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ЗООЛОГИЧЕСКИЕ ИССЛЕДОВАНИЯ № 16

ПРЕСНОВОДНЫЕ БРЮХОНОГИЕ МОЛЛЮСКИ, ОПИСАННЫЕ Я.И. СТАРОБОГАТОВЫМ

ТОВАРИЩЕСТВО НАУЧНЫХ ИЗДАНИЙ КМК

МОСКВА ❖ 2014

ZOOLOGICHESKIE ISSLEDOVANIA No. 16

FRESHWATER GASTROPODS DESCRIBED BY YA.I. STAROBOGATOV

KMK SCIENTIFIC PRESS

MOSCOW ❖ 2014

ISSN 1025-5320
ISBN 978-5-9906071-3-2

ZOOLOGICHESKIE ISSLEDOVANIA No. 16
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Editor of the Issue

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Редактор выпуска

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Freshwater gastropods described by Ya.I. Starobogatov. — Zoologicheskie Issledovania. No. 16. 62 p., 19 color plates.

An eminent Russian zoologist Ya.I. Starobogatov (1932–2004) has described more than a thousand molluscan taxa of various rank. A considerable part of these are names of freshwater gastropod species introduced by him (often with coauthors). This issue is devoted to a state-of-the-art review of Starobogatov's species of the three families: Lymnaeidae, Planorbidae, and Physidae (101 taxa in total). The data include a complete bibliography of the species, an information about the types, ecology, distribution, as well as illustrations based on the type series.

Пресноводные брюхоногие моллюски, описанные Я.И. Старобогатовым. — Зоологические исследования. № 16. 62 с., 19 цветных вклеек.

Выдающийся российский зоолог Я.И. Старобогатов (1932–2004) описал суммарно более тысячи таксонов разного ранга. Существенную часть наследия этого автора составляют введённые им (в том числе в соавторстве) в зоологическую практику названия видового уровня пресноводных брюхоногих моллюсков. Данный выпуск посвящён обзору на современном уровне видов трёх семейств — Lymnaeidae, Planorbidae, Physidae (всего 101 таксон). Приведены полная библиография по рассматриваемым видам, данные по типовым экземплярам, экологии и распространению, а также иллюстрации, основанные на типовых сериях.

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TYPES OF FRESHWATER GASTROPODS DESCRIBED BY YA.I. STAROBOGATOV, WITH ADDITIONAL DATA ON THE SPECIES: FAMILY LYMNAEIDAE

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The work aims to illustrate the type specimens of 53 lymnaeid species described by Ya.I. Starobogatov with coauthors. The data on these species include the history of the name application in literature, the information about type locality, type depository, localities of subsequent findings, ecology, and comments on some species. The species are arranged according to the system of Starobogatov and Kruglov, without an account of current, sometimes controversial, views.

ТИПЫ ПРЕСНОВОДНЫХ БРЮХОНОГИХ МОЛЛЮСКОВ, ОПИСАННЫЕ Я.И. СТАРОБОГАТОВЫМ, С ДОПОЛНИТЕЛЬНЫМИ ДАННЫМИ ПО ВИДАМ: СЕМЕЙСТВО LYMNAEIDAE

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Представлены изображения типов 53 видов лимнеид, описанных Я.И. Старобогатовым с соавторами. Сведения о видах включают историю упоминания видов в научной литературе, информацию о типовом местонахождении, о коллекциях, в которых хранятся типы, мест находок и распространении видов, их экологии, а также краткие замечания к некоторым видам. Родовая и подродовая принадлежность видов сохранена в авторском варианте Старобогатова и Круглова, перечисление видов приведено без учёта современных таксономических изменений.

Introduction

Yaroslav I. Starobogatov (1932–2004) was an eminent Soviet malacologist who contributed greatly to exploration of freshwater molluscan fauna of northern Eurasia, primarily of the former Soviet Union. Among more than 1,000 names in Mollusca introduced by Starobogatov together with his disciples and coauthors, there are more than 400 species-group names (see Sysoev, Kantor, 1992; the list is incomplete). However, due to the main method of investigation used by Starobogatov ("comparatory method"), his new species were mainly illustrated by shell contours only (and some were not illustrated at all in the original descriptions). This makes difficult the shell visualization, so necessary for still "habitus-oriented" systematic malacology, and definitely hampers comparison of these species using more traditional conchological methods. Therefore, the aim of the present series of papers is to provide photographic illustrations of Starobogatov's type specimens, along with all currently available data on distribution of the respective species, their ecology, etc. These data are often unpublished and based on labels in respective collections.

This is the first paper of the series, dealing with the family Lymnaeidae.

The family Lymnaeidae Rafinesque, 1815 is one of the largest in freshwater gastropods, with hundreds of described species [more than 1000 taxa of the species level listed by Hubendick (1951)] and with a world-wide distribution. The status of the majority of species still needs clarification. Starobogatov with coauthors described 58 species, mostly from waterbodies and streams of the former USSR and Mongolia. Most of them (44) were described in coauthorship with N.D. Kruglov, four species were described together with V.A. Gundrizer, 3 — with Z. Izzatullaev, and the remaining — with I.M. Moskvicheva, M.N. Zatrawkin and/or Z.I. Izzatullaev.

Three fossil (Neogene) species (*L. subonychia*, *L. sytschewskajae* and *L. tschuica*) were described from Altai in cooperation with S.M. Popova (Popova et al., 1970). We do not consider them here because we are primarily interested in Recent fauna of freshwater molluscs of the former USSR and adjacent territories. Therefore, illustrations of these species are not given here.

One species was described from a rather exotic locality: *L. shileykoi* Kruglov et Starobogatov from Mauritius Island. The type specimens of this species were not yet found, thus, and taking into account its distribution being very distant from the Palearctic, it is also not considered here.

The species *L. shadini* Izzatullaev, Kruglov et Starobogatov, 1983, which was later synonymized by the authors (Kruglov, Starobogatov, 1985) with *L. thiesseae* (Clessin, 1879), is also not figured due to impossibility to recognize the types (see below).

All the types are stored in the collection of the Zoological Institute, St.-Petersburg (ZIN). The registration numbers correspond to those in the systematic catalogue, as accepted in the ZIN collection (see also Kantor, Sysoev, 2006: 10).

Lymnaeids are universally acknowledged as a very taxonomically complex group. There is still no agreement even on the status of the genus *Lymnaea* L., 1758, not to mention the generic composition of the family (up to 37 recent genera and subgenera; see, for example http://en.wikipedia.org/wiki/Lymnaeidae and WMSD — Worldwide mollusc species DB — Family: LYMNAEIDAE). Some authors (e.g. Samadi et al., 2000) consider *Lymnea* species within a single large genus *Lymnaea* sensu lato, following the old classification of Hubendick (1951), but other authors accept numerous genera and subgenera (e.g. Falkner et al., 2001). Based on nuclear and/or mitochondrial markers, most investigators recently treated it as a complex of phylogenetically distant genera (e.g. Bargues et al., 2001; Correa et al., 2010). Besides, currently Vinarski (2013a) suggests allocating lymnaeids into 2 subfamilies — Lymnaeinae and Radiciinae, with 16 and 10 genera, correspondingly.

The system developed by Starobogatov together with Kruglov (Kruglov, Starobogatov, 1993 a,b; Kruglov, 2005, 2008) treats *Lymnaea* as a large but monophyletic genus with numerous subgenera and sections. Here we follow this system, simply because of easier comparison with original descriptions. To facilitate navigation over this large and complex genus, we provide a table summarizing characters of divisions of *Lymnaea* of subgeneric level (Table). This table was based on data taken from Kruglov (2005, 2008). The taxa not present in the territory of the former USSR are omitted.

All the measurements of shells figured here and in subsequent papers were made from photographs taken with a scale bar. Therefore, they can differ from those indicated in the original publications.

Abbreviations:

IBSS — Institute of Biology and Soil Science FEB RAS, Vladivostok, Russia;

LIN — Limnological Institute SB RAS, Irkutsk, Russia;

MSAM — Museum of Siberian Aquatic Molluscs, Omsk, Russia;

ZIN — Zoological Institute of Russian Academy of Sciences, St.-Petersburg, Russia;

ZMIPAE — Zoological Museum of the Institute of Plant and Animal Ecology, Ural Branch of RAS, Ekaterinburg, Russia.

Table 1. Generic structure of the family Lymnaeidae and characters of the genus-group taxa.

Genera and subgenera, according to Kruglov, 2005	**Shell shape**	**Mantle folder**	**Central plate of jaw 1 — solid 2 — composite**	**Radular teeth (Number of cusps in brackets)**	**Seminal receptacle 1 — alveolar 2 — alveolar-flagelliform 3 — finger-shaped**
Aenigmomphiscola Kruglov et Starobogatov, 1981 (3 spp.)	stagnicoline	normal	2	Thin R (2 uneven) + L4 (2 uneven) + M3 (3)	1
Stagnicola Leach, 1830 Sect. *Stagnicola* – 3 spp. Sect. *Fenziana* – 5 spp. Sect. *Ladislavella* – 3 spp. Sect. *Berlaniana* – 8 spp.	stagnicoline	normal	1	R (2 uneven) + 16-20 (2)+ 10-12 (3 or up to 5)	2
Corvusiana Sevain, 1881 Sect. *Corvusiana* – 3 spp. Sect. *Kazakhlymnaea* – 1 sp.	stagnicoline	normal	1	R (1) + 10-11 (3) + 18-20 (up to 4-5)	2
Omphiscola Rafinesque, 1819	stagnicoline	normal	1	R (2 uneven) + 9-10 (3) + 10-15 (up to 4-5)	1+2
Polyrhytis Meek, 1976 Sect. *Pseudoisidora* – 4 spp. Sect. *Dallirhytis* – 2 spp.	stagnicoline galbian	normal	1 1	R (1)+ 8-9 (2) + 3-4 (3)+ 15-17 (up to 5-6)	1 1
Lymnaea Lamarck, 1799 Sect. *Lymnaea* – 3 spp. Sect. *Sagnalina* – 2 spp. Sect. *Kobeltylymnaea* – 1 sp.	needle-shaped spire *Radix*-shaped, wide-conical	normal	1	R (1) + 17-22 (3) + 30-35 (up to 5-6)	2
Galba Schranck, 1803 Sect. *Galba* – 6 spp. Sect. *Montigalba* – 3 spp.	galbian	normal	1	R (2 uneven) + 9-12 (3) + 15-17 (up to 4-5)	2
Sibirigalba Kruglov et Starobogatov, 1985 – 2 spp.	galbian	normal	1	R (2 uneven) + 9-11 (3) + 12-16 (up to 4-5)	1
Orientogalba Kruglov et Starobogatov, 1985 Sect. *Orientogalba* – 1 sp. Sect. *Lenagalba* – 1 sp. Sect. *Viridigalba* – 3 spp.	galbian	normal	1	R (2 uneven) + 14-16 (3) + 14-16 (up to 5-6)	1

Table 1 (continued).

Genera and subgenera, according to Kruglov, 2005	**Shell shape**	**Mantle folder**	**Central plate of jaw 1 — solid 2 — composite**	**Radular teeth (Number of cusps in brackets)**	**Seminal receptacle 1 — alveolar 2 — alveolar-flagelliform 3 — finger-shaped**
Cerasina Kobelt, 1880	*Radix*-shaped	normal	1	R (2 uneven) + 10-12 (3 or 2) + 18-20 (up to 4-5)	?
Radix Montfort, 1810 Sect. *Radix* – 4 spp. Sect. *Thermoradix* – 5 spp. Sect. *Desertiradix* – 8 spp. Sect. *Iraniradix* – 3 spp. Sect. *Nipponiradix* – 7 spp. Sect. *Okhotiradix* – 1 sp. Sect. *Peregriformiana* – 2 spp.	*Radix*-shaped	normal	1	R (1) + 13-14 (3) + 8-10 (up to 5)	3
Peregriana Servain, 1881 Sect. *Peregriana* – 4 spp. Sect. *Altailymnaea* – 2 spp. Sect. *Amurolymnaea* – 4 spp. Sect. *Bouchardiana* – 5 spp. Sect. *Cyphideana* – 6 spp. Sect. *Kamtschaticana* – 5 spp. Sect. *Sibirilymnaea* – 6 spp.	*Radix*-shaped	normal	1	R (1) + 14-16 (3) +8-14 (up to 5-6)	1
Myxas Sowerby, 1822 – 4 spp.	*Radix*-shaped	completely covering the shell	1	R (2 non-equal)+19 (3) +14-16 (up to 7)	1
Pacifimyxas Kruglov et Starobogatov, 1985 – 3 spp.	wide-conical	partly (?) covering the shell	1	R-2 uneven cusps+7 with 3 cusps+8 (up to 6 and more cusps)	1

Table 1 (continued).

Genera and subgenera	Male reproductive system					Female reproductive system		
	Penis sheath with or without glandular bulbus	**Length of penis sheath (PSh) and preputium (Pr)**	**Penis fixer**	**Velum and sarcobelum**	**Folding of prostata**	**Position of sperma-theca***	**Length of spermathecal duct**	**Length of provagina**
Aenigmom-phiscola	with	almost equal (0.5–0.7)	?	wide velum forms preputium organ	single fold	1b	thin, long	wider and shorter than spermathecal duct
Stagnicola Sec. *Berlaniana* Sec. *Ladislavella*	without	almost equal PSh longer than Pr in 2-3 and more times (0.08–0.3) PSh equal or something shorter than Pr (1–1.7)	absent	equally developed	single fold	1a	thin, long	wider than spermathecal duct (length varies within subgenus) mostly equal in width to spermathecal duct
Corvusiana	without	PSh 2-4 times shorter than Pr	present	well and equally developed	polyplicate with unbranched folds	1a	thin, long	wider and shorter than spermathecal duct
Omphiscola	without	almost equal	?	velum absent, sarcobelum lightly developed	without folds	1a	thin, long	wider and shorter than spermathecal uct
Polyrhytis	without	PSh 3 times shorter than Pr	present	velum more developed than sarcobelum	single unbranched fold	1a	thin, long	wider and shorter than spermathecal duct
Lymnaea	without	PSh 3-4 times shorter than Pr	present	well and equally developed	polyplicate with branched folds	1a	thin, long	wider and shorter than spermathecal duct
Galba	without	PSh 2 times shorter than Pr	absent	merged	single fold	1a	thin, long	wider and very short (in 2 times than spermathecal duct)

* 1 — near pericardium (a — knitted with it and b — not knitted); 2 — far from pericardium.

Table 1 (continued).

	Male reproductive system					Female reproductive system		
Genera and subgenera	**Penis sheath with or without glandular bulbus**	**Length of penis sheath (PSh) and preputium (Pr)**	**Penis fixer**	**Velum and sarcobelum**	**Folding of prostata**	**Position of sperma-theca***	**Length of spermathecal duct**	**Length of provagina**
Sibirigalba	without	almost equal	absent	poorly and equally developed	single fold	1a	thin, long	wider and shorter than spermathecal duct
Orientogalba	without	almost equal	absent	equally developed	?	2	thin, long or thick short	wider and shorter than spermathecal duct
Cerasina	without	almost equal	absent	equally developed	polyplicate with one fold branched	1b	thin, long	almost similar length
Radix	without	amost equal	absent	equally developed	single fold	1b	thin, long	wider and shorter than spermathecal duct (in some species by 2 times)
Peregriana	without	amost equal	absent	equally developed	single fold	2	short	wider and longer than spermathecal duct
Myxas	without	almost equal	absent	velum more developed than sarcobelum	single fold	2	short	wider and longer than length of spermathecal duct
Pacifimyxas	without	almost equal	absent	equally developed	single fold	2	short	wider, longer or equal tolength of spermatheca

* 1 — near pericardium (a — knitted with it and b — not knitted); 2 — far from pericardium.

LYMNAEIDAE Rafinesque, 1815

1. *Aenigmomphiscola europaea* Kruglov et Starobogatov, 1981

Fig. 1 A

History of the name application.

Kruglov, Starobogatov, 1981: 969–970, fig. 1 (1, 7, 12), fig. 3 (A), fig. 4 (A) (original description, as genus *Aenigmomphiscola*, reproductive system morphology, distribution)
Kruglov, Starobogatov, 1993b (key to identification)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Khokhutkin et al., 2009 (holotype photo, key to identification, distribution in Southern Ural)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Kruglov, 2008 (taxonomy)
Vinarski et al., 2011 [molecular-phylogenetic analysis, 18S rRNA (Genbank FR797821.1), CO1 mtDNA (Genbank FR797861.1), cyt-B mtDNA (Genbanck FR797884.1, FR797885.1)
Vinarski, Grebennikov, 2012 (morphology, distribution)
Vinarski, 2013b (shell variability in specimens from the Moscow River floodland at Konobeevo village)

Type locality. Vicinities of Ufa city, bog near Urgun village [according to Khokhutkin et al. (2009), should be as: "Bashkiria, Uchalinsky district, bog near Urgun (= Muldashevo) village, 18.07.1974, coll. V.G. Boev"].

Types. Holotype (dry shell), No. 1. Paratypes: 83 (73 in alcohol and 10 dry shells), No. 2 – type locality; 10 dry shells, No. 3 – left bank of the Volga River (Yaroslavl City); 1 dry shell, No. 5 – bog in the Alatyr River valley (Gorky = Nizhnii Novgorod Region); 5 dried, No. 6 – the Alatyr River near Kochkurov (Nizhnii Novgorod Region).

Additional findings. Pools in the Moscow River floodland, near the Konobeevo Station (Vinarski, Grebennikov, 2012).

Ecology. Found in permanent boggy waterbodies (Kruglov, 2005), also in pools with silty bottom being remnants of floodland waterbodies – Konobeevo (Vinarski, Grebennikov, 2012). Recorded together with *A. uvalievae* in the type locality.

2. *Aenigmomphiscola kazakhstanica* Kruglov et Starobogatov, 1981

Fig. 1 B

History of the name application.

Kruglov, Starobogatov, 1981: 973, fig. 1 (3, 9, 14), fig. 3 ("B" = V), fig. 4 ("B" = V) (original description; distribution)
Berezkina, Starobogatov, 1988 (habitat)
Kruglov, Starobogatov, 1993b (key to identification)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Kruglov, 2008 (genus- and subgenus-level taxonomy)
Vinarski et al., 2007 (2008) (citation for Irtysh area in Western Siberia)
Khokhutkin et al., 2009 (shell photo, key to identification, general information, distribution in Southern Ural)
Dolgin, 2009 (citation for Irtysh area in Western Siberia)
Andreeva et al., 2009 (holotype photo, shell and copulatory organ of a specimen from Altai, key to identification, general information, distribution in Western Siberia)
Vinarski et al., 2011 (shell photos, morphometric data, molecular-phylogenetic analysis, 18S rRNA – Genbank FR797822.1 GI: 354951470, cyt-B mtDNA – Genbank FR797886.1)
Vinarski, Grebennikov, 2012 (holotype photo, shell morphometrics, genus distribution, conspecificity with *A. uvalievae*)

Type locality. Kokchetav Region, Shchuchinskij district [northern Kazakhstan], pasture Kyzyl-Agach.

Types. Holotype (dry shell): No. 1; paratypes: Nos. 2–3 (4 alcohol-preserved and 8 dried) from type locality; North Kazakhstan – Sokolovsky district, Dolmatovo region, collective farm "Put' Lenina"; No. 4 (5 alcohol and 1 dry); Presnovski region, near Presnovka village, wood chipping, No. 5 (3 dry); Sokolovsky district, collective farm Berezovski, pastures, on tussocks between birch trees, No. 6 (1 dry) and No. 7 (1 dry); Central Kazakhstan – winter camp Zholpak-Shilik, dell, damped meadow, No. 8 (5 alcohol); Altai Territory – Quaternary deposits at the Argun tributary, No. 9 (8 dry).

Additional findings. Mountain Altai – the Biya River, vicinities of Artybash (MSAM); Chelyabinsk city, vicinities of Kamennyi Karier settlement, Miass River (Khokhutkin et al., 2009). Kurgan and Chelyabinsk regions, North Kazakhstan (see map in Andreeva et al., 2009).

Ecology. Lives in temporary waterbodies formed by melted snow water and by precipitation (Berezkina, Starobogatov, 1988). The species was found together with *Lymnaea terebra* on immersed stones in the Biya River (Mountain Altai) (Khokhutkin et al., 2009) and together with *A. uvalievae* in Central Kazakhstan, as based on label data.

Remarks. Vinarski et al. (2011) showed that genetic distance by cyt-B mtDNA between specimens identified as *A. kazakhstanica* from Mountain Altai and *A. europaea* from Moscow Region was 0.09, which, in the authors' opinion, confirms the species-level status of the taxa. However, the authors did not discuss the possible correspondence of the revealed genetic distance to geographical distance between the respective populations. Vinarski et al. (2011) believe that resolution of the problem of valid or conspecific status of these taxa requires additional studies.

3. *Aenigmomphiscola uvalievae* Kruglov et Starobogatov, 1981

Fig. 1 C

History of the name application.

Kruglov, Starobogatov, 1981: 971–973, fig. 1 (2, 8, 13, not 3, 9, 14 as indicated), fig. 2, fig. 3 ("Б" = B), fig. 4 ("Б" = B) (original description, shell, radula, jaw, reproductive system and egg mass morphology)
Kruglov, Starobogatov, 1993b (key to identification)
Berezkina, Starobogatov, 1988 (as living in temporary waterbodies formed by melted snow and precipitation)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (shell morphology, anatomy, egg mass, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Vinarski et al., 2007 (2008) (Irtysh province in Western Siberia)
Khokhutkin et al., 2009 (shell photo, key to identification, general information, distribution in Southern Ural)
Dolgin, 2009 (Irtysh province in Western Siberia)
Chuzhekova et al., 2008 (records from springs near Zhigulevsk city)
Andreeva et al., 2009 (holotype photo, shell from Muldashevo – Bashkiria, general information, key to identification, distribution in Western Siberia)
Vinarski et al., 2011 (short remarks)
Vinarski, Grebennikov, 2012 (holotype photo, shell morphometrics, genus distribution, synonymy with *A. kazakhstanica*)
Vinarski, 2013b (shell variability in specimens from Chelyabinsk Region)

Type locality. Kokchetav Region, Shchukinskij district [northern Kazakhstan], kolkhoz imeni Frunze, pasture, sheep winter stay.

Types. Holotype (dry shell) No. 1; paratypes: 6 in alcohol and 9 dry, No. 2 from type locality; No. 3 (4 dry) from sheep camp "Kyzyl-Agach" of the same district; North Kazakhstan; No. 4 (2 in alcohol + 1 dissected) from Sokolovski region, Dolmatovo district, "Put' Lenina"; No. 5 (5 dry) from Presnovka, forest islets; No. 6 (5 dry) from pasture of Sokolovski region, Beresovskij collective farm; Central Kazakhstan – No. 7 (1 dissected, in alcohol) – winter stay Zholan-Shilik – wet meadow; No. 8 (3 dry) – Altai Territory (right bank of the Khanzhona River, left tributary of the Argun River); No. 9 (51 + 6 dissected in alcohol, 4 dry) – bog near Urgun village (Ufa, Bashkiria).

Additional findings. Bashkiria, Uchalinsky district, bog (ZMIPAE, MSAM) and springs near Zhigulevsk city – Samara Luka (Chuzhekova et al., 2008).

Ecology. Lives in temporary and permanent waterbodies, egg masses are laid on water vegetation (Kruglov, 2005). Occurs together with *A. kazakhstanica*.

Remarks. Two species-level taxa, *A. kazakhstanica* and *A. uvalievae*, differ mainly in a single shell character: the spire height exceeds the aperture height by less than 1.65 in the former case, and by more than 1.67 in the latter taxon (Starobogatov et al., 2004). Vinarski and Grebennikov (2012) have shown that the values of this character, as well as an anatomical one – the ratio between lengths of praeputium and penial sac, considerably overlap and thus cannot serve for identification of the species. If the species status of *A. kazakhstanica* and *A. uvalievae* is not confirmed by molecular-genetic methods, the reasons for morphological dimorphism in snails of the same species coexisting in the same biotope becomes unclear.

5. *Lymnaea* (*Corvusiana*) *curtacorvus* Kruglov et Starobogatov, 1984

Fig. 1 E

[= *Limnaea palustris* var. *curta* Clessin, 1873]

History of the name application.

Kruglov, Starobogatov, 1984b: 65, fig. 1, J; 2 5, 6 (original description; as *Lymnaea* subgenus *Corvusiana* section *Corvusiana*)
Kruglov, Starobogatov, 1993b (key to identification)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Nekhaev, 2011 (mention as stagnicoline life form from North-Eastern Europe)

Type locality. (Not stated in the original publication): [Karelia], bay of Peldozha Lake (the holotype label).

Types. Holotype (dry): No. 1, and 1 paratype (shell and body dissected by N.D. Kruglov) from Svyatozero Lake (No. 2).

Additional findings. Type series locality only: Karelia, vicinities of Svyatozero Lake, Biological Station of Pedagogical University (ZIN).

Ecology. Lives in overgrown and swampy inlets of large lakes (Kruglov, 2005).

6. *Lymnaea* (*Polyrhytis*) *kurenkovi* Kruglov et Starobogatov, 1989

Fig. 2 A

[= *Lymnaea bulimoides middendorffi* – Starobogatov, Streletzkaja, 1967: 233, fig. 25, after Kruglov et Starobogatov, 1989a]

History of the name application.

Kruglov, Starobogatov, 1989a: 18, figs. 1, 4 (original description, anatomy; as *Lymnaea* subgenus *Polyrhytis* section *Pseudoisidora*, distribution)
Bogatov, Zatrawkin*, 1990 (shell morphology, key to identification, distribution)
Kruglov, Starobogatov, 1993a (key to identification)
Prozorova, 1998 (citation for Beringia)

* M. Zatrawkin himself spelled his name with "w" (pers. comm. to A.S). Most, though not all, of his publications adopted this spelling, especially when they were not edited without accounting the author's opinion. Thus, here and then we folow the author's spelling of his name.

Prozorova, 1996 (1997) (record for the Kurile Archipelago)
Prozorova et al., 2002 (record for the Kurile Archipelago)
Prozorova, Shedko, 2003 (record from Kamchatka Peninsula in the Kamchatka River drainage, general distribution, ecology)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Bolotov et al., 2012 (record for thermal waters of Kamchatka)

Type locality. Eastern Kamchatka, Tumrok Ridge, hot spring (up to 38°C).

Types. Holotype (dry): No. 1, and 8 dry paratypes from the type locality (No. 2).

Additional findings. North Kurile Islands: Shumshu (Bolshoje Lake) and Paramushir; Kamchatka – Timofeevskij Bay of Azabachje Lake (IBSS collection).

Ecology. Inhabits brooks from thermal sources (Kruglov, Starobogatov, 1989) and warmed shallow water of various waterbodies (Prozorova, Shedko, 2003).

7. *Lymnaea (Polyrhytis) azabatschensis* Kruglov et Starobogatov, 1989

Fig. 2 B

[=*L. leai* Baker, 1907, part., after Prozorova, 1998]

History of the name application.

Kruglov, Starobogatov, 1989a: 18, figs. 1, 5, 2, 4 (original description, as *Lymnaea* (*Polyrhytis*) section *Pseudoisidora*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, distribution)
Kruglov, Starobogatov, 1993a (key to identification)
Prozorova, 1998 (record from Beringia)
Prozorova, Shedko, 2003 (record from Kamchatka Peninsula – the Kamchatka River drainage, general distribution, ecology)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Kamchatka, channel from Azabachje Lake to the Kamchatka River.

Types. Holotype (dry): No. 1.

Additional findings. Chukotka – Mainitz Lake, Alaska – the Katunak River, lower reaches of the Yukon and Kuskokwim rivers (Alaska); Lake Kluane (Canada) (ZIN); swampy backwaters of the Azabachjya River (Kamchatka); pond in Fairbanks (Alaska, USA) (IBSS).

Ecology. Lives in stagnant (Kruglov, 2005), well warmed semi-permanent waterbodies, including eutrophicated ones (Prozorova, Shedko, 2003).

8. *Lymnaea* (*Polyrhytis*) *falsipalustris* Kruglov et Starobogatov, 1989

Fig. 2 C

[=*L. leai* Baker, 1907 (part.)]

History of the name application.

Kruglov, Starobogatov, 1989a: 19, fig. 1, 6; 2, 5 (original description, as *Lymnaea* (*Polyrhytis*) section *Pseudoisidora*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, distribution)
Kruglov, Starobogatov, 1993a (key to identification)
Prozorova, 1998 (citation for Beringia)
Prozorova, Shedko, 2003 (record from Kamchatka Peninsula in the Kamchatka River drainage, general distribution, ecology)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Kamchatka, channel from Azabachje Lake to the Kamchatka River.

Types. Holotype (dry): No. 1.

Additional findings. Lake Kluane (Canada) (ZIN), banks of swampy backwaters of the Azabachjya River, together with the preceding species (Kamchatka), artificial pond, Fairbanks (Alaska) (IBSS).

Ecology. Lives in stagnant (Kruglov, 2005), well-warmed semi-permanent waterbodies, including eutrophicated ones, together with *L. azabatschensis*; tolerant to temporary drying up (Prozorova, Shedko, 2003).

9. *Lymnaea* (*Stagnicola*) *archangelica* Kruglov et Starobogatov, 1986

Fig. 2 D

History of the name application.

Kruglov, Starobogatov, 1986: 60, fig. 1; 2, 2 (original description, as *Lymnaea* subgenus *Stagnicola* section *Stagnicola*)
Kruglov, Starobogatov, 1993b (key to identification)
Leshko, 1998 (distribution – Pechora River basin)
Vinarski, 2002 (record for Ural area)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Vinarski et al., 2007 (2008) (record for Irtysh, Middle and Lower Obian provinces in Western Siberia)
Kantor, Sysoev, 2005; Kantor et al., 2010 information about types, type locality and general distribution)
Khokhutkin et al., 2009 (photo of shell from the Kiya River, key to identification, general information, distribution in Southern Ural)
Dolgin, 2009 (record for Irtysh, Middle- and Lower Obian, Lena provinces in Western Siberia)
Andreeva et al., 2009 (key to identification, general information, distribution)
Nekhaev, 2011 (record as a stagnicoline form from Northeastern Europe)
Palatov, Vinarski, 2014 (records from macrophyte thickets at depth down to 0.3 m in a floodland lake at the Istra River near Mikhailovka village, Moscow Region)

Type locality. Pool in floodland of the Uemlyanka River, Arkhangelsk Region, 10–12 km from entering the Severnaya Dvina River.

Types. Holotype (dry shell) No. 1. Paratypes: No. 2 (42 in alcohol) – Arkhangelsk Region, the

Dvina River mouth near lighthouse Mud'yug; No. 3 (4 in alcohol) – Dvina River mouth without specified locality; No. 5 (6 dry) – near the White Sea shore; No. 6 (27 in alcohol) – Uemlyanka River (tributary of the Dvina); No. 4 (8 dry) Berezovyi town (Ural region) and No. 8 (35 dry) – Polar Ural.

Additional findings. Arkhangelsk Region, near Nikolsky monastery (ZIN), Pechora basin (Leshko, 1998) and source of the Kiya Rivers in Orenburg Region (Khokhutkin et al., 2009).

Ecology. Lives in temporary floodland waterbodies (Khokhutkin et al., 2009). Leshko (1998) found this species in Laya-to Lake (Pechora basin), depth 1.5–2 m, on silty bottom, at low water mineralization and very high ammonium nitrogen content.

10. *Lymnaea* (*Galba*) *almaatina* Izzatullaev, Kruglov et Starobogatov, 1983

Fig. 2 E

History of the name application.

Izzatullaev et al., 1983a: 323, fig. 1 (3–4) (original description, as *Lymnaea* subgenus *Galba*)
Kruglov, Starobogatov, 1993b (as section *Montigalba*, key to identification)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Izzatulaev, Stadnichenko, 2010 (ecology)

Type locality. Spring in the valley of the Bolshaya Almaatinka River [southern Kazakh SSR, presently Kazakhstan]

Types. Holotype (dry shell and dissected body in alcohol): No 1.

Additional findings. No data.

Ecology. Lives in springs (Kruglov, 2005; Izzatulaev, Stadnichenko, 2010).

11. *Lymnaea* (*Galba*) *tengriana* Izzatullaev, Kruglov et Starobogatov, 1983

Fig. 2 F

History of the name application.

Izzatullaev, Kruglov et Starobogatov, 1983a: 323, fig. 1 (5) (original description, as *Lymnaea* (*Galba*) *tengriana*)
Kruglov, Starobogatov, 1993b (as section *Montigalba*, key to identification)
Kruglov, 2005 (key to identification, anatomy, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Izzatulaev, Stadnichenko, 2010 (ecology)

Type locality. Tajik SSR, Kuljab Region, Muminabad, pool in vicinity of Khan-Tengri Ridge.

Types. Holotype (dry): No. 1, paratype (dry shell), No. 2 – Farkhat, near Yangi-Kurgan (Tajikistan).

Additional findings. Besides the type locality, the species was recorded from Quaternary deposits of Balkhash area (Yun, Lenek River) (ZIN).

Ecology. Inhabits temporary pools (Kruglov, 2005).

12. *Lymnaea* (*Galba*) *shadini* Izzatullaev, Kruglov et Starobogatov, 1983

[= *Limnaea truncatula* var. *thiesseae* Clessin, 1879 = *Lymnaea* (*Galba*) *thiesseae* Clessin, fide Kruglov, Starobogatov, 1985b]

History of the name application.

Izzatullaev, Kruglov et Starobogatov, 1983b: 396, fig. 1 (3–4) (description as *Lymnaea* (*Galba*) *shadini*)
Kruglov, Starobogatov, 1985b (as *Lymnaea* (*Galba*) *thiesseae* Clessin of Section *Galba*)
Kruglov, Starobogatov, 1993a (as *Lymnaea* (*Galba*) *thiesseae* Clessin of Section *Galba*)
Vinarski, 2002 (new record from Ural region, as *Lymnaea* (*Galba*) *thiesseae*)
Kruglov, 2005 (reproductive system, as *Lymnaea* (*Galba*) *thiesseae* Clessin)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution as *Lymnaea* (*Galba*) *thiesseae* Clessin)
Izzatulaev, Stadnichenko, 2010 (ecology)
Nekhaev, 2011 (record as a galbian life form for Eastern Europe)
Vinarski, 2012b (shell and copulatory organ morphology, comparing with *L. truncatula,* records from Western Siberia)

Type locality. Tajik SSR, vicinities of Khorog, aryk [artificial brook].

Types. Presently cannot be identified (see below).

Additional findings. Besides the type locality, the species was recorded from Borzhom Reserve, Likani brook (ZIN); wet bank of the Chulym River near Tsentrpoligon village and near Teguldet settlement (Tomsk Region), the Tartas River at Severnyi settlement (Novosibirsk Region), and the Om River at Kuibyshev town (Novosibirsk Region) (Vinarski, 2012).

Ecology. Lives on wet walls and slopes, in semipermanent waterbodies and springs (Izzatulaev, Stadnichenko, 2010), on wet banks of small and middle-size rivers, in supralittoral in several cm above the water level; together with *L. truncatula* (Vinarski, 2012).

Remark. The types cannot be separated with certainty: there are no specimens in the ZIN collection with label data completely corresponding to those stated in the original description. The ZIN collection harbours "*L. shadini*" (No. 3, 2 dry spms, one exceeding 8 mm, the other less than 5 mm in height and decayed [the holotype shell was originally stated as being 5.0 mm high], det. Izzatullaev, labelled as Vakhsh Ridge, "area 1 May", spring, salty small river at the water reservoire", 11.09.1973,

lot No. 58, designated as "holotype and paratypes of *shadini*", the handwriting being unknown.

13. *Lymnaea* (*Sibirigalba*) *potanini* Kruglov et Starobogatov, 1985

Fig. 3 A

History of the name application.

Kruglov et Starobogatov, 1985: 28, fig. 1,2; 2,2 (original description, anatomy, as *Lymnaea* subgenus *Sibirigalba*)
Kruglov et Starobogatov, 1993a (key to identification)
Kruglov, 2005 (key to identification, anatomy, general information, distribution)

Type locality. Saksagir River in Ordos (China).

Types. Holotype (dry): Nos. 1 and 2 dissected paratypes from type locality (absent in ZIN collection).

Additional findings. No data.

Ecology. No exact data.

14. *Lymnaea* (*Orientogalba*) *lenaensis* Kruglov et Starobogatov, 1985

Fig. 3 B

History of the name application.

Kruglov, Starobogatov, 1985b: 31, fig. 1, 7; 2, 8 (original description, anatomy, as *Lymnaea* subgenus *Orientogalba* section *Lenagalba*)
Bogatov, Zatrawkin, 1990 (key to identification, distribution)
Prozorova, 1991a (records from basins of the rivers flowing to Japan Sea and watershed of Lake Khanka and Ussuri River)
Prozorova, 1991b (1992) (egg mass in a lake near Rudnaya Pristan settlement)
Prozorova, 1992 (living in semi-permanent waterbodies)
Kruglov, Starobogatov, 1993b (key to identification)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (key to identification, anatomy, general information, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Prozorova, 2013 (citation for Russian Far East)
Dolgin, 2013 (records from foothills and low-altitude mountains of Sayan mountain system)

Type locality. River Anga valley (upper Lena River, Irkutsk Region, Kachug district) [East Siberia].

Types. Holotype (alcohol): No. 7. Paratypes: No. 2 (1 in alcohol) — Ussuri Territory (Vinogradovka); No. 4 (1 dry) – Kaya River near Irkutsk city (Irkutsk Region); No. 5 (5 dry) – Lena River near Kachug settlement.

Additional findings. Primorye Territory – Posyet settlement; Irkutsk Region – offshore zone of the Kaya River near Markovo village; the Kurejka River (lower reaches of the Yenisei, lake No. 21) (ZIN); the Goloustnaya River basin (Irkutsk Region, near Anga settlement) (LIN); southern Primorye, vicinities of Posyet and Khasan settlements; Central Primorye, Rudnaya Pristan settlement; the Arsenyevka River basin (IBSS); Lower Tunguska valley (Krasnoyarsk Territory), Oleniok River valley (Yakutia) (Якутия) (Kruglov, Starobogatov, 1985b).

Ecology. Lives in floodland waterbodies (Kruglov, 2005), small temporary waterbodies (Prozorova, 2002), in valleys of rivers and brooks, often in swampy areas.

15. *Lymnaea (Orientogalba) tumrokensis* Kruglov et Starobogatov, 1985

Fig. 3 C

History of the name application.

Kruglov, Starobogatov, 1985b: 30, fig. 1, 6 (original description, as *Lymnaea* subgenus *Orientogalba* section *Viridigalba*)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, distribution)
Kruglov, Starobogatov, 1993b (key to identification)
Prozorova, 1998 (Beringia)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Hot spring (+38°C), eastern Kamchatka Peninsula, Tumrok Ridge.

Types. Holotype (dry): No 1 and 30 paratypes (dry shells) from type locality under No. 2.

Additional findings. Hot springs of Tumrok Ridge.

Ecology. Found in ca. 10 hot spring locatlities, the area of occurrence is less than 750 km² (Vinarski pers. comm.).

16. *Lymnaea* (*Peregriana*) *carelica* Kruglov et Starobogatov, 1983

Fig. 3 D

History of the name application.

Kruglov, Starobogatov, 1983b: 1467, fig. 2, 6; 3J (original description, as *Lymnaea* subgenus *Peregriana* section *Cyphideana*)
Kruglov, Starobogatov, 1992 (egg mass morphology from type locality)
Kruglov, Starobogatov, 1993b (key to identification)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (key to identification, anatomy, general information, egg mass, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and distribution)
Nekhaev, 2011 (record as an ampla-like life form from northeastern Europe)

Type locality. Shallow waterbody near Svjatozero (Karelian ASSR)

Types. Holotype (body in alcohol [not found] and a dry shell) No. 1.

Additional findings. No other data.

General distribution. Type locality only.

Ecology. It is only known that egg masses are attached to water vegetation (Kruglov, Starobogatov, 1991). Found together with *L.* (*Corvusiana*) *curtacorvus.*

Remark. Kruglov and Starobogatov (1983b) mentioned 98 paratypes, 10 dissected. They are not yet recognized as such in the ZIN collection.

17. *Lymnaea* (*Peregriana*) *teletzkiana* Kruglov et Starobogatov, 1984

Fig. 4 A

History of the name application.

Kruglov, Starobogatov, 1984a: 25, fig. 1, 2; 2, 2 (original description, as *Lymnaea* subgenus *Peregriana* section *Cyphideana*)
Kruglov, Starobogatov, 1993b (key to identification)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (key to identification, anatomy, general information, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Teletzkoe Lake [Altai Republic, SE Western Siberia].

Types. Holotype (body and shell separately): No. 1; paratypes: No. 2 (2 dissected) from type locality and No. 3 (1 dry) from the Buyant River (Altai Territory).

Additional findings. Bomnak River (Amur Region) and Khurk River (Onon basin, Mongolia) (ZIN).

Ecology. In the type locality in autumn the species was found on offshore boulders and on coarse debris, often among macrophytes (original data).

18. *Lymnaea* (*Peregriana*) *dipkunensis* Gundrizer et Starobogatov, 1979

Fig. 4 B

History of the name application.

Gundrizer, Starobogatov, 1979: 1134, fig. 1, 4 (original description, as *Lymnaea* (*Peregriana*), *Lymnaea mucronata* group)
Kruglov, Starobogatov, 1993b (key to identification, as *Lymnaea* subgenus *Peregriana* section *Cyphideana*)
Dolgin, 2003 (habitat)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (key to identification, anatomy, general information, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Dolgin, 2009 (citation for lower Yenisei province and possibly in Lena province in Eastern Siberia)
Pietsch et al., 2012 (record from North-West area of Sakhalin)

Type locality. Gornoe Lake, floodland of the Kurejka River upstream of the Dipkun River mouth [NW Siberia].

Types. Holotype (dry): No. 1 and 1 paratype (dry shell) No. 2 from the type locality.

Additional findings. Northwestern Sakhalin – Langry River basin (IBSS).

Ecology. Lives in floodland waterbodies (Dolgin, 2003) on silty-sandy bottom with well-developed water vegetation, population density up to 7 spms/m^2 (Gundrizer, Starobogatov, 1979).

19. *Lymnaea* (*Peregriana*) *juribeica* Kruglov et Starobogatov, 1984

Fig. 4 C

History of the name application.

Kruglov, Starobogatov, 1984a: 32, fig. 1, 17 (original description, as *Lymnaea* subgenus *Peregriana* section *Kamtchaticana*)
Kruglov, Starobogatov, 1993b (key to identification)
Dolgin, 2001 (distribution in Western Siberia)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (key to identification, general information, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Vinarski et al., 2007 (2008) (citation for lower Obian province in Western Siberia)
Khokhutkin et al., 2009 (paratype photo, general information, distribution)
Dolgin, 2009 (citation for lower Obian Province)
Andreeva et al., 2010 (paratype photo, general information)
Dolgin, Sviridenko, 2011 (habitat, Pur and Taz rivers)

Type locality. Tyumen Region [Western Siberia], Gydan Peninsula, Pisi-To Lake in the Juribei River basin.

