

Species names of J.-R. Bourguignat and their application in current taxonomy of fresh-water gastropods of the Russian fauna

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Twenty two species of gastropods described by French malacologist J.-R. Bourguignat and recognized as valid in the fauna of Russia and the former USSR are illustrated with the type specimens and recently collected material. Each species is provided with data on (1) syntypes, or, at their absence, specimens identified by Bourguignat; (2) a brief history of the name application as mentioned in the Russian literature; (3) published records of the species distribution; (4) taxonomic remarks. It appears that many species of the Russian fauna were erroneously identified due to the lack of access to the type material.

Key words: J.-R. Bourguignat, Gastropoda, fresh-water species, type material, taxonomy, Russian fauna.

Видовые названия Ж.-Р. Бурги́нья и их использование в современной систематике пресноводных брюхоногих моллюсков фауны России

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Для двадцати двух видов брюхоногих моллюсков, описанных французским малакологом Ж.-Р. Бурги́нья и признанных валидными в фауне России и бывшего СССР, приведены иллюстрации типовых и собранных впоследствии с указанной территории экземпляров. Для каждого вида приведены данные по (1) синтипам или, при их отсутствии, экземплярам, идентифицированным самим Бурги́нья; (2) краткой истории использования видовых названий в русской литературе; (3) опубликованным находкам и географическому распространению; (4) таксономические замечания. Показано, что многие виды фауны России были ошибочно определены вследствие отсутствия доступа к типовым материалам.

Ключевые слова: Ж.-Р. Бурги́нья, брюхоногие моллюски, пресноводные воды, типовой материал, фауна России.

Jules-René Bourguignat was at any rate an eminent European malacologist; even though his taxonomic heritage has been controversially appraised by subsequent scholars (see a review in: [Dance, 1970]). Hundreds and hundreds of continental species described by Bourguignat have been synonymized and then retrieved from synonymy and vice versa, although there seems to be a trend of recognition of species names as valid, as concerning fresh-water gastropod species described within the framework of the «nouvelle école» (that is, by Bourguignat and his disciples) [Bouchet, 2002].

Bourguignat mostly dealt with faunas quite distant from Russia. Naturally, the comprehensive review of Russian fresh-water fauna of the 1950th [Shadin, 1952] lists only two Bourguignat's species as valid: *Choanomphalus amauronius* Bourguignat, 1860 (simply because it has been described from Lake Baikal) and *Hydrobia longiscata* (Bourguignat, 1856) (with a query for Central Asian localities). However, with the onset of a new era of Russian fresh-water malacology associated with Ya.I. Starobogatov and his school, the species names of Bourguignat became being progressively applied to species of the Russian fauna, having resulted in recognition of more than 30 of Bourguignat's species treated as valid [Kantor, Sysoev, 2005].

One reason of using the names of Bourguignat by Starobogatov was to avoid

descriptions of new species. It is known that his massive descriptions of new species, irrespective of being well-grounded or not, were universally criticized by various authors who believed that the gastropod fauna of Europe in a broad sense (to the Urals and even farther) has been long ago described completely. Starobogatov mostly used those names of Bourguignat which were accompanied by good quality illustrations.

Needless to say, Starobogatov and his disciples had no access (and regrettably could not have it at the time of the «iron curtain») to the type material of Bourguignat. Thus, there could be some doubts in the reasons for identification of the Russian fauna species as those described by Bourguignat, especially because the latter have been often described from localities quite distant from what is currently treated as the species range in Russia.

Recently, the senior author happened to examine the Bourguignat collection at the Muséum d'Histoire Naturelle, Geneva (MHNG) and to photograph the species relevant to the Russian fauna. Therefore, the goal of the present paper was to illustrate these types together with shells identified as Bourguignat's species by Starobogatov and/or his disciples and mostly stored in the Zoological Institute of Russian Academy of Sciences, St.-Petersburg (ZIN). We hope that this publication will provide a more firm basis for the formal naming of species of the Russian fresh-water fauna.

