramidal; posterior teeth have the shape of clear rudimental ridges. Nacre white, with "oil spots" near umbones.

[**Диагноз.** Раковина овально-четырёхугольная, умеренно вздутая, толстостенная. Отношение ширины раковины к её максимальной высоте для среднеразмерных раковин составляет 0,67-0,72. Передний край округлый, плавно переходит в брюшной край и с образованием тупого округленного уголка — в слабо выгнутый спинной край. Лигament хорошо выражен. Крыло низкое. Его вершина отстоит от переднего края раковины на 0,85 её длины. Задний край в нижней части закруглен, плавно переходит в слегка вогнутый в срединной части брюшной край. Макушки слабо выступающие, сильно корродированные, отстоят от переднего конца раковины на 0,28 её длины. Линии роста четкие, грубые. Боковая скульптура не развита. Перيوстракум темно-коричневый. Передние зубы насеченные, хорошо развитые, пирамидальные; задние — в виде ясных рудиментарных валиков. Перламутр белый с масляными пятнами в примакушечной области.]

Remarks. The species differs from the Sakhalin-Kurilian species in its quadrangular-ovate shape of the shell and from *K. middendorffi* in its more inflated (Fig. 4 C, D) and more elongate shell.

Etymology. Species named after the locality, Kamchatka Peninsula.

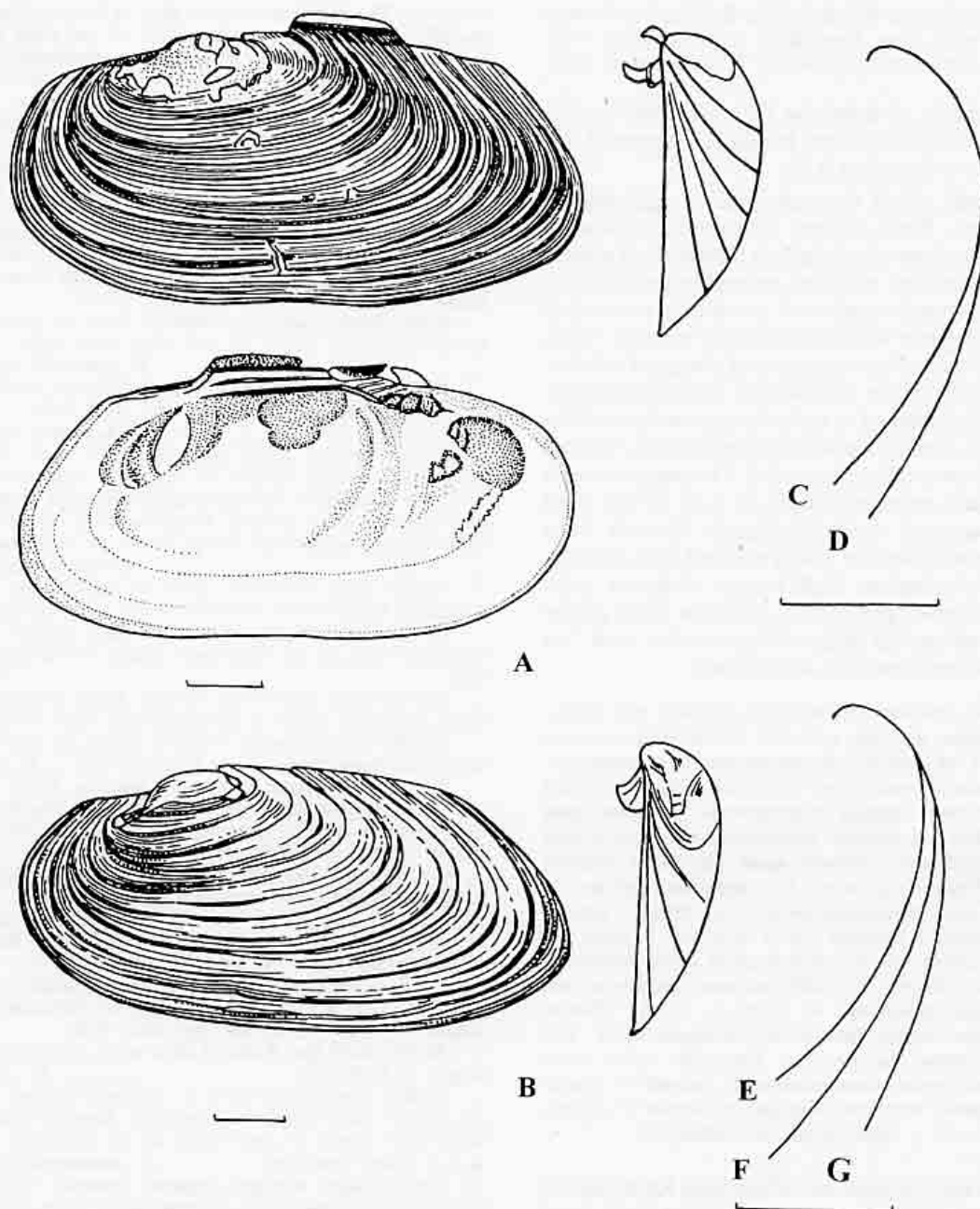


FIG. 4. Genus *Kurilinaia*. Holotypes of new species (A-B) and frontal section curves of right valves of 5 species (C-G): A, C — *Kurilinaia kamchatica* sp. nov.; B, F — *K. zatravkini* sp. nov.; D — *K. middendorffi* (lectotype); E — *K. kurilensis* from Iturup Island, Kuril Archipelago, Russia; G — *K. laevis* (lectotype of *Margaritana sachalinensis*). Scale bar: 1 cm.