Types. Holotype (dry): No. 1.

Additional findings. One dry specimen (not formally labelled as paratype) from type locality (ZIN No. 2).

Ecology. Occupies floodplain and upland habitats (Dolgin, Sviridenko, 2011).

Remarks. Reproductive system was not studied; in the opinion of Andreeva et al. (2009), it can be a synonym of *L. jacutica.*

20. *Lymnaea* (*Peregriana*) *jacutica* Starobogatov et Streletzkaja, 1967

Fig. 4 D

History of the name application.

Starobogatov, Streletzkaja, 1967: 233, fig. 27 (original description, as *Lymnaea* subgenus *Galba*)
Kruglov, Starobogatov, 1984a (morphology, as *Lymnaea* subgenus *Peregriana* section *Kamtschaticana*, anatomy, distribution)
Prozorova, 1986 (record from Chaun lowland)
Bogatov, Zatrawkin, 1990 (morphology, distribution, key to identification)
Kruglov, Starobogatov, 1991 (1992) (egg mass morphology from Kolhyma reservoir, Magadan city)
Kruglov, Starobogatov, 1993b (key to identification)
Dolgin, 2001 (distribution in Western Siberia)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution, egg mass)
Prozorova, 2005 (record from Tauysk Bay, general distribution)

Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Vinarski et al., 2007 (2008) (citation for lower Obian province in Western Siberia)
Khokhutkin et al., 2009 (morphology, photo of a specimen from Gydan Peninsula, distribution)
Dolgin, 2009 (citation for lower Obian, lower Yenisei, Lena and Yano-Kolyma provinces in Siberia)
Andreeva et al., 2010 (morphology, measurements of copulative organ, photo of a specimen from Gydan Peninsula, distribution)
Pietsch et al., 2012 (records from North-East and North-West Sakhalin)
Dolgin, 2013 (foothills, low-altitude and middle-range mountains of Sayan mountain system)

Type locality. Mouth of the Kolyma River, near small settlement Chajchaja.

Types. Holotype (dry shell) No. 1 and one paratype (body and shell separately) from vicinities of Zhigansk town, lover reaches of the Lena River (No 4.)

Additional findings. Kaya River near Irkutsk city – 1 dry specimen; Lena River near Kachug settlement (Irkutsk Region); Penzhina River basin (Kamchatka Territory); bog in floodland of the Kolyma River (middle reaches), Gydan Peninsula, Pisito Lake off left bank of Yuribei River (ZIN), Gydan Peninsula, floodland lake behind Sevryute Lake, Yuribei outpost (MSAM); Chaun lowland (IBSS); Upper Kolyma basin (vicinities of Agrobaza settlement and Jack London Lake) (IBSS); Tauiskaya inlet (North Okhotsk Sea coast) (IBSS); northwestern and northeastern Sakhalin except for Schmidt Peninsula (IBSS).

Ecology. Lives in lakes and dead channels (Dolgin, 2003; Starobogatov et al., 2004). In Siberia often coexists with *L. zazurnensis* (Khokhutkin et al., 2009).

21. *Lymnaea* (*Peregriana*) *kafanovi* Kruglov et Starobogatov, 1984

Fig. 4 E

History of the name application.

Kruglov, Starobogatov, 1984a: 31, fig. 1, 20; 2, 6 (original description, as *L.* (*Peregriana*) section *Kamtschaticana*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (morphology, distribution, key to identification)
Kruglov, Starobogatov, 1993b (key to identification)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2009 (2010) (information about types, type locality and general distribution)
Pietsch et al., 2012 (records from Sakhalin – east mountain area, the Tym River area and Poronai River and Poronnaisk mountain areas)

Type locality. Sakhalin Region [Sakhalin Island], vicinities of Nogliki settlement.

Types. Holotype (body in alcohol and dry shell) No. 1; paratypes: No. 2 (34 alcohol-preserved + 1 dry shell) from type locality and No. 3 (1 alcohol) from the Malaya Tymka River near Tymovskoe settlement (Sakhalin).

Additional findings. Basins of the Tym and Poronai rivers, east coast of Central Sakhalin (Peschanoe Lake) (IBSS).

Ecology. Found in thicket of macrophytes (label data).

22. *Lymnaea* (*Peregriana*) *gundrizeri* Kruglov et Starobogatov, 1983

Fig. 5 A

History of the name application.

Kruglov, Starobogatov, 1983a: 141 (original description, as *Lymnaea* (*Peregriana*) section *Altailymnaea*)
Kruglov, Starobogatov, 1984a (anatomy)
Kruglov, Starobogatov, 1993b (key to identification)
Prozorova, Sharyi-Ool, 1999 (record from west Tuva Republic – floodplain lake near Chadan settlement)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (key to identification, anatomy, general information, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Waterbody near the shore of Surulu-Kol Lake, Ulaganskij district, Altai Territory [now – Altai Republic; SW Siberia].

Types. Holotype (body in alcohol and dry shell) No. 1.

Additional findings. Besides the type locality, the species is known from western Mongolia (Kruglov, 2005).

Ecology. Lives in temporary waterbodies (Kruglov, 2005), in type locality found together with *L. ulaganica* (label data).

23. *Lymnaea* (*Peregriana*) *ulaganica* Kruglov et Starobogatov, 1983

Fig. 5 B

History of the name application.

Kruglov, Starobogatov, 1983a: 141 (original description, as *Lymnaea* subgenus *Peregriana* section *Altailymnaea*)
Kruglov, Starobogatov, 1984a (anatomy)
Kruglov, Starobogatov, 1993b (key to identification)
Prozorova, Sharyi-Ool, 1999 (record from western Tuva territory – floodplain lake near Chadan settlement)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (key to identification, anatomy, general information, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Vinarski et al., 2007 (2008) (record for Irtysh province in Western Siberia)
Vinarski, 2008 (shell variation, copulative organs, new records in Western Siberia)

Type locality. Waterbody near the shore of Surulu-Kol Lake, Ulaganskij district, Altai Territory [now – Altai Republic; SW Siberia].

Types. Holotype: No. 1; 2 paratypes (in alcohol) from type locality, No. 2.

Additional findings. Novosibirsk Region, pool near Severnoje-Biaza Road Omsk Region – Krivoe Lake near Atak village; pools on a wet meadow in the Irtysh River floodplain near Chernoluchye village and near Kachesovo village; a lake in the Irtysh River fllodland near Berezovoye village, a pool in the Irtysh River floodland in the northern outskirts of Omsk city; wet shore of the Tevriz River (Vinarski, 2008).

Ecology. In Omsk Region it was found in small floodplain pools and lakes and in Novosibirsk Region – in very a small shallow puddle on sandy bottom and among macrophytes (Vinarski, 2008).

24. *Lymnaea* (*Peregriana*) *igarkae* Gundrizer et Starobogatov, 1979

Fig. 5 C

History of the name application.

Gundrizer, Starobogatov, 1979: 1133, fig. 1, 3; 2, 3 (original description, as *Lymnaea* (*Peregriana*), *L. ovata*-group)
Kruglov, Starobogatov, 1993b (key to identification, as section *Ampullaceana*)
Dolgin, 2003 (biotopical occurrence – floodland and lowland waterbodies)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (key to identification, anatomy, general information, distribution)
Vinarski et al., 2007 (2008) (record for lower Obian province in Western Siberia)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Dolgin, 2009 (record for Lower Obian and Lower Yenisei provinces in Siberia)
Dolgin, Sviridenko, 2011 (records from Pur and Taz rivers)

Type locality. Waterbody in Igarka city [NW Siberia].

Types. Holotype (dry): No. 1. Paratypes: No. 2 (3 in alcohol, 2 of them dissected) from pond in outskirts of Igarka city, and No. 3 (1 in alcohol) from a floodland lake near the Taz River downstream of Tazovskij settlement.

Additional findings. Basin of the Pur River in Western Siberia (Dolgin, Sviridenko, 2011).

Ecology. Found in the type locality at 0.6–0.8 m deep, on silty bottom covered by semi-decomposed material and on water vegetation. Population density – up to 35 spms/m^2 (Gundrizer, Starobogatov, 1979). According to Dolgin and Sviridenko (2011), lives in floodplains of rivers.

25. *Lymnaea* (*Peregriana*) *obensis* Kruglov et Starobogatov, 1984

Fig. 5 D

History of the name application.

Kruglov, Starobogatov, 1984a: 25, fig. 1, 5 (original description, as *Lymnaea* subgenus *Peregriana* section *Bouchardiana*)
Kruglov, Starobogatov, 1993b (key to identification)
Dolgin, 2001 (citation for Western Siberia)
Dolgin, 2003 (biotopical occurrence)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (key to identification, anatomy, general information, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and distribution)
Vinarski et al., 2007 (2008) (citation for lower Obian province in Western Siberia)
Khokhutkin et al., 2009 (holotype photo, general information)
Andreeva et al., 2009 (holotype photo, general information)
Dolgin, 2009 (citation for lower Obian province in Siberia)

Type locality. Lake on the left bank of the Ob River, near Polovinnyj Island [Western Siberia].

Types. Holotype (dry): No. 1. 1 dry paratype No. 2 (type locality).

Additional findings. No other data.

Ecology. Lives in floodland waterbodies (Dolgin, 2003).

26. *Lymnaea* (*Peregriana*) *nogoonica* Kruglov et Starobogatov, 1983

Fig. 5 E

History of the name application.

Kruglov, Starobogatov, 1983a: 140 (description as *Lymnaea* subgenus *Peregriana* section *Sibirilymnaea*)
Kruglov, Starobogatov, 1984a (anatomy)
Kruglov, Starobogatov, 1993b (key to identification)
Prozorova, Sharyi-Ool, 1999 (record for Tuva Republic — vicinity of Kyzyl city in canal of the Yenisei River, Tonmas-Sug inflow of the Yenisei River and Azas Lake)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (key to identification, anatomy, general information)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and occurence)
Dolgin, 2013 (foothills, low-altitude and probably middle-range mountains of Sayan mountain system)

Type locality. Lake near Kosh-Agach settlement, Altai Territory [SW Siberia] — ZIN catalog and the original description; Lake Nogoon (Mongolia), according to Kruglov (2005).

Types. Holotype (dry): No. 1 and 2 dry paratypes, No. 2, from Altai Territory.

Additional findings. Chui depression (Altai) (Kruglov, 2005).

Ecology. Lives in drainless waterbodies (Kruglov, 2005).

27. *Lymnaea* (*Peregriana*) *novikovi* Kruglov et Starobogatov, 1983

Fig. 6 A

History of the name application.

Kruglov, Starobogatov, 1983a: 139 (original description, as *Lymnaea* subgenus *Peregriana* section *Sibirilymnaea*)
Kruglov, Starobogatov, 1984a (anatomy)
Kruglov, Starobogatov, 1993b (key to identification)

Prozorova, Sharyi-Ool, 1999 (records from Tuva – Tonmas-Sug inflow of the Yenisei River (vicinity of Kyzyl city), Azas lake and the Erzin River)
Zasypkina, 2003 (finding in Kara-Kol Lake in Tuva)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (key to identification, anatomy, general information, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Vinarski et al., 2007 (2008) (citation for Irtysh and Lower Obian provinces in Western Siberia)
Khokhutkin et al., 2009 (photo of shell from Alabuga Lake, Chelyabinsk Region, general information)
Andreeva et al., 2009 (photo of holotype and shell from the Tym River, general information)
Dolgin, 2009 (citation for Irtysh and Middle Obian provinces in Western Siberia)
Prozorova et al., 2009 (record from Selenga River watershed)
Dolgin, 2012 (records from the Upper Yenisei, Tuva)
Dolgin, 2013 (foothills and probably low-altitude mountains of Sayan mountain system)

Type locality. Tarkhatinskoe Lake, Koshagachskij district, Altai Territory [SW Siberia].

Types. Holotype (dry): No. 1; paratypes: No. 2 (1 dry) – Sretensk (Transbaikalian waterbody No. 1); Altai Territory – No. 3 (1 in alcohol and 1 dry) Kosh-Agach, pool without vegetation on right bank of the Chuya River; No. 6 (52 in alcohol and 1 dry) – pools on bank of the Chuya River (Kosh-Agach); No. 8 (9 dry) small permanent pool on the of the Chuya River; No. 4 (60 in alcohol) – backwater with vegetation in the Menka River; No. 5 (11 in alcohol) – Uzun-Kol Lake; No. 11 (1 destroyed shell) – pool at source of small river flowing from this lake; No. 7 (10 dry) – lake Surulu-Kol; No. 9 (8 in alcohol) – silted channel in the Chulyshman River mouth, left shore, 500 m from a lake, No. 10 (1 dry) – Vologodskaya channel (Ob River basin).

Additional findings. According to published data, the species was found in Western Siberia (southward of 64°N), southern and central Ural, lower Ob basin, Altai (Uzun-Kol Lake), Tuva (Tonmas-Sug, Azas, Kara-Kol lakes), basins of the Selenga and upper Yenisei rivers (Prozorova, Sharyi-Ool, 1999; Zasypkina, 2003; Andreeva et al., 2009; Prozorova et al., 2009).

Ecology. Lives in permanent waterbodies: lakes and small slow-running rivers; phyto- and oxyphilic species (Andreeva et al., 2009; Khokhutkin et al., 2009).

28. *Lymnaea* (*Peregriana*) *napasica* Kruglov et Starobogatov, 1983

Fig. 6 B

History of the name application.
Kruglov, Starobogatov, 1983a: 140 (original description, as *Lymnaea* subgenus *Peregriana* section *Sibirilymnaea*)
Kruglov, Starobogatov, 1993b (key to identification)
Vinarski, 2002 (citation for Siberia)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (shell morphology, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Vinarski et al., 2007 (2008) (citation for Irtysh, Middle and Lower Obian provinces in Western Siberia)
Andreeva et al., 2009 (photo of holotype and shell from Tym River, general information)
Dolgin, 2009 (citation for Irtysh, Middle and Lower Obian provinces in Western Siberia)

Type locality. Near Napas settlement, the Tym River, Tomsk Region [W Siberia].

Types. Holotype (dry) No. 1; paratypes: No. 2 (3 dry) from type locality, No. 3 (1 dry) – Vologodskaya channel (Ob River basin) and No. 4 (1 dry) – channel in the Chulyshman River mouth (Altai region).

Additional findings. No other data.

Ecology. Phytophilic species (Andreeva et al., 2009). According to original labels the species was found together with *L. novikovi*.

29. *Lymnaea* (*Peregriana*) *tsalolikhini* Kruglov et Starobogatov, 1983

Fig. 6 C

History of the name application.
Kruglov, Starobogatov, 1983a: 139 (original description, as *Lymnaea* subgenus *Peregriana* section *Sibirilymnaea*)
Kruglov, Starobogatov, 1984a (anatomy)
Kruglov, Starobogatov, 1993b (key to identification)
Prozorova, Sharyi-Ool, 1999 (record from Tuva Republic – Nogan-Khel lake)
Kruglov, 2005 (key to identification, anatomy, general information, distribution)
Prozorova et al., 2009 (record from Selenga River watershed)
Dolgin, 2013 (foothills, low-altitude and middle-range mountains of Sayan mountain system)

Type locality. Backwater in Nogoon Lake between Khar-Nur and Durgun-Nur lakes (Mongolia).

Types. Holotype (body in alcohol and dry shell): No. 1; paratypes No. 2 (2 dissected in alcohol) from type locality.

Additional findings. Lake Nogan-Khel of Tuva Republic (Prozorova, Sharyi-Ool, 1999) and Mongolian part of the Selenga River basin (Prozorova et al., 2009).

Ecology. In Altai found on cane, lives on vegetation in small lakes (Prozorova et al., 2009).

30. *Lymnaea* (*Peregriana*) *mongolitumida* Kruglov et Starobogatov, 1983

Fig. 6 D

History of the name application.
Kruglov, Starobogatov, 1983a: 139 (original description, as *Lymnaea* subgenus *Peregriana* section *Sibirilymnaea*)
Kruglov, Starobogatov, 1984a (anatomy)
Kruglov, Starobogatov, 1993b (key to identification)
Prozorova, Sharyi-Ool, 1999 (record from Tuva – watershed of Erzin River)

Kruglov, 2005 (key to identification, anatomy, general information, distribution)

Type locality. Khomyn-Kholoi Lake (West Mongolia).

Types. Holotype (dry): No. 1.

Additional findings. Watershed of the Erzin River – southeastern part of Tuva Republic (Prozorova, Sharyi-Ool, 1999) Noogon Lake (Mongolia) (Kruglov, 2005).

Ecology. Lives in large waterbodies (Kruglov, 2005).

31. *Lymnaea* (*Peregriana*) *kurejkae* Gundrizer et Starobogatov, 1979

Fig. 6 E

History of the name application.

Gundrizer, Starobogatov, 1979: 1131, fig. 1, 1; 2, 1 (original description, as *Lymnaea* (*Peregriana*) *L. mucronata* group)
Kruglov, Starobogatov, 1993b (key to identification as section *Sibirilymnaea*)
Starobogatov et al., 2004 (key to identification)
Dolgin, 2003 (biotopical occurrence – floodland waterbodies)
Kruglov, 2005 (key to identification, anatomy, general information, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Vinarski et al., 2007 (2008) (citation for Irtysh province in Western Siberia)
Andreeva et al., 2009 (photo of holotype and shell from brook near Mezhdurechje settlement in Omsk Region, copulative apparatus, general information)
Dolgin, 2009 (citation for Lower Yenisei province in Eastern Siberia)

Type locality. Lake in floodland of the Kurejka River 20 km upstream of its mouth [NW Siberia].

Types. Holotype (dry): No. 1; paratypes: Nos. 2–3 (4 dry+1 body in alcohol) from floodland lake No. 32 of the Kurejka River.

Additional findings. Backwater of Noogon Lake between Khar-Nur and Durgun-Nur (Mongolia) (ZIN); several waterbodies of middle reaches of the Irtysh River (see map in Andreeva et al., 2009).

Ecology. In the type locality the species was found on silty bottom at depth of 0.3 m, population density up to 12 spms/m^2 (Gundrizer, Starobogatov, 1979). Lives in non-permanent boggy waterbodies and small brooks (Andreeva et al., 2009). Found together with *L. tsalolikhini* in Noogon Lake (Mongolia) (label data).

32. *Lymnaea* (*Peregriana*) *dolgini* Gundrizer et Starobogatov, 1979

Fig. 7 A, B

History of the name application.

Gundrizer, Starobogatov, 1979: 1132, fig. 1, 2; 2, 2 (original description, as *Lymnaea* subgenus *Peregriana*)
Kruglov, Starobogatov, 1993b (key to identification, as *Lymnaea* subgenus *Peregriana* section *Sibirilymnaea*)
Dolgin, 2001 (distribution in Western Siberia)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Khokhutkin et al., 2009 (photo of shell from Vylposl channel near Labytnangi town, general information)
Kantor, Sysoev, 2005; Kantor et al., 2009 (2010) (information about types, type locality and general distribution)
Vinarski et al., 2007 (2008) (citation for Irtysh, Middle and Lower Obian provinces in Western Siberia)
Vinarski, 2008 (shell, anatomy and distribution in Irtysh region)
Andreeva et al., 2009 (photo of holotype and shells from lake near Staryi Konkul village in Omsk Region and from Polto waterbodies near Napas settlement in Tomsk Region; copulative apparatus of specimen from temporary waterbody near Novoshumilovo village in Tomsk Region; distribution, general information)
Dolgin, 2009 (citation for Irtysh, Middle and Lower Obian, Lower Yenisei provinces in Siberia)
Dolgin, Sviridenko, 2011 (records from Pur and Taz river basins in Western Siberia)
Vinarski, 2013b (shell variability in specimens from Ananyevskoe Lake, Omsk Region, Western Siberia)

Type locality. Lake in floodland of the Kurejka River 20 km upstream of its mouth [NW Siberia].

Types. Holotype (dry): No. 1; paratypes: No. 2 (1 dissected body in alcohol and 1 dry shell) from floodland lake No. 32 in the Kurejka River basin and No. 3 (9 dry) from floodland of the Lower Ob River near Sukhorukovskij Island.

Additional findings. Nameless lake in the Vasyugan River basin (Western Siberia) (ZIN collection); Vylposl channel near Labytnangi town (NW Siberia); vicinities of Kirensk town in Irkutsk Region (Khokhutkin, 2009); waterbodies in basins of the Irtysh and Ob rivers (see map in Andreeva et al., 2009).

Ecology. Lives in water vegetation in permanent floodland waterbodies (Dolgin, 2001) and in temporary boggy shallow pools (Andreeva et al., 2009). Found together with *L. kurejkae* in waterbodies of the Kurejka River floodland.

33. *Lymnaea* (*Peregriana*) *manomaensis* Kruglov, Starobogatov et Zatrawkin in Kruglov et Starobogatov, 1984

Fig. 7 C

History of the name application.

Kruglov, Starobogatov, 1984a: 29, fig. 1, 13; 2, 15 (original description, as *L.* (*Peregriana*) section *Amurlymnaea*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (morphology, distribution, key to identification)
Kruglov, Starobogatov, 1993b (key to identification)
Prozorova, 1991a (citation for watershed of lake Khanka and Ussuri River)
Prozorova, Kolpakov, 2004 (record from Northern Primorye)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Prozorova, 2013 (record from Southern Russian Far East)

Type locality. Khabarovsk Territory [Far East], floodland of the Amur River, near Nizhnyaya Manoma settlement.

Types. Holotype No. 1; 4 dry paratypes from type locality, No. 2.

Additional findings. Basin of rivers running on slopes of Sikhote-Alin northward of 45°N (Northern Primorye, Tatar Strait basin), tributaries of the Lower Amur (IBSS).

Ecology. Lives near shore of floodland waterbodies of different types, on water vegetation and on silty bottom (Bogatov, Zatrawkin, 1990; Starobogatov et al., 2004).

34. *Lymnaea* (*Peregriana*) *dvoriadkini* Kruglov et Starobogatov, 1984

Fig. 7 D

History of the name application.

Kruglov, Starobogatov, 1984a: 29, fig. 1, 14; 2, 17 (original description, as *L.* (*Peregriana*) section *Amurlymnaea*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (morphology, distribution, key to identification)
Kruglov, Starobogatov, 1993b (key to identification)
Prozorova, 1991a (records from basins of rivers flowing to Japan Sea and watershed of Lake Khanka and the Ussuri River)
Prozorova, 1991b (1992) (egg mass morphology in snails from bog near Zharikovo village and running-water pool of the Razdolnaya River)
Prozorova, 1992 (living in temporary and permanent waterbodies in Primorye)
Prozorova, 2000 (record from Khanka Lake drainage, general distribution, ecology)
Prozorova, Kolpakov, 2004 (records from central and northern Primorye)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution, egg mass)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Potikha et al., 2008 (record from Sikhote-Alin Reserve, ecology)
Prozorova, 2013 (record from southern Russian Far East)

Type locality. Primorye Territory [Far East], northern coast of Vostok Bay, stream near Avangard settlement.

Types. Holotype (dissected body and shell): No. 1; paratypes: No. 2 (7 in alcohol, one of them dissected) from type locality and No. 3 (1 dry) from the Amur at Mkhiya.

Additional findings. Amur and Primorye basins: ditch near rice field, Spassk city (vicinities of Vladivostok); pool on meadow near Petropavlovskoe Lake; spring near Kutuzovskoe village (Khabarovsk Territory, Lazo district); Khurmuli River near forestry of BAM; pool near Komsomolsk-na-Amure city; Bolshaya Khurba River (tributary of the Lower Amur); pool on right bank of the Ulbinka River (Lower Amur); Chekundushka River (tributary of the Bureya River); Yagdynjya River (tributary of the Bureya River) near Chekunda settlement; Bochinka River (left tributary of the Amur); pool near the Manoma River; pool near Bogorodskoe village (Amur River); waterbody No. 1, Sretensk and Borzyanka River (Zabaikalye Territory) (ZIN); Primorye Territory, basin of Khanka Lake and the Ussuri River: bog in floodland of the Studenaya River and in many other shallow floodland waterbodies; Japan Sea basin: running-water pool in floodland of the Razdolnaya River near Razdolnoe settlement; waterbodies in floodland of the Serebryanka River, and many other localities everywhere along the coast in shallow water of floodland waterbodies (IBSS).

Ecology. Lives in offshore zone of semi-permanent and permanent waterbodies of various types, usually on silty bottom (Potikha et al., 2008), occurs also on pebbles and sand at depth of 0.3 m (label data).

35. *Lymnaea* (*Peregriana*) *sihotealinica* Kruglov et Starobogatov, 1984

Fig. 7 E

History of the name application.

Kruglov, Starobogatov, 1984a: 30, fig. 1, 15; 2, 16 (original description, as *L. (Peregriana*) section *Amurlymnaea*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (morphology, distribution, key to identification)
Kruglov, Starobogatov, 1993b (key to identification)
Prozorova, 1991a (records from basins of rivers flowing to Japan Sea and watershed of Lake Khanka and the Ussuri River)
Prozorova, 1991b (1992) (egg mass morphology in snails from floodplain pool of the Molokanka River near Zharikovo village)
Prozorova, 1992 (living in temporary and permanent waterbodies of Primorye)
Prozorova, 2000 (record from the Khanka Lake drainage, general distribution, ecology)
Prozorova, 2001 (record from the Lower Tumen River drainage – near Rodnikovoe lake)
Kolpakov, 2003; Prozorova, Kolpakov, 2004 (records from central and northern Primorye)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution, egg mass)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Potikha et al., 2008 (record from Sikhote-Alin Reserve, ecology)
Prozorova, 2013 (record from southern Russian Far East)

Type locality. Primorye Territory [Far East], Khorolskij district, stream near the road between Vladimiro-Petrovka and Staraja Devitza.

Types. Holotype (dry): No. 1; paratypes: from waterbodies of Primorye Territory: No. 2 (98 in alcohol, 6 dry) and No. 3 (2 in alcohol) – near Staraya Devitsa settlement; No. 4 (11 dry) and No. 5 (4 dry) – at the Ussuri River mouth; No. 7 (2 dry) – Putyatina Island; No. 12 (9 in alcohol + 1 dissected) – Volno-Nadezhdinskoe settlement; Khabarovsk Territory: No. 8 (1 dry) – vicinities of Petropavlovskoe Lake near Kukhari settlement; No. 9 (10 dry) – near

Kutuzovka village; No. 11 (18 in alcohol) – puddle near the Egge River (Sovetskaya Gavan city); Zabaikalye Territory: No. 6 (21 dry) and No. 10 (18 dry) – Sretensk city, waterbody No. 1, bog connected with stream Margul.

Additional findings. Watershed of the Amur River, tributaries and their small waterbodies – Khurmuli (quarry near railway and waterbody near forestry), Pokha, Bochinka, Ulbinka (left bank), Bureya (forest lake 3 km downstream of Staraya Chekunda settlement, Dlinnoe lake and foodplain lake near Chekunda settlement), Chekundushka and its tributaries, Ukhta, Khurba, Urgal (small waterbody near railway station Urgal) and Borzyanka (the latter belongs to Zabaikalye Territory, tributary of the Onon River); small waterbodies near Sulukh settlement, the Upper Bureya River drainage; near railway station Obluchje (ZIN); Primorye Territory, Khanka Lake and the Ussuri River basins: pool in the Molokanka River floodland; small waterbodies on the shore of Sivuchjya Bay (Khasan district), waterbodies of the Serebryanka River floodland (northeastern Primorye) and numerous shallow-water floodland waterbodies along the entire coast (IBSS).

Ecology. Lives in offshore zone of semi-permanent and permanent waterbodies of various kinds, usually on silty bottom (Potikha et al., 2008), lives also on pebbles and silt with water vegetation down to 1.3 m depth (label data).

36. *Lymnaea* (*Peregriana*) *amurensis* Kruglov, Moskvicheva et Starobogatov in Kruglov et Starobogatov, 1984

Fig. 8 A

History of the name application.

Kruglov, Starobogatov, 1984a: 28, fig. 1, 12; 2, 14 (orignal description, as *L.* (*Peregriana*) section *Amurlymnaea*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (morphology, distribution, key to identification)
Kruglov, Starobogatov, 1993b (key to identification)
Prozorova, 1991a (records from basins of rivers flowing to the Japan Sea and watershed of Lake Khanka and the Ussuri River)
Prozorova, 1991b (1992) (egg mass morphology in snails from Khanka Lake and spring of the Molokanka River near Zharikovo village)
Prozorova, 1992 (living in temporary and permanent water bodies of Primorye)
Prozorova, 2000 (record from Khanka Lake drainage, general distribution, ecology)
Prozorova, 2001 (record from the Lower Tumen River drainage – running-water pools near Rodnikovoe lake and the Karasik River)
Kolpakov, 2003; Prozorova, Kolpakov, 2004 (records from central and northern Primorye)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution, egg mass)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Potikha et al., 2008 (record from Sikhote-Alin Reserve, ecology)
Zasypkina, 2008 (records from the Shilka and Ingoda rivers)
Prozorova, 2013 (record from southern Russian Far East)

Type locality. Khabarovsk Territory [Far East], valley of the Amur River, shallow waterbody near Petropavlovskoe Lake, at Kukhari village.

Types. Holotype: No. 1 (dry shell). Paratypes: No. 5, 52 spms in alcohol, Khabarovsk Territory – floodland meadow near Kukhari village (Amur basin); No. 2, 6 dry shells from type locality; No. 28, 3 dry shells from type locality; No. 80, 4 dry shells, spring near Kutuzovka village of Lazo region, No. 3, 39 spms in alcohol, vicinities of he Egge River (Sovetskaya Gavan city); No. 7 (17 spms in alcohol) and No. 10 (67 spms in alcohol), floodland meadow and Khalikovo lake near Osipenko settlement (Argun River); No. 11 (3 spms in alcohol), puddle at Chnyrrakh settlement (Amur River); No. 8 (11 spms in alcohol), pool in airport of Komsomolsk city; No. 12 (14 spms in alcohol), No. 6 (328 spms in alcohol), No. 13 (5 dry shells) — boggy groove near Vanino settlement (Sovgavansk); No. 17 (1 spm in alcohol), temporary pools in Khabarovsk city; No. 14 (10 dry shells), small river Semitka (Argun River basin); No. 15 (10 dry shells), floodland meadow at the Kiya River (Ussuri River basin); No. 4 (218 spms in alcohol) and No. 29 (8 dry shells): Primorye Territory, Putyatin Island (Vladivostok city), puddle at the road to lake; No. 9 (16 spms in alcohol), running-water waterbody in Putyatin Island; No. 39 (23 spms in alcohol), brook at the road Petrovka-Starye Devitsy (Khanka district); No. 16 (2 spms in alcohol), El-pauza Lake (Maikhe River basin), floodland meadow); No. 18 (7 dry shells), rice fields near Spassk city (vicinities of Vladivostok); No. 70 (9 spms in alcohol), puddle at Volno-Nadezhdinsk village (vicinities of Vladivostok); No. 19 (23 dry shells), the Ussuri River near Burenski ridge; No. 25 (6 dry shells), Zabaikalye Territory, waterbody No. 1 near Sretensk city.

Additional findings. Primorye Territory: Lake Khanka basin — vicinities of Ilyainka settlement (Komissarovka River basin), the Ilistaya River basin; Khabarovsk Territory: basins of numerous rivers and channels — Amur River, lake Pokrovskoe, Amgun, Osinovka, Vak, Nizhnyaya Uda, Ussuri, Sita, Khurmuli, Ulbinka, etc. (ZIN).

Basins of Lake Khanka and the Ussuri River: brook in the Molokanka River floodland; pool near Khanka Lake in vicinities of Kamen-Rybolov settlement; many other localities in shalow-water floodland waterbodies. Japan Sea basin: running-water pools near Rodnikovoe Lake and the Karasik River; waterbodies of the Serebryanka River floodland and many others (IBSS).

Ecology. Lives in offshore zone of semi-permanent and permanent waterbodies of various kinds, prefers running ones, often on silty bottom (Prozorova, 2000, 2002, Potikha et al., 2008), at the depth from 0.1 to 0.8 m on silt and sand (label data). Found together with *L. sihotealinica* in puddle in vicinity of the Egge River (Sovetskaya Gavan city); together with *L. sihotealinica* and *L. dvoriadkini* – in Petropavlovskoe Lake, with *L. schubinae*, *L. sihotealinica* and *L. dvoriadkini* – in rice field groove near Spassk city, with *L. sihotealinica*, *L. schubinae* and *L. zazurniensis* – in the Ussuri mouth, with *L. zazurniensis*, *L. dvoriadkini* and *L. sihotealinica* – in waterbody No. 1 near Sretensk city (Zabaikalye Territory), with *L. sihotealinica* – in a pool near lake on Putyatina Island (ZIN).

37. *Lymnaea* (*Radix*) *arachleica* Kruglov et Starobogatov, 1989

Fig. 8 B, C

History of the name application.

Kruglov, Starobogatov, 1989b: 23, fig. 1, 6, 2, 2 (original description, as *Lymnaea* subgenus *Radix* section *Desertiradix*)
Kruglov, Starobogatov, 1993a (key to identification)
Klishko, 2001 (within zoobenthos in Arakhlei lake)
Klishko, 2003 (morphology, general information)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (key to identification, anatomy, general information, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Prozorova et al., 2009 (record from Transbaikalia)
Dolgin, 2009 (citation for Lena province in Eastern Siberia)

Type locality. Lake Arakhlei (Zabaikalye Territory).

Types. Holotype: No. 1 and 14 alcohol-preserved paratypes (one of them dissected): No. 2.

Additional findings. Ivano-Arakhlei lake system: Shaksha Lake, Shirokaya River (entering Shaksha Lake), Orkhon River, Mongoi Lake (Prozorova et al., 2009).

Ecology. Lives in thickets of water vegetation and on silted sediments (Klishko, 2003).

38. *Lymnaea* (*Radix*) *alticola* Izzatullaev, Kruglov et Starobogatov, 1983

Fig. 8 D

History of the name application.

Izzatullaev, Kruglov, Starobogatov, 1983b: 53, fig. 1–2 (original description, as *Lymnaea* (*Radix*) section *Thermoradix*)
Kruglov, Starobogatov, 1989b (anatomy)
Kruglov, Starobogatov, 1991 (1992) (egg mass morphology in snails from waterbodies of Tajikistan)
Kruglov, Starobogatov, 1993a (key to identification)
Kruglov, 2005 (key to identification, anatomy, general information, distribution, egg mass)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Izzatulaev, Stadnichenko, 2010 (ecology)

Type locality. Eastern Pamir, Zor-Kul Lake.

Types. Holotype (dry): No. 1, 4 alcohol-preserved paratypes (1 dissected) from Chilu-chor Chasma, Tajikistan.

Distribution. Thermal sources in Central Asian mountains (Kruglov, Starobogatov, 1993a).

Ecology. Thermocrenophilic-phytophilic species (Izzatulaev, Stadnichenko, 2010).

39. *Lymnaea* (*Radix*) *thermokamtschatica* Kruglov et Starobogatov, 1989

Fig. 8 E

History of the name application.

Kruglov, Starobogatov, 1989b: 22, fig. 1, 9; 2, 9 (original description, as *L.* (*Radix*) section *Thermoradix*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, distribution)
Kruglov, Starobogatov, 1991 (1992) (egg mass morphology in snails from type locality)
Kruglov, Starobogatov, 1993a (key to identification)
Prozorova, 1998 (records from Beringia)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution, egg mass)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Bespalaya et al., 2011 (mention in comparison of thermal water malacofaunas of Subarctic)

Type locality. Hot spring Khadutka, Kamchatka.

Types. Holotype (dry): No. 1; paratypes: 140 dry, No. 2, and 13 dry, No. 3, from type locality.

Additional findings. Kamchatka: Kolychev hot springs, 15 km southeastward of Alnei settlement, Kirevna River (Elovka River basin) (ZIN).

Ecology. Collected from stones, sand and leaflets of *Plantago*, at water temperature 13–23°C (up to 27°C) (label data). Found together with *Radix hadutkae*.

40. *Lymnaea* (*Radix*) *hadutkae* Kruglov et Starobogatov, 1989

Fig. 8 F, G

History of the name application.

Kruglov, Starobogatov, 1989b: 22, fig. 1, 12; 2, 7 (original description, as *L.* (*Radix*) section *Thermoradix*, anatomy, distribution)
Golubev, Laenko (1982) (growth of juveniles in nature and in waste waters of Berezovskaya thermal power station, as *L. hodutkae*)
Khmeleva et al., 1985 (ecology, growth, respiration, etc.; as *L. hodutkae*)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, as *L. hodutkae,* distribution)
Kruglov, Starobogatov, 1991 (1992) (egg mass morphology in snails from type locality)
Kruglov, Starobogatov, 1993a (key to identification)

Prozorova, 1998 (records from Beringia)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution, egg mass)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Aksenova et al. 2012 (citation, adaptation)

Type locality. Hot spring Khadutka, Kamchatka.

Types. Holotype (dry): No. 1; paratypes from type locality: 160 dry (No.2) and 15 in alcohol, 2 of them dissected (No.3).

Additional findings. Kamchatka: 15 km southwestward of Alnei settlement, near the Kirevna River (Elovka River basin) – brook and warm pool in small bog, hot springs; Kronotsky Reserve, geyser valley, at mountain fioot, Vitrazha thermal field (ZIN).

Ecology. Lives on sandy and stony surfaces, lower part of *Plantago* leaves, in areas of hot springs, at water temperature up to 23°C. Egg masses are attached to water vegetation and to hard substratum (Kruglov, 2005). Khmeleva et al. (1985) have shown that snails are viable at short-term stay at +43°C and can long live at 5–7°C. The temperature limits of reproduction are +12–33°C. Molluscs in searching for food (cyanobacteriae in bacterial mat) constantly move in areas of temperature range from 8 to 43°C; the densiest aggregations – up to 75,000 spms per m^2 (= up to 2 kg of wet mass) – were recorded at 26–32°C, the maximum wet mass of a snail with shell was 1.53 g. The life cycle does not exceed 80 days, the juvenile period being 30–35 days (see details in Khmeleva et al., 1985).

41. *Lymnaea* (*Radix*) *hakusyensis* Kruglov et Starobogatov, 1989

Fig. 9 A

History of the name application.

Kruglov, Starobogatov, 1989b: 20, fig. 1, 5; 2, 6 (original description, as *Lymnaea* subgenus *Radix* section *Thermoradix*)
Laenko, 1981 (ecology, living at temperature up to 34°C)
Kruglov, Starobogatov, 1993a (key to identification)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (key to identification, anatomy, general information, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Sitnikova, Takhteev, 2006 (coexistent with *L. thermobaicalica*)
Prozorova et al., 2009 (distribution)

Type locality. Hot spring entering Baikal Lake in the vicinities of Khakusy Bay.

Types. Holotype (dry): No. 1. Paratypes: 45 in alcohol and 14 dry from type locality (No. 2), 87 in alcohol (No. 3) with label "Baikal, hot spring"; 2 in alcohol (No. 4) from hot spring near Goryachinsk settlement (east Baikal area); 6 dry (No. 5) with label "Baikal, hot sprig, Khakusy"; and 21 in alcohol (No. 6) from warm brooks downstream of Khakusy resort.

Additional findings. No other data.

Ecology. Lives downstream of hot water source, in shallow, warm, slow-running brook, on pebbles and gravel, to which the egg masses are attached. Lives on mixed bottom: stony substrates interleaved with coarse sand and silt, with weak water vegetation (moss etc.) and cyanobacterial mats (Sitnikova, unpubl.). Water temperature of 31–35°C (Takhteev et al., 2000).

42. *Lymnaea* (*Radix*) *thermobaicalica* Kruglov et Starobogatov, 1989

Fig. 9 B

History of the name application.

Kruglov, Starobogatov, 1989b: 20, fig. 1, 10–11; 2, 5 (original description, as *Lymnaea* (*Radix*) section *Thermoradix*)
Kruglov, Starobogatov, 1991 (1992) (egg mass morphology in snails from type locality)
Kruglov, Starobogatov, 1993a (key to identification)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (key to identification, anatomy, general information, egg mass, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Sitnikova, Takhteev, 2006 (coexistent with *L. hakusiensis*)
Prozorova et al., 2009 (distribution)
Takhteev et al., 2010 (distribution in Baikal region)

Type locality. Warm spring entering Baikal Lake in vicinities of Khakusy Bay [it was not stated explicitly whether the holotype was collected from the same place as *L. hakusyensis* or from another habitat].

Types. Holotype: No. 1 (shell and dissected body). Paratypes: 12 in alcohol (No. 2), labelled as "Baikal, hot spring"; 1 dry (No. 3) from "Baikal, hot spring, Khakusy"; 11 + 2 bodies in alcol and 2 dry spms (No. 4) from warm brooks downstream of Khakusy resort.

Additional findings. Besides Khakusy spring, found in brooks of Garginskij (Barguzin River basin) and Kotelnikovskij (NW Baikal shore) hot springs (Sitnikova, Takhteev, 2006).

Ecology. In Garginskij spring the species was found at water temperature of 37°C, on cyanobacterial mats, which are probably the food source (Takhteev et al., 2000).

Remarks. Shells of two species described from Khakusy spring differ in shape and size: the shell of *L. hakusiensis* is ovate, with height (holotype) slightly exceeding 13 mm at 4 whorls and width 10.5 mm; the shell of *L. thermobaicalica* is ovate-conical, with height (holotype) 8.9 mm at 3.7 whorls and width 5.0 mm. The main diagnostic character is the provagina width: it is narrow in *L. hakusiensis* and widened in *L. thermobaicalica* (Kruglov, Starobogatov,

1989b). Conchological similarity of *L. hakusiensis* and *L. thermobaicalica* has led to a confusion in identification of snails collected in Baikal hot springs (see Takhteev et al., 2001; Sitnikova, Takhteev, 2006), and there appeared an opinion about conspecificity of the taxa (Prozorova et al., 2009; Takhteev et al., 2010). It should be noted that all young individuals possess conchological characters typical of *L. thermobaicalica*. Moreover, adult snails include probably hybrid individuals: snails identified conchologically as *L. thermobaicalica* had narrow provagina characteristic of *L. hakusiensis*, but not wide one of *L. thermobaicalica*, as stated by Kruglov and Starobogatov (1989b).

Despite the absence of special studies (which are certainly needed), we suggest that brooks of Khakusy spring are inhabited by two parapatric ecotypes having presently the taxonomic species status. These ecotypes earlier occupied (and perhaps still occupy) somewhat different ecological niches within the same thermal source. Judging from the shell morphology, *L. hakusiensis* in more associated with rapid current areas: large aperture facilitates more firm attachment to stony substrate, whereas *L. thermobaicalica* lives in more steady parts of the brooks. It was shown that the increase in the aperture size is an adaptation targeted to withstand water current (Lam, Calow, 1988). Besides, it is possible that *L. hakusiensis* inhabits warmer parts of the brooks, and *L. thermobaicalica* – colder ones, which affects the general shell size (larger in *L. hakusiensis* than in *L. thermobaicalica*) and the life span – the shell of *L. hakusiensis* often looks older than in *L. thermobaicalica* (eg., cf. the holotypes – Figs 9A and 9B).