Taxonomic account

Family **Neritidae** Rafinesque, 1815

Theodoxus subthermalis
(Bourguignat in Issel, 1865)
Fig. 1 A–F

Theodoxus fluviatilis var. *subthermalis* Bourguignat – Issel, 1865: 22–23.

Type locality. Not stated (Lac de Paleostomi, près de Poti, Georgie – locality of syntypes).

Types. 7 syntypes, MHNG, Bourguignat collection, No. 11737.

History of the name application.

Theodoxus subthermalis – Shadin, 1952 (key to identification, shell description, distribution);

– Anistratenko, 1998 (key to identification, illustrations, distribution);

– Anistratenko et al., 1999 (shell description, key to identification, distribution);

– Starobogatov et al., 2004 (key to identification, distribution);

– Yildirim et al., 2006 (distribution);

– Anistratenko et al., 2008 (distribution);

– Kantor, Sysoev, 2005; Kantor et al., 2009 (information about types, type locality and general distribution).

General distribution. Lakes of the Caucasus (Transcaucasia) and the eastern coast of the Black and Azov seas; Iran, possibly Turkey.

Remarks. Taxonomic history of the species in the Russian fauna is unclear. Shadin was probably the first who introduced this species name to our fauna. Shadin's [1952] concept was not illustrated. However, it is well seen (Fig. 1) that the shells regarded to be that species in the ZIN collection (Shadins's identification) differ from the syntypes in the shell shape. Moreover, the next published record [Anistratenko, 1998] refers also to a different species, as can be seen from a comparison of our Fig. 1A, B and Anistratenko's [1998, pl. 1, fig. 5a, b] illustration which shows a shell rather squarish in the frontal plane, not rhomboidal as in the syntypes of *subthermalis*. Anistratenko [1998], Anistratenko et al. [1999] and Starobogatov et al. [2004] adopt the main distinguishing character of the species as being the width of aperture plus columellar shield not exceeding 0.64 of the shell width. However, this index is more than 0.7 in the syntypes of the species. Probably, specimens regarded

as *Th. subthermalis* found along eastern coast of the Black and Azov seas should be described as a new species, whereas the validity of *Th. subthermalis* and its actual range require additional studies. It can appear that true *Th. subthermalis* is a local endemic of western maritime Georgia.

Family **Bellamyidae** Rohrbach, 1937

Amuropaludina chloantha

(Bourguignat, 1860)

Fig. 1G–I

Vivipara chloantha Bourguignat, 1860b: 534, pl. 24, figs. 5–7.

Type locality. «Divers affluents de l'Amour moyen» [Far East of Russia].

Types. 1 syntype, MHNG, Bourguignat collection, No. 4734.

History of the name application.

Amuropaludina chloantha – Moskvicheva, 1979 (shell description, distribution);

– Bogatov, Zatravkin, 1990 (shell description, key to identification, ecology, distribution);