РИС. 4. Род *Kurilinaia*. Голотипы новых видов (А-В) и контуры фронтального сечения правых створок пяти видов (С-Г): А, С — *Kurilinaia kamchatica* sp. nov.; В, F — *K. zatravkini* sp. nov.; D — *K. middendorffi* (лектотип); E — *K. kurilensis* с о-ва Итуруп, Курильские о-ва; G — *K. laevis* (лектотип *Margaritana sachalinensis*). Масштаб 1 см.

Kurilinaia zatravkini

Bogatov, Prozorova et Starobogatov, sp. nov.

(Fig. 4 B, F)

Material. Holotype from a spring near Golovnino settlement, south part of Kunashir Island (collected by A.A. Schileyko, 7.09.1991; ZISP, No. 1 in taxonomic catalogue). Paratypes: 4 specimens from the same locality

(ZISP); 1 separate valve from a spring flowing into Kurilka River, Iturup Island of the Kuril Archipelago (collected by Kononenkov, 1964; ZISP); 3 specimens from Kushiri River near the town of Kushiri, Hokkaido, Japan (collected by T. Habe, 1984; ZISP); 1 specimen from Svobodnaya River, Shikotan Island of the Kuril Archipelago (collected by V.V. Bogatov, 07.08.1994; IBSS); 3 specimens from the western shore of the central part of Sakhalin near the former settlement of Due (collected

by F. Schmidt and A. Gmelin, 1861; ZISP); 17 specimens and 1 sole valve from Tym' River opposite of the Voskresenskoye settlement (collected by F.Ya. Taranetz, 1934; ZISP).

Dimensions of holotype (in cm). Shell length 7.49; shell width 2.18; shell height at umbones 3.61; shell height at ligament 3.81.

Diagnosis. Shell elongate-oval or egg-shaped, inflated, firm. Ratio of shell width to its maximum height for medium-sized shells is 0.56-0.61. Anterior margin of the shell rounded, smoothly passing into the ventral margin and with an obtusely rounded angle passing into the straight dorsal margin. Wing lowered. Distance between apex of wing and anterior margin is 0.76 of the shell length. Posterior margin of the shell sharpened in its lower part and smoothly passing into weakly curved ventral margin. Umbones weakly protruding, corroded. Distance between umbones and anterior margin is 0.26 of the shell length. Ligament well developed. Growth lines clear. Lateral sculpture not developed [see remarks above]. Periostracum dark brown. Anterior teeth incised, massive, pyramidal; posterior teeth of the shape of rudimental ridges. Nacre white, with "oil spots" in adumbonal part of the shell.

[**Диагноз.** Раковина удлинненно-овальная или овально-яйцевидная, вздутая, прочная. Отношение ширины раковины к ее максимальной высоте для среднеразмерных раковин составляет 0,56-0,61. Передний край резко закруглен, плавно переходит в брюшной край и с образованием хорошо выраженного тупого утолщения — в спрямленный спинной край. Лигамент хорошо выражен. Крыло опущено. Его вершина отстоит от переднего края раковины на 0,76 ее длины. Задний край раковины в нижней части заострен, плавно переходит в слегка выгнутый брюшной край. Макушки слабо выступающие, корродированные, отстоят от переднего края раковины на 0,26 ее длины. Линии роста четкие, periostracum темно-коричневый. Боковая скульптура не развита. Передние зубы насеченные, массивные, пирамидальные, задние — в виде rudimentарных валиков. Перламутр белый с масляными пятнами в примакушечной области.]

Remarks. The species differs from Kamchatkan species by the elongate-oval shape of its shell, from *K. kurilensis* by its flatter shell, and from *K. laevis* by its clearly more inflated shell (Fig. 4 E-G).

Etymology. The species is named to the memory of the late Russian malacologist M.N. Zatravkin.

Key to the identification of genera and species of Russian Margaritiferidae

1(16). Besides anterior teeth there are rudimental posterior ones having the shape of thin ridges. Small papilliform outgrowths between mantle folds and exhalant siphon absent, however they may appear on the lateral surface of the lower part of the inhalant siphon.

2(11). Anterior teeth massive and high. Inner margin of inhalant siphon bears big multiple mantle outgrowths, not projecting over its margin. Outgrowths of inhalant siphon may transform into folds. Pedal carina is weakly expressed.....Genus *Kurilinaia*

3(6). Shell ovate-triangular, strongly corroded near

umbones. The distance between apex of wing and anterior margin of shell is more than 0.84 of the shell length.