Baikalian sources have been greatly changed in last decades due to recreational reasons. For example, a resort has been built in the hot water source in Khakusy, and now there are several brooks feeding swimming pools instead of a single brook existed in 1975. The snail habitats are still under pression.

43. *Lymnaea* (*Radix*) *narzykulovi* Izzatullaev, Kruglov et Starobogatov, 1983

Fig. 9 C

History of the name application.

Izzatullaev, Kruglov et Starobogatov, 1983b: 55, fig. 3–4 (original description, as *Lymnaea* (*Radix*) section *Pamiriradix*)
Kruglov, Starobogatov, 1989b (anatomy)
Kruglov, Starobogatov, 1993a (key to identification)
Starobogatov et al., 2004 (key to identification)
Kruglov, 2005 (key to identification, anatomy, general information, egg mass, distribution)

Type locality. Eastern Pamir, Turumtaikul Lake.

Types. Holotype: No 1. Paratypes: 24 in alcohol (No. 2) from type locality.

Additional findings. East Pamir, Zor-Kul Lake; Vakhsh River riverbed (ZIN) and Shaimak town, Tajikistan (Kruglov, 2005).

Ecology. Lives in lakes and springs (Kruglov, 2005).

44. *Lymnaea* (*Radix*) *schubinae* Kruglov et Starobogatov, 1989

Fig. 9 D

History of the name application.

Kruglov, Starobogatov, 1989b: 24, fig. 1, 16; 2, 14 (original description, as *L.* (*Radix*) section *Ussuriradix*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, distribution)
Prozorova, 1991a (records from basins of rivers flowing to Japan Sea and watershed of Lake Khanka and the Ussuri River)
Prozorova, 1991b (1992) (egg mass morphology in snails from spring of Molokanka and lake I of the Studenaya River near Zharikovo village)
Kruglov, Starobogatov, 1993a (key to identification)
Prozorova, 2000 (record from Khanka Lake drainage, general distribution, ecology)
Kolpakov, 2003; Prozorova, Kolpakov, 2004 (records from central Primorye)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Potikha et al., 2008 (record from Sikhote-Alin Reserve, ecology)
Zasypkina, 2008 (records from Onon and Amazar rivers)
Prozorova, 2013 (records from continental Southern Russian Far East)

Type locality. Bochinka River (left tributary of the Amur) near Amursk city, Khabarovsk Territory.

Types. Holotype (shell and body separately) (No. 1). Paratypes: 73 alchohol-fixed and 38 dry (Nos. 2–5, 7, 17–23, 30 from: type locality: No. 7 – 20 in alcohol, No. 22 – 11 in alcohol and 5 dry, No. 30 – 10 in alcohol; brook between stations Vladimiro-Petrovka and Starye Devitzy (Khanka district of Primorye Territory): No. 2 – 2 in alcohol; rice field groove near Spassk city: No. 3 – 3 dry; vicinities of the Ussuri River mouth near Bureinski ridge: No. 4 – 2 dry; pool on riverbank near Volno-Nadezhdinskoe village Primorye territory: No. 5 – 3 in alcohol; ditch in the Khurba River floodland (left tributary of the Amur): No. 17 – 7 dry and No. 19 – 2 in alcohol and 6 dry; pool near Bogorodskoe village (Amur basin): No. 21 – 23 in alcohol and 9 dry; open-cut mine at 29th km of the Komsomolsk–Amursk: No. 18 – 3 dry; floodland lake at the Ukhta River (tibutary of the Amur): No. 20 – 2 dry; Borzyanka River (Zabaikalye): No. 23 – 2 in alcohol.

Additional findings. Khabarovsk Territory: Topolevo Lake; small lake in outskirts of Khabarovsk city; small lake near airport of Khabarovsk; small lake near the Khurmuli River and Khurmuli River near forestry (BAM); pool near Khurba settlement;

Bolshaya Khurba River; open-cut mine near Novyi Mir settlement; lake near Sita River. Amur Region: brook entering the Chekundushka River (Bureya River basin), pool at Bogorodskoe village; Udyl Lake; Sakhalin – Tym River basin (ZIN).

Primorye Territory, Khanka Lake basin – Spasovka River; slow-running brook in the Molokanka River floodland; lake in the Studenaya River floodland; Ussuri River basin – brook near Chuguevka village; Japan Sea basin – small lake in Mingorodok Park in Vladivostok city; slowly running brook near Tavrichanka settlement; Zerkalnaya River; Vaskovksoye Lake in the Rudnaya River basin; Serebryanka River; Samarga River (IBSS). Specimens from the Upper Amur River basin (Zasypkina, 2008) were reidentified by L. Prozorova as *L. auricularia* (IBSS).

Ecology. Lives in running-water waterbodies with cold water underrun; on water vegetation and on silty sand, rarely on stony bottom, at the depth down to 0.6 m (label data). Found together with *L. schubinae*, *L. sihotealinica* and *L. dvoriadkini* – in rice field groove near Spassk city; with *L. sihotealinica*, *L. schubinae* and *L. zazurniensi* – near the Ussuri mouth; with *L. amurensis* – in a pool on the river bank near Volno-Nadezhdinskoe village.

45. *Lymnaea* (*Radix*) *pacifampla* Kruglov et Starobogatov, 1989

Fig. 10 A

History of the name application.

Kruglov, Starobogatov, 1989b: 25, fig. 1, 17; 2, 15 (original description, as *L.* (*Radix*) section *Ussuriradix*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, distribution)
Prozorova, 1991a (records from basins of rivers flowing to Japan Sea and watershed of Lake Khanka and the Ussuri River)
Prozorova, 1991b (1992) (egg mass morphology in snails from Sukhodol River)
Prozorova, 2000 (record from Khanka Lake drainage, general distribution, ecology)
Prozorova, 2001 (record from the Lower Tumen River drainage – Lake Lotos)
Prozorova, Kolpakov, 2004 (record from Central Primorye)
Kruglov, Starobogatov, 1993a (key to identification)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution, egg mass)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Potikha et al., 2008 (record from Sikhote-Alin Reserve, ecology)
Zasypkina, 2008 (records from Onon, Shilka, Amazar, Never, Tynda and Tygda rivers)
Prozorova, 2009 (mention as *ampla* life-form)
Prozorova, 2013 (distribution in continental southern Russian Far East)

Type locality. Mouth of the Gladkaya River, Posyet Bay of the Japan Sea, Primorye Territory, Southern Russian Far East.

Types. Holotype (shell): No. 1. Paratypes: Khabarovsk Territory, Kiya River at Grodekovo village – 4 in alcohol (No. 2); Gladkaya River mouth (Far East, near Posyet Bay of the Japan Sea – 2 dry (No. 3).

Additional findings. Near Tegerte, cove of Posyet Bay, Japan Sea and (?) Tym River (Sakhalin) (ZIN). Primorye Territory, Ussuri River basin – backwater of the Arsenyevka River. Khanka Lake basin – floodland waterbody near the Studenaya River. Japan Sea basin – Lotos Lake (Khasan district); Gladkaya River; Sukhodol River; Serebryanka Rive in Sikhote-Alin Reserve; Yaponskoe Lake in the Serebryanka River basin; Samarga River (IBSS). Specimens from the Upper Amur River basin (Zasypkina, 2008) were reidentified by L. Prozorova as *L. auricularia* (IBSS).

Ecology. Lives in offshore zone of small rivers and in clear running-water lakes with developed belt of macrophytes, on vegetation and on firm argillaceous or sandy, usually slightly silty bottom. In lakes, in biotopes with semi-submerged vegetation or on sandy shallows (Prozorova, 2001), in rivers – on macrophytes (Prozorova, 2000).

46. *Lymnaea* (*Radix*) *ussuriensis* Kruglov et Starobogatov, 1989

Fig. 10 B

History of the name application.

Kruglov, Starobogatov, 1989b: 24, fig. 1, 15; 2, 13 (original description, as *L.* (*Radix*) section *Ussuriradix*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, distribution)
Prozorova, 1991a (records from basins of rivers flowing to southern Japan Sea and watershed of Lake Khanka and the Ussuri River)
Prozorova, 1991b (1992) (egg mass morphology in snails from the Molokanka and Studenaya rivers near Zharikovo village, Primorye Territory)
Kruglov, 1991 (1992) (egg mass morphology, Amur River, Kabarovsk Territory
Prozorova, 1995 (record from Khanka Lake drainage)
Prozorova, 1997 (distribution in Southern Russian Far East)
Prozorova, 2000 (record from Khanka Lake drainage, general distribution, ecology)
Prozorova, Kolpakov, 2004 (citation for Central Primorye)
Kruglov, Starobogatov, 1993a (key to identification)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution, egg mass)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Prozorova, 2013 (distribution in continental Southern Russian Far East)

Type locality. Lake on the border of Khabarovsk [Far East].

Types. Holotype (shell): No. 1; 40 paratypes (dry), from type locality, No. 2.

Additional findings. Khabarovsk Territory and Primorye Territory – lake near Topolevo village; the

Kiya River near Grodekovo village; Khurmuli River; small river near Osinovka village (Ussuri River basin); small swampy lake near the Olenevka River; small lake near the Ussuri River downstream of Breevka village; Chirka River (Ussuri River mouth); Zaboi Lake (Tira River basin); Petropavlovskoe Lake (Amur River basin); Argun River near Priargunskaya station; Lopukhovoe Lake (Ilistaya River); Krivoe Lake (Chirka River floodland); Zolotoe Lake in river floodland in Khanka district; pool in the Manoma River floodland (Anyui River tributary); Khurba River floodland (tributary of Amur River); Bochinka Rive (tributary of the Lower Amur); floodland lake near Bochinka River; Amur River downstream of Bogorodskoe village; floodland lake at Ukhta channel (downstream of Kilchen); Udyl Lake; Chekundushka River floodland (tributary of Bureya River) (ZIN). Primorye Territory, southern part – Vladivostok city; Chan Lake; small lake near Artemovka River; Khanka Lake basin – floodland of Komissarovka River; floodland waterbodies at the Studenaya and Molokanka rivers (IBSS).

Ecology. Lives in weakly running waterbodies, usually in floodland lakes, at depth down to 1 m, on silty bottom and on water vegetation.

47. *Lymnaea* (*Radix*) *schelechovi* Kruglov et Starobogatov, 1989

Fig. 10 C

History of the name application.

Kruglov, Starobogatov, 1989b: 27, fig. 1, 24; 2, 22 (original description, as *L.* (*Radix*) section *Ochotiradix*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, distribution)
Kruglov, Starobogatov, 1993a (key to identification)
Prozorova, 1998 (citation for Beringia)
Prozorova, Shedko, 2003 (record from Kamchatka Peninsula in the Kamchatka River basin, general distribution, ecology)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution, egg mass)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Prozorova, 2005 (record from Tauiskaya inlet, general distribution, ecology)

Type locality. Maloe Lake, basin of the river Bolshaya, south-western Kamchatka.

Types. Holotype (body and shell): No. 1. Paratypes: 92 in alcohol and 1 dry, from type locality, No. 2.

Additional findings. Verkhne-Penzhinskoe Lake (Penzhina River basin, Kamchatka Territory); Kluane Lake (Canada) (ZIN); Kamchatka – Timofeevskij Bay of Azabachje Lake; North Okhotsk Sea coast – small lake in the Kava River basin; Tynerynda Lake in the Yama River basin (IBSS).

Ecology. Lives in floodland lakes, on soft bottom with sand and silt (Kruglov, Starobogatov, 1989b; Prozorova, Shedko, 2003).

48. *Lymnaea* (*Radix*) *chereshnevi* Kruglov et Starobogatov, 1989

Fig. 10 D

History of the name application.

Kruglov, Starobogatov, 1989b: 27, fig. 1, 24; 2, 22 (original description, as *L.* (*Radix*) section *Nipponiradix*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, distribution)
Kruglov, Starobogatov, 1993a (key to identification)
Prozorova, 1998 (record from Beringia)
Prozorova, Shedko, 2003 (record from Kamchatka Peninsula in the Kamchatka River basin, general distribution, ecology)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Maloe Lake, basin of the river Bolshaya, south-western Kamchatka.

Types. Holotype (body and shell separately): No. 1. Paratypes: 5 in alcohol, from type locality, No. 2.

Additional findings. Western Kamchatka – central part of Tigil district, right bank of the upper Kvachikha River; Canada – Kluane Lake (ZIN); Azabachje Lake (north-eastern shore); Azabachjya River (IBSS). North Kurile Islands: Paramushir and Shumshu (Prozorova, 1998; Prozorova et al., 2002; Prozorova, Shedko, 2003). North-western North America: the Yukon River basin (Prozorova, Foster, 2000).

Ecology. Lives in permanent running-water waterbodies, on sandy-silty bottom (Prozorova, Shedko, 2003).

49. *Lymnaea* (*Radix*) *zarenkovi* Kruglov et Starobogatov, 1989

Fig. 10 E, F

History of the name application.

Kruglov, Starobogatov, 1989b: 26, fig. I, 23; 2, 18 (original description, as *L. (Radix)* section *Nipponiradix*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, distribution)
Kruglov, Starobogatov, 1993a (key to identification)
Prozorova, 1996 (1997) (citation for Iturup Island)
Prozorova et al., 2002 (distribution in Kurile Archipelago)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Unnamed lake situated in 1–1.5 km from a river that flows out from Blagodatnoe Lake [Iturup Island, Kurile Islands].

Types. Holotype (initially in alcohol, dried due to poor preservation): No. 1. Paratypes: 13 alcohol-

preserved (one of them dried) from type locality, No. 2.

Additional findings. South Kurile Islands: Iturup, Lebedinoe Lake (ZIN). [Lebedinoe Lake was eroneously called Lebedinskoe in the original description of *L. zarenkovi*].

Ecology. Lives on sandy-silty bottom in offshore zone of the lake.

Remarks. The species is identical to *L. kunashirica* in the shell shape but differs from the later in the absence of copulative apparatus (aphallic form) (Kruglov, Starobogatov, 1989b). *L. zarenkovi* was not found in samples from Lebedinoe Lake stored in the IBSS. Specimens with shell of *L. kunashirica–L. zarenkovi* type were recorded in Natasha Lake on the shore of Dobroe Nachalo Bay. Two dissected specimens of different age (shell height 29 and 12.5 mm) had copulatory apparatus corresponding in proportions to that in *L. kunashirica*. The length of praeputium in the larger specimen (2.5 mm) was less than in the smaller one (3.5 mm), perhaps due to high infestation with trematodes. The holotype of *L. zarenkovi* is a juvenile specimen (shell height 11.1 mm) but studied specimens of *L. kunashirica* of that size already possessed copulative apparatus. Therefore, the species status of *L. zarenkovi* needs confirmation.

50. *Lymnaea* (*Radix*) *kunashirica* Kruglov et Starobogatov, 1989

Fig. 11 A

History of the name application.

Kruglov, Starobogatov, 1989b: 27, fig. 1, 22; 2, 1 (original description, as *L.* (*Radix*) section *Nipponiradix*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (key to identification, distribution)
Kruglov, Starobogatov, 1993a (key to identification)
Prozorova, 1996 (1997) (citation for Kunashir Island)
Prozorova et al., 2002 (record from Kurile Archipelago)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Lagunnoe Lake, Kunashir Island [Kurile Islands].

Types. Holotype: No. 1 (not found in the ZIN collection).

Additional findings. South Kurile Islands: Kunashir (Lagunnoe, Aliger and neighboring small lakes) and Iturup (Natasha Lake, Dobroe Nachalo Bay) (IBSS).

Ecology. Lives in lake with sandy-silty bottom, on the bottom and on offshore macrophytes.

Remarks. The holotype was described as a juvenile specimen with shell height of 7.5 mm. According to data of L.A. Prozorova, adult shells of *L kunashirica* are up to 30 mm high. Specimens of *L kunashirica* with shell height of 14 to 29 mm were collected in Aliger Lake, close to the type locality, in late June, 1998 (Fig. 11 A). One specimen had quite developed copulative apparatus (praeputium length 4 mm). The species is similar to *L. japonica* Jay, 1857 in the shell shape, differing in somewhat larger uppermost whorl and smaller last whorl. *L. japonica* is less associated with the macrophyte zone than *L kunashirica* and can live on stones along the shore of large lakes.

Since the type specimens of this species were not found in ZIN, we give here an illustration of shell from Aliger Lake (IBSS). According to Prozorova (1996), this species was first mentioned on Iturup Island as *Lymnaea auricularia plicatula* Benson, 1842 by Kluchareva et al., 1969).

51. *Lymnaea* (*Radix*) *kurilensis* Kruglov et Starobogatov, 1989

Fig. 11 B

History of the name application.

Kruglov, Starobogatov, 1989b: 26, fig. 1, 2; 2, 20 (original description, as *L.* (*Radix*) section *Nipponiradix*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, distribution)
Kruglov, Starobogatov, 1993a (key to identification)
Prozorova, 1996 (1997) (records from Southern Kurile Islands and Hokkaido)
Prozorova et al., 2002 (record from Kurile Archipelago)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Pietsch et al., 2012 (records from Sakhalin – Lamanon littoral area, South Lowland area, central mountain area and southeast area)

Type locality. Lebedinoe Lake, Iturup Island [Kurile Islands], vicinities of Kurilsk city.

Types. Holotype (dry): No. 1. Paratypes: 5 dry, from type locality, No. 2; 2 dry, from Blagodatnoe Lake (Iturup), No. 3; 5 dry with label “Japan, Hokkaido”, No. 5.

Additional findings. Tym River (Sakhalin) and specimens labelled as “Kurile Islands” (ZIN); South Kurile Islands: Iturup, Kunashir, Shikotan, Lesser Kurile Islands (Zelenyi); South Sakhalin (Kriljon Peninsula) (IBSS).

Ecology. Lives in lakes, on bottom of various kinds (sandy-silty, silty-sandy, stony), in bogs, as well as in slowly running rivers in the zone of offshore macrophytes.

Remarks. This species is most common among other species of *Radix* in South Kurile Islands. Waterbodies at last stages of succession harbour a deviating ear-shaped form of *L. kurilensis* with corroded apex and expanded last whorl.

52. *Lymnaea* (*Radix*) *iturupica* Kruglov et Starobogatov, 1989

Fig. 11 C

History of the name application.

Kruglov, Starobogatov, 1989b: 26, fig. 1, 20; 2, 17 (original description, as *L.* (*Radix*) section *Nipponiradix*, anatomy, distribution)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, distribution)
Kruglov, Starobogatov, 1993a (key to identification)
Prozorova, 1996 (1997) (records from Southern Kurile Islands – Iturup, Shikotan, Zelynyi, and from Hokkaido)
Prozorova et al., 2002 (record from Kurile Archipelago)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Lebedinoe Lake, Iturup Island [Kurile Islands], vicinities of Kurilsk city.

Types. Holotype (dry): No. 1; paratypes: 1 dry from type locality (No. 2); 1 dry spm with label "Japan, Hokaido", No. 3.

Additional findings. No data.

Ecology. Lives on sandy-silty bottom in offshore zone of the lake.

Remarks. In the shape of two last whorls, *L. iturupica* is similar to *L. kurilensis*, both species possessing low spire and broad aperture. The differences are clearly seen only in comparison of shells with intact upper whorls. Therefore, corroded ear-shaped forms of *L. kurilensis* were earlier often identified as *L. iturupica* (Prozorova et al., 2002). Subsequent re-identification of IBSS collection showed that all specimens collected outside Lebedinoe Lake and labelled as *L. iturupica* actually belong to *L. kurilensis*.

53. *Lymnaea* (*Pacifimyxas*) *magadanensis* Kruglov et Starobogatov, 1985

Fig. 11 D

History of the name application.

Kruglov, Starobogatov, 1985a: 76, fig. 1, 5; 2, 4 (original description, as *Lymnaea* (*Pacifimyxas*) anatomy, distribution)
Bogatov, Zatrawkin, 1990 (morphology, distribution, key to identification)
Kruglov, Starobogatov, 1991 (1992) (egg mass morphology in population from Kolyma River reservoir, Magadan city)
Prozorova, 1998 (record from Beringia)
Starobogatov et al., 2004 (key to identification, distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution, egg mass)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Prozorova, 2005 (record from Tauiskaya inlet, general distribution)

Type locality. Magadan city [northern East], water reservoir of hydroelectric power station.

Types. Holotype (body in alcohol and dry shell): No. 3.

Additional findings. Ola River (Magadan Region); Sibit-Tiellak River (left tributary of the Kolyma River) near Bolshoy Anichag Ridge; bog in floodland in middle reaches of the Kolyma River (ZIN); upper reaches of the Kolyma River in Magadan Reserve; Magadan city, bog in floodland of the Kamenushka River; lakes near Fairbanks (Alaska) (IBSS).

Ecology. Lives in stagnant and slowly running, sometimes swampy floodland waterbodies (usually in overgrown floodland lakes), on water vegetation and on silty bottom, often together with another related species, *Lymnaea* (*Pacifimyxas*) *streletzkajae.*

54. *Lymnaea* (*Pacifimyxas*) *streletzkajae* Kruglov et Starobogatov, 1985

Fig. 11 E

History of the name application.

Kruglov, Starobogatov, 1985a: 76, fig. 1, 6; 2, 5 (original description, as *Lymnaea* (*Pacifimyxas*) anatomy, distribution)
Bogatov, Zatrawkin, 1990 (morphology, distribution, key to identification)
Prozorova, 1998 (citation for Beringia)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2009 (information about types, type locality and general distribution)
Kruglov, 2005 (shell morphology, anatomy, distribution)
Prozorova, 2005 (record from Tauiskaya inlet, general distribution)

Type locality. Bog in the Middle Kolyma River floodland, near Agrobaza settlement [northern Russian Far East].

Types. Holotype (dry): No. 3.

Additional findings. River Ola (Magadan Region); River Sibit-Tiellakh (left tributary of the Kolyma River, near Bolshoi Annachang Ridge); bog in floodland of middle reaches of the Kolyma River (ZIN); upper reaches of the Kolyma in Magadan Reserve; north coast of the Okhotsk Sea – Tauiskaya inlet shore, Kava River (Magadan Reserve); lakes near Fairbanks (Alaska) (IBSS).

Ecology. Lives in stagnant and slowly running, sometimes swampy floodland waterbodies (usually in overgrown floodland lakes), on water vegetation and on silty bottom, often together with another related species, *Lymnaea* (*Pacifimyxas*) *magadanensis.*

Conclusion

Despite that the species listed above are only a portion of lymnaeid fauna of the former USSR, the data presented can evoke some additional consider-

ations. First, a single locality often harbors up to 3 (sometimes even more) described species from a single genus-level taxon (section or subgenus) which are similar in shell morphology and reproductive system. This may indicate either an intensive sympatric evolution in respective lineages, or the insufficiency of criteria for reliable recognition of the species. Second, there are still very few data on ecology, intra- and infrapopulation variability of morphological characters, not to mention the basically lacking molecular information about the species.

Acknowledgements

The authors are greatly indebted to Dr. P.V. Kijashko and L.L. Yarokhnovich (ZIN) for their help with dealing with the collection. The work was supported by the RFBR projects Nos 12-04-00503, 14-44-04105 and the RSF project No. 14-50-00029. This study was also partially supported by Budget Research Project, No. VI.51.1.10 in LIN SB RAS.

References

Aksenova O.V., Bolotov I.N., Bespalaya Yu.V. 2012. Adaptations of hydrobionts to living in thermal sources. – Physiological, biochemical, and molecular-genetic mechanisms of adaptation of hydrobionts. IBIW, Borok: 3–5. [Аксёнова О.В., Болотов И.Н., Беспалая Ю.В. 2012. Адаптации гидробионтов к обитанию в термальных источниках. – Физиологические, биохимические и молекулярно-генетические механизмы адаптаций гидробионтов. Материалы Всероссийской конференции с международным участием. ИБВВ, Борок: 3–5].

Andreeva S.I., Andreev N.I., Vinarski M.V. 2010. Key to freshwater gastropods of Western Siberia (Mollusca: Gastropoda). V. 1. Gastropoda: Pulmonata. Fasc. 1. Families Acroloxidae and Lymnaeidae. Omsk. 200 p. [Андреева С.И., Андреев Н.И., Винарский М.В. 2010. Определитель пресноводных брюхоногих моллюсков (Mollusca: Gastropoda) Западной Сибири. Ч. 1. Gastropoda: Pulmonata. Вып. 1. Семейства Acroloxidae и Lymnaeidae. Омск. 200 с.] [In Russian].

Bargues M.D., Vigo M., Horak P., Dvorak J., Patzner R.A., Pointier J.P., Jackiewicz M., Meier-Brook C., Mas-Coma S. 2001. European Lymnaeidae (Mollusca: Gastropoda), intermediate hosts of trematodiases, based on nuclear ribosomal DNA ITS-2 sequences. – Infection, Genetics and Evolution 1: 85–107. PII: S1567-1348(01)00019-3

Berezkina G.V., Starobogatov Ya.I. 1988. Reproductive ecology and egg clusters of freshwater Pulmonata. I.M. Likharev (ed.). Trudy Zoologicheskogo Instituta AN SSSR, V. 174, Leningrad: USSR Academy of Science. 307 p. [Берёзкина Г.В., Старобогатов Я.И. Экология размножения и кладки пресноводных легочных моллюсков. Труды Зоологического института АН СССР, Т. 174, 307 с.] [In Russian].

Bespalaya Yu.V., Bolotov I.N., Usacheva O.V. 2011. Mollusc population of a subarctic hydrothermal ecosystem in winter. – Zoologicheskii Zhurnal, 90 (11): 1304–1322. [Беспалая Ю.В., Болотов И.Н., Усачёва О.В. 2011. Население моллюсков Субарктической гидротермальной экосистемы в зимний период. – Зоологический журнал, 90 (11): 1304–1322 [In Russian].

Bogatov V.V., Zatrawkin M.N. 1990. Gastropod molluscs of fresh and brackish waters of the Far East of the USSR. A guide. Vladivostok: FED AS USSR. 169 p. [Богатов В.В., Затравкин М.Н. 1990. Брюхоногие моллюски пресных и солоноватых вод Дальнего Востока СССР: Определитель. Владивосток: изд-во ДВО АН СССР. 169 с.] [In Russian].

Bolotov I.N., Bespalaya Yu.V., Usacheva O.V. 2012. Ecology and evolution of hydrobionts in hot springs of the Subarctic and Arctic: formation of similar communities, adaptation of species and microevolutionary processes. – Uspekhi Sovremennoi Biologii, 132 (1): 77–86. [Болотов И.Н., Беспалая Ю.В., Усачёва О.В. 2012. Экология и эволюция гидробионтов в горячих источниках Субарктики и Арктики: формирование аналогичных сообществ, адаптации видов и микроэволюционные процессы. – Успехи современной биологии, 132 (1): 77–86.] [In Russian].

Chuzhekova T.A., Shatskikh E.V., Zimareva L.B. 2008. On the macrozoobenthos of springs near Zhigulevsk city and its vicinities. – Vodnye ekosistemy: Troficheskie urovni i problemy podderzhaniya bioraznoobraziya. Materialy konferentsii., 24–28 November, 2008, Vologda State ped. Univ.: Vologda, 234–237. [Чужекова Т.Ф., Шатских Е.В., Зимарева Д.Б. 2008. О макрозообентосе ручьев г. Жигулевска и его окрестностей. – Водные экосистемы: трофические уровни и проблемы поддержания биоразнообразия. Материалы конференции, 24–28 ноября, 2008, Волог. гос. пед. унив.: Вологда, 234–237.] [In Russian].

Correa A.C., Escobar J.S., Duran P., Renaud F., David P., Jarne Ph., Pointier J.-P., Hurtrez-Bousseś S. 2010. Bridging gaps in the molecular phylogeny of the Lymnaeidae (Gastropoda: Pulmonata), vectors of Fascioliasis. – BMC Evolutionary Biology, 10: 381–393. doi: 10.1186/1471-2148-10-381

Dolgin V.N. 2001. Fresh-water molluscs of sub-Arctic and Arctic Siberia. Doc. Sc. Theses. Tomsk. 423 p. (MS) [Долгин В.Н. 2001. Пресноводные моллюски Субарктики и Арктики Сибири. Дисс… докт. биол. наук. Томск. 423 с. (Рукопись)] [In Russian].

Dolgin V.N. 2003. Biotopic distribution of the fresh water molluscs in water bodies of North Siberia. – Trudy Tomskogo Gosudarstvennogo Pedagogicheskogo Universiteta, ser. Estestvennye i tochnye nauki, 4 (36): 55–61. [Долгин В.Н. 2003. Биотопическое распределение пресноводных моллюсков в водоемах севера Сибири. – Труды Томского государственного педагогического университета, серия Естественные и точные науки, 4 (36): 55–61.] [In Russian].

Dolgin V.N. 2009. On the study of freshwater molluscs from Siberia. – Vestnik Tomskogo Gosudarstvennogo Pedagogicheskogo Universiteta, 11 (89): 174–180. [Долгин В.Н. 2009. К изучению пресноводных моллюсков Сибири. – Вестник Томского государствен-

ного педагогического университета, 11 (89): 174–180]. [In Russian].

Dolgin V.N. 2012. Freshwater molluscs of the Upper Yenisei basin and lakes of Tuva. – Vestnik Tomskogo Gosudarstvennogo Pedagogicheskogo Universiteta, 7 (122): 129–131. [Долгин В.Н. 2012. Пресноводные моллюски бассейна Верхнего Енисея и озер Тувы. – Вестник Томского государственного педагогического университета, 7 (122): 129–131.] [In Russian]

Dolgin V.N. 2013. Freshwater molluscs of the Sayan mountain system. – Vestnik Tomskogo Gosudarstvennogo Pedagogicheskogo Universiteta, 8 (136): 18–22. [Долгин В.Н. 2013. Пресноводные моллюски Саянской горной системы. – Вестник Томского государственного педагогического университета, 8 (136): 18–22.] [In Russian]

Dolgin V.N., Sviridenko B.F. 2011. Freshwater molluscs of the basins of the Pur and Taz Rivers (West Siberia). – Vestnik Tomskogo Gosudarstvennogo Pedagogicheskogo Universiteta, 8 (110): 89–92.

Falkner G., Bank R.A., von Proschwitz T. 2001. Checklist of the non-marine molluscan species-group taxa of the states of Northern, Atlantic and Central Europe (CLECOM I). – Heldia 4: 1–76.

Golubev A.P., Laenko T.M. 1982. Growth of juvenile molluscs *Lymnaea hodutkae* in nature and in waster waters of Berezovskaya EHS. – Proceedings of the AN BSSR, ser. biol., 4: 101–102. [Голубев А.П., Лаенко Т.М. 1982. Рост ювенильных моллюсков *Lymnaea hodutkae* в естественном геотермальном источнике и на сбросных водах Березовской ГРЭС. – Весці АН БССР. Сер. Біял. навук, 4: 101–102.] [In Russian].

Gundrizer V.A., Starobogatov Ya.I. 1979. New species of fresh-water molluscs of the Lower Yenisei basin. – Zoologicheskii Zhurnal, 58 (8): 1130–1135. [Гундризер В.А., Старобогатов Я.И. 1979. Новые виды пресноводных моллюсков бассейна нижнего Енисея. – Зоологический журнал, 58 (8): 1130–1135.] [In Russian].

Hubendick B. 1951. Recent Lymnaeidae, their variation, morphology, taxonomy, nomenclature and distribution. Kungliga Svenska Vetenskapsakademiens Handlingar, 3, 1–223.

Izzatullaev Z.I., Kruglov N.D., Starobogatov Ya.I. 1983a. New for science and for the Central Asia species of lymnaeids of the subgenus *Galba* of the genus *Lymnaea* (Gastropoda, Pulmonata). 1. Section *Montigalba* sect. n. – Doklady Akademii Nauk Tajikskoj SSR, 26 (5): 321–324. [Иззатуллаев З.И., Круглов Н.Д., Старобогатов Я.И. 1983a. Новые для науки и новые для Средней Азии виды прудовиков подрода *Galba* рода *Lymnaea* (Gastropoda, Pulmonata). 1. Секция *Montigalba* sect. n. – Доклады Академии наук Таджикской ССР, 26 (5): 321–324.] [In Russian].

Izzatullaev Z.I., Kruglov N.D., Starobogatov Ya.I. 1983b. New and ill-known species of molluscs of the subgenus *Radix* of the genus *Lymnaea* of the USSR fauna from the Central Asia (Gastropoda, Pulmonata). – Izvestiya Akademii Nauk Tajikskoj SSR, otdelenie biol. nauk, 4 (93): 53–57. [Иззатуллаев З.И., Круглов Н.Д., Старобогатов Я.И. 1983b. Новые и малоизвестные виды моллюсков подрода *Radix* рода *Lymnaea* фауны СССР и Средней Азии (Gastropoda, Pulmonata). – Известия Академии наук Таджикской ССР, отд. биол. наук, 4 (93): 53–57.] [In Russian].

Izzatulaev Z.I., Stadnichenko A.P. 2010. Distribution of water mollusks of Central Asia in biotopes and different types of reservoirs. – Naukovi Zapiski, Ternopolski Natsionalnyi Pedagogichnyi Universitet, Seriya Biologiya. Presnovodnaya Gidrobiologiya, 2 (43): 216–218. [Иззатуллаев З.И., Стадниченко А.П. 2010. Распределение водных моллюсков Средней Азии по биотопам и различным типам водоемов. – Наукові Записки, Тернопільський національний педагогічний університет. Серия Біологія. Прісноводна Гідробіологія, 2 (43): 216–218.] [In Russian].

Kantor Yu.I., Sysoev A.V. 2005. Catalogue of mollusks of Russia and adjacent countries. Moscow: KMK Scientific Press, 627 p.

Kantor Yu.I., Sysoev A.V. 2006. Marine and brackish water Gastropoda of Russia and adjacent countries: an illustrated catalogue. Moscow: KMK Scientific Press, 371 p.

Kantor Yu.I., Vinarski M.V., Schileyko A.A., Sysoev A.V. 2010. Catalogue of the continental molluscs of Russia and adjacent territories; version 2.3.1, www.ruthenica.com

Khmeleva N.N., Golubev A.P., Laenko T.M. 1985. The ecology of gastropod molluscs from geothermal springs in Kamchatka. Zhurnal Obshchei Biologii, 46 (2): 230–240. [Хмелёва Н.Н., Голубев А.П., Лаенко Т.М. Экология брюхоногих моллюсков из горячих источников Камчатки. Журнал общей биологии, 46 (2): 230–240.] [In Russian].

Khokhutkin I.M., Vinarski M.V., Grebennikov M.E. 2009. Molluscs of the Urals and the adjacent areas. The family Lymnaeidae (Gastropoda, Pulmonata, Lymnaeiformes). P. 1. Ekaterinburg: Goshchitskiy Publ. 162 p. [Хохуткин И.М., Винарский М.В., Гребенников М.Е. 2009. Моллюски Урала и прилегающих территорий. Семейство Прудовиковые Lymnaeidae (Gastropoda, Pulmonata, Lymnaeiformes). Ч. 1. – Екатеринбург: Гощицкий. 156 с.] [In Russian].

Kijashko P.V. 2009. Check-list for Caspian Sea molluscs. www.zin.ru/projects/caspdiv/caspian_molluscs.html

Klishko O.K. 2001. Zoobenthos of Zabaikalie lakes. P. 1. Species diversity, distribution and structural organization. Ulan-Ude: BNC SD RAS, 208 p. [Клишко О.К. 2001. Зообентос озер Забайкалья. Ч. 1. Видовое разнообразие, распространение и структурная организация. Улан-Удэ: Изд-во БНЦ СО РАН, 208 с.] [In Russian].

Klishko O.K. 2003. Atlas of benthic invertabretes from Zabaikalie lakes. Chita: Chit. State Univer., 350 p. [Клишко J.R. 2003. Атлас донных беспозвоночных озер Забайкалья. Чита: ЧитГУ, 350 с.] [In Russian].

Kluchareva O.A., Linevich A.A., Sokolovskaya N.L., Starobogatov Ya.I. 1969. Benthos of lagoon lakes of the Kunashir Island (Kurile Islands). – Biological productivity of the Siberian waterbodies. Moscow: Nauka, 122–227. [Ключарёва О.А., Линевич А.А., Соколовская Н.Л., Старобогатов Я.И. 1969. Бентос лагуновых озер острова Кунашир (Курильские острова). – Биологическая продуктивность сибирских водоемов. М.: Наука, 122–227]. [In Russian].

Kolpakov E.V. 2003 The species composition and distribution peculiarities of freshwater gastropod mollusks (Gastropoda) of Northeastern Primorye. – Vladimir Ya. Levanidov's Biennial Memorial Meetings, 2: 160–164. [Колпаков Е.В. 2003. Состав и особенности распространения пресноводных брюхоногих моллюсков (Gastropoda) на северо-востоке Приморья. – Чтения памяти В.Я. Леванидова, 2: 160–164.] [In Russian].

Kruglov N.D. 2005. Molluscs of the family Lymnaeidae (Gastropoda Pulmonata) in Europe and Northern Asia. Smolensk: SGPU Publishing, 507 p. [Моллюски семейства прудовиков (Lymnaeidae Gastropoda Pulmonata) Европы и северной Азию Смоленск: Издво СПГУ, 507 с.] [In Russian].

Kruglov N.D. 2008. Two systems of the Lymnaeidae (Gastropoda Pulmonata): European and Russian. Where the truth is? – Izvestiya Smolenskogo Pedagogicheskogo Universiteta, 2: 33–50. [Круглов Н.Д. Две системы моллюсков семейства прудовиков (Gastropoda Pulmonata Lymnaeidae): европейская и российская. Где истина? – Известия Смоленского педагогического университета, 2: 33–50. [In Russian].

Kruglov N.D., Starobogatov Ya.I. 1981. A new genus of the Lymnaeidae and taxonomy of the subgenus *Omphiscola* (Lymnaea) (Pulmonata, Gastropoda). – Zoologicheskii Zhurnal, 60 (7): 965–977. [Круглов Н.Д., Старобогатов Я.И. 1981. Новый род Lymnaeidae и систематика подрода *Omphiscola* (*Lymnaea*) (Pulmonata, Gastropoda). – Зоологический журнал, 60 (7): 965–977.] [In Russian].

Kruglov N.D., Starobogatov Ya.I. 1983a. Endemic *Lymnaea* of the subgenus *Peregriana* in the Siberian subregion of Palaearctic. In: Molluscs, taxonomy, ecology and regularities of distribution. Vsesojuznoe soveshchanie po izucheniju molljuskov. Avtoreferaty dokladov. Leningrad: Nauka, 7: 139–141. [Круглов Н.Д., Старобогатов Я.И. 1983а. Эндемичные *Lymnaea* подрода *Peregriana* в Сибирской подобласти Палеарктики. В кн.: Моллюски. Систематика, экология и закономерности распространения. Авторефераты докладов. 7. Ленинград, Наука: 139–141.] [In Russian].

Kruglov N.D., Starobogatov Ya.I. 1983b. A contribution to the morphology of European representatives of the subgenus *Peregriana* (*Lymnaea*) Gastropoda, Pulmonata). – Zoologicheskii Zhurnal, 62 (10): 1462–1473. [Круглов Н.Д., Старобогатов Я.И. 1983b. К морфологии и систематике европейских представителей подрода *Peregriana* рода *Lymnaea* (Gastropoda, Pulmonata). – Зоологический журнал, 62 (10): 1462–1473.] [In Russian].

Kruglov N.D., Starobogatov Ya.I. 1984a. A contribution to the morphology and taxonomy of the subgenus *Peregriana* (*Lymnaea* Gastropoda Pulmonata) of the Asian part of the USSR and adjacent regions. – Zoologicheskii Zhurnal, 63 (1): 22–33. [Круглов Н.Д., Старобогатов Я.И. 1984а. К морфологии и систематике видов подрода *Peregriana* рода *Lymnaea* (Gastropoda, Pulmonata) Азиатской части СССР и сопредельных районов. – Зоологический журнал, 63 (1): 22–33.] [In Russian].

Kruglov N.D., Starobogatov Ya.I. 1984b. Morphological peculiarities and taxonomy of molluscs of the subgenus *Corvusiana* in the genus *Lymnaea* (Gastropoda Pulmonata Lymnaeidae). – Byulleten Moskovskogo obschestva ispytatelei prirody, otdel biologicheskii, 89 (2): 58–70. [Круглов Н.Д., Старобогатов Я.И. 1984b. Морфологические особенности и систематика моллюсков подрода *Corvusiana* рода *Lymnaea* (Gastropoda Pulmonata Lymnaeidae). – Бюллетень Московского общества испытателей природы, отдел биологический, 89 (2): 58–70.] [In Russian].

Kruglov N.D., Starobogatov Ya.I. 1985a. *Myxas*-similar Lymnaeidae (Gastropoda, Pulmonata), their origin and specific composition. – Byulleten Moskovskogo obschestva ispytatelei prirody, otdel biologicheskii, 90 (2): 69–78. [Круглов Н.Д., Старобогатов Я.И. 1985а. *Myxas*-подобные Lymnaeidae (Gastropoda, Pulmonata), их происхождение и видовой состав. – Бюллетень Московского общества испытателей природы, 90 (2): 69–78.] [In Russian].

Kruglov N.D., Starobogatov Ya.I. 1985b. The volume of the subgenus *Galba* and of the other similar subgenera of the genus *Lymnaea* (Gastropoda, Pulmonata). – Zoologicheskii Zhurnal, 64 (1): 24–35. [Круглов Н.Д., Старобогатов Я.И. 1985b. Объем подрода *Galba* и сходных с ним подродов рода *Lymnaea* (Gastropoda, Pulmonata). – Зоологический журнал, 64 (1): 24–35.] [In Russian].

Kruglov N.D., Starobogatov Ya.I. 1986. Molluscs of the subgenus *Stagnicola* from the genus *Lymnaea* of the USSR fauna. – Byulleten Moskovskogo obschestva ispytatelei prirody, otdel biologicheskii, 91 (2): 59–72. [Круглов Н.Д., Старобогатов Я.И. 1986. Моллюски подрода *Stagnicola* рода *Lymnaea* фауны СССР (Gastropoda: Pulmonata). – Бюллетень Московского общества испытателей природы, 91 (2): 59–72.] [In Russian].

Kruglov N.D., Starobogatov Ya.I. 1989a. Molluscs of the subgenus *Polyrhytis* of the genus *Lymnaea* of the fauna of the USSR (Pulmonata, Lymnaeidae). – Zoologicheskii Zhurnal, 68 (3): 14–20. Круглов Н.Д., Старобогатов Я.И. 1989а. Моллюски подрода *Polyrhytis* рода *Lymnaea* фауны СССР (Pulmonata, Lymnaeidae). – Зоологический журнал, 68 (3): 14–20.] [In Russian].

Kruglov N.D., Starobogatov Ya.I. 1989b. Morphology and taxonomy of the molluscs from the subgenus *Radix* of the genus *Lymnaea* (Gastropoda, Pulmonata, Lymnaeidae) from Siberia and Far East of the USSR. – Zoologicheskii Zhurnal, 68 (5): 17–30. [Круглов Н.Д., Старобогатов Я.И. 1989b. Морфология и систематика моллюсков подрода *Radix* рода *Lymnaea* (Gastropoda, Pulmonata, Lymnaeidae) Сибири и Дальнего Востока. – Зоологический журнал, 68 (5): 17–30.] [In Russian].