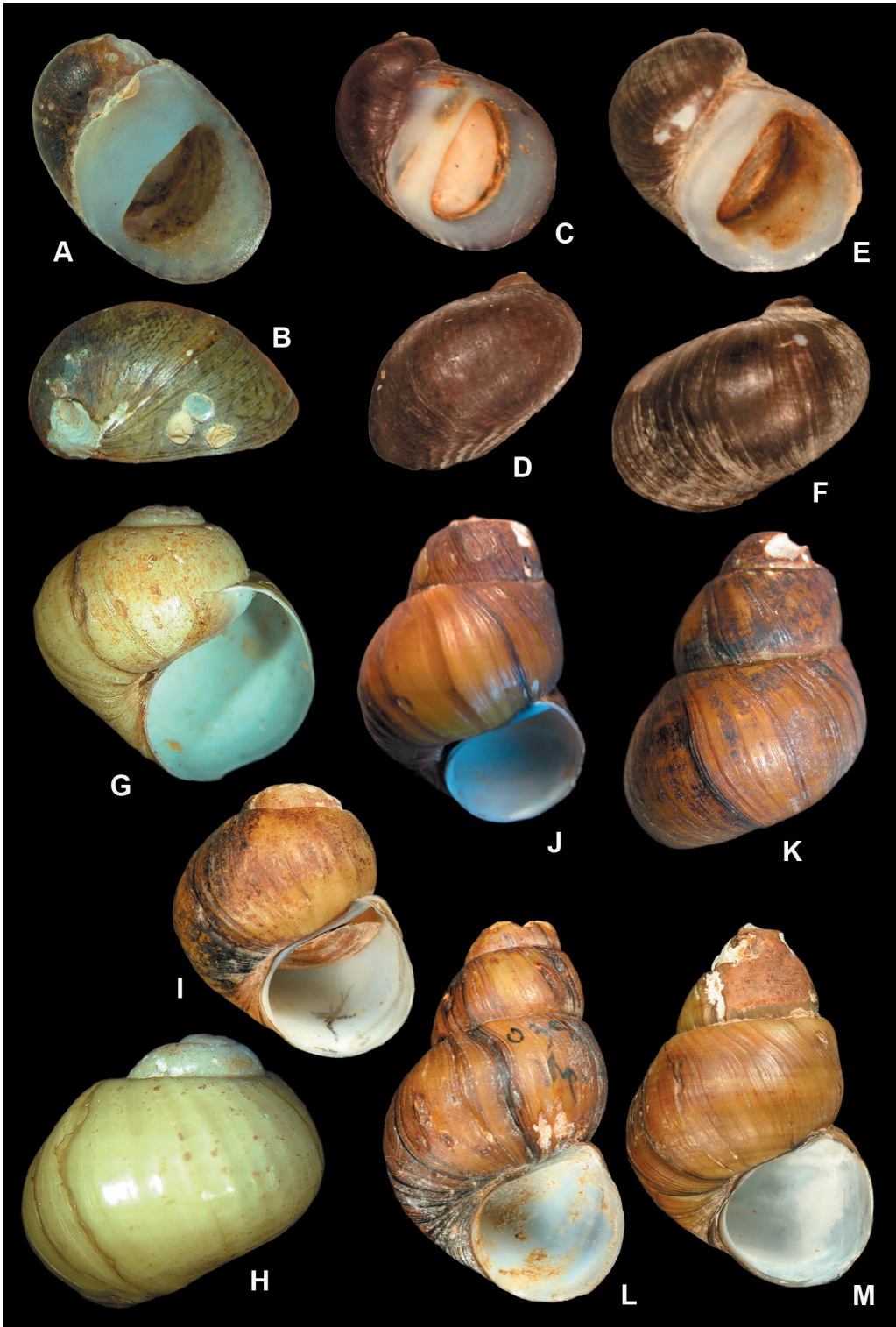
– Prozorova, 2000 (distribution in Lake Khanka drainage);

– Starobogatov et al., 2004 (key to identification, distribution);

– Kantor, Sysoev, 2005; Kantor et al., 2009 (information about the types, type locality and general distribution).

General distribution. Amur basin, excluding upper part of Zeya basin; in rivers and running lakes.

Remarks. Specimens of *A. chloantha* identified by I. Moskvicheva and stored in the ZIN (Fig. 1I) correspond well to the syntype of this species in the shell shape. The syntype looks as immature specimen with thin aperture edges, narrow umbilicus, and remained embryonal shell, which is not characteristic of adult, mature specimens of *Amuropaludina*.



Amuropaludina pachya
(Bourguignat, 1860)

Fig. 1J–M

Vivipara pachya Bourguignat, 1860b: 532–533, pl. 24, figs. 1–2.

Type locality. «Le flueve Amour» [Far East of Russia].

Types. 1 syntype, MHNG, Bourguignat collection, No. 4741.

History of the name application.