4(5). Ratio of shell width to its maximum height is 0.61-0.66 *K. middendorffi*

5(4). Ratio of shell width to its maximum height is 0.67-0.72 *K. kamchatica* sp. nov.

6(3). Shell elongate or ovate, moderately corroded near umbones. The distance between apex of wing and anterior margin of shell is not more than 0.78 of the shell length.

7(8). Shell flat. Ratio of shell width to its maximum height is not more than 0.54 *K. laevis*

8(7). Shell inflated. Ratio of shell width to its maximum height is more than 0.55.

9(10). Shell moderately inflated. Ratio of shell width to its maximum height is not more than 0.61 *K. zatravkini* sp. nov.

10(9). Shell significantly inflated. Ratio of shell width to its maximum height is not less than 0.63 *K. kurilensis* sp. nov.

11(2). Anterior teeth pyramidal, not high. Interior margin of inhalant siphon is equipped with alternating 1, 2, 3 or some more multiple mantle outgrowths, protruding over outer mantle margin. Outgrowths may transform to folds in aged specimens. Pedal carina is well developedGenus *Margaritifera*

12(13). Shell flattened. Ratio of shell width to its maximum height is not more than 0.56 *M. margaritifera*

13(12). Shell moderately or strongly inflated. Ratio of shell width to its maximum height is not less than 0.58.

14(15). Shell moderately inflated. Ratio of shell width to its maximum height is not more than 0.62 *M. elongata*

15(14). Shell strongly inflated. Ratio of shell width to its maximum height is not less than 0.65 *M. borealis*

16(11). Shell hinge with only anterior teeth. There are small papilliform outgrowths between mantle folds and exhalant siphon. Such appendices cover the whole lateral surface of inhalant siphon.

17(18). Shell very flat. Ratio of shell width to its maximum height is not more than 0.45 *D. prozorovae* sp. nov.

18(17). Shell more inflated. Ratio of shell width to its maximum height is not less than 0.48.

19(24). Dorsal margin straight, nearly parallel to longitudinal axis. Ratio of shell height at umbones to its length in oldest shells not less than 0.46.

20(21). Shell flat. Ratio of shell width to its maximum height is 0.48-0.52 *D. dahurica*

21(20). Shell moderately or strongly inflated.

22(23). Shell moderately inflated. Anterior margin of shell wide. Ratio of shell width to its maximum height is not more than 0.62 *D. ussuriensis* sp. nov.

23(22). Shell strongly inflated. Anterior margin of shell rather narrow. Ratio of shell width to its maximum height is more than 0.65 *D. tiunovae*

24(19). Dorsal margin evidently curved. Ratio of shell height at umbones to its length in oldest shells is not more than 0.44.

25(26). Shell flat, fragile. Ratio of shell width to its maximum height is 0.48-0.52 *D. suifunensis*

26(25). Shell moderately inflated, firm. Ratio of shell width to its maximum height is 0.54-0.60 *D. komarovi* sp. nov.

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Margaritiferidae (Mollusca Bivalvia) России

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РЕФЕРАТ. Представлен таксономический обзор семейства Margaritiferidae в пределах России с использованием признаков морфологии раковины и мягкого тела. Установлено, что в Российской Федерации жемчужницы принадлежат 14 видам, относящимся к 3 родам: *Margaritifera* Schumacher, 1815, *Dahurinaia* Starobogatov, 1970 и *Kurilinaia* Zatravkin et Bogatov, 1988, ранее выделенному как подрод рода *Dahurinaia*. Род *Margaritifera* распространен на северо-западе России, где представлен 3 видами: *M. margaritifera* (L., 1758), *M. elongata* Lamarck, 1819 и *M. borealis* Westerlund, 1871. Два последних вида являются новыми для фауны Рос-

сии. Род *Dahurinaia* распространен в бассейне р. Амур, на юге Приморья и северо-западе о-ва Сахалин, где представлен 6 видами, 3 из которых являются новыми для науки: *D. dahurica* (Middendorff, 1850), *D. tiunovae* Bogatov et Zatravkin, 1988, *D. suifunensis* Moskvicheva, 1973, *D. komarovi* Bogatov, Prozorova et Starobogatov sp. nov., *D. ussuriensis* Bogatov, Prozorova et Starobogatov sp. nov., *D. prozorovae* Bogatov et Starobogatov sp. nov. Род *Kurilinaia* обитает на Курильском архипелаге, о-ве Камчатка, о-ве Сахалин (исключая северо-западные районы) и о-ве Хоккайдо, где представлен 5 видами, 2 из которых являются новыми для науки: *K. laevis* (Haas, 1910), *K. kurilensis* (Zatravkin et Starobogatov, 1984) (syn. *D. shigini* Zatravkin et Bogatov, 1987), *K. middendorffi* (Rosen, 1926), *K. kamchatica* Bogatov, Prozorova et Starobogatov sp. nov., *K. zatravkini* Bogatov, Prozorova et Starobogatov sp. nov. Приведены описания новых видов, таблица для определения родов и видов российских представителей семейства Margaritiferidae.