Kruglov N.D., Starobogatov Ya.I. 1991 (1992). Unknown egg-clusters of molluscs of the genus *Lymnaea* (Gastropoda Pulmonata Lymnaeidae). – Reproduction and egg-clusters of molluscs. Trudy Zoologicheskogo Instituta AN SSSR, 228: 11–129. [Круглов Н.Д., Старобогатов Я.И. 1992. Неизвестные яйцевые кладки моллюсков рода *Lymnaea* (Gastropoda Pulmonata Lymnaeidae). – Размножение и яйцевые кладки моллюсков. Труды Зоологического института АН СССР, 228: 11–129. [In Russian].

Kruglov N.D., Starobogatov Ya.I. 1993a. Annotated and illustrated catalogue of species of the family Lym-

naeidae (Gastropoda Pulmonata Lymnaeiformes) of Palaearctic and adjacent river drainage areas. Part 1. (Guide to Recent molluscs of northern Eurasia). – Ruthenica, 3 (1): 65–91.

Kruglov N.D., Starobogatov Ya.I. 1993b. Annotated and illustrated catalogue of species of the family Lymnaeidae (Gastropoda Pulmonata Lymnaeiformes) of Palaearctic and adjacent river drainage areas. Part 2. (Guide to Recent molluscs of northern Eurasia). – Ruthenica, 3 (2): 161–180.

Laenko T.M. 1981. Caloric content of hydrobionts from thermal springs of Zabaikalie. – Proceedings of the AS BSSR, seriya biologicheskikh nauk, 6: 112–114. [Лаенко Т.М. 1981. Калорийность гидробионтов из горячих источников Забайкалья. – Весці АН БССР, серия біял. навук, 6: 112–114.] [In Russian].

Leshko Yu.I. 1998. Molluscs. Europen Fauna of the North-East Russia. SPb: Nauka, 5 (1), 168 p. [Лешко Ю.В. 1998. Моллюски. Фауна европейского северо-востока России. СПб: Наука, 5 (1), 168 с.] [In Russian].

Nekhaev I.O. 2011. Geographic distribution features of subgenera and life forms of Lymnaeidae (Gastropoda, Pulmonata) in Eastern Europe. – Izvestiya Rossiiskoi Akademii nauk, 4: 477–483. [Нехаев И.О. 2011. Особенности географического распространения подродов и жизненных форм Lymnaeidae (Gastropoda, Pulmonata) в Восточной Европе. – Известия РАН, серия Биология, 4: 477–483.] [In Russian].

Palatov D.M., Vinarski M.V. 2014. New data on freshwater malacofauna of the central part of European Russia and distribution of some species of molluscs. – Ruthenica, 24 (1): 45–63. [Палатов Д.М., Винарский М.В. 2014. Новые данные о пресноводной малакофауне центра Европейской России и распространении некоторых видов пресноводных моллюсков. – Ruthenica, 24 (1): 45–63.] [In Russian].

Pietsch T.W., Bogatov V.V., Storozhenko S.Y., Lelej A.S., Barkalov V.Y., Takahashi H., Joneson S.L., Kholin S.K., Minakawa N., Ohara M., Bennett D.J., Anderson T.R., Crawford R.L., Clew K.A., Harpel J.A., Krestov P.V., Makarchenko E.A., Prozorova L.A., Kuwahara Y., Shed'ko S.V., Yabe M., Woods P.J., Stevenson D.E. 2012. Biodiversity and biogeography of Sakhalin Islands. – Flora and Fauna of North-West Pacific islands (Materials of International Kuril and Sakhalin island Projects). Vladivostok: Dalnauka, 11–78. (http://www.biosoil.ru/files/00010905.pdf)

Popova S.M, Devyatkin E.V., Starobogatov Ya.I. 1970. Molluscs of the Kyzylgir Formation of Mountain Altai. Moscow: Nauka, 95 p. [Попова С.М., Девяткин Е.В., Старобогатов Я.И. 1970. Моллюски Кызылгирской свиты Горного Алтая. Москва: Наука, 95 с.] [In Russian].

Potikha E.V., Prozorova L.A., Kolpakov E.V. 2008. On the fauna of freshwater mollusks of the Sikhote Alin national park. – Vladimir Ya. Levanidov's Biennial Memorial Meetings. Vladivostok: Dalnauka, 4: 134–141. [Потиха Е.В., Прозорова Л.А., Колпаков Е.В. 2008. К фауне пресноводных моллюсков Сихотэ-Алинского заповедника. – Чтения памяти В.Я. Леванидова. Владивосток: Дальнаука, 4: 134–141.] [In Russian].

Prozorova L.A. 1986. Composition and biogeographic characteristics of the malacofauna gastropods of Chaun lowlands. In.: Freshwater benthic organisms of Far East. – Trudy Biologo-pochvennogo Instituta, FEB RAS, Vladivostok: FES Center, AS USSR: 39–47. [Прозорова Л.А. 1986. Состав и биогеографическая характеристика малакофауны брюхоногих Чаунской низменности. В кн.: Донные организмы пресных вод Дальнего Востока (Труды БПИ ДВО РАН). Владивосток: ДВНЦ АН СССР: 39–47.] [In Russian].

Prozorova L.A. 1991a. Composition and biogeographic characteristics of the fresh water malacofauna of Primorie. – Zoologicheskii Zhurnal, 70 (9): 54–63. [Прозорова Л.А. 1991а. Состав и биогеографическая характеристика пресноводных брюхоногих моллюсков Приморского края. – Зоологический журнал, 70 (9): 54–63]. [In Russian].

Prozorova L.A. 1991b (1992). Egg mass morphology of the fresh water gastropods. In: Reproduction and egg mass of the molluscs. – Trudy Zoologicheskogo Instituta AS USSR, 228: 74–110. [Прозорова Л.А. 1991б (1992). Морфология кладок брюхоногих моллюсков Приморского края. В кн.: Размножение и кладки яиц моллюсков. – Труды Зоологического института АН СССР, 228: 74–110]. [In Russian].

Prozorova L.A. 1992. Molluscs of small water bodies of South Far East Russia. – Zoologicheskii Zhurnal, 71 (9): 41–45. [Прозорова Л.А. 1992. Моллюски малых водоемов юга Дальнего Востока России. Зоологический журнал, 71 (9): 41–45.] [In Russian].

Prozorova L.A. 1996 (1997). Gastropods and small bivalvies of fresh and brackish waterbodies of the Kurile Islands. Annotated list of species. – Bulletin of the Russian Far East Malacological Society, 1: 21–34. [Прозорова Л.А. Брюхоногие и мелкие двустворчатые моллюски пресных и солоноватых вод южных Курильских островов. Аннотированный список видов. – Бюллетень дальневосточного малакологического общества, 1: 21–34.] [In Russian].

Prozorova L.A., 1998. Annotated list of Beringian freshwater molluscs. – Bulletin of the Russian Far East Malacological Society, 2: 12–28.

Prozorova L.A. 2000. An annotated list of aquatic molluscs of the basin Khanka Lake. – Bulletin of the Russian Far East Malacological Society, 4: 10–29. [Прозорова Л.А. 2000. Аннотированный список водных моллюсков бассейна оз. Ханка. – Бюллетень дальневосточного малакологического общества, 4: 10–29.] [In Russian].

Prozorova L.A. 2001. Species composition and distribution of freshwater malacofauna in the basin of lower reaches of the Tumen (Tumangang) River. – The state of environment and biota of the southwestern part of Peter the Great Bay and the Tuman River mouth. Vladivostok: Dalnauka, 2: 52–68. [Прозорова Л.А. 2001. Видовой состав и распределение пресноводной малакофауны в бассейне нижнего течения реки Туманной. – Экологическое состояние и биота юго-западной части залива Петра Великого и устья реки Туманной. Владивосток: Дальнаука, 2: 52–68] [In Russian].

Prozorova L.A. 2005. Fresh water and land mollusks of the Tauiskaya bay shore line. – Biodiversity of the Tauiskaya Bay Sea of Okhotsk. Vladivostok: Dalnauka, 252–261. [Прозорова Л.А. 2005. Пресноводные и наземные моллюски побережья Тауйской губы. – Биологическое разнообразие Тауйс-

кой губы Охотского моря. Владивосток: Дальнаука, 252–261.] [In Russian].

Prozorova L.A. 2009. Once again about *Lymnaea ampla* (Hartmann, 1821) and taxonomical problems of Lymnaeidae (Gastropoda: Pulmonata). – Bulletin of the Russian Far East Malacological Society, 13: 47–54. [Прозорова Л.А. 2009. Еще раз о *Lymnaea ampla* (Hartmann, 1821) и трудностях систематики Lymnaeidae (Gastropoda: Pulmonata). – Бюллетень дальневосточного малакологического общества, 13: 47–54.] [In Russian].

Prozorova L.A. 2013. Freshwater mollusks of Lower Amur River basin and Primorye. Species diversity, keys of genera and families, rear species. Saarbrucken, Germany: Palmarium Academic Publishing. 59 p. [Прозорова Л.А. 2013. Пресноводные моллюски бассейна Нижнего Амура и Приморья. Видовое разнообразие, ключи родов и семейств, редкие виды. Saarbrucken, Germany: Palmarium Academic Publishing, 59 с.] [In Russian].

Prozorova L.A., Kolpakov E.V. 2004. Distributional patterns of the freshwater molluscs in the North East Primorye (southern Russian Far East, Primorye Territory). – Abstracts of the Conference on Molluscs of Northern Asia and northern Pacific: Biodiversity, Ecology, Biogeography and Faunal History. October 4–6, 2004, Vladivostok, Russia. Vladivostok: Dalnauka, 121–123.

Prozorova L.A., Saenko E.M., Bogatov V.V. 2002. Freshwater mollusks. Plant and animal world of the Kurile Islands. – Data of the International Kurile Project. Vladivostok: Dalnauka, 82–95. [Прозорова Л.А., Саенко Е.М., Богатов В.В. 2002. Пресноводные моллюски. Растительный и животный мир Курильских островов. – Материалы Международного Курильского проекта. Владивосток: Дальнаука, 82–95.] [In Russian].

Prozorova L.A., Sharyi-Ool M.O. 1999. Aquatic pulmonate molluscs (Gastropoda, Pulmonata) of Tuva. – Bulletin of the Russian Far East Malacological Society, 3: 11–25. [Прозорова Л.А., Шарый-Оол М.О., 1999. Водные легочные моллюски (Gastropoda, Pulmonata) Тувы. – Бюллетень дальневосточного малакологического общества, 3: 11–25.] [In Russian].

Prozorova L.A., Shedko M.B. 2003. Molluscs of the Lake Azabachie and their biocenotic importance. – Trudy Kamchatskogo filiala tikhookeanskogo instituta geografii RAS, 120–151 [Прозорова Л.А., Шедько М.Б. 2003. Моллюски озера Азабачье и их биоценотическое значение. – Труды Камчатского филиала Тихоокеанского института географии ДВО РАН, 120–151.] [In Russian].

Prozorova L.A, Sitnikova T., Zasypkina M.O, Matafonov P.V, Dulmaa A. 2009. Freshwater snails (Gastropoda) of the Baikal Lake basin and the surrounding areas. – An annotated list of the fauna of Lake Baikal and its watershed. Chapter 16. Novosibirsk: Nauka, 2: 170–188. [Прозорова Л.А., Ситникова Т.Я., Засыпкина М.О., Матафонов П.В., Дулмаа А. 2009. Пресноводные брюхоногие моллюски (Gastropoda) бассейна оз. Байкал и прилегающих территорий. – Аннотированный список фауны озера Байкал и его водосборного бассейна. Глава 16. Новосибирск: Наука, 2: 170–188.] [In Russian].

Samadi S., Roumegoux A., Bargues M.D., Mas-Coma S., Yong M., Pointier J.P. 2000. Morphological studies of lymnaeid snails from the human fascioliasis endemic zone of Bolivia. – Jornal of Molluscan Studies, 66: 31–44.

Sitnikova T.Ya., Takhteev V.V. 2006. Gastropods from hot springs of Pribaikalie. Hydrobiology of water bodies of south Eastern Siberia. – Trudy Biologo-pochvennogo fakulteta Irkutskogo gosudarstvennogo universiteta, 6: 137–150. [Ситникова Т.Я., Тахтеев В.В. 2006. Брюхоногие моллюски (Gastropoda) из горячих источников Прибайкалья. Гидробиология водоемов юга Восточной Сибири. – Труды Биолого-почвенного факультета Иркутского государственного университета, 6: 137–150.] [In Russian].

Starobogatov Ya. I., Budnikova L.L. 1976. On the fauna of freshwater gastropods of Extreme North-Eastern USSR. – Trudy Biologo-pochvennogo instituta DVO AN SSSR, 36(139): 72–88. [Старобогатов Я.И., Будникова Л.Л. 1976. О фауне пресноводных брюхоногих моллюсков Крайнего северо-востока СССР. – Труды Биолого-почвенного института ДВО АН СССР, 36 (139): 72–88.] [In Russian].

Starobogatov Ya.I., Prozorova L.A., Bogatov V.V., Saenko E.M. 2004. Molluscs. In: Keys to freshwater invertebrates of Russia and adjacent territories. V. 6. Molluscs, polychaetes, nemerteans. SPb: Nauka: 9–491. [Старобогатов Я.И., Прозорова Л.А., Богатов В.В., Саенко Е.М. 2004. Моллюски. В кн.: Определитель пресноводных беспозвоночных России и сопредельных территорий. Т. 6. Моллюски, полихеты, немертины. СПб: Наука: 9–491.] [In Russian].

Starobogatov Ya.I., Streletzkaja E.A. 1967. Composition and zoogeographical characteristics of freshwater malacofauna of East Siberia and northern part of Far East. In: Molluscs and their role in biocoenoses and formation of faunas. – Trudy ZIN AN SSSR, 42: 221–268. [Старобогатов Я.И., Стрелецкая Э.А. 1967. Состав и зоогеографическая характеристика пресноводной малакофауны Восточной Сибири и севера Дальнего Востока. Моллюски и их роль в биоценозах и формировании фаун. Труды Зоологического института АН СССР, 42: 221–268.] [In Russian].

Sysoev A.V., Kantor Yu.I. 1992. Names of Molluscs introduced by Ya.I. Starobogatov in 1957–1992. Dedicated to 60th anniversary. – Ruthenica, 2 (2): 119–159.

Tahteev V.V, Izhboldina L.A, Pomazkova G.I, Provis V.I, Sitnikova T., Bondarenko N.A, Mazepova G.F, Rozhkova N.A, Starobogatov Ya.I., Galkin A., Pleshanov A.S, Bessolitsyna I.A, Rusinek O.T, Ambrosova E.V. 2000. Biota of some hot springs of Baikal region and related bodies of water. – Research of aquatic ecosystems in Eastern Siberia. Biodiversity of the Baikal region. Trudy Biologo-pochvennogo fakulteta Irkutskogo gosudarstvennogo universiteta, 3: 55–100. [Тахтеев В.В., Ижболдина Л.А., Помазкова Г.И., Провиз В.И., Ситникова Т.Я., Бондаренко Н.А., Мазепова Г.Ф., Рожкова Н.А., Старобогатов Я.И., Галкин А.Н., Плешанов А.С., Бессолицына И.А., Русинек О.Т., Амбросова Е.В. 2000. Биота некоторых термальных источников Прибайкалья и связанных с ними водоемов. – Исследования водных экосистем Восточной Сибири. Био-

разнообразие Байкальского региона: Труды Биолого-почвенного факультета Иркутского государственного университета, 3: 55–100.] [In Russian].

Tahteev V.V, Pleshanov A.S, Egorova I.N, Sudakova E.A, Okuneva G.L, Pomazkova G.I, Sitnikova T., Kravtsova L.S, Rozhkova N.A., Galimzyanova A.V. 2010. Main pecularities and the formation of aquatic and terrestrial biota in thermal and mineral springs of the Baikal region. – Izvestiya Biologo-pochvennogo fakulteta Irkutskogo gosudarstvennogo universiteta, series Biology; Ecology, 3 (1): 33–37. [Тахтеев В.В., Плешанов А.С., Егорова И.Н., Судакова Е.А., Окунева Г.Л., Помазкова Г.И., Ситникова Т.Я., Кравцова Л.С., Рожкова Н.А., Галимзянова А.В. 2010. Основные особенности и формирование водной и наземной биоты термальных и минеральных источников Байкальского региона. – Известия Иркутского государственного университета, серия Биология; Экология, 3 (1): 33–37.] [In Russian].

Vinarski M.V. 2002. Fauna of lymnaeids (Gastropoda, Pulmonata, Lymnaeidae) of Ural (as based on collection of Zoological museum of the Institute for Ecology of Plants and Animals of Ural Division of the Russian Academy of Sciences). – Biota of mountain territories: the history and the present state. Ekaterinburg: Akademkniga, P. 16–17. [Винарский М.В. 2002. Фауна прудовиков (Gastropoda, Pulmonata, Lymnaeidae) (по материалам Зоомузея ИЭРиЖ УрО РАН). – Биота горных территорий: история и современное состояние. Сборник трудов конференции молодых ученых. 15–19 февраля, Екатеринбург: Академкнига, 16–17.] [In Russian]

Vinarski M.V. 2008. Three lymnaeid species (Gastropoda: Lymnaeidae) new for the Irtysh River basin (Western Siberia). – Bulletin of the Russian Far East Malacological Society, 12: 71–78.

Vinarski M.V. 2012a. The lymnaeid genus *Catascopia* Meier-Brook et Bargues, 2002 (Mollusca: Gastropoda: Lymnaeidae), its synonymy and species composition. – Invertebrate Zoology, 9 (2): 91–104.

Vinarski M.V. 2012b. *Lymnaea* (*Galba*) *thiesseae* (Clessin) – a new species at malacofauna in Siberia. – Naukovi zapiski Ternopilskigo natsionalnogo pedagogichnogo universitetu, seriya Biologiya, 2 (51): 45–49. [*Lymnaea* (*Galba*) *thiesseae* (Clessin) – новый вид малакофауны Сибири. – Наукові записки Тернопільского національного педагогічного университету, серія Біологія, 2 (51): 45–49.] [In Russian].

Vinarski M.V. 2013a. One, two, or several? How many lymnaeid genera are there? – Ruthenica, 23 (1): 41–58.

Vinarski M.V. 2013b. Variability in freshwater pulmonate mollusks (the taxonomic aspect). Omsk: Omsk State Pedagogical University Publisher, 268 p. [Винарский М.В. 2013. Изменчивость пресноводных легочных моллюсков (таксономический аспект). Омск: издательство Омского государственного педагогического университета, 268 с.] [In Russian].

Vinarski M.V., Andreev N.I., Andreeva S.I., Lazutkina E.A., Karimov A.V., 2007 (2008). Diversity of gastropods in the inland waterbodies of Western Siberia. – Invertebrate Zoology, 4 (2): 173–183.

Vinarski M.V., Grebennikov M.E. 2012. A review of the species of the genus *Aenigmomphiscola* Kruglov, Starobogatov, 1981 (Gastropoda: Pulmonata: Lymnaeidae). – Ruthenica, 22 (2): 159–170. [Винарский М.В., Гребенников М.Е. 2012. Обзор видов рода *Aenigmomphiscola* Kruglov, Starobogatov, 1981 (Gastropoda: Pulmonata: Lymnaeidae. – Ruthenica, 22 (2): 159–170.] [In Russian].

Vinarski M., Schniebs K., Glöer P., Hundsdoerfer A. 2011. The taxonomic status and phylogenetic relationships of the genus *Aenigmomphiscola* Kruglov and Starobogatov, 1981 (Gastropoda: Pulmonata: Lymnaeidae). – Journal of Natural History, 45 (33–34): 2049–2068.

Zasypkina M.O. 2008. Freshwater molluscs fauna from Upper part of the Amur River basin. – Freshwater ecosystems of the Amur River basin. Vladivostok: Dalnauka, 144–150. [Засыпкина М.О. 2008. Фауна водных моллюсков бассейна Верхнего Амура. – Пресноводные экосистемы бассейна реки Амур. Владивосток: Дальнаука, 144–150.] [In Russian].

Zoologicheskie Issledovania, 2014, No. 16: 39–54

TYPES OF FRESHWATER GASTROPODS DESCRIBED BY YA.I. STAROBOGATOV, WITH ADDITIONAL DATA ON THE SPECIES: FAMILY PLANORBIDAE

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The work aims to illustrate the type specimens of the freshwater planorbid gastropods described by Ya.I. Starobogatov with coauthors. The data on these species (34) include the history of the name application in literature, the information about type locality, type depository, localities of subsequent findings, ecology, and comments on some species.

ТИПЫ ПРЕСНОВОДНЫХ БРЮХОНОГИХ МОЛЛЮСКОВ, ОПИСАННЫЕ Я.И. СТАРОБОГАТОВЫМ, С ДОПОЛНИТЕЛЬНЫМИ ДАННЫМИ ПО ВИДАМ: СЕМЕЙСТВО PLANORBIDAE

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Представлены изображения типовых экземпляров пресноводных гастропод семейства Planorbidae, описанных Я.И. Старобогатовым с соавторами. Сведения о рассматриваемых видах (34) включают историю упоминания видов в научной литературе, информацию о типовом местонахождении, о коллекциях, в которых хранятся типы, местах находок и распространении видов, их экологии, а также краткие замечания к некоторым видам.

Introduction

The structure of the superfamily Planorboidea Rafinesque, 1815 (or the family Planorbidae in Russian scientific tradition) has been always differing from that adopted in Western taxomomic practice [e.g., cf. Baker (1945), Hubendick (1955) and Starobogatov (1958, 1967, 1970); Starobogatov et al. (2004)].

Currently, the system of Bouchet et al. (2005) is in use, which is based on morphological classification of Hubendick (1978) and molecular phylogenetic analysis of Morgan et al. (2002). According to Bouchet et al. (2005), the family Planorbidae includes 4 subfamilies, 2 of them – Bulininae and Planorbinae [united by Hubendick (1978) as 'Ancyloplanorbidae'] – are characteristic of the freshwater malacofauna of the former USSR and have been traditionally adopted in Russian literature as separate families (Starobogatov, 1967, 1970; Starobogatov et al., 2004).

Jørgensen et al. (2004) and Albrecht et al. (2007), based on results of molecular phylogenetic analysis, supported the monophyly of the 'Ancyloplanorbidae' sensu Hubendick (1978), though the former authors attributed the rank of subfamily to bulinids and planorbids, whereas the latter authors believe them being families.

According to Starobogatov et al. (2004), (1) Bulinidae P. Fischer et Crosse, 1880 include 4 subfamilies: Miratestinae P. & F. Sarasin, 1897 (= tribe Miratestini sensu Buchet et al., 2005), Camptoceratinae Dall, 1870, Helisomatinae F. C. Baker, 1928 and Planorbariinae Starobogatov, 1990 (all three as synonyms of the tribe Coretini Gray, 1847 sensu Bouchet et al., 2005 with the latter as a possible subfamily Camptoceratinae; (2) Planorbidae Rafinesque, 1815 consisting of subfamilies 1) Ancylinae Rafinesque, 1815, which is at the rank of a family (e.g. Jørgensen et al., 2004; Albrecht et al., 2007; Sitnikova et al., 2012), tribe within Planorbinae (Bouchet et al., 2005), or a subfamily in Planorbidae including two tribes (Albrecht et al., 2007); 2) Biomphalariinae H. Watson, 1954 [= tribe Biomphalariini of Planorbinae of Bouchet et al. (2005)]; 3) Planorbinae [= tribe Planorbini of Planorbinae of Bouchet et al. (2005) or subfamily of Planorbidae with 2 tribes of Albrecht et al. (2007)] 4) Neoplanorbinae Hannibal, 1912 [also subfamily of Planorbidae sensu Bouchet et al. (2005)].

Here we basically follow the system of Bouchet et al. (2005), simply for the reason of stability and equality of approach.

Subfamily Planorbinae sensu Starobogatov et al. (2004) includes 10 genera not arranged into groups of higher rank. Of them, 3 genera – *Segmentina* Fleming, 1818, *Hippeutis* Charpentier, 1837 and *Polypylis* Pilsbry, 1906 – are united by Bouchet et al. (2005) and Albrecht et al. (2007) into the tribe Segmentini Baker, 1945. Probably, this tribe should also include the genera *Kolhymorbis* Starobogatov et Streletzkaja, 1967 (Far East of Russia), *Helicorbis* Benson, 1855 (Transbaikalia and Far East) and *Trochorbis* Benson, 1855 (southern Asia including Tajikistan). It should be mentioned that the latter two genera were included by Baker (1945) into the subfamily Segmentininae.

Two genera, *Choanomphalus* Gerstfeldt, 1859 and *Planorbis* Geoffroy, 1767, out of 4 other genera of the Planorbinae sensu Starobogatov et al. (2004), are sister-groups and have the same status in the current taxonomy of Planorbinae (Bank et al., 2001; Albrecht et al., 2007).

Starobogatov et al. (2004), following Baker (1945) and Hubendick (1955), consider *Armiger* Hartmann, 1843 as a separate genus, whereas Meier-Brook (1983) and Bank et al. (2001) lowered its status to subgeneric within *Gyraulus* Charpentier, 1837.

The genus *Anisus* Studer, 1820 in Russian literature was traditionally subdivided into 8 subgenera, two of them – *Bathyomphalus* Charpentier, 1837 and *Gyraulus* – are usually adopted in Western approach (e.g. Meier-Brook, 1983; Bank et al., 2001; Glöer, 2002; Albrecht et al., 2007) as separate genera. Subgenus *Torguis* Starobogatov, 1967 is treated within the genus *Gyraulus*, and only three subgenera, *Anisus*, *Disculifer* Boettger, 1944 and *Costorbis* Lindholm, 1926, are included in the genus *Anisus*. The subgenus *Vorticulus* Prozorova et Starobogatov, 1997 should be probably also included in the genus *Anisus*, while the subgenus *Microanisus* Dvoriadkin, 1980 seems to be a part of the genus *Gyraulus.* Besides, we can mention that the subgenus *Lamorbis* Starobogatov, 1967 is treated by Starobogatov et al. (2004) within the genus *Choanomphalus* Gerstfeldt, 1859, whereas Western scholars consider it within the genus *Gyraulus*.

Freshwater malacofauna of the former USSR contains 174 species and subspecies of pulmonate gastropods of the superfamily Planorboidea: 15 in Bulininae and the rest – in Planorbidae sensu Starobogatov (10 species of Ancylinae and 149 – of Planorbinae s. str.). Starobogatov with his disciples described 2 species of bulinines and 32 species of planorbines; of them, *Kolhymorbis maacki* Starobogatov et Streletzkaja, 1967 was synonymized by Moskvicheva (1974) with *K. angarensis* (Dybowski et Grochmalicki, 1925). However, the taxonomic decision of Moskvicheva is not a nomenclatural act since it was published, as it has been formally stated, "as a manuscript" (see ICZN Art. 8.1). The species *Armiger bakeri* is absent from the fauna of Russia, having been introduced (Prozorova, Star-

obogatov, 1997) as a replacement name for a taxon from freshwater fauna of Canada and the northern USA, without recognizing and studying the type series. Correspondingly, any types of this species are not illustrated here, although the existing data on them are provided. Three species occurring in the Caspian Sea and described by Starobogatov and Logvinenko (1966), have been figured earlier (Kantor, Sysoev, 2006).

The given below list of species described by Starobogatov with coauthors was compiled somewhat differently as compared to that in Kantor et al. (2010), i.e. the genera *Gyraulus* and *Bathyomphalus* are considered as separate. The basic structure of data on the species is the same as for the preceding Lymnaeidae.

All the types are stored in the collection of the Zoological Institute, St.-Petersburg (ZIN), unless otherwise indicated. The registration numbers correspond to those in the systematic catalogue, as accepted in the ZIN collection (see also Kantor, Sysoev, 2006: 10).

Abbreviations:

IBSS – Institute of Biology and Soil Science FEB RAS, Vladivostok, Russia

LIN – Limnological Institute SB RAS, Irkutsk, Russia

ZIN – Zoological Institute of Russian Academy of Sciences, St.-Petersburg, Russia

PLANORBIDAE Rafinesque, 1815

BULININAE P. Fischer et Crosse, 1880

1. *Culmenella buldowskii* Starobogatov et Prozorova, 1990

Fig. 1 A, B.

History of the name application.

Starobogatov, Prozorova, 1990: 33–34, fig. 1 8, 2 5 (description, copulatory organ morphology)
Prozorova, 1991a (records from watersheds draining into northern part of Japan Sea and Khanka Lake)
Prozorova, 1991b (1992) (biology)
Prozorova, 1992 (living in permanent and semipermanent waterbodies)
Starobogatov et al., 2004 (key to identification, distribution)
Prozorova, 2005 (as a species from Red Book)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Prozorova, 2013 (mention for lower Amur River basin and Primorye)

Type locality. Khanka Lake, near Astrakhanka village.

Types. Holotype (in alcohol) No. 1; 15 alcohol-preserved paratypes, Nos. 2–7, from: type locality (5 spms, No. 2; 3 spms, one dissected, No. 3; 2 spms, No. 5), ditch in Khasansk region (3 spms, No. 4, and 1 spm, No. 6), and Daubikhae River (now Arsenievka River), quarry near the bridge of Varfolomeevka settlement of Yakovlevsk district (Primorye) (1 spm, No. 7).

Additional findings. Basin of Melgunovka River (Arsenievka River basin) and Lotos Lake (Khasan district) (Prozorova, 2005).

Ecology. Lives in permanent mesotrophic waterbodies with well-developed belt of submerged or submersed macrophytes, on water vegetations. Prefers offshore zone of large lakes or floodland waterbodies with favourable oxygen conditions. Breaths with the aid of adaptive gill pushed upward as a kind of sail. Feeds on decaying vegetation and periphyton. Life cycle of 1.2–2 years. Hermaphrodite, breeds in May-July, laying small pink-yellowish transparent clutches containing 4–10 egg capsules and looking as a flattened disc comprised by twisted garrot (Prozorova, 2005).

2. *Culmenella lindholmi* Starobogatov et Prozorova, 1990

Fig. 1 C, D.

History of the name application.

Starobogatov, Prozorova, 1990: 31–33, fig. 1 2, 2 4 (description, copulatory organ morphology)
Prozorova, 1991a (records from watersheds draining into northern Japan Sea and Khanka Lake)
Prozorova, 1992 (living in permanent and semi-permanent waterbodies)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Prozorova, 2013 (mention for malacofauna of lower Amur River basin and Primorye)

Type locality. Khanka Lake, near village Astrakhanka.

Types. Holotype No. 1 (in alcohol) and 39 paratypes, 1 of the latter dry (No. 5, from a waterbody near Yakovlevka settlement) other in alcohol: No. 2 (7 spms) from type locality; Nos. 3 (1 spm) and 4 (1 spm is a paralectotype of *Culmenella rezvoji* Lindholm, 1929) from lake Nedostupnoe near Yakovlevka settlement; No 6 (3 spms) from Khanka Lake southward of Astrakhanka settlement; No. 7 (1 spm) from water meadow near Astrakhanka settlement, No. 8 (1 spm) from oxbow lake near railway station "Razdol'noe settlement"; No. 9 (17 spms) from floodplain of a river of Vladivostok district; No. 10 (5 spms) from a lake near Petropavlovka settlement, Amur River basin; No. 11 (1 spms) from Khanka Lake; No. 12 (1 spm) from floodplain of the Daubikha River near Yablonovka settlement. All identified as *Camptoceras lindholmi*.

Additional findings. No data.

Ecology. Similar to that in *C. buldowskii* co-occurring in Khanka Lake and the Daubkha River at Yakovlevka village.

3. *Armiger eurasiaticus* Prozorova et Starobogatov, 1996

Fig. 1 E, F.

History of the name application.

Prozorova, Starobogatov, 1996: 172, fig. 3D.
Prozorova, 1998 (record from Kolyma River basin and Chaun Lowland)
Starobogatov et al., 2004 (key to identification, distribution)
Prozorova, Zasypkina, 2005a (shell morphometry, microsculpture of protoconch, record from Many-Khol Lake in Tuva Republic)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Vinarski et al., 2007 (2008) (records from Irtysh and Middle Ob provinces)
Dolgin, 2009 (records from Irtysh, Middle Ob, Lower Yenisei and Yano-Kolyma provinces)
Prozorova et al., 2009 (records from Ivano-Arakhlei lakes and Many-Khol Lake in Tuva)
Dolgin, 2012 (recods from Tuva and upper Yenisei)
Prozorova, 2013 (mention for malacofauna of Lower Amur River basin and Primorye)
Khokhutkin, Vinarski, 2013 (synonymy; information about types, type locality, shell morphology, distribution in the Pechora River basin, Middle and South Urals, southern Transuralia)
Vinarski, 2013 (Krivoe Lake, Omsk Region, West Siberia; ontogenetic shell variability)

Type locality. Estonia, eastward of Võrtsjärv Lake (Elva, Estonia).

Types. Holotype (dry) No. 1; 1 dry paratype (No. 2) from type locality.

Additional findings. Pond Ezergamo (Estonia); Pechora River, Setun River (inflow of Moskva River); Moskva River (near Sheshimorova settlement); near Yaroslavl city and Kast River (Yaroslavl Region); Ekaterinburg and Tobolsk cities; near Dzesey Lake (Yakutia); Indigirka River (right bank, 3–6 km from Shamanovo); Malyi Anyui River (Kolyma Lowland) (ZIN).

Ecology. Lives in shallow permanent and temporary waterbodies, as well as in offshore zone of large lakes (Prozorova et al., 2009).

4. *Armiger khoresmicus* Prozorova et Starobogatov, 1996

Fig. 1 G.

History of the name application.

Prozorova, Starobogatov, 1996: 174, fig. 4D.
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Lake Korp-Kul', Khiva district of Khoresm Region of Uzbekistan.

Types. Holotype (dry) No. 1; 1 dry paratype from type locality, No 2.

Additional findings. No data.

Ecology. No data.

5. *Armiger bakeri* Prozorova et Starobogatov, 1996

[nom. nov. pro *Armiger crista* Clarke, 1973: 406, non Linnaeus, 1758: Prozorova et Starobogatov, 1996]

History of the name application.

Prozorova et Starobogatov, 1996: 174, Fig. 4E (diagnosis of North American *Armiger crista* and differences from *Armiger* known for the USSR)

Type locality. Not traced.

Types. No data.

Additional findings. No data.

Ecology. No data.

Remarks. Prozorova and Starobogatov (1996) stated that the species lives in Canada and northern parts of the USA. We could not find any records of this species from the fauna of Canada and North America for 17 years after the species description.

6. *Bathyomphalus agardhi* Starobogatov in Prozorova, 2003

Fig. 1 H.

Anisus (*Bathyomphalus*) *agardhi* "Starobogatov, 1996" – Prozorova, 2003: 100 (nom. nov. pro *Planorbis contortus* var. *labiatus* Westerlund, 1874 non *Planorbis labiatus* Benson, 1850).

History of the name application.

Prozorova, 2003 (key to identification, as *Anisus* (*Bathyomphalus*) *agardhi* "Starobogatov, 1996")
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Nechaev, 2006 (distribution in Kola Peninsula)
Vinarski et al., 2013 (photo of *Planorbis contortus* var. *labiatus* syntype, information about types, taxonomical remark)

Type locality. Oeland Island, Borgholm, Sweden.

Types. The ZIN collection includes 10 dry specimens identified by Westerlund and labelled as "Borgholm, Sueciae" (No. 1), just these specimens were considered as *B. agardhi* by Starobogatov and Prozorova who, however, did not select the type series. Vinarski et al. (2013) indicated the presence of type specimens in Göteborgs Naturhistoriska Museét – 156 spms (AN 3958), and in Swedish Museum of Natural History, Stockholm – 6 spms (AN 12: 54).

Additional findings. Samarka River near Samara City (det. Lindholm) (ZIN No. 2), Krotovyi brook basin and Nizhnetutomskoe water reservoir at Kola Peninsula (Nekhaev, 2009).

Ecology. The main substrate is sunken branches and snugs, occurs also on silty bottom with high concentration of organics (Nekhaev, 2009).

Remarks. Vinarski et al. (2013) ascribe the authorship to "Prozorova in Starobogatov, Prozorova, Bogatov et Saenko, 2004". They claimed that "Prozorova [2003] herself did not introduce this name as intentionally new". However, the introduction of

the new name in Starobogatov et al., 2004 is basically the same (in the sense of the ICZN) as in Prozorova, 2003: "*Anisus agardhi* Prozorova, 2003 (nom. nov. pro *Planorbis contortus* var. *labiatus* Westerlund, 1874, non *Planorbis labiatus* Benson, 1850)" and "*A.* (*B.*) *agardhi* Starobogatov, 1996 (nom. nov. pro *Planorbis contortus* Westerlund, 1874 non *P. labiatus* Benson, 1850)", respectively. Therefore, the reference to Art. 16.1 of the ICZN by Vinarski et al. (2013) is irrespective to the case, and we retain the earlier authorship of Prozorova, 2003.

Vinarski et al. (2013: 93) also restricted the type series by including only shells with marked characters of the species in the syntypes, which, even though being reasonable, contradicts the ICZN Arts. 72.1.1 and 72.4.1.

7. *Choanomphalus* (*Baicaloplanorbis*) *kozhovi* Beckman et Starobogatov, 1975

Fig. 1 I.

History of the name application.

Beckman, Starobogatov, 1975: 106, fig. 4E (shell description)
Sitnikova, Roepstorf, 1999 (comparison with *Ch. grachevi*)
Sitnikova et al., 2004 (information about types, type locality, site of locations)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Near Bolshaya Kosa Cape (NW Baikal).

Types. Holotype (in alcohol, shell partly decayed); No. 1 1 paratype (No. 2, in alcohol) from Zavorotnyi Cape (NW Baikal).

Additional findings. Near Svyatoi Nos Peninsula and Krestovski Cape in eastern part of Central Baikal (LIN).

Ecology. Rare species, found on stony-sandy substrates at the depth of 12 m and from 22 to 70 m.

8. *Choanomphalus* (*Antichoanomphalus*) *planorbiformis* Beckman et Starobogatov, 1975

Fig. 2 A, B.

History of the name application.

Beckman, Starobogatov, 1975: 107, fig. 4zh. (description, locations)
Sitnikova, Shimaraev, 2001 (mention as Baikal deepwater dweller)
Roepstorf, Riedel, 2004 (SEM photos of pro- and teleconchs, penis stiletto, radular teeth)
Sitnikova et al., 2004 (information about types, type locality, distribution, ecology)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Sosnovka Bank (northern Baikal), depth 400 m.

Types. Holotype (in alcohol, shell almost dissolved); No 1 3 dry paratypes from type locality: No 2.

Additional findings. Akademic Ridge (Roepstorf, Riedel, 2002) and the entrance to Barguzin Bay of Baikal (Beckman, Starobogatov, 1975).

Ecology. Found at depth of 120 to 580 m, on sandy bottom (Sitnikova et al., 2004); feeds on sedimented phytoplankton (Roepstorf, Riedel, 2002).

9a. *Choanomphalus* (*Kozhovisulcifer*) *bathybius bathybius* Beckman et Starobogatov, 1975

Fig. 2 C.

History of the name application.

Beckman, Starobogatov, 1975: 104, fig. 4A (description)
Sitnikova, Shimaraev, 2001 (record as deepwater Baikal dweller)
Roepstorf, Riedel, 2004 (SEM photos of proto- and teleconchs, penis stilet, radular teeth)
Sitnikova et al., 2004 (information about types, type locality)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Khlystov et al., 2009; Zemskaya et al., 2012 (record from oil-methane seep Gorevoy Uteys)

Type locality. Sosnovka Bank (northern Baikal), depth 400 m.

Types. Holotype (in alcohol, shell mostly dissolved) No 1.

Additional findings. Barguzin Bay (Roepstorf, Riedel, 2002) and on bitumen structure of oil-methane seep Gorevoy Uteys, depth 920 m of lake Baikal (Zemskaya et al., 2012).

Ecology. Probably an eurybathic species living on sandy bottom and requiring hard substrate for egg laying.

9b. *Choanomphalus* (*Kozhovisulcifer*) *bathybius meridianus* Beckman et Starobogatov, 1975

Fig. 2 D.

History of the name application.

Beckman, Starobogatov, 1975: 105, fig. 4B (description)
Sitnikova et al., 2004 (information about types, type locality, general information)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Near Slyudjanka city (southern Baikal), depth 170 m.

Types. Holotype (in alcohol, shell partly dissolved) No. 1.

Additional findings. No data.

Ecology. No data.

10. *Choanomphalus* (*Kozhovisulcifer*) *huzhirensis* Beckman et Starobogatov, 1975

Fig. 2 E, F.

History of the name application.

Beckman, Starobogatov, 1975: 104–105, fig. 4G (description)
Sitnikova et al., 2004 (information about types, type locality, distribution)

Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Maloe More, against Khuzhir settlement, 65 m (Baikal Lake).

Types. Holotype (in alcohol, shell covered by crystallic deposits and nearly dissolved) No. 1; 4 paratypes (initially in alcohol, then dried) from type locality, No. 2.

Aditional locations. Near Byrkhin Cape; Maloe More strait; near Boguchan Island; Ongokonskaya Bay, Kultuk (ZIN); Maloe More strait, Cape Elokhin of Lake Baikal (LIN).

Ecology. Found on stones and sand at a depth zone of 3–170 m.

11. *Choanomphalus* (*Kozhovisulcifer*) *lindholmi* Beckman et Starobogatov, 1975

Fig. 2 G.

History of the name application.

Beckman, Starobogatov, 1975: 105, fig. 4V (description)
Sitnikova et al., 2004 (information about types, type locality, sites of locations)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Near Zavorotnyj Cape (NW Baikal).

Types. Holotype (in alcohol) No. 1; 15 paratypes (in alcohol) from type locality, No. 2; 3 paratypes (in alcohol) from Cape Bolshaya Kosa (Lake Baikal): No. 3.

Additional findings. No data.

Ecology. Rare species, found on stony-sandy substrates at a depth zone from 12 to 70 m.

12. *Choanomphalus* (*Pseudogyraulus*) *okhoticus* Prozorova et Starobogatov, 1997

Fig. 2 H.

History of the name application.

Prozorova, Starobogatov, 1997: 43–44, fig. 1G (description)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Prozorova, 2013 (mention for malacofauna of lower Amur River basin and Primorye)

Type locality. Tugur River valley.

Types. Holotype (dry) No. 1.

Additional findings. No data.

Ecology. Found in a small permanent waterbody (Prozorova, Starobogatov, 1997).

Remarks. The species was described from a single specimen and its stylet was not sttudied. Therefore, the assignment of this species to *Choanomphalus* can be considered as only conventional. The shell is similar to that in *Gyraulus*.

13. *Gyraulus amuricus* (Prozorova et Starobogatov, 1998)

Fig. 3 A.

History of the name application.