Amuropaludina pachya – Moskvicheva, 1979 (shell description, distribution);

– Bogatov, Zatravkin, 1990 (shell description, ecology, distribution);

– Prozorova, 2000 (distribution in Khanka Lake drainage);

– Starobogatov et al., 2004 (key to identification, distribution);

– Kantor, Sysoev, 2005; Kantor et al., 2009 (information about the types, type locality and general distribution).

General distribution. Central and lower Amur basin, in rivers and running lakes.

Remarks. It is difficult to compare the syntype with other specimens of this species due to absence of upper whorls in the former. It can only be suggested that the syntype lacks at least 3 upper whorls. Meanwhile, there is only little doubt that most shells identified by I. Moskvicheva as *A. pachya* (Fig. 1L) really belong to that species, as judging by the whorl and aperture shape. It can be mentioned that the shell of *Vivipara praerosa* (Gerstfeldt, 1959) figured by Shadin [1952, fig. 142] quite corresponds to the syntype of *A. pachya*, while Shadin did not consider the two other species of *Amuropaludina*.

Family **Melanopsidae**

H. et A. Adams, 1854

Esperiana berlani

(Bourguignat, 1884)

Fig. 2A–C

Fagotia (Esperiana) berlani Bourguignat, 1884: 34–35.

Type locality. «Le Danube à Ibraila; la Save entre Agram et Sissek» [Danube at Braila, Romania; Sava River between Zagreb and Sisak, Croatia].

Types. 2 syntypes, MHNG, Bourguignat collection, Nos. 11044, 11045.

History of the name application.

Fagotia (Dneprifagotia) berlani – Starobogatov et al., 1992 (shell morphology, distribution);

– Anistratenko, 1998 (key to identification, distribution);

– Pershko, 2003 (shell morphology);

– Starobogatov et al., 2004 (key to identification, distribution);

– Kantor, Sysoev, 2005; Kantor et al., 2009 (information about the types, type locality and general distribution);

– Pershko, 2011 (karyology, distribution).

General distribution. Lower Danube and rivers of northwestern basin of the Black Sea.

Remarks. The shells identified by Starobogatov as *E. (=F.) berlani* are quite similar to the syntypes in the shell shape.