Prozorova, Starobogatov, 1998: 57, fig. 1D [description as *Anisus* (*Gyraulus*)]
Kolpakov, 2003 (records in central and northern Primorye regions of Russian Far East)
Prozorova, 2003 (key to identification)
Prozorova et al., 2004 (record from spring of Belaya River near Sokol settlement of Sakhalin Island)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Potikha et al., 2008 (record in Sikhote-Alin Reserve)
Zasypkina, 2008 (record from Shilka River)
Pietsch et al., 2012 (records from Sakhalin Island: North-West area, Tym' and Poronay rivers, Central mountain area)
Prozorova, 2013 (mention for malacofauna of Lower Amur River basin and Primorye)

Type locality. Khabarovsk District, lake in the plain of Bureya River, 3 km dowstream from mouth of Chekunda River.

Types. Holotype (in alcohol) No. 1. Paratypes: No. 2 – 11 alcohol-preserved spms, Khabarovsk Territory, floodland of Bolshoi Khurbin River (tributary of lower Amur); No. 3 – 26 spms in alcohol, lake in floodland of Bureya River, 3 km downstream of Chekunda settlement.

Additional findings. Northern Sakhalin Island – Belaya River, spring near Sokol settlement (Prozorova et al., 2004), Sikhote-Alin Reserve – lakes Solontsovoe and Golubichnoe, middle reaches of Serebryanka River and Yaponskoe Lake near the reserve (Potikha et al., 2008).

Ecology. Lives in rivers and floodland lakes (Prozorova, 2003).

14. *Gyraulus buriaticus* (Prozorova et Starobogatov, 1997)

Fig. 3 B.

History of the name application.

Prozorova, Starobogatov, 1997: 44, fig. 2A (description as *Anisus* (*Gyraulus*)
Prozorova, 2001 (records from lower and middle Tumannaya River)
Kolpakov, 2003 (records in central and northern Primorye Territory of Russian Far East)
Prozorova, 2003 (key to identification)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Potikha et al., 2008 (record in Sikhote-Alin Reserve)
Zasypkina, 2008 (records from Ingoda, Shilka and Never rivers)
Prozorova et al., 2009 (record from Ivano-Arakhlei lakes)
Pietsch et al., 2012 (record from northwest Sakhalin Island)
Prozorova, 2013 (record for malacofauna of lower Amur River basin and Primorye)

Type locality. Pool in the Tsagal-Gol River floodland, vicinity of Gusinooziorsk town, Buriat Republic.

Types. Holotype (dry) No. 1; paratypes: No. 2 (4 shells) and No. 3 (58 shells) from type locality.

Additional findings. Khabarovsk Territory – floodlands and backwaters of the lower Amur tributaries: Malaya Khurba, Ulbinka, Bochinka, Bolin, Manoma rivers; Primorye Territory – Edinka and Poima rivers (ZIN collection, det. Prozorova).

Ecology. Lives in permanent and semipermanent waterbodies (Prozorova et al., 2009).

15. *Gyraulus chereshnevi* (Prozorova et Starobogatov, 1997)

Fig. 3 C.

History of the name application.

Prozorova, Starobogatov, 1997: 48, fig. 3B [description as *Anisus* (*Gyraulus*)]
Prozorova, 1998 (record for eastern Chukotka)
Prozorova, 2003 (key to identification)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Bolotov et al., 2012 (as a component of a hot spring fauna)

Type locality. Hot springs in the valey of the Gilmimliveyem River at outlets of thermal waters, Chukchi Peninsula.

Types. Holotype (in alcohol) No. 1; paratypes: No. 2 (103 alcohol-preserved spms) from type locality, and No. 3 (9 alcohol-preserved spms) from spring-outlet lake Tioploe, Chukchi Peninsula.

Additional findings. No data.

Ecology. Lives in hot springs and warmed water bodies, sometimes together with *G. infraliratus* (Prozorova, Starobogatov, 1997).

16. *Gyraulus iturupensis* (Prozorova et Starobogatov, 1997)

Fig. 3 D.

History of the name application.

Prozorova, Starobogatov, 1997: 48–49, fig. 3C [description as *Anisus* (*Gyraulus*)]
Prozorova, 2003 (key to identification)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Solnechnoye Lake, Iturup Island (southern Kurile Islands).

Types. Holotype No. 1; paratypes (in IBSS): 3 spms from stream entering Solnechnoe Lake; 4 spms from Utinoe Lake, Zeleny Island (Lesser Kurile Islands – Habomai); 1 spm from Aliger Lake, Kunashir Island (Southern Kurile Islands) and 21 spms from Tokotan Lake, Urup Island (Southern Kurile Islands).

Additional findings. No data.

Ecology. Lives in permanent waterbodies on sandy or muddy-sandy bottom, sometimes on plants. Found together with *G. zelenensis*, *G. infirmis* and *G. spirillus* (Prozorova, Starobogatov, 1997).

17. *Gyraulus khabarovskiensis* (Prozorova et Starobogatov, 1997)

Fig. 3 E.

History of the name application.

Prozorova, Starobogatov, 1997: 45, fig. 2D [description as *Anisus* (*Gyraulus*)].
Prozorova, 2003 (key to identification)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Zasypkina, 2008 (records from Never and Tynda rivers)

Type locality. Innokentievskoye Lake (Khabarovsk part of Amur drainage area).

Types. Holotype (dry) No. 1, and 4 dry paratypes from type locality, No. 2.

Additional findings. Never and Tynda rivers (Zasypkina, 2008).

Ecology. Lives in permanent or semipermanent waterbodies on plants and bottom, together with *G. centrifugops* and *G. subfiliaris* (Prozorova, Starobogatov, 1997).

18. *Gyraulus kussakini* (Prozorova et Starobogatov, 1997)

Fig. 3 F.

History of the name application.

Prozorova, Starobogatov, 1997: 46, fig. 2F [description as *Anisus* (*Gyraulus*)].
Prozorova, 1998 (record for "North-eastern Asia from Chukotka and Kamchatka west to Kolhyma")
Prozorova, 2003 (key to identification)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Pietsch et al., 2012 (record from northeast area of Sakhalin Island)

Type locality. Branch of the Anadyr River with slightly brackish water, entering the Ugolnaya Inlet.

Types. Holotype (dry) No. 1 (as *Anisus jacuticus*).

Additional findings. Pastures of collective farms "Put Ilyicha" and "Znamya Lenina" in the Irkutsk Region; river near Okocha settlement (Severnaya Gavan, Khabarovsk Territory); pond in tundra 20 km southward of Agaival (Koryak National Area); Chukotka: stream flowing out from Tioploe Lake, hot springs of Gilmilelivaem River; Basin of Mechigmen Bay of the Bering Sea (as *Anisus jacuticus*) (ZIN).

Ecology. Lives in semipermanent waterbodies (Prozorova, Starobogatov, 1997).

Remarks. There are 53 spms of this species (including holotype) in the ZIN collection. They are stored as *Anisus jacuticus* Prozorova et Starobogatov, which corresponds to *Gyraulus kussakini* Prozorova et Starobogatov, 1997 (L.A. Prozorova, pers. comm).

19. *Gyraulus sretenskiensis* (Prozorova et Starobogatov, 1997)

Fig. 4 A.

History of the name application.

Prozorova, Starobogatov, 1997: 44–45, fig. 2B [description as *Anisus* (*Gyraulus*)]
Prozorova, 2003 (key to identification)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Zasypkina, 2008 (records from Onon, Ingoda, Never and Shilka rivers)
Prozorova, 2013 (record for malacofauna of Lower Amur River basin and Primorye)

Type locality. Small inflow of Margul stream, vicinity of Sretensk town, Shilka River drainage area, Chita Region.

Types. Holotype (dry) No. 1; and 68 paratypes (dry), Nos. 2 and 3.

Additional findings. Onon, Ingoda and Never rivers (Zasypkina, 2008) and lower Amur River basin, without exact localities (Prozorova, 2013).

Ecology. Found on silty bottom (Prozorova, Starobogatov, 1997).

20. *Gyraulus terekholicus* (Prozorova et Starobogatov, 1997)

Fig. 2 I.

History of the name application.

Prozorova, Starobogatov, 1997: 45, fig. 2C [description as *Anisus* (*Gyraulus*)]
Prozorova, 2003 (key to identification)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Sitnikova et al., 2006 (record from Lake Hövsgöl, reproductive system morphology)
Prozorova et al., 2009 (distribution)
Dolgin, 2012 (records from Tuva region and possibly from Upper Yenisei)
Dolgin, 2013 (low-altitude and middle-range mountains of Sayan mountain system)

Type locality. Lake Terekhol, Tuva Republic.

Types. Holotype (dry) No. 1; 25 dry paratypes (No. 2) from type locality.

Aditional locations. Tertiary deposits on the right bank of the Kholu River (northern side of Ubsanur depression, Mongolia), Nogo Lake (between Khrnur and Durgun-nur, Mongolia), Khubsugul Lake (ZIN).

Ecology. Lives on offshore stones and pebbles, among *Ulotrix* (Prozorova et al., 2009).

21. *Gyraulus thermochukchensis* (Prozorova et Starobogatov, 1997)

Fig. 4 B.

History of the name application.

Prozorova, Starobogatov, 1997: 46, 47, fig. 3A [description as *Anisus* (*Gyraulus*)]
Prozorova, 1998 (mention for eastern Chukotka)
Prozorova, 2003 (key to identification)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Bolotov et al., 2012 (as a member of a hot spring malacofauna)

Type locality. Hot springs in the valey of the Gilmimliveyem River at outlets of thermal water, Chukchi Peninsula.

Types. Holotype (dry) No. 1; 24 dry paratypes from type locality, No. 2; 4 paratypes from hot springs of Gilmimliveyem River near Bering Sea, No. 3; and 6 paratypes from lake Tioploe near Providenie Bay, No. 4.

Additional findings. No data.

Ecology. Lives in warm springs with water temperature up to 42° (Prozorova, Starobogatov, 1997), sometimes together with *G. chereshnevi* (label data).

22. *Gyraulus tugurensis* (Prozorova et Starobogatov, 1997)

Fig. 4 C.

History of the name application.

Prozorova, Starobogatov, 1997: 45–46, fig. 2E [description as *Anisus* (*Gyraulus*)]
Prozorova, 2003 (key to identification)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Prozorova, 2013 (record for fauna of Lower Amur River basin and Primorye)

Type locality. Tugur River valley.

Types. Holotype (dry) No. 1; 3 dry paratypes from type locality, Nos. 2 and 3.

Addional locations. No data.

Ecology. Lives in permanent and semipermanent waterbodies together with *G. sibiricus* (Prozorova, Starobogatov, 1997)

23. *Gyraulus zelenensis* (Prozorova et Starobogatov, 1997)

Fig. 4 D.

History of the name application.

Prozorova, Starobogatov, 1997: 49, fig. 3D [description as *Anisus* (*Gyraulus*)]
Prozorova, 2003 (key to identification)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Utinoye Lake, Zelenyi Island (Lesser Kurile Islands – Habomai).

Types. Holotype (dry) No. 1; paratypes: 3 spms from Solnechnoe Lake; Iturup Island (Southern Kurile Islands); 2 spms from Kuybyshevskoe Lake (same island); 3 spms from Aliger Lake (Kunashir Island (Southern Kurile Islands); and small pond near Aliger Lake (the same Island) (all in IBSS).

Additional findings. No data.

Ecology. Lives together with *G. iturupensis.*

24. *Gyraulus centrifugops* (Prozorova et Starobogatov, 1997)

Fig. 4 E.

History of the name application.

Prozorova, Starobogatov, 1997: 49–50 [nom. nov. pro *Anisus centrifugus* sensu Bogatov et Zatrawkin, 1991[1990], non *Planorbis centrifugus* Westerlund, 1897].
Prozorova, 2001 (record from water bodies of lower Tumannaya River basin)
Kolpakov, 2003 (records in Central Primorye region of Russian Far East)
Prozorova, 2003 (key to identification)
Prozorova et al., 2004 (records from Krasnoselskaya River–inflow of Sysuya River, in Sakhalin island)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Potikha et al., 2008 (record from Golubichnoe lake in Sikhote-Alin Reserve)
Zasypkina, 2008 (records from Onon, Shilka, Amazar, Gorchaki and Tygda rivers)
Pietsch et al., 2012 (records from Sakhalin Island: north-eastern area, Tym River area, Poronai River and Poronaisk mountain areas, west mountain area, south Sakhalin lowland and central mountain areas)
Prozorova, 2013 (mention for lower Amur River basin and Primorye)

Type locality. Amur River.

Types. Holotype No. 1 (dry) and 1 dry paratype from type locality (the types were selected from lot No. 3 labelled "Amur River, coll. Gorshkevich, 1859, det. Westerlund & Schrenck as *Planorbis centrifugus*", though there is no corresponding record in the catalogue card).

Additional findings. There are 29 catalogue cards in the ZIN collection, with label data (more than 300 lots) on localities embracing various waterbodies from basins of the Amur and Ussuri rivers, Khanka Lake, as well as waterbodies of Primorye and Mongolia.

Ecology. Inhabits permanent and semipermanent waterbodies (Prozorova, 2003).

Remarks. Of 347 lots with original identification as *Anisus* (*Gyraulus*) *centrifugus*), 5 (Nos. 7, 10, 17, 71 and 338) were re-identified by Prozorova and Starobogatov as *Anisus subfiliaris* Moskvicheva in Dvoriadkin, 1980, and a specimen from the lot No. 338 taken in "Gusinoe Lake, Putyatin Island, Shkotovskii district of Primorye, coll. Starobogatov, 2.10.1956", was labelled by Prozorova as a syntype of *Gyraulus subfiliaris*. Other specimens were labelled as *A.* (*G.*) *centrifugops*. One dry specimen from the lot No. 1 and 2 specimens from the lot No. 2 were designated as types (lectotype and paralectotypes) of *Anisus* (*Gyraulus*) *centrifugus* by Prozorova, Starobogatov (1997). Three juveniles (in alcohol, No. 33) were identified by these authors as *A.* (*G.*) *kamtschaticus* (Westerlund, 1876).

25. *Gyraulus substroemi* (Starobogatov et Budnikova, 1976)

Fig. 5 A.

History of the name application.

Starobogatov, Budnikova, 1976: 85–86, fig. 5 V [description as *Anisus* (*Gyraulus*), copulatory organ morphology]
Zatrawkin, 1985 (key to identification)
Prozorova, 1986 (record from Chaun Lowland)
Bogatov, Zatrawkin, 1990 (shell and copulatory organ morphology, key to identification, records from Upper Kolyma and Anadyr river basin)
Prozorova, 2003 (key to identification)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Anadyr district, pool near Vakarevo (Chukchi Peninsula).

Types. Holotype (dried after fixation in alcohol) No. 1; 1 paratype (in alcohol) from type locality, No. 2.

Additional findings. Chukchi Peninsula – Mayniys Lake and Ayon Lake; Kamchatka – Penzhina River near Slautnoe settlement; Verkhne-Penzhinskoe Lake near Verkhne-Penzhinsk settlement; lake of Penzhina River basin (middle flow); Lake Azabachje (ZIN).

Ecology. Lives in permanent and small semipermanent waterbodies (Prozorova, 2003), on silted pebbles, according to label of the sample from Lake Azabachje.

26. *Planorbis kubanicus* Soldatenko et Starobogatov, 1998

Fig. 5 B.

[= *Planorbis carinatus* var. *dilatatus* Clessin 1873, non *Planorbis dilatatus* Gould, 1841]

History of the name application.

Soldatenko, Starobogatov, 1998: 59–60, 62, figs. 1A, 2 (description, reproductive system morphology)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Soldatenko, Petrov, 2009 (cuticular structures in the copulatory apparatus)
Glöer, Pešik, 2010 (shell photo, comparison to other species of *Planorbis*)
Kryuchkova, 2012 (absence of trematodes *Alaria alata* in lower Volga area and northern Caucasus)

Type locality. Russia, Krasnodar Region, Kuban River, Akhtansk group of limans.

Types. Holotype (dry): No. 1.

Additional findings. Kuma River near winter-quarters; pond near village Balabino, northward of Manych; Bavaria, Koenigsee, Germany (Soldatenko, Starobogatov, 1998); Ciscaucasia (Starobogatov et al., 2004), lower Volga area and northern Caucasus (Kryuchkoba, 2012).

Ecology. Found in shallow permanent waterbodies and rivers (Starobogatov et al., 2004).

27. *Helicorbis kozhovi* Starobogatov et Streletzkaja, 1967

Fig. 5 C.

History of the name application.

Starobogatov, Streletzkaja, 1967: 239–240, fig. 36 (description)
Starobogatov et al., 2004 (key to identification, distribution)
Prozorova, Zasypkina, 2005b (record from Khilok River of Selenga River basin)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Dolgin, 2009 (record from Lena and Yano-Kolhyma provinces)
Prozorova et al., 2009 (record from Angara River, 700 km from source, distribution, ecology)
Zasypkina in Semernoy et al., 2013 (record from Kotokel lake)

Type locality. Kotokel Lake, Mostovaja inlet (Baikal Lake area).

Types. Holotype (dry) No. 1; 1 dry paratype from type locality, No. 2.

Additional findings. Manzurka River (inflow of Lena River) (ZIN).

Ecology. In Kokotel Lake it lives in shallow waters on water vegetation or on silty bottom (Prozorova et al., 2009).

28. *Helicorbis shilkaensis* Starobogatov, 1996

Fig. 5 D.

History of the name application.

Starobogatov, 1996: 1427–1428, textfig. 1.
Prozorova, 1991a (records from basins of Khanka Lake and Ussuri River, and basins of rivers entering southern Japan Sea)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Zasypkina, 2008 (records from Ingoda and Shilka rivers)
Prozorova, 2013 (record for malacofauna of lower Amur River basin and Primorye)

Type locality. Vicinities of Sretensk, Shilka River valley, Chita Region.

Types. Holotype (dry) No. 1; 19 dry paratypes from type locality (No. 2).

Additional findings. No other data.

Ecology. No exact data.

29. *Helicorbis sujfunensis* Starobogatov, 1957

Fig. 5 E.

History of the name application.

Starobogatov, 1957: 1004–1005, figs. zh-p (description, morphology of radular teeth and copulatory organs)
Starobogatov, 1970 (record from Tunka basin and Amur River province)
Moskvicheva, 1974 (record from Amur River basin)
Dvoriadkin, 1980; 1987 (parasite infestation)
Zatrawkin, 1985 (key to identification)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, ecology, distribution)
Prozorova, 1991b (1992) (egg mass morphology; records from swamp and floodplain of Studenaya River and floodplain pool of Molokanka River near Zharikovo settlement, Primorye)
Prozorova, 2001 (records from Lake Lotos and small water bodies of Tumannaya River)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Zasypkina, 2008 (records from Ingoda and Shilka rivers)
Besprozvannykh, 2000; 2007; 2009 (trematode invasion in waterbody in Vladivostok City)
Prozorova, 2013 (record for malacofauna of lower Amur River basin and Primorye)

Type locality. Vicinities of Voroshilov city (now Ussurijsk City, Far East).

Types. Holotype (in alcohol, shell almost dissolved) No. 1; 15 paratypes (in alcohol, 2 dissected) from type locality, No. 2.

Additional findings. Vicinities of Blagoveshchensk and Khabarovsk, as well as Chita (Ugdan Lake); Khanka Lake and its basin; Amur River basin water bodies of southern part of Primorje – 76 lots in ZIN.

Ecology. Lives in temporary waterbodies (Starobogatov et al., 2004).

30. *Kolhymorbis shadini* Starobogatov et Streletzkaja, 1967

Fig. 6 A, B.

History of the name application.

Starobogatov, Streletzkaja, 1967: 237, fig. 32 (description)
Starobogatov, Budnikova, 1976 (records from Chukchi Peninsula)
Zatrawkin, 1985 (key to identification)
Prozorova, 1986 (records from Chaun Lowland)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, distribution, ecology)
Prozorova, 1998 (record from Kolyma and Anadyr river basin, Chaun Lowland)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Dolgin, 2009 (records from lower Yenisei, Lena and Yano-Kolyma provinces)
Dolgin, 2012 (records from Upper Yenisei)
Dolgin, 2013 (foothills and low-altitude mountains of Sayan mountain system)

Type locality. Waterbodies of the Kolyma delta near Pokhodsk.

Types. Holotype (initially in alcohol, dried, decayed) No. 1; paratypes: 2 (in alcohol, one of them dissected), Nos. 2 (in alcohol) and 3.

Additional findings. Pool an Vakhareva River, Anadyr area (ZIN).

Ecology. Lives in dead-channel, thermokarst and semipermanent waterbodies on water vegetation (Bogatov, Zatrawkin, 1990).

31. *Kolhymorbis maacki* Starobogatov et Streletzkaja, 1967

Fig. 5 F.

[? = *Kolhymorbis angarensis* (B. Dybowski et Grochmalicki, 1925)]

[B. Dybowski, Grochmalicki, 1925: 880–881, Fig. 72–73 (as *Segmentina nitida angarensis*)]

History of the name application.

Starobogatov, Streletzkaja, 1967: 237–238, fig. 33
Moskvicheva, 1974 (record from Amur River basin, as *Kolhymorbis angarensis*)
Bogatov, Sirotski, 1978 (record from lakes of upper Zeya River)
Zatrawkin, 1985 (record for Far East malacofauna)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, distribution, ecology)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Soldatenko, 2009 (new diagnosis, radular teeth and copulatory apparatus morphology)
Dolgin, 2012 (records from upper Yenisei)
Prozorova, 2013 (record for lower Amur River basin and Primorye)

Type locality. Lunkha River (Yakutia)

Types. Holotype (dry) No. 1; paratypes – 4 dry (No. 3) from lake Gusinoe (Shkotovski region, Putyatin Island, Primorye), 3 dry (No. 4) from spring near Razdolnoe settlement, near Vladivostok City; and 812 alcohol-preserved spms (Nos. 5–12) from: Khabarovsk Territory – bog at Amgun River (P. Osipenko district); pool in floodland at Krasnorechenskij settlement; floodland meadow of Vertopryakha River (tributary of the Amur; Primorye – flowing waterbody on Putyatin Island; meadow at Astrakhanovka village (Khanka district); at Varfolomeevka settlement (Yakovlevsky district); inflow of ground water and a spring at Razdolnoe settlement (Vladivostok district); pool in Bolshaya Klyuchichnaya River floodland (Vladivostok ditrict).

Additional findings. 37 samples in the ZIN collection taken in various areas of the Amur and Zeya river basins.

Ecology. Inhabits temporary and semipermanent waterbodies (Starobogatov et al., 2004).

Remarks. Only findings of *Kolhymorbis angarensis* in Baikal area will allow resolving the problem of its possible conspecificity with *K. maacki.*

32. *Polypylis almaatina* Starobogatov et Mamilova, 1970

Fig. 6 C.

History of the name application.

Starobogatov, Mamilova, 1970: 62–63, fig. 1,2 (description)
Izzatulaev, 1972 (record from Tajikistan)

Type locality. Eastward of Alma-Ata (Kazakh SSR), spring at the territory of collective farm "Zarya Vostoka".

Types. Holotype (in alcohol) No. 1; paratypes – 30 spms (in alcohol) from type locality, No. 2; 57 spms (in alcohol) from pool near "Pravlenie" bus stop, vicinities of Alma-Ata City, No. 3.

Additonal locations. No information.

Ecology. Lives in small temporary waterbodies.

33. *Polypylis likharevi* Starobogatov et Streletzkaja, 1967

Fig. 6 D.

History of the name application.

Starobogatov, Streletzkaja, 1967: 238–239, fig. 35 (description)
Bogatov, Sirotski, 1978 (records from floodland lakes of upper Zeya River)
Zatrawkin, 1985 (key to identification)
Prozorova, 1986 (record from Chaun Lowland)
Bogatov, Zatrawkin, 1990 (shell morphology, key to identification, ecology, record from Kolyma and upper Zeya river basin)
Prozorova, 1998 (record from Kolyma and upper Zeya river basin)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Dolgin, 2009 (record for Yano-Kolyma province)
Dolgin, 2012 (record for Upper Yenisei)
Dolgin, 2013 (foothills and low-altitude mountains of Sayan mountain system)

Type locality. Lake in the former river bed in floodland of the River Malyj Anyuj [NE Siberia].

Types. Holotype (dry) No. 1; 2 (dry) paratypes from type locality, No. 2.

Additional findings. Lake Skalistoe, upper Zeya River basin (ZIN), see also "History of the name application".

Ecology. Lives in thermokarst floodland waterbodies, on water vegetation (Bogatov, Zatrawkin, 1990).

34. *Polypylis sibirica* Starobogatov et Streletzkaja, 1967

Fig. 6 E.

History of the name application.

Starobogatov, Streletzkaja, 1967: 238, fig. 34 (description)
Shapovalova, 1981 (record from Ivano-Arakhlei lakes)
Klishko, 2003 (record from Ivano-Arakhlei lakes)
Prozorova, Zasypkina, 2005b (records from Undugun Lake of Selenga River basin)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Dolgin, 2009 (records from lower Yenisei, Lena and Yano-Kolyma provinces)
Prozorova et al., 2009 (records from Angara River, Chivyrkui Bay of Lake Baikal and Lake Kotokel)
Dolgin, 2012 (record from Upper Yenisei)
Sharyi-ool in Semernoy et al., 2013 (record from Kotokel lake)
Dolgin, 2013 (foothills and low-altitude mountains of Sayan mountain system)

Type locality. Lake on the Oblom Cape (eastern coast of Baikal Lake).

Types. Holotype (in alcohol) No. 1; paratypes (in alcohol): 11 spms from type locality (No. 2) and 2 spms from lake Galatyi (Pribaikalie) (No. 3).

Additional findings. Lake Arakhlei (Transbaikalia); vicinities of Irkutsk City, "Kada" River; Mon-

golia – Ulagaan Lake and vicinities of Ulan-Bator (ZIN).

Ecology. Lives in lakes on water vegetation (Starobogatov et al., 2004).

Conclusion

As seen from the above-said, most species of Planorbidae were described by Starobogatov with coauthors as based on shell morphology only, without using data on reproductive system uncluding the stylet morphology. The shell variability has not been studied at all. The data on ecology of the species are also scarce. Most publications citing these species concern purely faunistic studies and the respective references are often based on preceding publicatons only, without a critical reassessment of the material. All this means that there is an urgent need for a complete revision of the family.

It should be also added that shells of many holotypes of small planorbids are currently more or less dissolved (up to a nearly complete absence of the shell), which makes difficult reliable identification of the species. Perhaps, only the molecular-genetic methods may be useful in this case.

Acknowledgements

The authors are very grateful to L.L. Yarokhnovich (ZIN) for her invaluable help in dealing with the gastropod collection of the Institute; to Dr. L.A. Prozorova (IBSS) for information about some specimens in the ZIN collection, and to E. Dolid (LIN) for processing some shell illustrations. The work was supported by the RFBR projects Nos 12-04-00503, 14-44-04105 and the RSF Project No. 14-50-00029. This study was also partially supported by Budget Research Project, No. VI.51.1.10 in LIN SD RAS.

References

Albrecht Ch., Kuhn K., Streit B. 2007. A molecular phylogeny of Planorboidea (Gastropoda: Pulmonata): insights from enhanced taxon sampling. – Zoologica Scripta, 36: 27–39.

Baker F.C. 1945. The Molluscan family Planorbidae. Urbana: University of Illinois Press. 530 p.

Bank R.A., Bouchet Ph., Falkner G., Gittenberger E., Hausdorf B., von Proschwitz T., Ripken Th.E.J. 2001. Supraspecific classification of European non-marine Mollusca (CLECOM Sections I+II). – Heldia, 4(1/2): 77–128.

Beckman M.Yu., Starobogatov Ya.I. 1975. Baikal deep-water molluscs and their related forms. – Galazyi G.I. (ed). News about the Baikal fauna. – Trudy Limnologicheskogo Instituta SO AN SSSR, 18 (38): 92–111. [Бекман М.Ю., Старобогатов Я.И. 1975. Байкальские глубоководные моллюски и родственные им формы. – Галазий Г.И. (ред.). Новое о фауне Байкала. Труды Лимнологического института СО АН СССР, 18 (38): 92–111.] [In Russian]

Besprozvannykh V.V. 2000. Life cycle of the trematode *Pneumonoeces nanchangensis major* (Plagiorchidae) parasiting in lungs of frogs in the Primorye Region. – Parazitologiya, 34(1): 63–66. [Жизненный цикл трематоды *Pneumonoeces nanchangensis major* (Plagiorchidae) – паразита легких лягушек в Приморском крае. – Паразитология, 34(1): 63–66.] [In Russian]

Besprozvannykh V.V. 2007. Life Cycle of the trematode *Halipegus japonicus* (Halipegidae) in Primorskiy Kray (Russia). – Vestnik Zoologii, 41 (1): 23–28. [Беспрозванных В.В. 2007. Жизненный цикл трематоды *Halipegus japonicus* (Halipegidae) в условиях Приморского края. – Вестник зоологии, 41(1): 23–28.] [In Russian]

Besprozvannykh V.V. 2009. Life cycle of the trematode *Neodiplostomum oriolinum* (Diplostomatidae) under natural conditions in Primorye Region (Russia). – Vestnik Zoologii, 42(2): 99–105.

Bogatov V.V., Sirotskii S.E. 1978. Production of the molluscs and their role in biocenoses of floodplain waterbodies of the Upper Zeya. – Lebedev Yu.M. (ed.) Hydrobiology of the Amur basin. Vladivostok: FESC AS USSR, p. 116–122. [Богатов В.В., Сиротский С.Е. 1978. Продукция моллюсков и их роль в биоценозах пойменных озер верховьев реки Зеи. – Лебедев Ю.М. (ред). Гидробиология бассейна Амура. Владивосток: ДВНЦ АН СССР. С. 116–122.] [In Russian]

Bogatov V.V., Zatrawkin M.N. 1990. Gastropod molluscs of fresh and brackish waters of the Far East of the USSR. A guide. Vladivostok: FED AS USSR. 169 p. [Богатов В.В., Затравкин М.Н. 1990. Брюхоногие моллюски пресных и солоноватых вод Дальнего Востока СССР: Определитель. Владивосток: Изд-во ДВО АН СССР. 169 с.] [In Russian]

Bolotov I.N., Bespalaya Yu.V., Usacheva O.V. 2012. Ecology and evolution of hydrobionts in hot springs of the Subarctic and Arctic: formation of similar communities, adaptation of species and microevolutionary processes. – Biology Bulletin Reviews, 132 (1): 77–86. [Болотов И. Н., Беспалая Ю. В., Усачева О. В. 2012. Экология и эволюция гидробионтов в горячих источниках Субарктики и Арктики: формирование аналогичных сообществ, адаптации видов и микроэволюционные процессы. – Успехи современной биологии, 132 (1): 77–86.] [In Russian]

Bouchet P., Rocroi J.-P., Frýda J., Hausdorf B., Ponder W., Valdés Á., Warén A. 2005. Classification and nomenclator of gastropod families. – Malacologia, 47 (1-2): 1–397.

Dolgin V.N. 2009. A study of freshwater molluscs from Siberia. – Vestnik Tomskogo Gosudarstvennogo Pedagogicheskogo Universiteta, 11(89): 174–180. [Долгин В.Н. 2009. К изучению пресноводных моллюсков Сибири. – Вестник Томского государственного педагогического университета,, 11(89): 174–180]. [In Russian]

Dolgin V.N. 2012. Freshwater mollusks of the Upper Yenisei basin and lakes of Tuva. – Vestnik Tomskogo Gosudarstvennogo Pedagogicheskogo Universiteta,

7(122): 129–131 [Долгин В.Н. 2012. Пресноводные моллюски бассейна Верхнего Енисея и озер Тувы. – Вестник Томского государственного педагогического университета,, 7 (122): 129–131.] [In Russian]

Dolgin V.N. 2013. Freshwater molluscs of mountain the Sayan mountain system. – Vestnik Tomskogo Gosudarstvennogo Pedagogicheskogo Universiteta, 8 (136): 18–22. [Долгин В.Н. 2013. Пресноводные моллюски Саянской горной системы. – Вестник Томского государственного педагогического университета, 8 (136): 18–22.] [In Russian]

Dvoryadkin V.A. 1980. Planorbids (Gastropoda, Pulmonata) of Primorskii Kray and Outer Manchuria and their infection with trematode larvae. – Freshwater fauna of Far East. Vladivostok: FESC AS USSR, P. 24–36. [Дворядкин В.А. 1980. Планорбиды (Gastropoda, Pulmonata) и их зараженность личинками трематод в Приморье и Приамурье. – Пресноводная фауна Дальнего Востока. Владивосток: ДВНЦ АН СССР, С. 24–36.] [In Russian]

Glöer P. 2002. Mollusca I. Süsswassergastropoden Nord- und Mitteleuropas. Bestimmungsschlüssel, Lebensweise, Verbreitung. – Groh K. (ed). Die Tierwelt Deutschland, 73. Hackencheim: ConchBooks, 327 p.

Glöer P., Peœik V. 2010. The *Planorbis* species of the Balkans with the description of *Planorbis vitojensis* n.sp. (Gastropoda: Planorbidae). – Journal of Conchology, 40(3): 249–357.

Hubendick B. 1955. Phylogeny in the Planorbidae. – Transactions of the Zoological Society of London [Biol.], 28(6): 453–542.

Hubendick B. 1978. Chapter 1: systematics and comparative morphology of the basommotophora. – Fretter V., Peake J.F. (eds.). Pulmonates, vol. 2A Systematics, Evolution and Ecology. London: Academic Press, p. 1–47.

Izzatullaev Z. 1972. On the fauna of freshwater molluscs of the Hissar Range and adjacent regions of Tajikistan. – Izvestiya Akademii Nauk Tajikskoy SSR, Otdeleniye biologicheskikh nauk, 3(48): 44-49. [Иззатуллаев З. 1972. К фауне пресноводных моллюсков Гиссарского хребта и со-предельных районов Таджикистана. – Известия Академии наук Таджикской ССР, отделение биологических наук, 3(48): 44-49.] [In Russian]

Jørgensen A., Kristensen T.K., Stohard J.R. 2004. An investigation of the 'Ancyloplanorbidae' (Gastropoda, Pulmonata, Hygrophila): preliminary evidence from DNA sequence data. – Molecular Phylogenetics and Evolution, 32: 778–787.

Kantor Yu.I., Sysoev A.V. 2005. Catalogue of mollusks of Russia and adjacent countries. Moscow: KMK Scientific Press, 627 p.

Kantor Yu.I., Sysoev A.V. 2006. Marine and brackish water Gastropoda of Russia and adjacent countries: an illustrated catalogue. Moscow: KMK Scientific Press, 371 p.

Kantor Yu.I., Vinarski M.V., Schileyko A.A., Sysoev A.V. 2010. Catalogue of the continental mollusks of Russia and adjacent territories, version 2.3.1. – www.ruthenica.com

Khokhutkin I.M., Vinarski M.V. 2013. Molluscs of the Urals and the adjacent areas. The families Acroloxidae, Physidae, Planorbidae (Gastropoda, Pulmonata, Lymnaeiformes). Part 2. Vasilieva I.A. (ed.), Ekaterinburg: Goshchitskiy Publishers, 184 p. [Хохуткин И.М., Винарский М.В. 2013. Моллюски Урала и прилегающих территорий. Часть 2. Васильева И.А. (ред.), Екатеринбург: Гощицкий,185 с.] [In Russian]

Khlystov O.M., Zemskaya T.I., Sitnikova T.Ya., Mekhanikova I.V. et al. 2009. Bottom bitumen structures and biota inhabiting them according to investigation of Lake Baikal with the Mir submersible. – Doklady Akademii Nauk (Earth Sciences), 428(5): 682–685. [Хлыстов О.М., Земская Т.И., Ситникова Т.Я., Механикова И.В. и др. 2009. Донные битумные постройки и населяющая их биота по данным обследования озера Байкал с глубоководных обитаемых аппаратов "Мир". – Доклады Академии Наук; 428(5): 682–685.]

Klishko O.K. 2003. Atlas of benthic invertebrates from Zabaikalie lakes. Chita: Chita State University, 350 p. [Клишко Л.К. 2003. Атлас донных беспозвоночных озер Забайкалья. Чита: ЧитГУ, 350 с.] [In Russian]

Kolpakov E.V. 2003 The species composition and peculiarities of distribution of freshwater gastropod mollusks (Gastropoda) in Northeastern Primorye. – Vladimir Ya. Levanidov's Biennial Memorial Meetings, 2: 160–164. [Колпаков Е.В. 2003. Состав и особенности распространения пресноводных брюхоногих моллюсков (Gastropoda) на северо-востоке Приморья. – Чтения памяти Владимира Яковлевича Левандова, 2: 160–164.] [In Russian]

Kryuchkova E. N. 2012. Helminth ecology in domestic and wild carnivores in European part of the Russian Federation. – Thesis of dissertation… doctor of veterinary science, Ivanovo: D.K. Belyaev Ivanovo Agricultural Academy, 47 p. [Крючкова Е.Н. 2012. Экология гельминтов у домашних и диких плотоядных животных в европейской части российской федерации. – Автор. дисс…. докт. ветер. наук, Иваново: Ивановская гос. сельскохоз. акад. им. акад. Д.К. Беляева, 47 с.] [In Russian].

Logvinenko B.M., Starobogatov Ya.I. 1966. Molluscs of the family Planorbidae in the Caspian Sea. – Zoologicheskii Zhurnal, 45(10): 1467–1475. [Логвиненко Б.М., Старобогатов Я.И. 1966. Моллюски семейства Planorbidae Каспия. – Зоологический журнал, 45(10): 1467–1475.] [In Russian]

Meier-Brook C. 1983. Taxonomic studies on *Gyraulus* (Gastropoda: Planorbidae). – Malacologia, 24 (1–2): 1–113.

Moskvicheva I.M. 1974. Fresh water molluscs of the Lower part Aur River basin. – Thesis of candidate of sciences dissertation…. Biological sciences. Leningrad: ZIN AS USSR, 20 p. [Москвичева И.М. 1974. Пресноводные моллюски нижней части бассейна Амура. – Автореф. дис…. канд. биол.наук, Ленинград: ЗИН АН СССР, 20 с.] [In Russian]

Morgan J.A.T., DeJong R.J., Jung Y., Khallaayoune Kh., Kock S., Mkoli G.M., Loker E.S. 2002. A phylogeny of planorbid snails, with implications for the evolution of *Schistosoma* parasites. – Molecular Phylogenetics and Evolution, 25: 477–488.

Nekhaev I.O., 2006. The peculiarities of distribution of limnic molluscs of the family Planorbidae (Gastropoda Pulmonata) in northwestern part of the Murmansk

region. – Vestnik Murmanskogo gosudarstvennogo tekhnicheskogo universiteta, 9(5): 794–797 [Нехаев И.О. 2006. Особенности распространения моллюсков семейства Planorbidae (Gastropoda Pulmonata) в прибрежной части водоемов северо-запада Кольского полуострова. – Вестник Мурманского государственного технического университета, 9(5): 794–797] [In Russian]

Pietsch T.W., Bogatov V.V., Storozhenko S.Y., Lelej A.S., Barkalov V.Y., Takahashi H., Joneson S.L., Kholin S.K., Minakawa N., Ohara M., Bennett D.J., Anderson T.R., Crawford R.L., Clew K.A., Harpel J.A., Krestov P.V., Makarchenko E.A., Prozorova L.A., Kuwahara Y., Shed'ko S.V., Yabe M., Woods P.J., Stevenson D.E. 2012. Biodiversity and biogeography of Sakhalin Islands. – Flora and Fauna of North-West Pacific islands (Materials of International Kuril and Sakhalin island Projects). Vladivostok: Dalnauka, 11–78. (http://www.biosoil.ru/files/00010905.pdf)

Potikha E.V., Prozorova L.A., Kolpakov E.V. 2008. To the fauna of freshwater mollusks of the Sikhote Alin national park. – Vladimir Ya. Levanidov's Biennial Memorial Meetings. Vladivostok: Dalnauka, 4: 134–141. [Потиха Е.В., Прозорова Л.А., Колпаков Е.В. 2008. К фауне пресноводных моллюсков Сихотэ-Алинского заповедника. – Чтения памяти проф. В.Я. Леванидова. Владивосток: Дальнаука, 4: 134–141.] [In Russian]

Prozorova L.A. 1986. Composition and biogeographic characteristics of the gastropod malacofauna of Chaun lowland. – Freshwater benthic organisms of Far East. (Trudy biologo-pochvennogo instituta DVO RAN), Vladivostok: FES Center, AS USSR: 39–47. [Прозорова Л.А. 1986. Состав и биогеографическая характеристика малакофауны брюхоногих Чаунской низменности. – Донные организмы пресных вод Дальнего Востока (Труды Биолого-почвенного института ДВО РАН). Владивосток: ДВНЦ АН СССР: 39–47.] [In Russian]

Prozorova L.A. 1991a. Composition and biogeographic characteristics of the freshwater gastropod malacofauna of Primorye Territory. – Zoologicheskii Zhurnal, 70 (9): 54–63. [Прозорова Л.А. 1991а. Состав и биогеографическая характеристика пресноводных брюхоногих моллюсков Приморского края. – Зоологический журнал, 70 (9): 54–63]. [In Russian]

Prozorova L.A. 1991b (1992). Egg mass morphology of the freshwater gastropods in Primorye Territory. – Starobogatov Ya.I. (ed) Reproduction and egg mass of the molluscs (Trudy Zoologicheskogo instituta AN SSSR, 228), Leningrad: AN SSSR, p. 74–110. [Прозорова Л.А. 1991б (1992). Морфология кладок брюхоногих моллюсков Приморского края. – Старобогатов Я.И. (ред.). Размножение и кладки яиц моллюсков. (Труды Зоологического института АН СССР, 228). Ленинград: Академия наук СССР, с. 74–110]. [In Russian]

Prozorova L.A. 1992. Molluscs of small waterbodies of South Far East of Russia. – Zoologicheskii Zhurnal, 71 (9): 41–45. [Прозорова Л.А. 1992. Моллюски малых водоемов юга Дальнего Востока России. – Зоологический журнал, 71 (9): 41–45.] [in Russian]

Prozorova L.A., 1998. Annotated list of Beringian freshwater molluscs. – Bulletin of the Russian Far East Malacological Society, 2: 12–28.

Prozorova L.A. 2001. Species composition and distribution of freshwater malacofauna in the basin of lower reaches of the Tumen (Tumangang) River. – The state of environment and biota of the southwestern part of Peter the Great Bay and the Tumannaya River mouth. Vladivostok: Dalnauka, 2: 52–68. [Прозорова Л.А. 2001. Видовой состав и распределение пресноводной малакофауны в бассейне нижнего течения реки Туманной. – Экологическое состояние и биота юго-западной части залива Петра Великого и устья реки Туманной. Владивосток: Дальнаука, 2: 52–68] [In Russian]

Prozorova L.A. 2003. Taxonomy and species composition of the genus *Anisus* Studer (Gastropoda, Planorbidae) in the fauna of Russia. – Bulletin of the Russian Far East Malacological Society, 7: 99–115. [Прозорова Л.А. 2003. Таксономическая структура и видовой состав рода *Anisus* Studer (Gastropoda, Planorbidae) в фауне России. – Бюллетень дальневосточного малакологического общества, 7: 99–115.] [In Russian]

Prozorova L.A. 2005. Molluscs. Gastropoda (freshwater). – Red Book of Primorye Territory. (Animals). Vladivostok: Administration of Primorskii Kray, P. 40–42. [Прозорова Л.А. 2005. Моллюски. Брюхоногие (пресноводные). – Красная книга Приморского края. (Животные). Владивосток: Администрация Приморского края, С. 40–42.] [In Russian] http://redbookpk.ru/2.animals/2.invertebrata/4.mollusca/2.gastropoda/14.culmenella%20buldowskii/culmenella%20buldowskii.html

Prozorova L.A. 2013. Freshwater mollusks of Lower Amur River basin and Primorye. Species diversity, keys of genera and families, rear species. Saarbrucken, Germany: Palmarium Academic Publishing. 59 c. [Прозорова Л.А. 2013. Пресноводные моллюски бассейна Нижнего Амура и Приморья. Видовое разнообразие, ключи родов и семейств, редкие виды. Saarbrucken, Germany: Palmarium Academic Publishing. 59 с.] [In Russian]

Prozorova L.A, Bogatov V.V., Saenko E.M. 2004. New data on the freshwater mollusks fauna of Sakhalin Island. – Storozhenko S.Yu. (ed.). Flora and fauna of Sakhalin Island (Data of the International Sakhalin project, part 1). Vladivostok: Dalnauka, P. 138–144. [Прозорова Л.А., Богатов В.В., Саенко Е.М. 2004. Новые данные по фауне пресноводных моллюсков острова Сахалин. – Стороженко С.Ю. (отв. ред.) Растительный и животный мир острова Сахалин. (Материалы Международного Сахалинского проекта, ч. 1). Владивосток: Дальнаука, С. 138–144.] [In Russian]

Prozorova L.A, Sitnikova T., Zasypkina M.O, Matafonov P.V, Dulmaa A. 2009. Freshwater snails (Gastropoda) of Baikal Lake basin and the surrounding areas. – Timoshkin O.A. (ed). An annotated list of the fauna of Lake Baikal and its watershed. (Basins and channels in the South of East Siberia and North Mongolia, book I, chapter 16). Novosibirsk: Nauka, P. 170–188. [Прозорова Л.А., Ситникова Т.Я., Засыпкина М.О., Матафонов П.В., Дулмаа А. 2009. Пресноводные брюхоногие моллюски (Gastropoda) бассейна оз. Байкал и прилегающих территорий. – Тимошкин О.А. (ред). Аннотированный список фауны озера Байкал и его водосборного бассейна (Водоемы и

водотоки юга Восточной Сибири и Северной Монголии, книга 1, глава 16). Новосибирск: Наука, С. 170–188.] [In Russian]

Prozorova L.A., Starobogatov Ya.I. 1996. Guide to Recent molluscs of Northern Eurasia. 6. Genus *Armiger* Hartmann, 1840 (family Planorbidae). – Ruthenica, 5(2): 167–175.

Prozorova L.A., Starobogatov Ya.I. 1997. New species of the subgenus *Gyraulus* of the genus *Anisus* and *Gyraulus*-similar forms from Asiatic Russia (with notes on classification of the genera *Anisus* and *Choanomphalus*) (Gastropoda Planorbidae). – Ruthenica, 7(1): 39–50.

Prozorova L.A., Starobogatov Ya.I. 1998. Subgenus *Gyraulus* (Pulmonata, Planorbidae) from the south of the Russian Far East. – Ruthenica, 8(1): 55–58. [Прозорова Л.А., Старобогатов Я.И. 1998. Подрод *Gyraulus* (Pulmonata, Planorbidae) на юге Дальнего Востока России. – Ruthenica, 8(1): 55–58.] [In Russian]

Prozorova L.A, Zasypkina M.O. 2005a. The new data on morphology and distribution of molluscs of the genus *Armiger* Hartmann, 1840 (Gastropoda, Planorbidae). – Makarchenko E.A. (ed). Vladimir Ya. Levanidov's Biennial Memorial Meetings, 3. Vladivostok: Dalnauka, P. 289–294. [Прозорова Л.А., Засыпкина М.О. 2005а. Новые данные по морфологии и распространению моллюсков рода *Armiger* Hartmann, 1840 (Gastropoda, Planorbidae). – Макарченко Е.А. (отв. ред). Чтения памяти проф. Владимира Яковлевича Леванидова, 3. Владивосток: Дальнаука, С. 289–294.] [In Russian]

Prozorova L.A, Zasypkina M.O. 2005b. Freshwater molluscs of the Khilok River (Selenga River drainage, East Baikal Lake region). – Makarchenko E.A. (ed). Vladimir Ya. Levanidov's Biennial Memorial Meetings, 3. Vladivostok: Dalnauka, P. 295–300. [Прозорова Л.А., Засыпкина М.О. 2005б. Пресноводные моллюски р. Хилок (бассейн р. Селенга, Забайкалье). – Макарченко Е.А. (отв. ред). Чтения памяти проф. Владимира Яковлевича Леванидова, 3. Владивосток: Дальнаука, С. 295-300.] [In Russian]

Roepstorf P., Riedel F. 2004. Deepwater gastropods endemic to Lake Baikal – an SEM study on protoconchs and radulae. – Journal of Conchology, 38(3): 253–282.

Semernoy V.P., Sharyi-ool M.O., Bazova N.V., Matafonov D.V., Proviz V.I., Zorina O.V. 2013. Taxonomic diversity. – Pronin N.M. (ed). Lake Kotokel'skoe: natural conditions, biota, ecology (Macrozoobenthos, 9.1). Ulan-Ude: Publishing Buryat Scientific Center, SD RAS, P. 187–196. [Семерной В.П., Шарый-оол М.О., Базова Н.В., Матафонов Д.В., Провиз В.И., Зорина О.В. 2013. Таксономическое разнообразие. – Пронин Н.М. (отв. ред.). Озеро Котокельское: природные условия, биота, экология. (Макрозообентос, 9.1). Улан-Удэ: Изд-во БНЦ СО РАН, С. 187–196.] [In Russian]

Shapovalova I.M. 1981. Macrozoobenthos. – Beckman M.Yu., Gorlachev V.P. (eds). Biological productivity of Lake Arakhley (Zabaikalie). Novosibirsk: Nauka, p. 122–138. [Шаповалова И.М. 1981. Макрозообентос. – Бекман М.Ю., Горлачев В.П. (ред). Биологическая продуктивность озера Арахлей (Забайкалье). Новосибирск: Наука, с. 122–138.] [In Russian]

Sitnikova T., Goulden C., Robinson D. 2006. On gastropod mollusks from Lake Hövsgöl. – Goulden C., Sitnikova T., Gelhaus J., Boldgiv B. (eds.). The Geology, Biodiversity and Ecology of Lake Hövsgöl (Mongolia), 15. Leiden, Netherlands: Backhuys Publishers, p. 233–252.

Sitnikova T.Ya , Kijashko P.V., Sysoev A.V. 2012. Species names of J.-R. Bourguignat and their application in current taxonomy of fresh-water gastropods of the Russian fauna. – The Bulletin of the Russian Far East Malacological Society, 15–16: 87–116.

Sitnikova T.Ya., Röpstorf P. 1999. A new species of planorbid gastropod from Lake Baikal. – Ruthenica, 9(2): 123–128.

Sitnikova T.Ya., Shimaraev N.M. 2001. Deep-water "dwarfs" and "giants" among endemic Baikal gastropods. – Zhurnal obshchei biologii, 62(3): 226–238. [Ситникова Т.Я., Шимараев М.Н. 2001. О глубоководных "карликах" и "гигантах" среди байкальских эндемичных гастропод. – Журнал общей биологии, 62(3): 226–238.] [In Russian]

Sitnikova T.Ya., Starobogatov Ya.I., Shirokaya A.A., Shibanova I.V., Korobkova N.V., Adov F.V. 2004. Gastropoda. – Timoshkin O.A. (ed). Index of animal species inhabiting Lake Baikal and its catchment area. (Lake Baikal, 2. 4). Novosibirsk: Nauka, P. 937–1002. [Ситникова Т.Я., Старобогатов Я.И., Широкая А.А., Шибанова И.В., Коробкова Н.В., Адов Ф.В. 2004. Брюхоногие моллюски. – Тимошкин О.А. (отв. ред). Аннотированный список фауны озера Байкал и его водосборного бассейна. (озеро Байкал, 2.4). Новосибирск: Наука, С. 937–1002.] [In Russian]

Soldatenko E.V. 2009. New diagnostic characters of *Kolhymorbis angarensis* (Dybowski & Grochmalicki, 1925) (Gastropoda: Pulmonata: Planorbidae). – Zoosystematica Rossica, 18(2): 191–195.

Soldatenko E.V., Petrov A.A. 2009. Cuticular structures in the copulatory apparatus of *Planorbis planorbis* (Linnaeus, 1758) (Gastropoda: Pulmonata: Planorbidae). – Zoosystematica Rossica, 18(1): 11–16.

Soldatenko E.V., Starobogatov Ya.I. 1998. A new species of the genus *Planorbis* (Gastropoda Pulmonata Planorbidae). – Ruthenica, 8(1): 59–63.

Spyra A., Strzelec M. 2013. Occurrence and morphological variability of *Guraulus crista* (Gastropoda: Pulmonata: Planorbidae) on different types of substratum in woodland ponds. – Biologia, Section Zoology, 68(4): 679–686.

Starobogatov Ya.I. 1957. On the taxonomic position of two freshwater molluscs from the Far East. – Zoologicheskii Zhurnal, 36(7): 999–1006. [Старобогатов Я.И. 1957. О систематическом положении двух пресноводных моллюсков Дальнего Востока. – Зоологический журнал, 36(7): 999–1006.] [In Russian]

Starobogatov Ya.I. 1958. The system and phylogeny of Planorbidae (Gastropoda Pulmonata). – Byulleten Moskovskogo obschestva ispytatelei prirody, otdel biologicheskii, 63(6): 37–53. [Старобогатов Я.И. 1958. Система и филогения Planorbidae (Gastropoda Pulmonata). – Бюллетень МОИП, отдел биологический, 63(6): 37–53.] [In Russian]

Starobogatov Ya.I. 1967. On the systematization of freshwater pulmonate molluscs. – Starobogatov Ya.I. (ed). Molluscs and their role in biocoenoses and fauna

formation. (Trudy Zoologicheskogo instituta AN SSSR, 42). Leningrad: Nauka, p. 280–304. [Старобогатов Я.И. 1967. К построению системы пресноводных легочных моллюсков. – Старобогатов Я.И. (ред.). Моллюски и их роль в биоценозах и формировании фаун. (Труды Зоологического института АН СССР, 42). Ленинград: Наука, с. 280–304.] [In Russian]

Starobogatov Ya.I. 1970. Molluscan fauna and zoogeographic zonation of continental freshwater bodies of the world. Strelkov A.A. (ed). Leningrad: Nauka, 372 p. [Старобогатов Я.И. 1970. Фауна моллюсков и зоогеографическое районирование континентальных водоемов земного шара. Стрелков А.А. (ред.). Ленинград: Наука, 372 с.] [In Russian]

Starobogatov Ya.I. 1996. A new species of the genus *Helicorbis* (Gastropoda, Planorbidae) from upper part of the Amur basin. – Zoologicheskii Zhurnal, 75(9): 1427–1429. [Старобогатов Я.И. 1996. Новый вид рода *Helicorbis* (Gastropoda, Planorbidae) из верхней части бассейна Амура. – Зоологический журнал, 75(9): 1427–1429.] [In Russian]

Starobogatov Ya.I., Budnikova L.L. 1976. On the fauna of freshwater gastropod molluscs of the USSR Far North-East. – Levanidov V.Ya. (ed). Freshwater fauna of the Chukchi Peninsula. Trudy Biologo-pochvennogo instituta, novaja serija, 36(139): 72–88. [Старобогатов Я.И., Будникова Л.Л. 1976. О фауне пресноводных брюхоногих моллюсков крайнего северо-востока. – Леванидов В.Я. (ред). Пресноводная фауна Чукотского полуострова. Труды Биолого-почвенного института, новая серия, 36(139): 72–88.] [In Russian]

Starobogatov Ya.I., Mamilova R.Kh. 1970. A new species of *Polypylis* from South-Eastern Kazakhstan. – Biologiya i geografiya (Alma-Ata), 5: 62–63. [Старобогатов Я.И., Мамилова Р.Х. 1970. Новый вид *Polypylis* из юго-восточного Казахстана. – Биология и география (Алма-Ата), 5: 62–63.] [In Russian]

Starobogatov Ya.I., Prozorova L.A. 1990. Species composition of the family Bulinidae (Gastropoda, Pulmonata) in waterbodies of the USSR (with notes on the system of subfamily Camptoceratinae). – Zoologicheskii Zhurnal, 69(4): 27–37. [Старобогатов Я.И., Прозорова Л.А. 1990. Видовой состав семейства Bulinidae (Gastropoda, Pulmonata) в водоемах СССР (с замечаниями по системе подсемейства Camptoceratinae) Приморского края. – Зоологический журнал, 69(4): 27–37.] [In Russian]

Starobogatov Ya.I., Prozorova L.A., Bogatov V.V., Saenko E.M. 2004. Molluscs. – Tsalolikhin S.Ya. (ed). Key to freshwater invertebrates of Russia and adjacent territories. (Molluscs, polychaetes, nemerteans, 6). Sankt-Petersburg: Nauka: P. 9–491. [Старобогатов Я.И., Прозорова Л.А., Богатов В.В., Саенко Е.М. 2004. Моллюски. – Цалолихин С.Я. (ред). Определитель пресноводных беспозвоночных России и сопредельных территорий. (Моллюски, полихеты, немертины, 6). Санкт-Петербург: Наука, С. 9–491.] [In Russian]

Starobogatov Ya.I., Streletzkaja E.A. 1967. Composition and zoogeographical characteristics of freshwater malacofauna of the East Siberia and northern part of the Far East. – Starobogatov Ya.I. (ed). Molluscs and their role in biocoenoses and fauna formation. (Trudy Zoologicheskogo instituta AN SSSR, 42). Leningrad: Nauka, p. 221–268. [Старобогатов Я.И., Стрелецкая Э.А. 1967. Состав и зоогеографическая характеристика пресноводной малакофауны Восточной Сибири и севера Дальнего Востока. – Старобогатов Я.И. (ред). Моллюски и их роль в биоценозах и формировании фаун. (Труды Зоологического института АН СССР, 42). Ленинград: Наука, с. 221–268.] [In Russian]

Vinarski M.V. 2013. Variability in freshwater pulmonate mollusks (the taxonomic aspect).Omsk: Omsk State Pedagogical University Publisher, 268 p. [Винарский М.В., 2013. Изменчивость пресноводных легочных моллюсков (таксономический аспект). Омск: издательство Омского государственного педагогического университета. – 268 с.] [In Russian]

Vinarski M.V., Andreev N.I., Andreeva S.I., Lazutkina E.A., Karimov A.V. 2007 (2008). Diversity of gastropods in the inland waterbodies of Western Siberia. – Invertebrate Zoology, 4(2): 173–183.

Vinarski M.V., Nekhaev I.O., Glöer P., von Proschwitz T. 2013. Type materials of freshwater gastropod species described by C.A. Westerlund and accepted in current malacological taxonomy: a taxonomic and nomenclatorial study. – Ruthenica, 23(2): 79–108.

Zasypkina M.O. Fauna of the water molluscs of Upper Amur River basin. – Freshwater ecosystems of the Amur River basin. Vladivostok: Dalnauka, p. 144–150. [Засыпкина М.О. 2008. Фауна водных моллюсков бассейна Верхнего Амура. – Пресноводные экосистемы бассейна реки Амур. Владивосток: Дальнаука, с. 144–150.] [In Russian]

Zatrawkin M.N., 1985. Molluscs of the family Planorbidae from the Soviet Far East. – Starobogatov Ya.I. (ed). New data on the taxonomy and ecology of molluscs (Trudy Zoologicheskogo instituta AN SSSR, 135). Leningrad: ZIN AN SSSR, p. 38–43. [Затравкин М.Н. 1985. Моллюски семейства Planorbidae Дальнего Востока СССР. – Старобогатов Я.И. (ред). Новые данные по систематике и экологии моллюсков (Труды Зоологического института АН СССР, 135). Ленинград: ЗИН АН СССР, с. 38–43.] [In Russian]

Zemskaya T.I., Sitnikova T.Ya., Kiyashko S.I., Kalmychkov G.V. et al. 2012. Faunal communities at sites of gas- and oil-bearing fluids in Lake Baikal. – Geo-Marine Letters, 32(5–6): 437–451.

Zoologicheskie Issledovania, 2014, No. 16: 55–62

TYPES OF FRESHWATER GASTROPODS DESCRIBED BY YA.I. STAROBOGATOV, WITH ADDITIONAL DATA ON THE SPECIES: FAMILY PHYSIDAE

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The work aims to illustrate the type specimens of the freshwater physid gastropods described by Ya.I. Starobogatov with coauthors. The data on 14 described species include the history of the name application in literature, the information about type locality, type depository, localities of subsequent findings, ecology, and comments on some species.

ТИПЫ ПРЕСНОВОДНЫХ БРЮХОНОГИХ МОЛЛЮСКОВ, ОПИСАННЫЕ Я.И. СТАРОБОГАТОВЫМ, С ДОПОЛНИТЕЛЬНЫМИ ДАННЫМИ ПО ВИДАМ: СЕМЕЙСТВО PHYSIDAE

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Представлены изображения типовых экземпляров пресноводных гастропод семейства Physidae, описанных Я.И. Старобогатовым с соавторами. Сведения о 14 рассматриваемых видах включают историю упоминания видов в научной литературе, информацию о типовом местонахождении, о коллекциях, в которых хранятся типы, местах находок и распространении видов, их экологии, а также краткие замечания к некоторым видам.

Introduction

The Russian malacological tradition adopts the system of Physidae having been developed by Starobogatov (Starobogatov, 1967; 1970; Starobogatov et al., 1989; Starobogatov et al., 2004), which divides the family into two subfamilies: Physinae Fitzinger, 1833 and Aplexinae Starobogatov, 1967. The same opinion was supported by most Western scholars (e.g., Burch, 1982; Taylor, 2003; Bouchet et al., 2005). Molecular-phylogenetic studies (Wethington, Lydeard, 2007) have shown the monophyly of physids and suggested to return to the simple two-genera classification system favored by Thiele (1931-1935) and Zilch (1959-1960) – *Physa* and *Aplexa* (in North American species).

The currently adopted subdivision into tribes within each subfamily (Bouchet et al., 2005) corresponds to that suggested by Taylor (2003). Physids living in freshwater waterbodies of Russia and adjacent countries were assigned by Taylor to the following tribes: Aplexini – genera *Aplexa* Fleming, 1820, *Amuraplexa* Starobogatov, Prozorova et Zatrawkin, 1989, *Paraplexa* Starobogatov, 1989, *Sibirenauta* Starobogatov et Streletskaja, 1967; Physini – genera *Physa* Draparnaud, 1801 and *Beringophysa* Starobogatov et Budnikova, 1976; and Physelini Taylor, 2003 – genera *Physella* Haldeman, 1843 and *Costatella* Dall, 1870.

Starobogatov et al. (2004) assigned two genera to the subfamily Aplexinae: *Sibirenauta* and *Aplexa*, the latter one subdivided into subgenera (*Aplexa*, *Amuraplexa*, *Paraplexa*); the subfamily Physinae includes 3 genera: *Physa*, *Physella* and *Costatella*, the first including 4 subgenera: *Physa, Mediterraneophysa* Starobogatov et Budnikova, 1976, *Ussuriphysa* Starobogatov, Prozorova et Zatrawkin, 1989, *Beringophysa* Starobogatov et Budnikova, 1976.

Starobogatov with coauthors described 14 physid species from the territory of the former USSR.

The list of species given below follows Starobogatov et al., 1989; Starobogatov et al., 2004, without additions or corrections.

All the types are stored in the collection of the Zoological Institute, St.-Petersburg (ZIN), unless otherwise indicated. The registration numbers correspond to those in the systematic catalogue, as accepted in the ZIN collection (see also Kantor, Sysoev, 2006: 10).

Abbreviations:

IBSS – Institute of Biology and Soil Science FEB RAS, Vladivostok, Russia

LIN – Limnological Institute SB RAS, Irkutsk, Russia

ZIN – Zoological Institute of Russian Academy of Sciences, St.-Petersburg, Russia

PHYSIDAE Fitzinger, 1833

APLEXINAE Starobogatov, 1967

1. *Aplexa* (*Amuraplexa*) *amurensis* Starobogatov et Prozorova in Starobogatov, Prozorova et Zatrawkin, 1989

Fig. 1 A.

History of the name application.

Starobogatov, Prozorova, Zatrawkin, 1989: 65, fig. 1 *4,* 2 *4* (description, copulatory organ structure)
Prozorova, 1991a (record from Khanka Lake, in basins of rivers entering southern and northern Okhotsk Sea)
Prozorova, 1991b (1992) (egg mass morphology)
Prozorova, 1992 (living in ephemeric and semipermanent waterbodies)
Prozorova, Sharyi-Ool, 1999 (findings in Yenisei branch in vicinities of Kyzyl city)
Prozorova, 2001 (findings in off-road puddle near Karasik River, basin of Tumannaya River)
Taylor, 2003 (mention)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Zasypkina, 2008 (findings in Tynda River, as *A. amuricus*)
Prozorova et al., 2009 (mention for Angara River and upper Yenisei River)
Prozorova, 2013 (mention for malacofauna of Lower Amur River basin and Primorje)

Type locality. Khabarovsk Territory [Far East], swamp near Konstantinovka settlement.

Types. Holotype (in alcohol): No. 1 [from No. 220 of *Ph. hypnorum*, det. Moskvicheva, ZIN].

Additional locations. Paratypes were not designated in the ZIN collection (although, they are probably paratypes as being re-identified by Starobogatov and Prozorova). They are listed in the catalogue as *Ph. hypnorum* det. Moskvicheva: Yakovlevka, Spassk District, Primorye Territory (Nos. 121, 124); Suputinsky Reserve (Nos. 122, 123); Primorye Territory, floodland of Daubikhe River (Nos. 220, 221, 7 spms in alcohol); swamp floodland of Suchan (= Partizanskaya) River near Sergeevka settlement (No. 222); Khanka Lake at Spassk city; floodland of Zavitaya River, Zeya River basin; offroad ditch, Zavitinsky district, Amur Region (No. 229); Tolkacha River at Nizhniya Poltavka village, Amur Region (No. 231); floodland of the Bolhsoi In River, Amur basin (No. 232); Lefu river moth, Khahka lowland (No. 235); Khabarovsk Territory, silo pit at Petropavlovka village (No. 209); small lake at forest border of Petropavlovka village (No. 207); offroad puddle at the road to Krasnaya Rechka, Khabarovsk City (No. 210); puddle at Ulbinka River, Amur basin (No. 245); puddles at Nizhneya Manoma, Krabarovsk Teritory (No. 246); puddle in Komsomolsk-on-Amur City (No. 244); pasture of collective farm “Put Iljicha”, Irkutsk Region (No. 251).

Ecology. Lives in temporary waterbodies (Starobogatov et al., 2004). Based on labels, it lives on

water vegetation and on soft bottom; found together with *A. orientalis* (Nos. 207, 209, 210, 232, 245, 246), *A. moskvichevae* (No. 122), *A. moskvichevae aphallica* (No. 235), and *S. kultukiana* (No. 251).

2. *Aplexa* (*Amuraplexa*) *aphallica* Starobogatov et Zatrawkin in Starobogatov, Prozorova et Zatrawkin, 1989

Fig. 1 B.

History of the name application.

Starobogatov, Prozorova, Zatrawkin, 1989: 66, fig. 1 *7* (description as *A. moskvichevae aphallica*)
Prozorova, Starobogatov, 1998 (mention as *A. aphallica*)
Taylor, 2003 (= *Amuraplexa amurensis*)
Starobogatov et al., 2004 (key to identification, distribution as *A. aphallica*)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Prozorova, 2013 (mention for malacofauna of Lower Amur River basin and Primorye)

Type locality. Primorye Territory [Far East], Khanka district, a channel in the rice field in vicinity of Vladimiro-Petrovka village.

Types. Holotype (in alcohol) No. 1 [from No. 203 of *A. hypnorum*, det. Lazareva].

Additional findings. Lefu River mouth, Khanka Lake lowland (Nos. 228, 235 of *A. hypnorum*, re-identified by Prozorova and Starobogatov).

Ecology. Lives in temporary waterbodies (Starobogatov et al., 2004).

Remarks. One lot (No. 203) out of more than 500 spms in the ZIN – *A. hypnorum*, det. Lazareva, has been re-identified by Starobogatov, Prozorova and Zatrawkin as *A. moskvichevae*, as indicated by a handwritten label inserted in the tube with this specimen. A separate sheet attached to the catalogue, has a Starobogatov's handwritten note indicating that the specimen from the lot *A. hypnorum* No. 203 is the holotype of *A. moskvichevae aphallica*. The jar with other specimens contains a label written by M. Zatrawkin and indicating that they belong to *A. amurensis*.

3. *Aplexa* (*Amuraplexa*) *moskvichevae* Starobogatov et Zatrawkin in Starobogatov, Prozorova et Zatrawkin, 1989

Fig. 1 C, D.

History of the name application.

Starobogatov, Prozorova, Zatrawkin, 1989: 66, fig. 1 (6), 2 (6) (description as *A. moskvichevae moskvichevae*)
Prozorova, 1991a (findings in Khanka Lake, in basins of rivers entering southern and northern Okhotsk Sea, as *A. moskvichevae*)
Prozorova, 1991b (1992) (egg mass morphology, as *A. moskvichevae moskvichevae*)
Prozorova, 1992 (mention for ephemeral and periodic waterbodies)
Taylor, 2003 (= *Amuraplexa amurensis*)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Prozorova, 2013 (mention for malacofauna of Lower Amur River basin and Primorje)

Type locality. Artemovka River [Khabarovsk Territory, Far East].

Types. Holotype (in alcohol) No 1; 2 paratypes (in alcohol): No. 2 [with label: floodland of Maikhe River (old name of Artemovka River), col. Dworiadkin, 1973, det. Moskvicheva as *A. hypnorum*: No. 234].

Additional findings. Paratypes were not designated, initially identified as *A. hypnorum* and then re-identified as *A. moskvichevae* by Ya. Starobogatov: puddle at the road Khabarovsk-Vladivostok, 8 km from Khabarovsk (No. 176); Primorye Territory – Suputinsky Reserve (No. 122); dead channels and bogs at Suputinka River, Suputinsky Reserve (No. 226); bog at Tadushi River, Skobelevo village (No. 233); floodland of Maikhe River (No. 224); Khabarovsk Territory, swamp near settlement Konstantinovka (No. 220).

Ecology. Lives in temporary waterbodies (Starobogatov et al., 2004). Judging from labels, found together with *A. orientalis* (Nos. 220, 226, 233), *A. amurensis* (Nos. 220) and *Ph. hankensis* (No. 176).

4. *Aplexa* (*Amuraplexa*) *orientalis* Starobogatov et Prozorova in Starobogatov, Prozorova et Zatrawkin, 1989

Fig. 1 E.

History of the name application.

Starobogatov, Prozorova, Zatrawkin, 1989: 65, fig. 1 *5, 2 5* (description, copulatory organ morphology)
Prozorova, 1991a (record from Khanka Lake, in basins of rivers entering southern and northern Okhotsk Sea)
Prozorova, 1992 (mention for ephemeral and periodic waterbodies)
Prozorova, 2001 (record from shallow waterbodies on the shore of Sivuchiya Bight, Tumannaya River basin)
Taylor, 2003 (= *Amuraplexa amurensis*)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Prozorova, 2013 (mention for malacofauna of Lower Amur River basin and Primorye)

Type locality. Khabarovsk Territory [Far East], swamp near settlement Konstantinovka.

Types. Holotype (in alcohol) No. 1 (from No. 220 – *A. hypnorum*).

Additional findings. As *A. hypnorum* – small lake at the forest border at Petropavlovka village, Khabarovsk Territory (No. 207); puddle at a road at the same village (No. 208); puddle at the road to Krasnaya Rechka, Khabarovsk City (No. 210); puddle at Shkotovo railway station, Primorye Territory (No. 125); running bog at Amgun River, P. Osipenko village, Khabarovsk Territory (No. 212); shore

puddle in forest of right bank of Bomnak channel, Upper Zeya basin (No. 217); girts and bogs at Suputinka River, Suputinsky Reserve (No. 226); Utinoe Lake, Suifun (= Razdolnaya) River floodland at Nezhino settlement, Primorye Territory (No. 227); Zeya River floodland, from the river to the Gilyui River mouth (No. 230); Bolshoi In River floodland, Amur basin (No. 232); bog at Tadeushi River, Skobelevo village (No. 233); Lazo village (Vangou) (No. 236);

Ecology. Lives in temporary waterbodies (Starobogatov et al., 2004). Judging from labels, found together with *A amurensis* (Nos. 207, 210, 232), *A. moskvichevae* (Nos. 226, 233), and *Sibirinauta kultukiana* (B. Dybowski, 1913) (No. 230).

5. *Aplexa* (*Amuraplexa*) *japonica* Prozorova et Starobogatov, 1998

Fig. 1 F.

History of the name application.

Prozorova, Starobogatov, 1998: 1068, textfig.

Type locality. Moss "pillows" on the bank of brook entering the Sekigawa River, Sasagamine Mount, 1340 m a.s.l., Niigata Prefercture, Honshu, Japan.

Types. Holotype (initially in alcohol, then dried) No. 1; 3 paratypes (initially in alcohol, one of them subsequently dried) from type locality: No. 2.

Additional findings. No data.

Ecology. No exact data.

6. *Sibirenauta tuwaensis* Starobogatov et Zatrawkin in Starobogatov, Prozorova et Zatrawkin, 1989

Fig. 2 A.

History of the name application.

Starobogatov, Prozorova, Zatrawkin, 1989: 68, figs. 1 *9*, 2 *8* (description, copulatory apparatus structure)
Prozorova, Sharyi-Ool, 1999 (record from puddle at Azas Lake and Khogan-Khel Lake, Tuva)
Taylor, 2003 (as Aplexinae *incertae sedis*)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Dolgin, 2012 (mention for Upper Yenisei and Tuva)
Dolgin, 2013 (low-altitude and middle-range mountains of Sayan mountain system)

Type locality. Temporary puddle near Toorakhem settlement, Tuva ASSR [at the border of Mongolia].

Types. Holotype (in alcohol) No. 1 [from No. 248 *A. hypnorum*, det. Gundrizer]; 13 paratypes (in alcohol) from type locality: No. 2; and 2 (dry) paratypes from Eder-Hol (Mongolia): No. 3.

Additional findings. No additional data.

Ecology. Lives in temporary waterbodies (Starobogatov et al., 2004).

PHYSINAE Fitzinger, 1833

7. *Physa* (*Physa*) *streletzkajae* Starobogatov et Budnikova, 1976

Fig. 2 B.

History of the name application.

Starobogatov, Budnikova, 1976: 84, fig. 5 II (description, copulatory apparatus structure)
Bogatov, Zatrawkin, 1990: (information about types, key to identification, shell morphology, ecology and distribution)
Prozorova, 1998 (record from Kolyma and Anadyr river basins, northwestern shores of the Okhotsk Sea)
Taylor, 2003 (= *Ph. streletzkajae*)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Dolgin, 2009 (mention for Yano-Kolhym province)

Type locality. Anadyr district, Vakarevo, lake No. 6, station 5 (Chukchi Peninsula).

Types. Holotype (dry, fractured) No. 1; 1 paratype (in alcohol, dissected) from type locality: No. 2.

Additional findings. Penzhina River basin, at Slautnoe settlement (Kamchatka) (ZIN No. 4).

Ecology. Lymnophylic. No exact additional data.

8. *Physa* (*Mediterraneophysa*) *arachleica* Starobogatov et Prozorova in Starobogatov, Prozorova et Zatrawkin, 1989

Fig. 2 C.

History of the name application.

Starobogatov, Prozorova, Zatrawkin, 1989: 72, fig. 3 *4,* 4 *4* (description, copulatory apparatus structure)
Bogatov, Zatrawkin, 1990 (information about types, key to identification, shell morphology, ecology, record from Kolyma River delta)
Prozorova, Sharyi-Ool, 1999 (records from Azis Lake and a backwater of Yenisei River at Kyzyl City)
Klishko, 2003 (shell picture from Arakhlei lake)
Taylor, 2003 (= *Ph. arachleica*)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Dolgin, 2009 (mention for Lena River province)
Prozorova et al., 2009 (mention for Ivano-Arakhlei lakes)
Dolgin 2012 (record from Tuva)
Dolgin, 2013 (foothills and low-altitude mountains of Sayan mountain system)

Type locality. Arakhlei Lake [Transbaikalia, SE Siberia].

Types. Holotype (in alcohol, currently dried): No. 1; 12 paratypes (in alcohol, 1 dissected, the other with nearly completely destroyed shell) from type locality: No. 2.

Additional findings. No additional data; the record from waterbodies of Tuva is probably erroneous, according to Prozorova et al. (2009).

Ecology. Lives in the zone of water vegetation (Klishko, 2003).

9. *Physa* (*Ussuriphysa*) *hankensis* Starobogatov et Prozorova in Starobogatov, Prozorova et Zatrawkin, 1989

Fig. 2 D.

History of the name application.

Starobogatov, Prozorova, Zatrawkin, 1989: 72, figs. 3 *5,* 4 *5,6*
Bogatov, Zatrawkin,1990 (information about types, key to identification, shell morphology, ecology, records from middle and lower Amur River)
Prozorova, 1991a (egg mass morphology)
Prozorova, 1991b (1992) (record from Khanka Lake, in basins of rivers entering southern and northern Okhotsk Sea)
Prozorova, 2001 (record from Lotos Lake)
Taylor, 2003 (= *Ph. hankensis*)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Zasypkina, 2008 (records from Tynda and Tygra rivers)
Prozorova, 2013 (mention for malacofauna of Lower Amur River basin and Primorje)

Type locality. Khabarovsk, swamp near Kaktokovskoye Lake [Far East].

Types. Holotype No. 1 [derived from No. 399 of *Ph. fontinalis*]. No paratypes.

Additional findings. Lake Khanka (Starobogatov et al., 1989).

Ecology. Prefers clear lakes with well developed submerged water vegetation (Prozorova, 2001). Found together with *Ph. khabarovskiensis* in Khanka Lake and with *A. moskvichevae* [puddle on the road from Khabarovsk to Vladivostok, 8 km from Khabarovsk (No. 176)].

10. *Physa* (*Ussuriphysa*) *jarochnovitschae* Starobogatov et Zatrawkin in Starobogatov, Prozorova et Zatrawkin, 1989

Fig. 2 E.

History of the name application.

Starobogatov, Prozorova, Zatrawkin, 1989: 73, fig. 3 *7,* 4 *7* (description, difference from *Ph. hankensis* in copulatory apparatus structure)
Bogatov, Zatrawkin, 1990 (information about types, key to identification, shell morphology, ecology and distribution)
Taylor, 2003 (= *Ph. hankensis*)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Prozorova, 2013 (mention for malacofauna of lower Amur River basin and Primorye)

Type locality Delta of the Kolyma River (NE Siberia).

Types. Holotype (in alcohol, presently dried): No. 1 and alcohol-preserved paratypes from type locality: No. 2.

Additional findings. No exact data.

Ecology. Lives in stagnant waterbodies (Starobogatov et al., 2004).

11. *Physa* (*Ussuriphysa*) *khabarovskiensis* Starobogatov et Zatrawkin in Starobogatov, Prozorova et Zatrawkin, 1989

Fig. 2 F.

History of the name application.

Starobogatov et al., 1989: 73, fig. 3 *6* (shell description)
Bogatov, Zatrawkin, 1990 (information about types, key to identification, shell morphology, ecology and distribution)
Taylor, 2003 (= *Ph. hankensis*)
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Prozorova, 2013 (mention for malacofauna of Lower Amur River basin and Primorye)

Type locality. Khabarovsk, swamp near Kaktokovskoye Lake (Far East).

Types. Holotype (in alcohol): No. 1 [from No. 399 of *Physa fontinalis*]. No paratypes.

Additional findings. No data.

Ecology. Lives in shallow permanent waterbodies (Starobogatov et al., 2004). Found together with *Ph. hankensis* (Starobogatov et al., 1989).

12. *Physa* (*Beringophysa*) *chukchensis* Starobogatov et Budnikova, 1976

Fig. 2 G.

History of the name application.

Starobogatov, Budnikova, 1976: 84. fig. 5 I (description as *Ph.* (*Beringophysa*) *ampullacea chukchensis*, copulatory apparatus structure)
Starobogatov et al., 1989 (mention as *Ph. chukchensis*)
Bogatov, Zatrawkin, 1990 (information about types, key to identification, shell morphology, ecology and distribution)
Prozorova, 1998 (mention for Chaun Lowland, Amguema River basin, north-western Alaska)
Taylor, 2003[(= *Beringophysa jennessii* (Dall, 1919)].
Starobogatov et al., 2004 (key to identification, distribution)
Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)
Dolgin, 2009 (mention for Yano-Kolhym province)

Type locality. Ust-Chaun [Chukchi Peninsula].

Types. Holotype (in alcohol) No. 1; paratypes (in alcohol): 8 spms from type locality (No. 2); 14 spms from lake of Amguema River near 105 km of track Egvekinot-Iultin (Ckukchi Peninsula).

Additional findings. Lakes in middle reaches of the Kurupkan River (Chukchi Peninsula, near Providence Bay) (ZIN).

Ecology. Lives in thermokarst waterbodies (Starobogatov et al., 2004).

Remarks. Five paratypes (No. 3) from type locality (originally identified as such by Budnikova and Starobogatov) were reidentified by Starobogatov as a mixture of two species: *Ph. chukchensis* and *Ph. jennessii.* Paratypes No. 5 (lake near airport of Anadyr, Chukchi Peninsula) were also reidentified,

and served as a source for separation of holotypes of *Ph. kuvaevi* and *Ph. tei*.

13. *Physa* (*Beringophysa*) *kuvaevi* Starobogatov et Prozorova in Starobogatov, Prozorova et Zatrawkin, 1989

Fig. 3 A.

History of the name application.

Starobogatov et al., 1989: 74, fig. 3 *8,* 4 *8* (description, copulatory apparatus structure)

Bogatov, Zatrawkin, 1990 (information about types, key to identification, shell morphology, ecology and distribution)

Prozorova, 1998 (mention for Lower Anadyr River basin)

Taylor, 2003 [= *Beringiophysa jennessii* (Dall, 1919)].

Starobogatov et al., 2004 (key to identification, distribution)

Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Type locality. Lake near airport Anadyr (Chukchi Peninsula).

Type series. Three specimens from type locality: No. 1.

Additional findings. No data.

Ecology. Lives in thermokarst waterbodies (Starobogatov et al., 2004).

Remark. There is a problem with the holotype. The lot No. 1 contains 3 spms identified by Starobogatov as *Ph. kuvaevi* and separated from 6 paratypes of *Ph. ampullacea chukchensis* (No. 5). [The other 2 spms were reidentified by Starobogatov as *Ph*. sp., and one was selected as the holotype of *Ph. tei*.] No other specimens identified as *Ph. kuvaevi* were found in the collection, even though the authors mentioned 5 shells collected in the type locality. Since the label data correspond to the type locality, the 3 spms with authors' identification should be regarded as the type series. Of these 3 spms of *Ph. kuvaevi*, two are represented by fragmented shells, thus the holotype cannot be reliably identified as such based on the shell dimensions. Here we illustrate the only more or less intact shell (H = 4.2 mm vs 10.5 mm in the holotype) which should be treated as paratype.

14. *Physa* (*Beringophysa*) *tei* Starobogatov et Prozorova in Starobogatov, Prozorova et Zatrawkin, 1989

Fig. 3 B, C.

History of the name application.

Starobogatov et al., 1989: 74–75, fig. 3 *9* (description)

Bogatov, Zatrawkin, 1990 (information about types, key to identification, shell morphology, ecology and distribution)

Prozorova, 1998 (mention for North-eastern Asia, Lower Anadyr River basin; Canada)

Taylor, 2003 [<*Beringiophysa jennessii* (Dall, 1919)].

Starobogatov et al., 2004 (key to identification, distribution)

Kantor, Sysoev, 2005; Kantor et al., 2010 (information about types, type locality and general distribution)

Dolgin, 2009 (mention for Upper Yenisei, Lena and Yano-Kolhym provinces)

Type locality. Lake near airport Anadyr (Chukchi Peninsula).

Types. Holotype (in alcohol): No. 1 [from No. 5 of *Ph. chukchensis*, coll. Budnikova, det. Budnikova & Starobogatov].

Additional findings. Floodland lake in 15 km from the Avtotkuul river mouth, Anadyr liman: No 2.

Ecology. Lives in thermokarst waterbodies (Starobogatov et al., 2004).

Remark. We illustrate a specimen which does not belong to the type series, because the holotype is heavily damaged whereas there no paratypes. However, this specimen was identified by Starobogatov himself.

Conclusion

Taylor (2003) believes that three species (*A. aphallica*, *A. moskvichevae* and *A. orientalis*) are synonyms of *A. amurensis*, 2 species (*Ph. jarochnovitschae* and *Ph. khabarovskiensis*) are synonyms of *Ph. hankensis*, and three species (*Ph. chukchensis*, *Ph. kuvaevi* and *Ph. tei*) are synonyms of *Beringophysa jennessii*. Therefore, the number of valid species of Starobogatov and coauthors shrinks to 6. The total number of species recorded for waterbodies of Russia can be also decreased if the recently proven data within the family is taken into account: both the molecular analysis (Wethington, Lydeard, 2007) together with anatomical data, and "the growing body of experimental evidence demonstrating little reproductive isolation among many physid populations formerly considered specifically distinct" (Dillon, 2007).

Acknowledgements

The authors are very grateful to L.L. Yarokhnovich (ZIN) for her invaluable help in dealing with the gastropod collection of the Institue; to Dr. L.A. Prozorova (IBSS) for information about some specimens from the ZIN collection, and to E. Dolid (LIN) for processing some shell illustrations. The work was supported by the RFBR projects Nos 12-04-00503, 14-44-04105 and the RSF Project No. 14-50-00029. This study was also partially supported by Budget Research Project, No. VI.51.1.10 in LIN SD RAS.

References

Bogatov V.V., Zatrawkin M.N. 1990. Gastropod molluscs of fresh and brackish waters of the Far East of the USSR. A guide. Vladivostok: FED AS USSR. 169 p. [Богатов В.В., Затравкин М.Н. 1990. Брюхоногие

моллюски пресных и солоноватых вод Дальнего Востока СССР: Определитель. Владивосток: Изд-во ДВО АН СССР. 169 с.] [In Russian].

Bouchet P., Rocroi J.-P., Frýda J., Hausdorf B., Ponder W., Valdés Á., Warén A. 2005. Classification and nomenclator of gastropod families. – Malacologia, 47 (1-2): 1–397.

Burch J.B. 1982. North American freshwater snails: identification key, generic synonymy, supplemental notes, glossary, references, index. – Walkerana, 1: 1–365.

Dillon R. 2007. The classification of the Physidae. http://fwgna.blogspot.ru/2007/10/classification-of-physidae.html (October 12, 2007).

Dolgin V.N. 2009. A study of freshwater molluscs from Siberia. – Vestnik Tomskogo Gosudarstvennogo Pedagogicheskogo Universiteta, 11(89): 174–180. [Долгин В.Н. 2009. К изучению пресноводных моллюсков Сибири. – Вестник Томского государственного педагогического университета, 11(89): 174–180]. [In Russian].

Dolgin V.N. 2012. Freshwater mollusks of the Upper Yenisei basin and lakes of Tuva. – Vestnik Tomskogo Gosudarstvennogo Pedagogicheskogo Universiteta, 7(122): 129–131 [Долгин В.Н. 2012. Пресноводные моллюски бассейна Верхнего Енисея и озер Тувы. – Вестник Томского государственного педагогического университета, 7 (122): 129–131.] [In Russian]

Dolgin V.N. 2013. Freshwater molluscs of mountain the Sayan mountain system. – Vestnik Tomskogo Gosudarstvennogo Pedagogicheskogo Universiteta, 8 (136): 18–22. [Долгин В.Н. 2013. Пресноводные моллюски Саянской горной системы. – Вестник Томского государственного педагогического университета, 8 (136): 18–22.] [In Russian]

Kantor Yu.I., Sysoev A.V. 2005. Catalogue of mollusks of Russia and adjacent countries. Moscow: KMK Scientific Press, 627 p.

Kantor Yu.I., Sysoev A.V. 2006. Marine and brackish water Gastropoda of Russia and adjacent countries: an illustrated catalogue. Moscow: KMK Scientific Press, 371 p.

Kantor Yu.I., Vinarski M.V., Schileyko A.A. Sysoev A.V. 2010. Catalogue of the continental mollusks of Russia and adjacent territories. Version 2.3.1, www.ruthenica.com

Prozorova L.A. 1991a. Composition and biogeographic characteristics of the freshwater malacofauna of Primorye. – Zoologicheskii Zhurnal, 70 (9): 54–63. [Прозорова Л.А. 1991а. Состав и биогеографическая характеристика пресноводных брюхоногих моллюсков Приморского края. – Зоологический журнал, 70 (9): 54–63]. [In Russian].

Prozorova L.A. 1991b (1992). Egg mass morphology of the freshwater gastropods. – Starobogatov Ya.I. (ed). Reproduction and egg mass of the molluscs (Trudy Zoologicheskogo Instituta, 228), Leningrad: AS USSR. P. 74–110. [Прозорова Л.А. 1991б (1992). Морфология кладок брюхоногих моллюсков Приморского края. – Старобогатов Я.И. (ред.). Размножение и кладки яиц моллюсков. (Труды Зоологического института АН СССР, 228). Ленинград: Академия наук СССР. С. 74–110]. [In Russian].

Prozorova L.A. 1992. Molluscs of small water bodies of South Far East Russia. – Zoologicheskii Zhurnal, 71 (9): 41–45. [Прозорова Л.А. 1992. Моллюски малых водоемов юга Дальнего Востока России. – Зоологический журнал, 71 (9): 41–45.] [In Russian].

Prozorova L.A., 1998. Annotated list of Beringian freshwater molluscs. – Bulletin of the Russian Far East Malacological Society, 2: 12–28.

Prozorova L.A. 2001. Species composition and distribution of freshwater malacofauna in the basin of lower reaches of the Tumen (Tumangang) River. – The state of environment and biota of the southwestern part of Peter the Great Bay and the Tuman River mouth. Vladivostok: Dalnauka, 2: 52–68. [Прозорова Л.А. 2001. Видовой состав и распределение пресноводной малакофауны в бассейне нижнего течения реки Туманной. – Экологическое состояние и биота юго-западной части залива Петра Великого и устья реки Туманной. Владивосток: Дальнаука, 2: 52–68] [In Russian].

Prozorova L.A. 2003. Taxonomy and species composition of the genus *Anisus* Studer (Gastropoda, Planorbidae) in the fauna of Russia. – Bulletin of the Russian Far East Malacological Society, 7: 99–115. [Прозорова Л.А. 2003. Таксономическая структура и видовой состав рода *Anisus* Studer (Gastropoda, Planorbidae) в фауне России. – Бюллетень Дальневосточного малакологического общества, 7: 99–115.] [In Russian].

Prozorova L.A. 2005. Molluscs. Gastropoda (freshwater). – Red Book of Primorskii Kray. (Animals). Vladivostok: Administration of Primorskii Kray. P. 40–42. [Прозорова Л.А. 2005. Моллюски. Брюхоногие (пресноводные). – Красная книга Приморского края. (Животные). Владивосток: Администрация Приморского края. С. 40–42.] [In Russian]. http://redbookpk.ru/2.animals/2.invertebrata/4.mollusca/2.gastropoda/14.culmenella%20buldowskii/culmenella%20buldowskii.html

Prozorova L.A. 2013. Freshwater mollusks of Lower Amur River basin and Primorye. Species diversity, keys to genera and families, rear species. Saarbrucken, Germany: Palmarium Academic Publishing. 59 c. [Прозорова Л.А. 2013. Пресноводные моллюски бассейна Нижнего Амура и Приморья. Видовое разнообразие, ключи родов и семейств, редкие виды. Saarbrucken, Germany: Palmarium Academic Publishing. 59 с.] [In Russian].

Prozorova L.A., Starobogatov Ya.I. 1998. A new species of genus *Aplexa* (Pulmonata, Physidae) from Japan. – Zoologicheskii Zhurnal, 77 (9): 1068–1070. [Прозорова Л.А., Старобогатов Я.И. 1998. Новый вид рода *Aplexa* (Pulmonata, Physidae) из Японии. – Зоологический журнал, 77 (9): 1068–1070.] [In Russian].

Prozorova L.A., Sharyi-Ool M.O., 1999. Aquatic pulmonate mollusks (Gastropoda Pulmonata) of Tuva. – The Bulletin of the Russian Far East Malacological Society, 3: 11–25. [Прозорова Л.А., Засыпкина М.О., 1999. Водные легочные моллюски (Gastropoda Pulmonata) Тувы. – Бюллетень Дальневосточного малакологического общества, 3: 11–25] [In Russian].

Prozorova L.A, Sitnikova T., Zasypkina M.O, Matafonov P.V, Dulmaa A. 2009. Freshwater snails (Gastropoda) of the Baikal Lake basin and the surrounding areas. –

Timoshkin O.A. (ed). An annotated list of the fauna of Lake Baikal and its watershed. (Basins and channels in the South of East Siberia and North Mongolia, book I, chapter 16). Novosibirsk: Nauka, P. 170–188. [Прозорова Л.А., Ситникова Т.Я., Засыпкина М.О., Матафонов П.В., Дулмаа А. 2009. Пресноводные брюхоногие моллюски (Gastropoda) бассейна оз. Байкал и прилегающих территорий. – Тимошкин О.А. (ред). Аннотированный список фауны озера Байкал и его водосборного бассейна (Водоемы и водотоки юга Восточной Сибири и Северной Монголии, книга 1, глава 16). Новосибирск: Наука, С. 170–188.] [In Russian].

Starobogatov Ya.I. 1967. On the systematization of freshwater pulmonate molluscs. – Starobogatov Ya.I. (ed). Molluscs and their role in biocoenoses and fauna formation. (Trudy Zoologicheskogo Instituta, 42). Leningrad: Nauka, P. 280–304. [Старобогатов Я.И. 1967. К построению системы пресноводных легочных моллюсков. – Старобогатов Я.И. (ред.). Моллюски и их роль в биоценозах и формировании фаун. (Труды ЗИН, 42). Ленинград: Наука, С. 280–304. [In Russian].

Starobogatov Ya.I. 1970. Molluscan fauna and zoogeographic zonation of continental freshwater bodies of the world. Leningrad: Nauka, 372 p. [Старобогатов Я.И. 1970. Фауна моллюсков и зоогеографическое районирование континентальных водоемов земного шара. Ленинград: Наука, 372 с.] [In Russian].

Starobogatov Ya.I., Budnikova L.L. 1976. On the fauna of freshwater gastropod molluscs of the USSR Far North-East. – Levanidov V.Ya. (ed). Freshwater fauna of the Chukchi Peninsula. Trudy Biologo-Pochvennogo Instituta, novaja serija, 36(139): 72–88. [Старобогатов Я.И., Будникова Л.Л. 1976. О фауне пресноводных брюхоногих моллюсков крайнего северо-востока. – Леванидов В.Я. (ред). Пресноводная фауна Чукотского полуострова. Труды Биолого-почвенного института, новая серия, 36(139): 72–88.] [In Russian].

StarobogatovYa.I., Prozorova L.A., Zatrawkin M.N. 1989. Composition of the family Physidae (Gastropoda, Pulmonata, Lymnaeformes) from Siberia and Far East of the USSR (with notes on European physids). – Byulleten Moskovskogo obschestva ispytatelei prirody, otdel biologicheskii, 94 (1): 62–76. [Старобогатов Я.И., Прозорова Л.А., Затравкин М.Н. 1989. Состав семейства Physidae (Gastropoda, Pulmonata, Lymnaeformes) Сибири и дальнего Востока СССР (с замечаниями об европейских физидах). – Бюллетень МОИП, отдел биологический, 94 (1): 62–76.] [In Russian].

Starobogatov Ya.I., Prozorova L.A., Bogatov V.V., Saenko E.M. 2004. Molluscs. – Tsalolikhin S.Ya. (ed). Key to freshwater invertebrates of Russia and adjacent territories. (Molluscs, polychaetes, nemerteans, 6). Sankt-Petersburg: Nauka: P. 9–491. [Старобогатов Я.И., Прозорова Л.А., Богатов В.В., Саенко Е.М. 2004. Моллюски. – Цалолихин С.Я. (ред). Определитель пресноводных беспозвоночных России и сопредельных территорий. (Моллюски, полихеты, немертины, 6). Санкт-Петербург: Наука, С. 9–491.] [In Russian].

Taylor D.W. 2003. Introduction to Physidae (Gastropoda: Hygrophila). – Revista de Biologia tropical, International Journal of Tropical Biology and Conservation (San José, Costa Rica), 51(1): 1–300.

Thiele J. 1931–1935. Handbuch der Systematischen Weichtierkunde. Part 1. Jena: Gustav Fisher, P. 1–376.

Wethington, A.R., Lydeard C. 2007. A molecular phylogeny of Physidae (Gastropoda: Basommatophora) based on mitochondrial DNA sequences. – Journal of Molluscan Studies, 73: 241–257.

Zasypkina M.O. 2008. Fauna of the water molluscs of Upper Amur River basin. – Freshwater ecosystems of the Amur River basin. Vladivostok: Dalnauka, P. 144–150. [Засыпкина М.О. 2008. Фауна водных моллюсков бассейна Верхнего Амура. – Пресноводные экосистемы бассейна реки Амур. Владивосток: Дальнаука, С. 144-150.] [In Russian].

Zilch A.1959–1960. 1959–1960. Gastropoda. Part 2. Euthyneura. – Schindewolf. A. (ed). Handbuch der Palaeozoologie. Berlin: Borntraeger, 6: 1–4.

Научное издание

Пресноводные брюхоногие моллюски, описанные Я.И. Старобогатовым
— Зоологические исследования. 2014. № 16. 62 с., 19 цв. вкл.
Москва: Товарищество научных изданий КМК.
при участии ИП Михайлова К.Г.

Верстка: К.Г. Михайлов

Для заявок:
123100, Москва, а/я 16, Издательство КМК
электронный адрес mikhailov2000@gmail.com
http://avtor-kmk.ru

Подписано в печать 05.12.2014. Формат 60×90/8. Объём 11,5 п.л. Бумага офсетн. и мелов. Тираж 100 экз.
Отпечатано в ООО «Галлея-Принт», Москва, 5-я Кабельная ул., 5б

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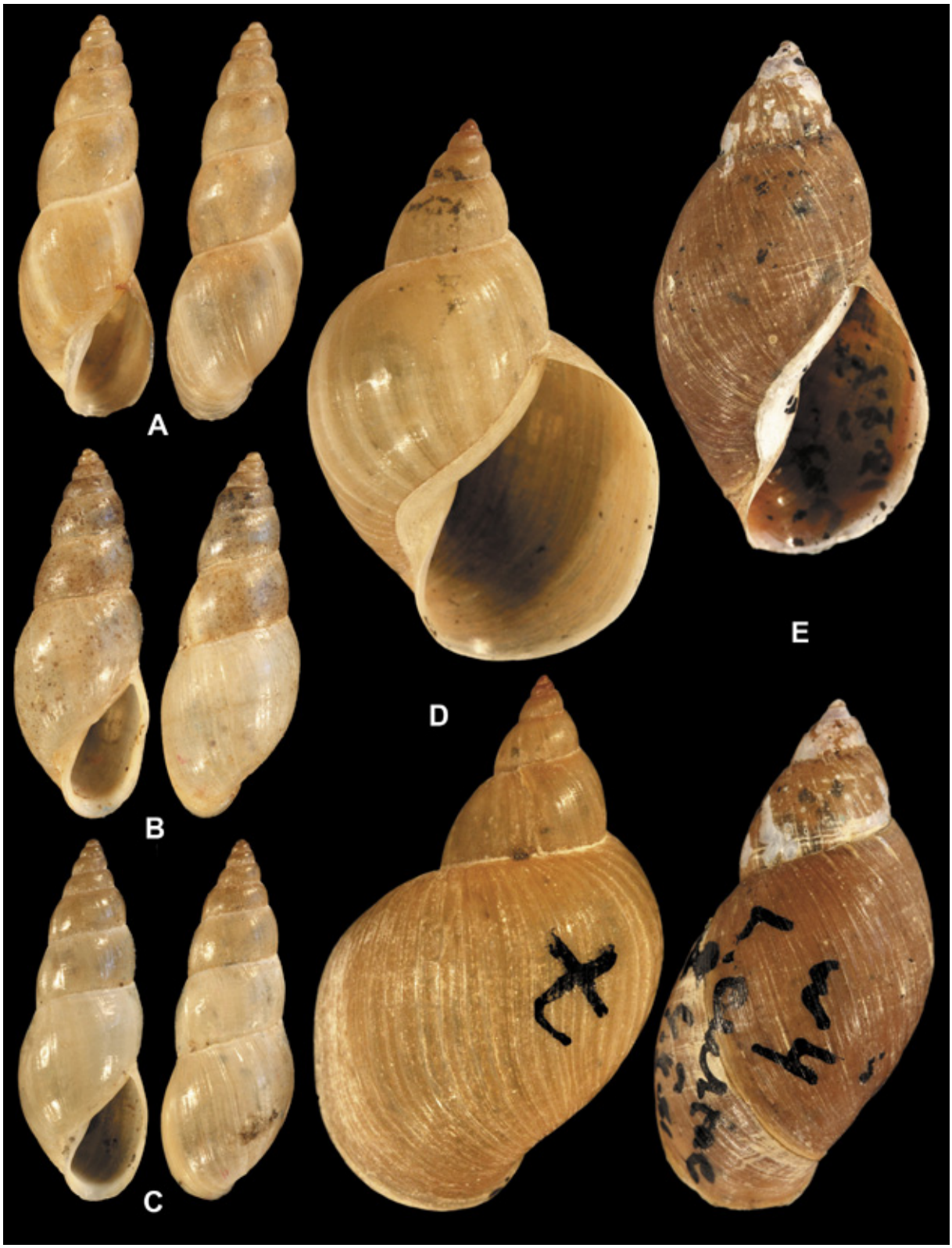

Fig. 1. A – *Aenigmomphiscola europaea*, holotype, H = 12.7 m; B – *A. kazakhstanica*, H = 11.15 mm; C – *A. uvalievae*, holotype, H = 9.9 mm; D – *Lymnaea araratensis*, holotype, H = 30.2 mm; E – *L. curtacorvus*, holotype, H = 26.9 mm.

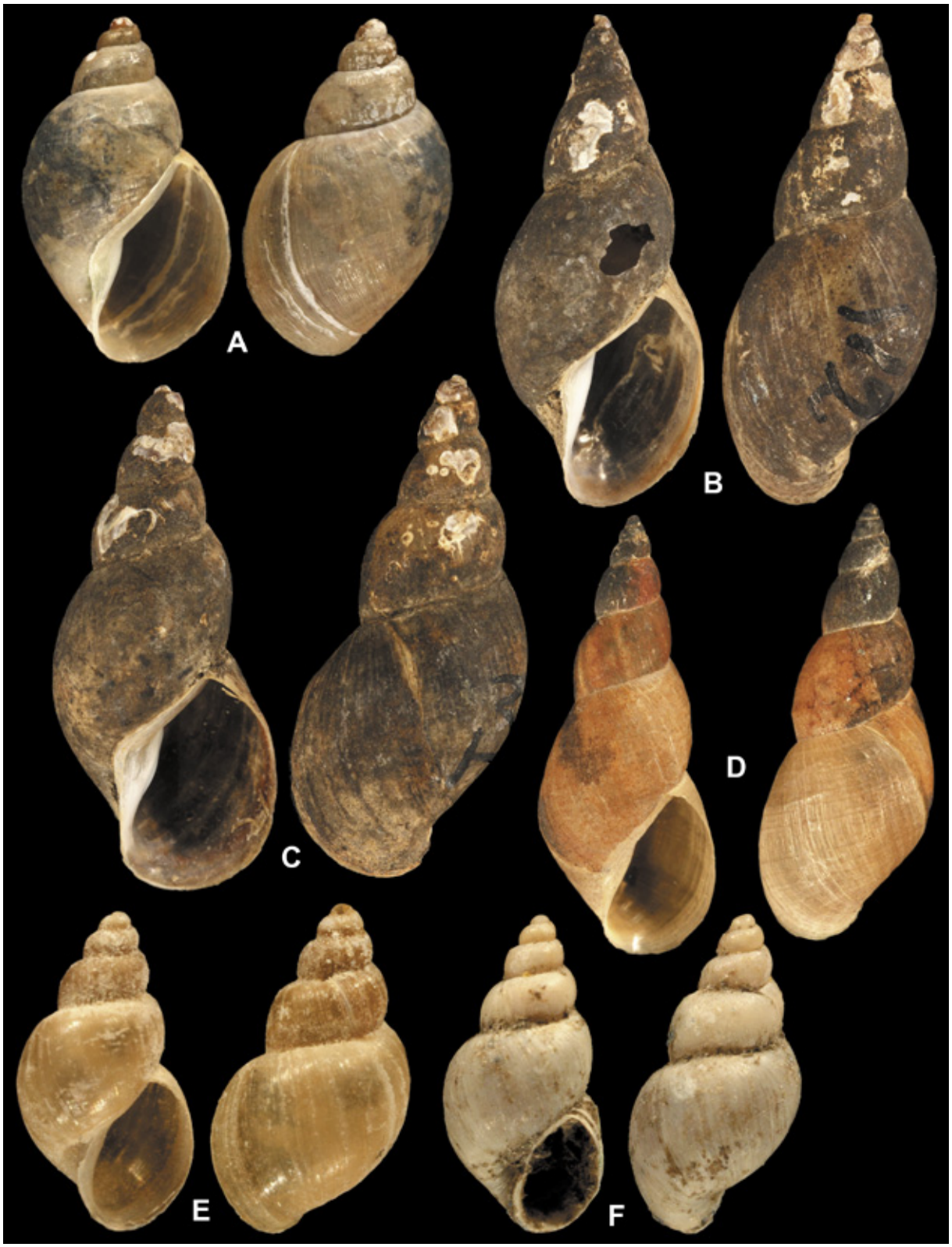

Fig. 2. A – *Lymnaea kurenkovi*, holotype, H = 10.4 mm; B – *L. azabatschensis*, holotype, H = 26.2 mm; C – *L. falsipalustris*, holotype, H = 27.1 mm; D – *L. archangelica*, holotype, H = 20.5 mm; E – *L. almaatina*, holotype, H = 5.6 mm; F – *L. tengriana*, holotype, H = 5.5 mm.

Fig. 3. A – *Lymnaea potanini*, holotype, H = 5.1 mm; B – *L. lenaensis*, holotype, H = 7.9 mm; C – *L. tumrokensis*, holotype, H = 8.4 mm; D – *L. carelica*, holotype, H = 16.6 mm.

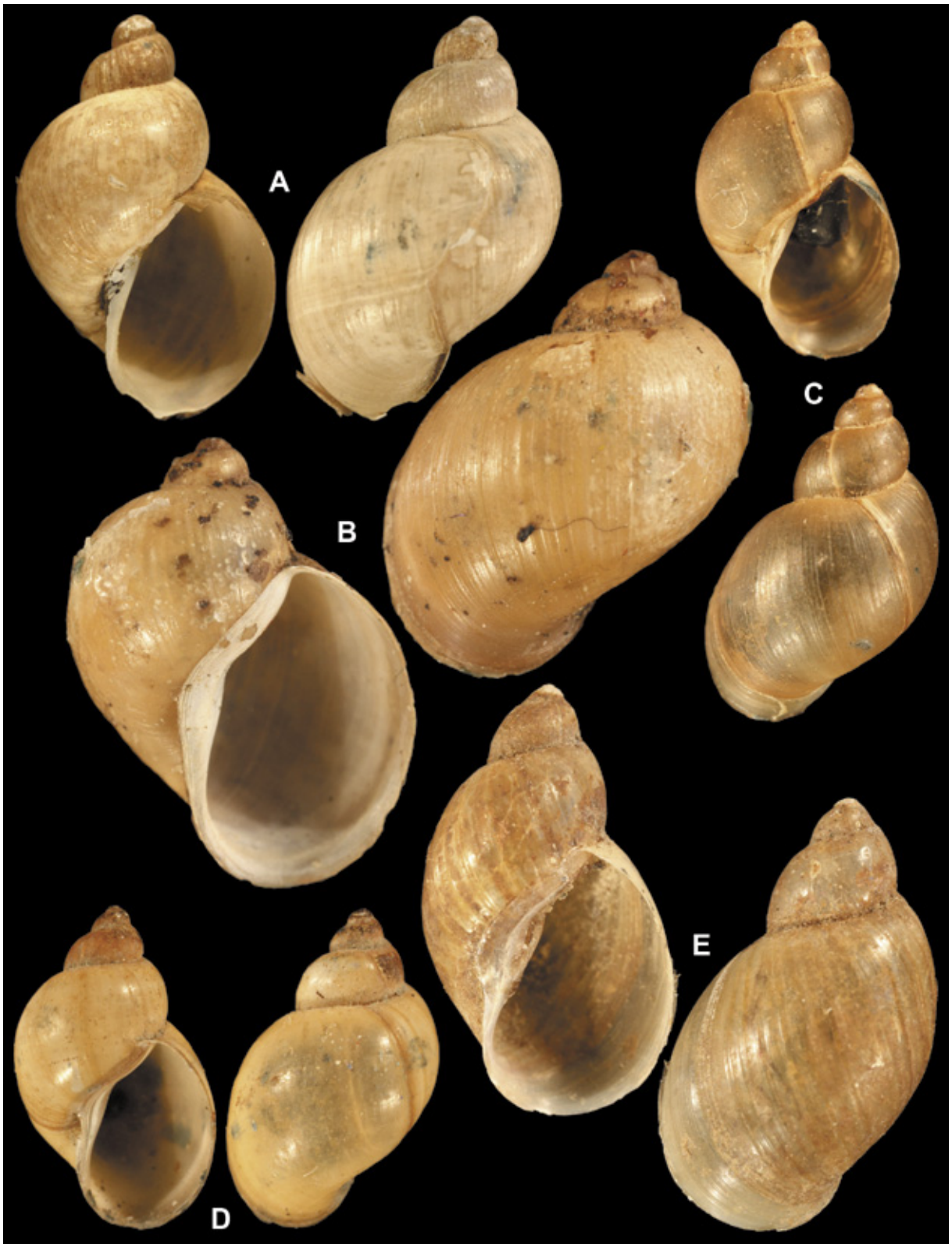

Fig. 4. A – *Lymnaea teletzkiana*, holotype, H = 13.2 mm; B – *L. dipkunensis*, holotype, H = 15.5 mm; C – *L. juribeica*, holotype, H = 9.2 mm; D – *L. jacutica*, holotype, H = 8.2 mm; E – *L. kafanovi*, holotype, H = 13.7 mm.

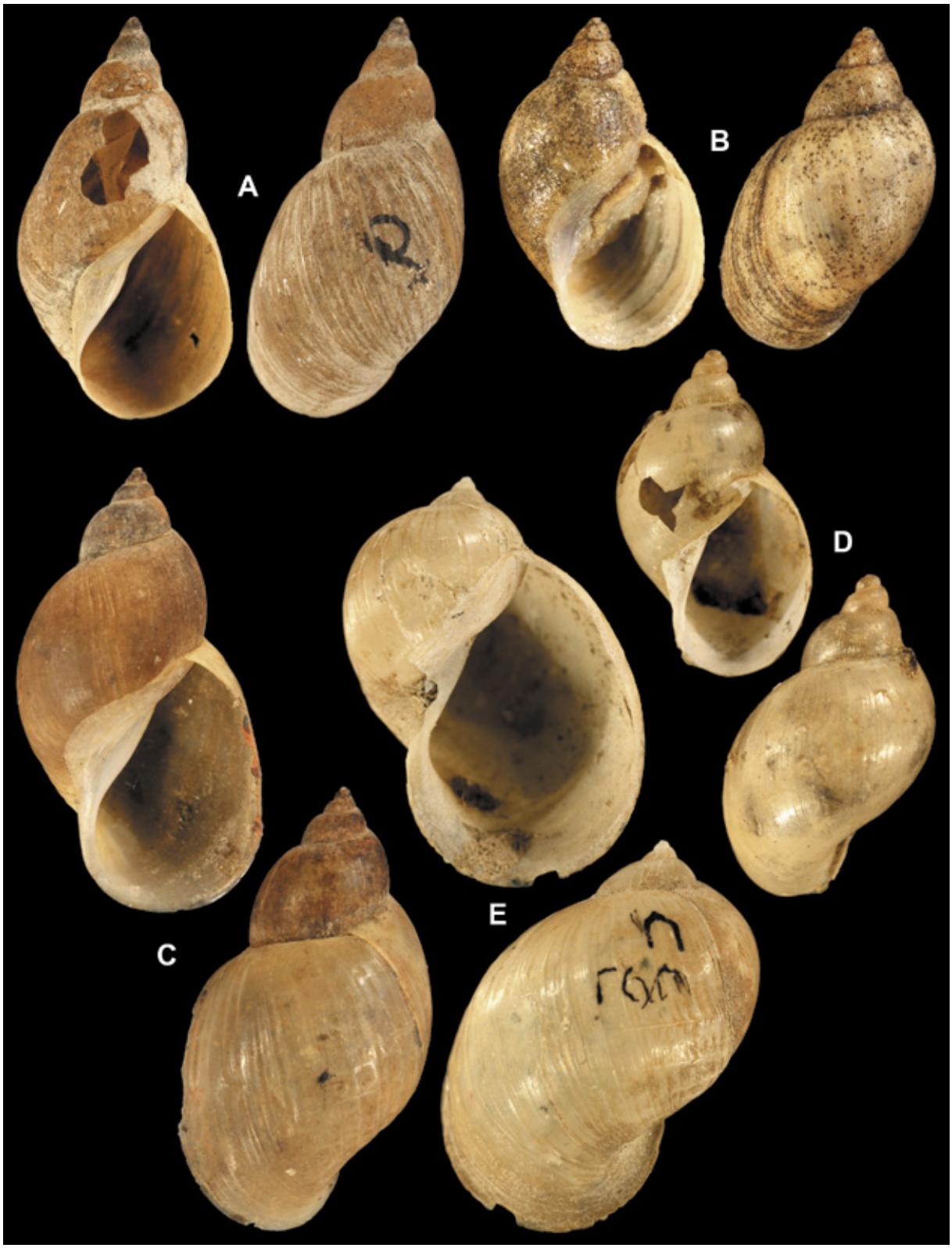

Fig. 5. A – *Lymnaea gundrizeri*, holotype, H = 19.2 mm; B – *L. ulaganica*, holotype, H = 11.4 mm; C – *L. igarkae*, holotype, H = 24.8 mm; D – *L. obensis*, holotype, H = 10.6 mm; E – *L. noogonica*, H = 21.8 mm.

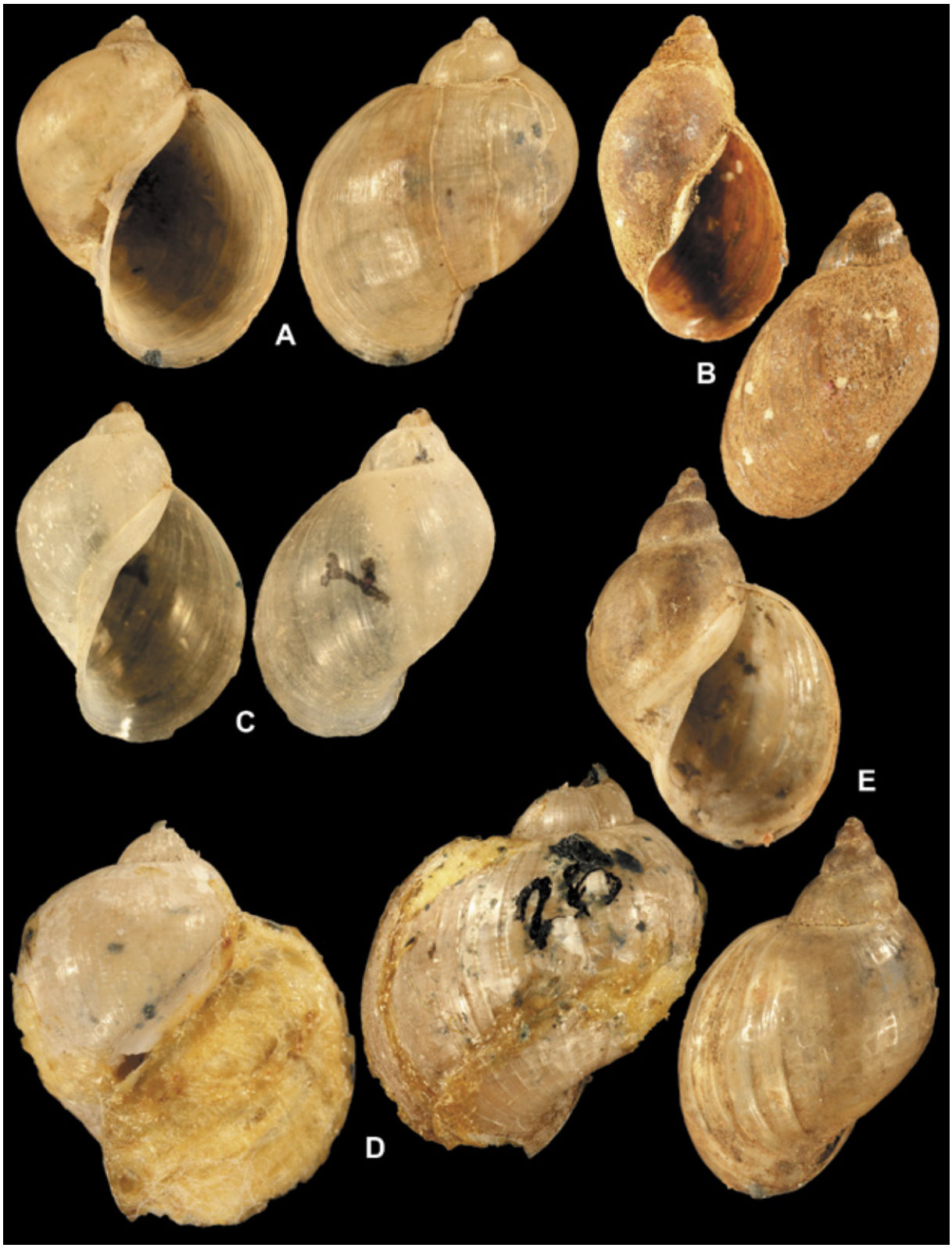

Fig. 6. A – *Lymnaea novikovi*, holotype, H = 14.3 mm; B – *L. napasica*, holotype, H = 12.4 mm; C – *L. tsalolikhini*, holotype, H = 13.6 mm; D – *L. mongolitumida*, holotype, H = 18.9 mm; E – *L. kurejkae*, H = 15.4 mm.

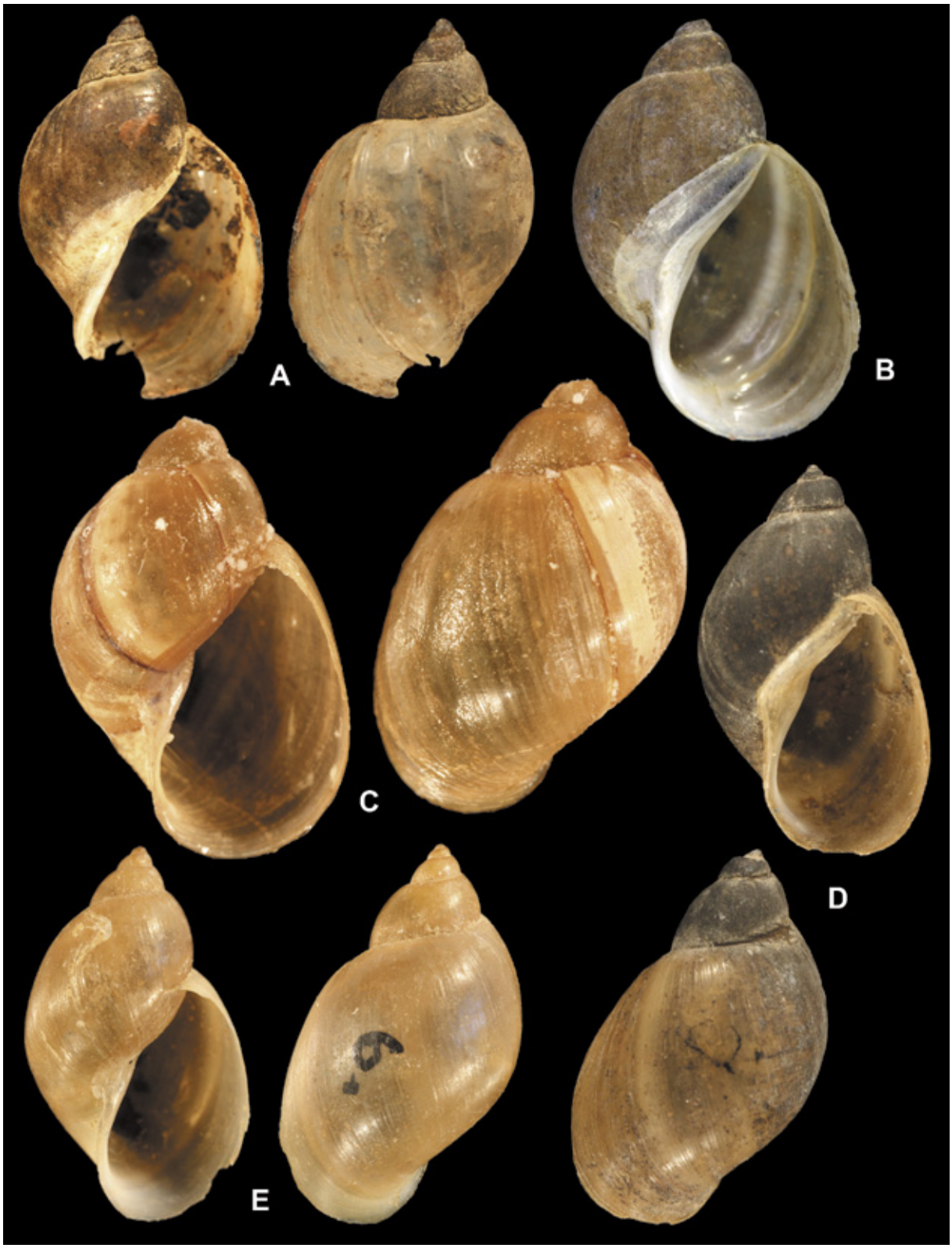

Fig. 7. A – *Lymnaea dolgini*, holotype, H = 13.8 mm; B – *L. dolgini*, paratype No. 2, H = 17.9 mm; C – *L. manomaensis*, holotype, H = 18.3 mm; D – *L. dvoriadkini*, holotype, H = 13.5 mm; E – *L. sihotealinica*, H = 13.4 mm.

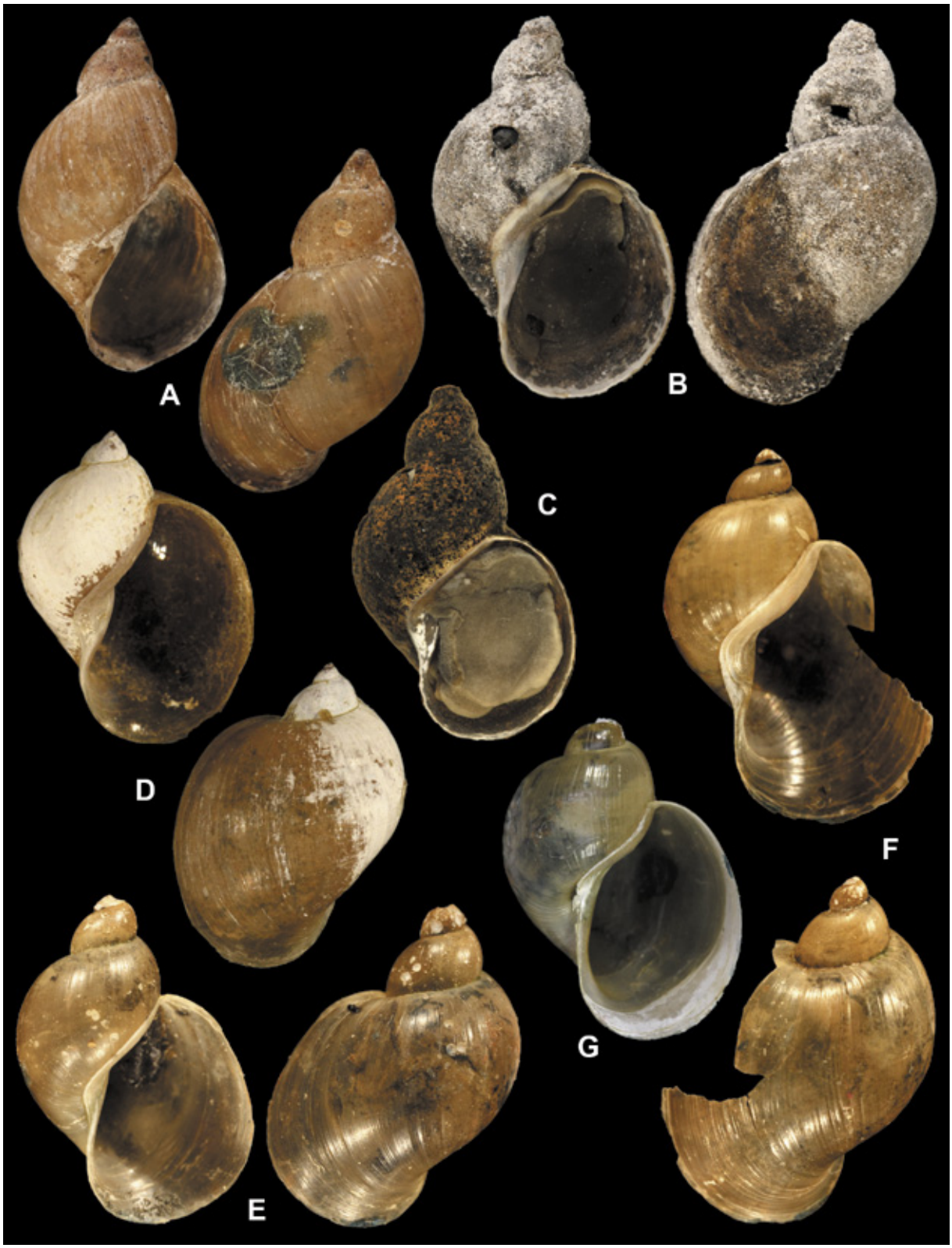

Fig. 8. A – *Lymnaea amurensis*, holotype, H = 14.1 mm; B – *L. arachleica*, holotype, H = 17.8 mm; C – *L. arachleica*, paratype, H = 17.0 mm; D – *L. alticola*, holotype, H = 14.6 mm; E – *L. thermokamtschatica*, H = 13.2 mm; F – *L. hadutkae*, holotype, H = 15.9 mm; G – *L. hadutkae*, paratype, H = 13.5 mm.

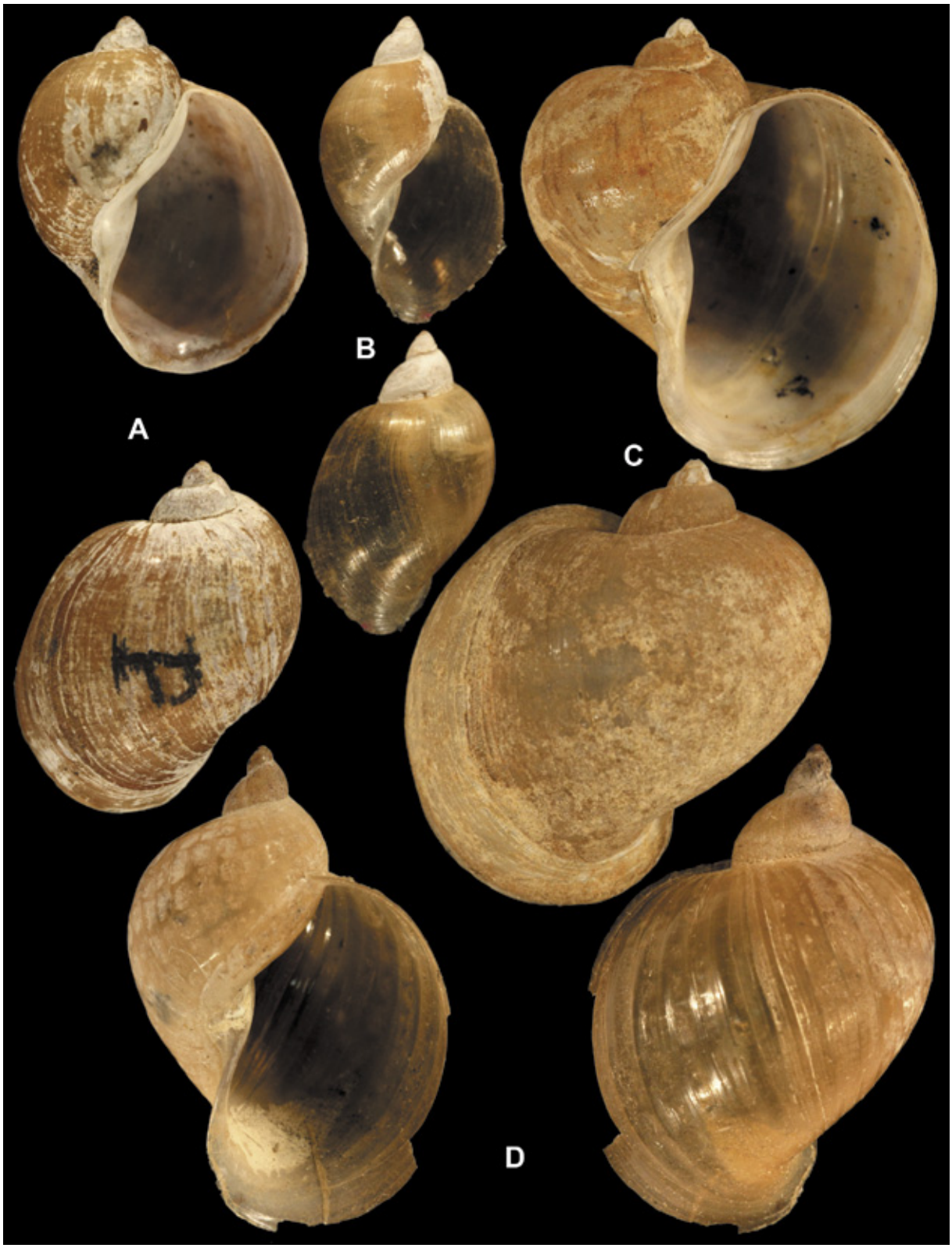

Fig. 9. A – *Lymnaea hakusyensis*, holotype, H = 13.6 mm; B – *L. thermobaicalica*, holotype, H = 8.2 mm; C – *L. narzykulovi*, holotype, H = 22.1 mm; D – *L. schubinae*, holotype, H = 23.8 mm.

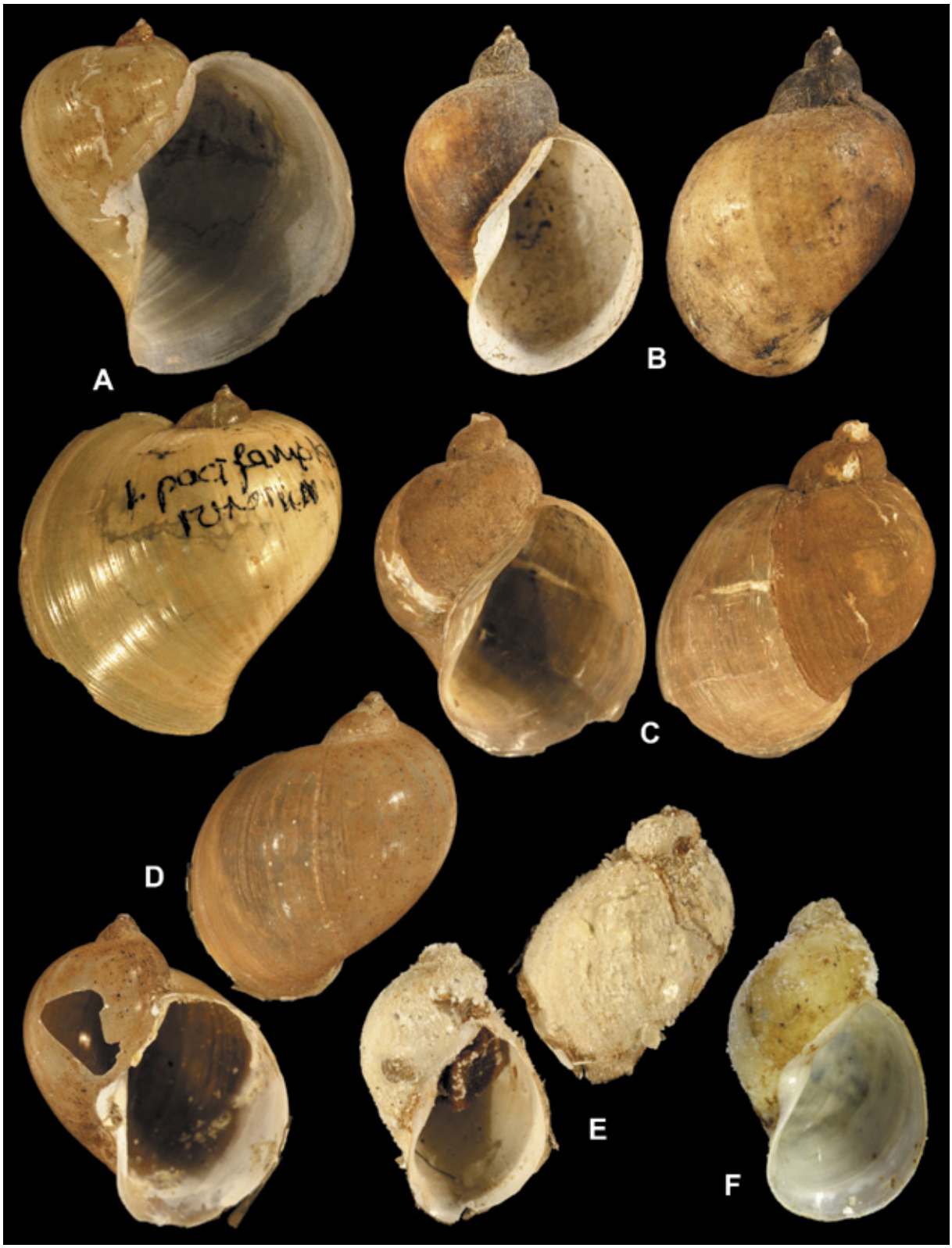

Fig. 10. A – *Lymnaea pacifampla*, holotype, H = 29.9 mm; B – *L. ussuriensis*, holotype, H = 19.2 mm; C – *L. schelechovi*, holotype, H = 24.6 mm; D – *L. chereshnevi*, holotype, H = 16.0 mm; E – *L. zarenkovi*, holotype, H = 7.4 mm; F – *L. zarenkovi*, paratype No. 2, H = 9.2 mm.

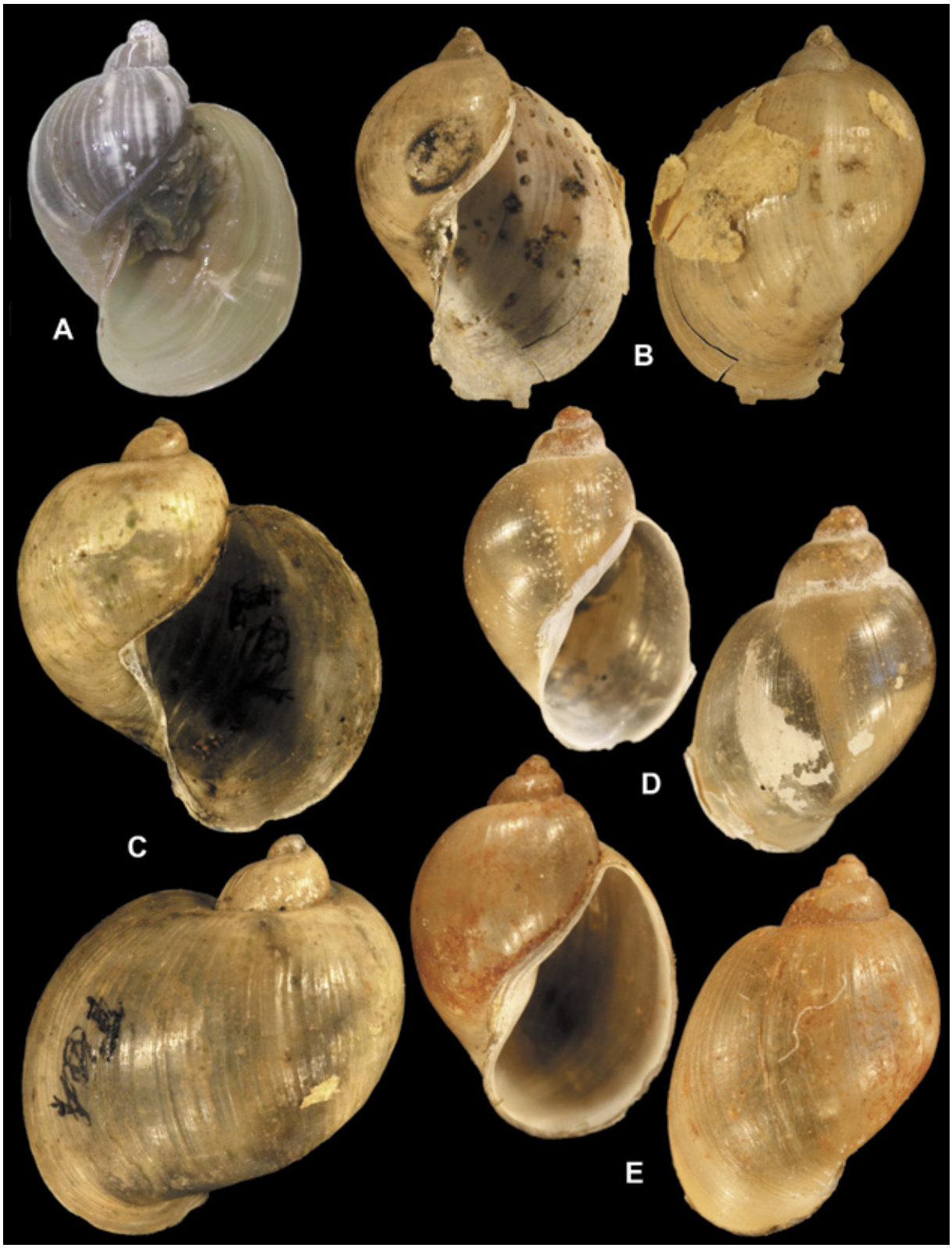

Fig. 11. A – *Lymnaea kunashirica*, H = 18.7 mm; B – *L. kurilensis*, holotype, H = 19.9 mm; C – *L. iturupica*, holotype, H = 21.6 mm; D – *L. magadanensis*, holotype, H = 8.9 mm; E – *L. streletzkajae*, holotype, H = 10.1 mm.

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Fig. 1. A – *Culmenella buldowskii*, holotype, H = 4.0 mm; B – *C. buldowskii*, paratype No. 2, H = 4.3 mm; C – *C. lindholmi*, holotype, H = 4.7 mm; D – *C. lindholmi*, paratype No. 9, H = 2.8 mm; E – *Armiger eurasiaticus*, paratype No. 2, Estonia, eastward of Võrtsjärv Lake, D = 2.6 mm; F – *A. eurasiaticus*, holotype, D = 1.9 mm; G – *A. khoresmicus*, holotype, D = 1.7 mm; H – *Bathyomphalus agardhi*, syntype, "Borgholm, Sueciae", D = 4.5 mm; I – *Choanomphalus kozhovi*, holotype, D = 2.1 mm.

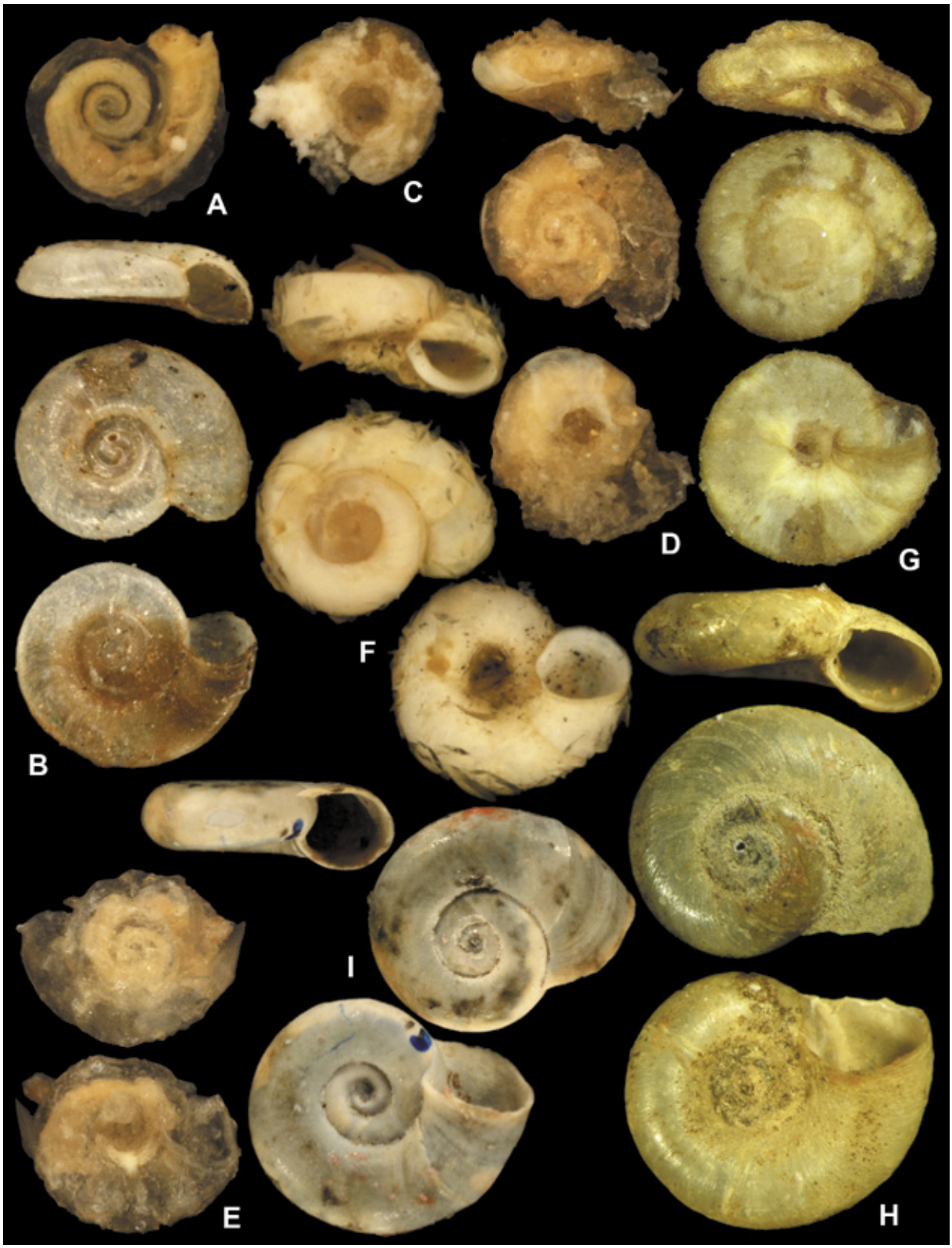

Fig. 2. A – *Choanomphalus planorbiformis*, holotype, D = ca. 1.8 mm; B – *Ch. planorbiformis*, paratype No. 2, D = 2.2 mm; C – *Ch. bathybius bathybius*, holotype, D = ca. 1.5 mm; D – *Ch. bathybius meridianus*, holotype, D = ca. 1.8 mm; E – *Ch. huzhirensis*, holotype, D = ca. 2.0 mm; F – *Ch. huzhirensis*, paratype No. 2, D = 1.8 mm; G – *Ch. lindholmi*, holotype, D = 2.3 mm (from original description); H – *Ch. ochoticus*, holotype, D = 5.7 mm; I – *Gyraulus terekholicus*, holotype, D = 4.6 mm.

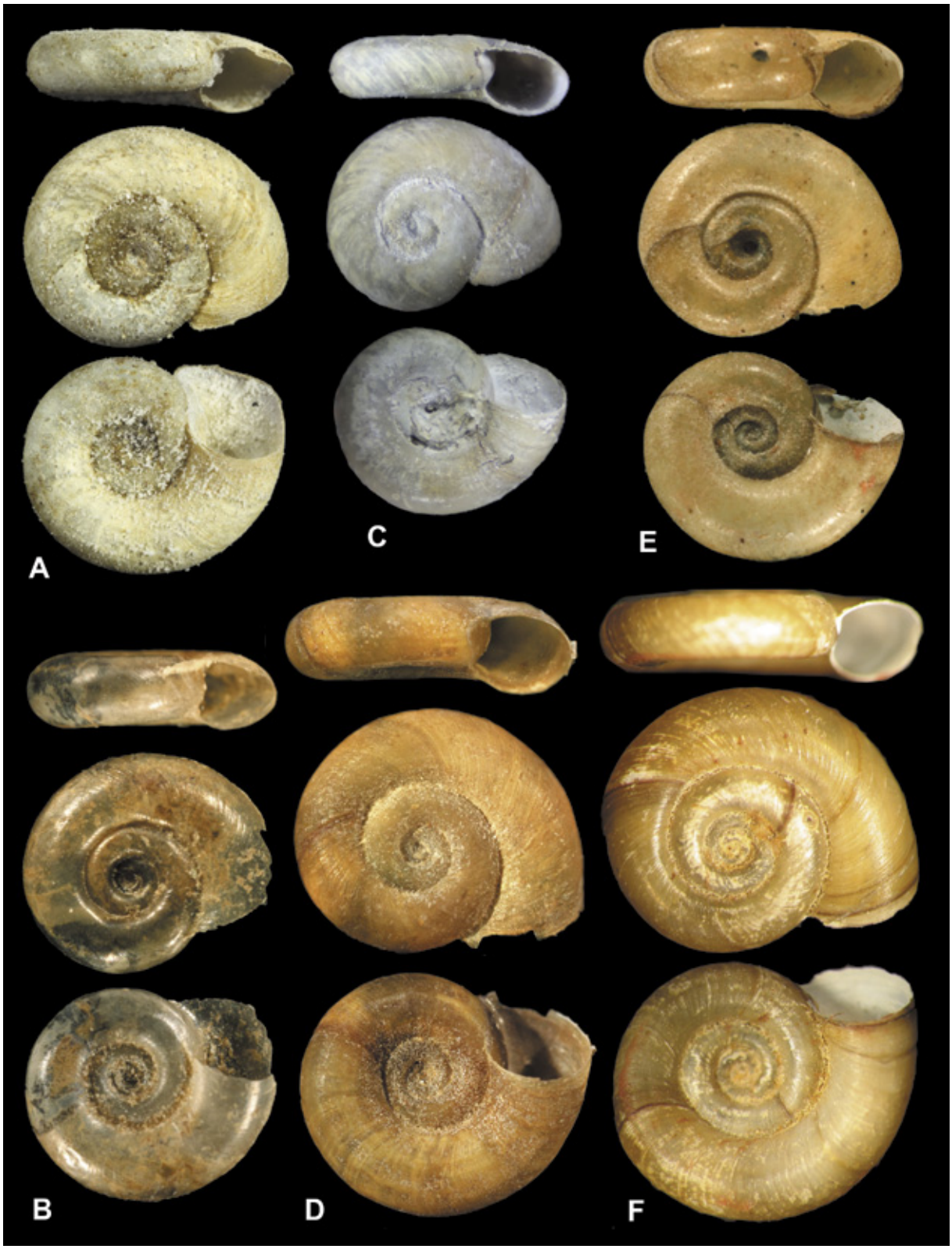

Fig. 3. A – *Gyraulus amuricus*, holotype, D = 6.1 mm; B – *G. buriaticus*, holotype, D = 5.6 mm; C – *G. cherehnevi*, holotype, D = 5.2 mm; D – *G. iturupensis*, paratype, D = 6.3 mm, South Kurile Islands, Urup Island, Tokotan Lake, 45°51′ N, 149°47′ E, IBSS No. 107-95; E – *G. khabarovskiensis*, holotype, D = 6.0 mm; F – *G. kussakini*, holotype, D = 7.3 mm.

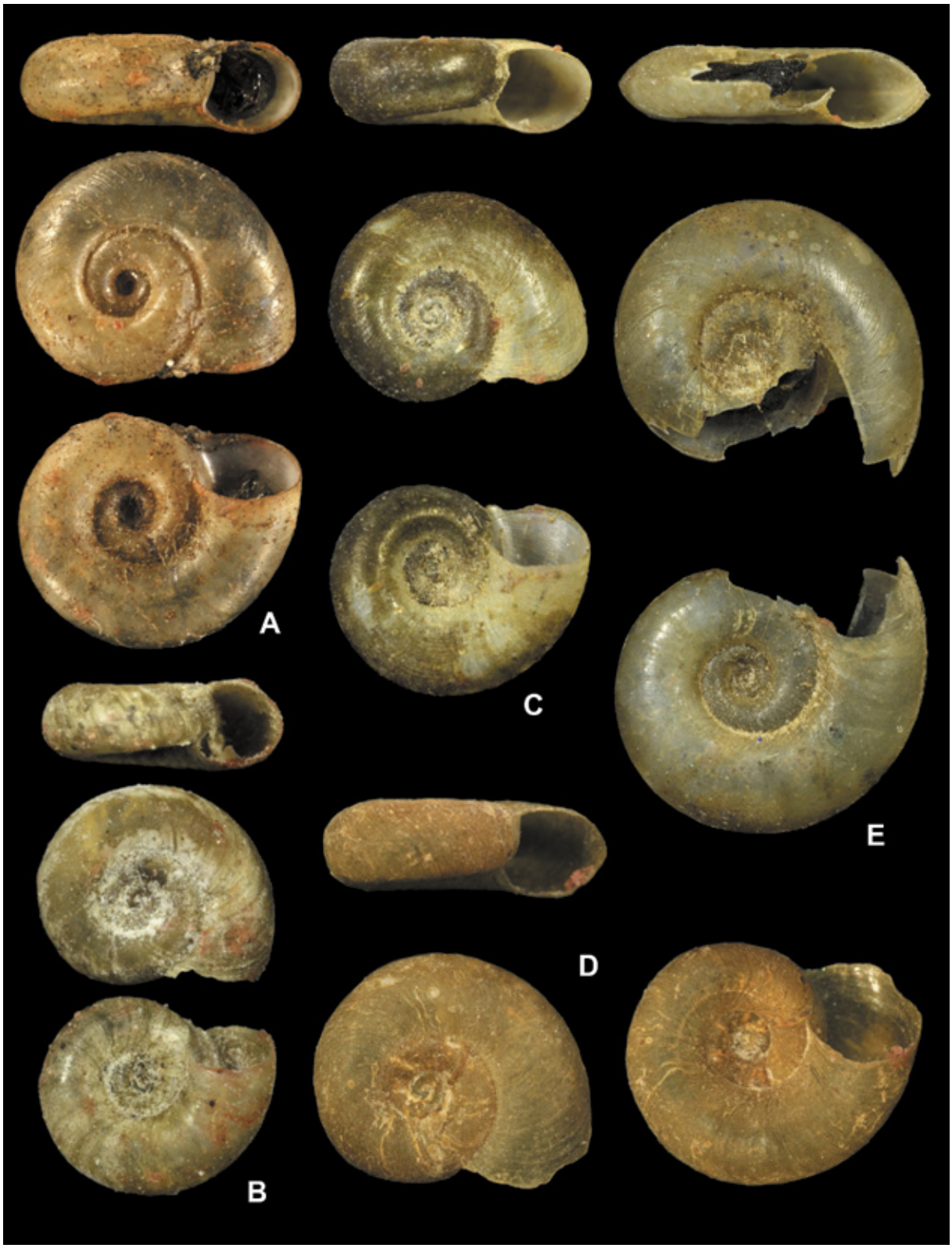

Fig. 4. A – *Gyraulus sretenskiensis*, holotype, D = 5.6 mm; B – *G. thermochukchensis*, holotype, D = 3.1 mm; C – *G. tugurensis*, holotype, D = 4.3 mm; D – *G. zelenensis*, holotype, D = 4.1 mm; E – *G. centrifugops*, holotype, D = 6.3 mm.

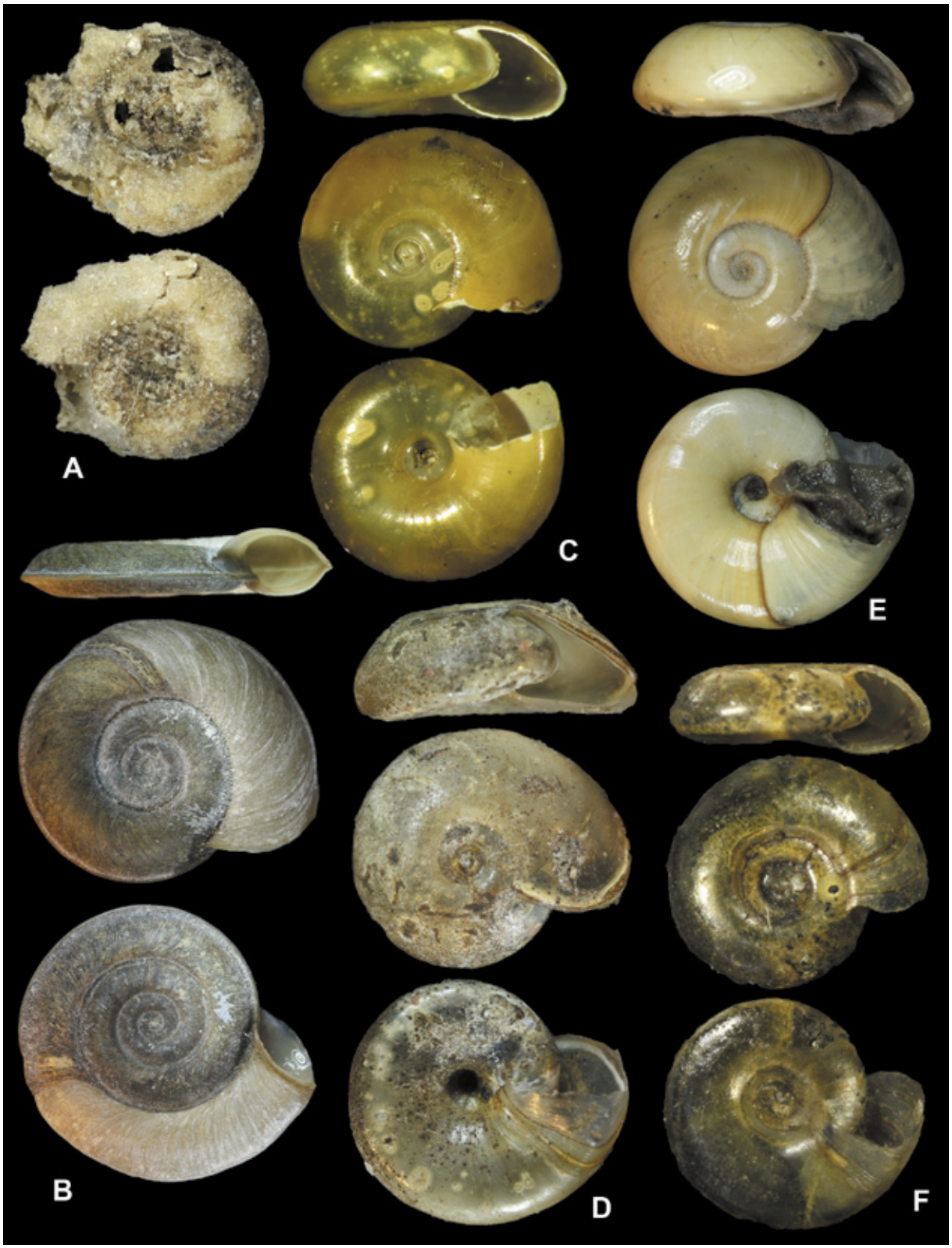

Fig. 5. A – *Gyraulus substroemi*, holotype, D = ca. 3.7 mm; B – *Planorbis kubanicus*, holotype, D = 17.5 mm; C – *Helicorbis kozhovi*, holotype, D = 4.5 mm; D – *H. shilkaensis*, holotype, D = 5.2 mm; E – *H. suifunensis*, holotype, D = 6.2 mm; F – *Kolhymorbis maacki*, holotype, D = 3.0 mm.

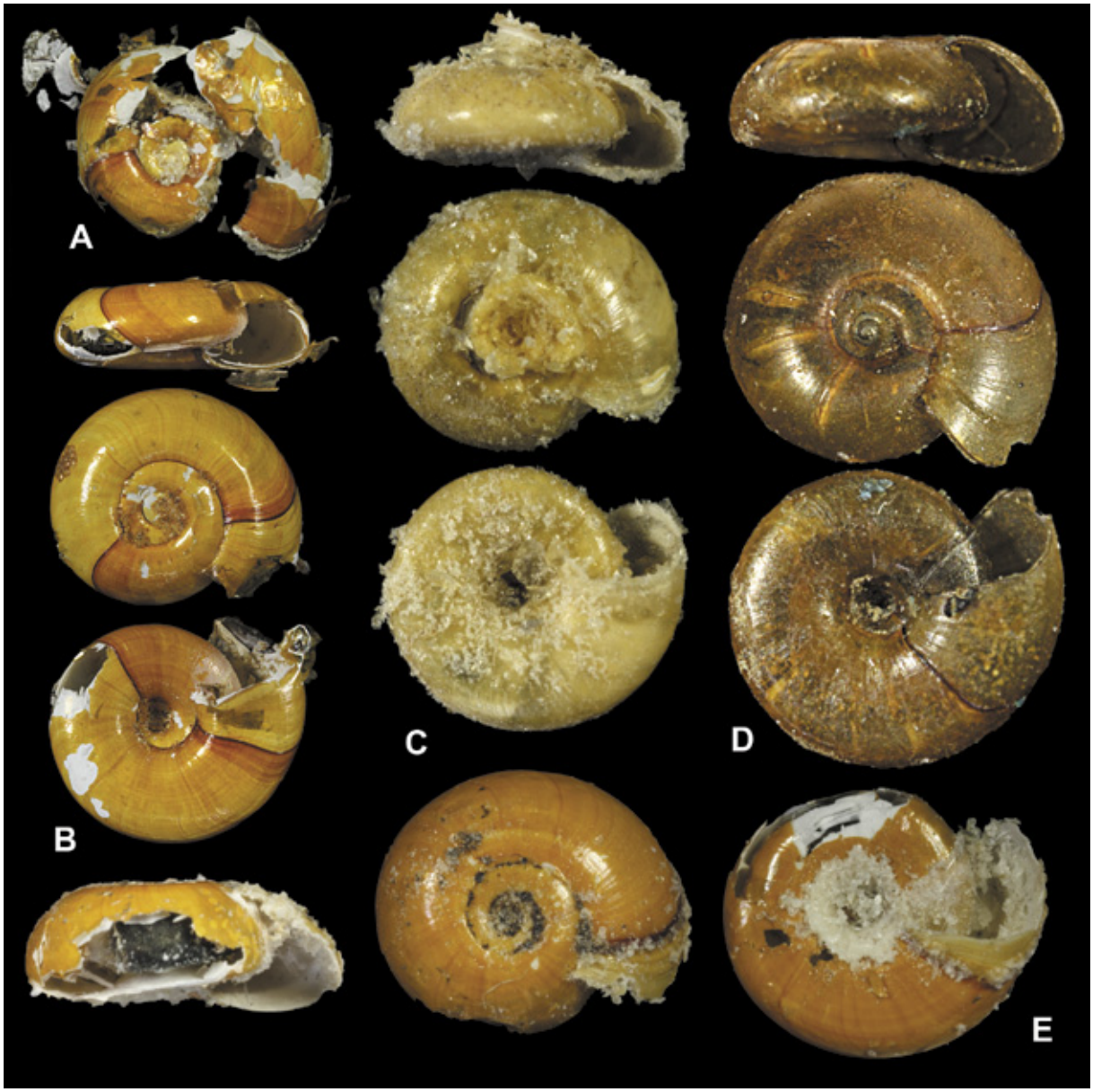

Fig. 6. A – *Kolhymorbis shadini*, holotype, D = 2.5 mm (from original publication); B – *K. shadini*, paratype No. 2, D = 3.1 mm; C – *K. almaatina*, holotype, D = 4.4 mm; D – *Polypylis likharevi*, holotype, D = 3.2 mm; E – *P. sibirica*, holotype, D = 4.7 mm.

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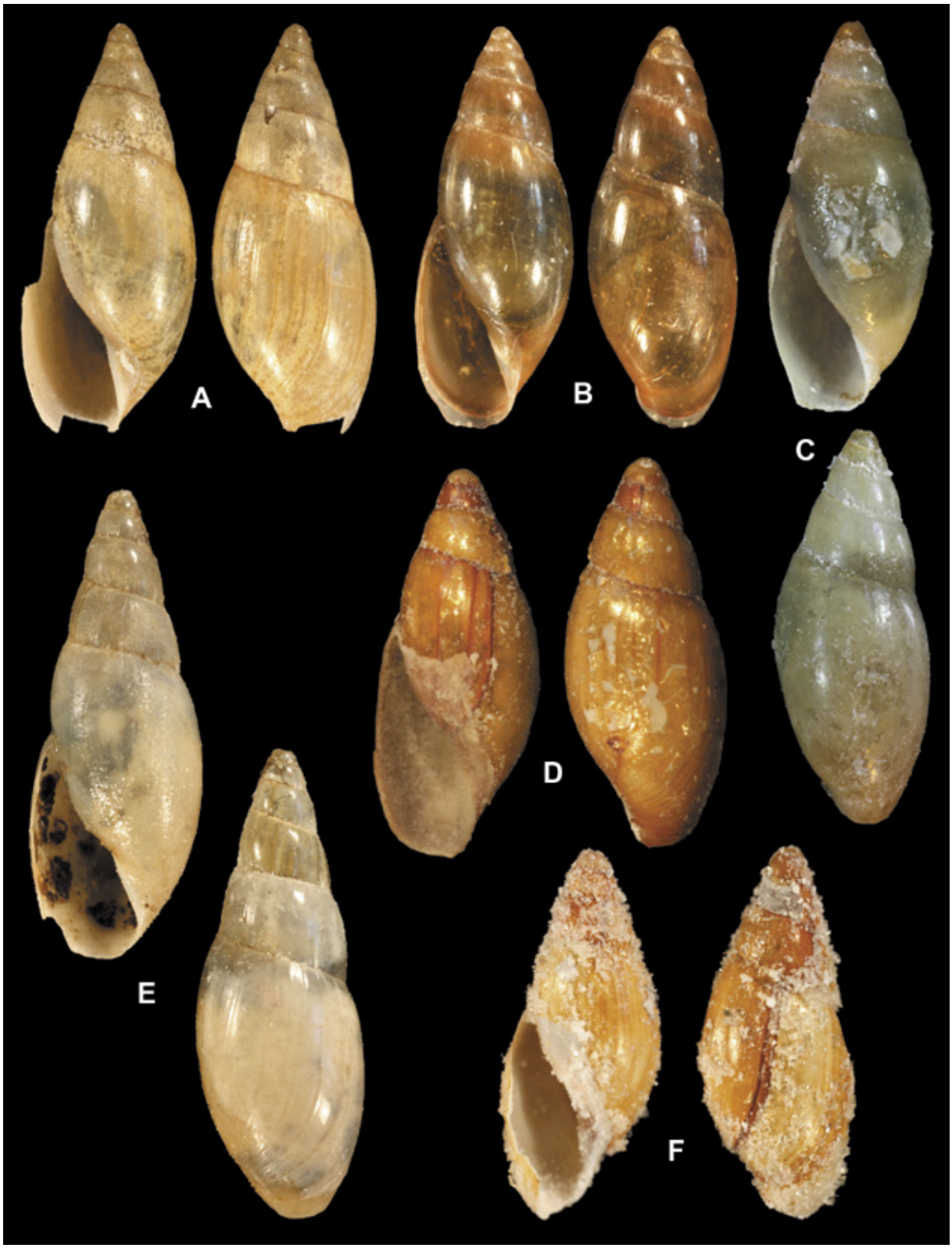

Fig. 1. A – *Aplexa amurensis*, holotype, H = 10.8 mm; B – *Aplexa aphallica*, holotype, H = 9.7 mm; C – *Aplexa moskvichevae*, paratype, H = 9.6 mm; D – *Aplexa moskvichevae*, holotype, H = 6.8 mm; E – *Aplexa orientalis*, holotype, H = 14.2 mm; F – *Aplexa japonica*, holotype, H = 6.0 mm.

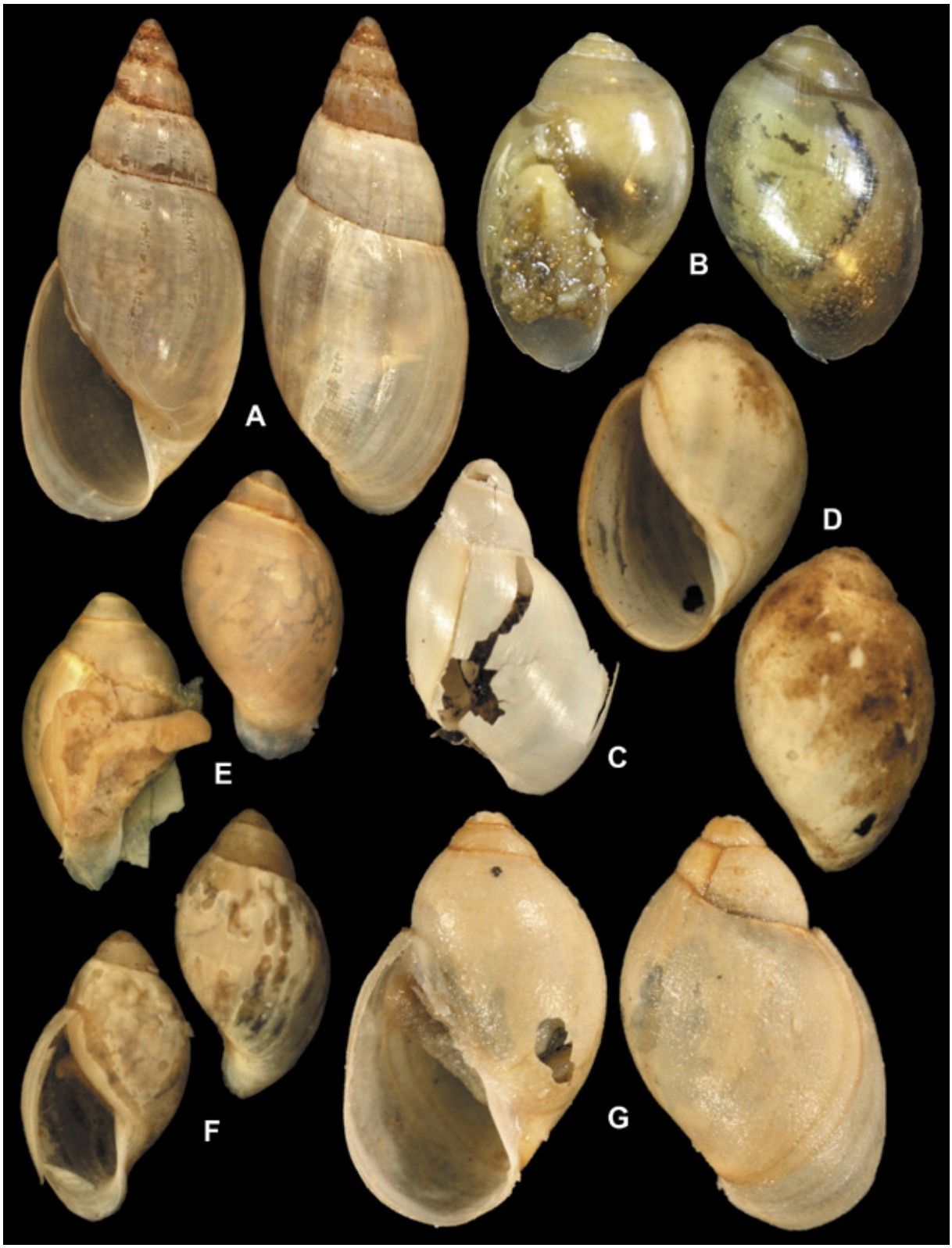

Fig. 2. A – *Siberinauta tuvaensis*, holotype, H = 14.9 mm B – *Physa streletzkajae* (No. 4, det. Starobogatov), H = 6.6 mm; C – *Physa arachleica*, holotype, H = 5.4 mm; D – *Physa hankensis*, holotype, H = 5.7 mm; E – *Physa jarochnovitschae*, holotype, H = 5.1 mm; F – *Physa khabarovskiensis*, holotype, H = 5.2 mm; G – *Physa chukchensis*, holotype, H = 8.4 mm.

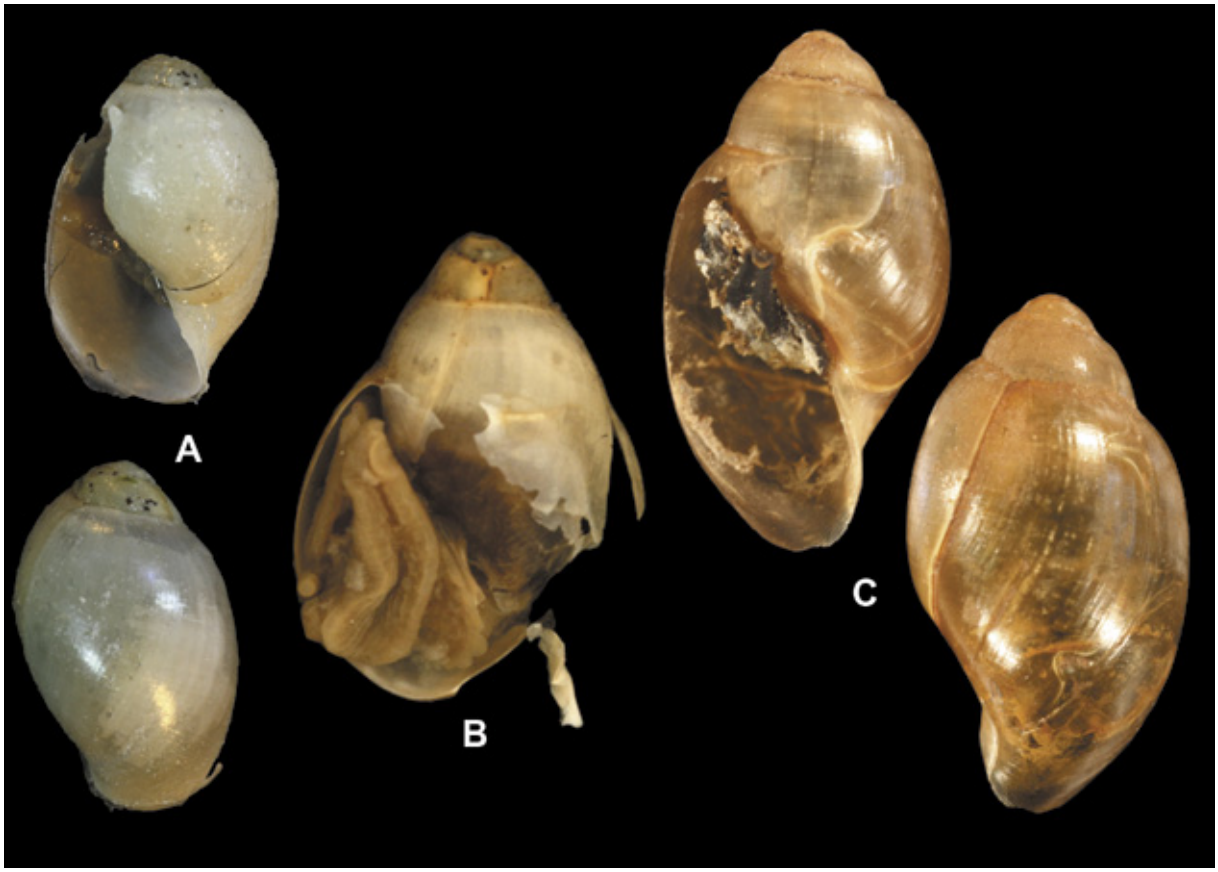

Fig. 3. A – *Physa kuvaevi,* paratype, H = 4.2 mm; B – *Physa tei*, holotype; C – *Physa tei* (No. 2, det. Starobogatov), H = 7.9 mm.