Esperiana danubialis

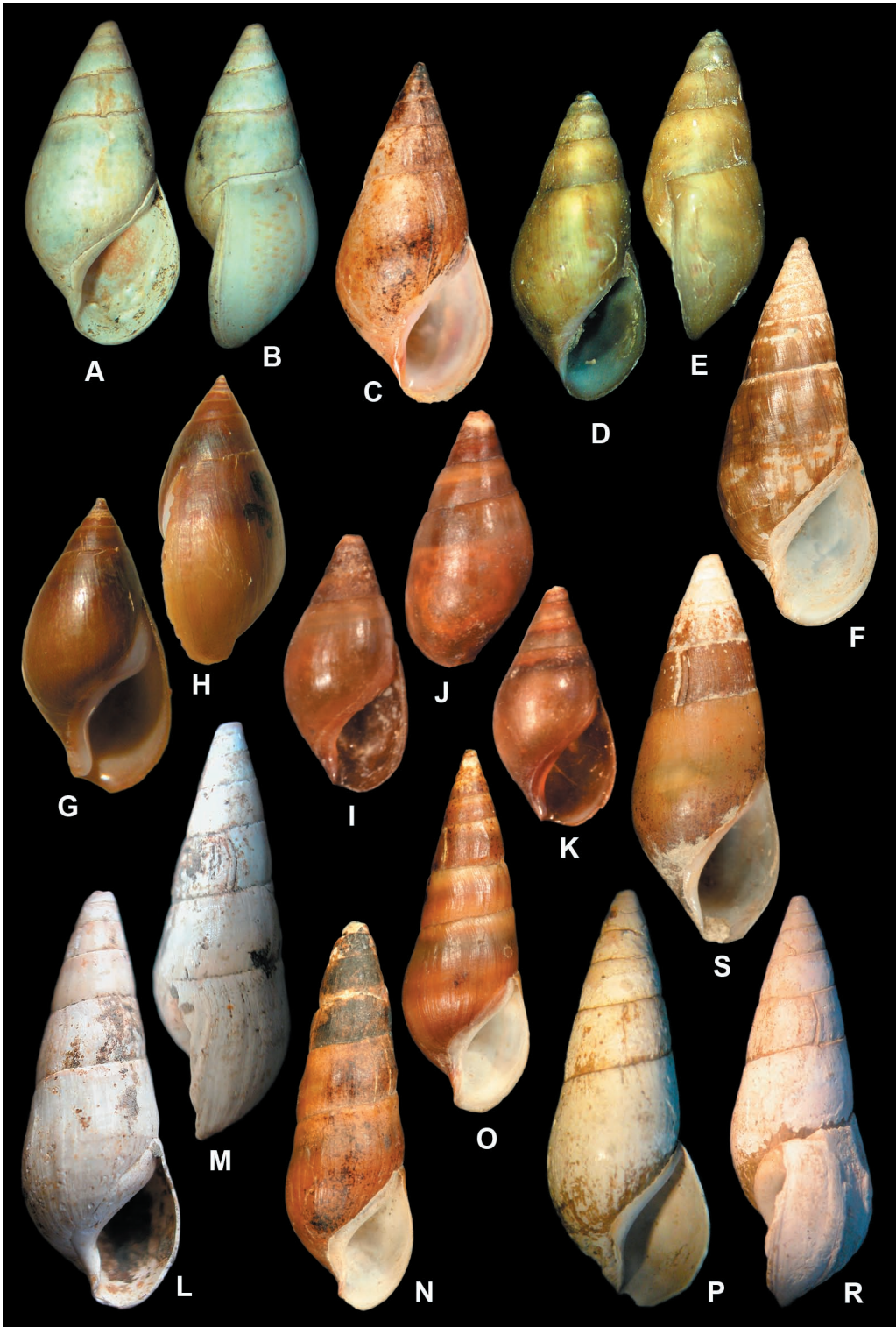
Bourguignat, 1884

Fig. 2D–F

Fagotia (Esperiana) danubialis Bourguignat, 1884: 35–36.

Type locality. «Le Danube à Ibraila; la Save à Agram; la Krapina à Sused

Fig. 1. A–F – *Theodoxus subthermalis*: A, B – syntype, H=7.9 mm; C, D – «Kreka brook, near Zamraradze estate» (Georgia?), H=6.8 mm, det. Shadin, ZIN No. 7; E, F – Zanga River, Armenia, H=7.0 mm, det. Shadin, ZIN No. 1; G–I – *Amuropaludina chloantha*: G, H – syntype, H=26.8 mm; I – middle reaches of the Amur, Russia, H=24.4 mm, det. Moskvicheva, ZIN No. 111; J–M – *Amuropaludina pachya*: J, K – syntype, H=36.5 mm; L – Lake Dzhalunshoye, Shrinđa Channel, Amur Basin, Russia, H=52.0 mm, det. Moskvicheva, ZIN No. 10; M – Amur Channel near Novo-Mikhailovskoe Settlement, Khabarovsk Territory, Russia, H=43.6 mm, det. Zatravkin, ZIN No. 33.



(Croatie)» [Danube at Braila, Romania; Sava River at Zagreb and Krapina River, Croatia].

Type s. 36 syntypes, MHNG, Bourguignat collection, Nos. 11046 (3 specimens), 11047 (25 specimens), 11048 (8 specimens).

History of the name application.

Fagotia (Dneprifagotia) danubialis – Starobogatov et al., 1992 (shell morphology, distribution);

– Gradovski, 1998 (ecology);

– Pershko, Bondarchuk, 2001 (distribution in northern Ukraine);

– Pershko, 2003 (shell morphology);

– Starobogatov et al., 2004 (key to identification, distribution);

– Kantor, Sysoev, 2005; Kantor et al., 2009 (information about the types, type locality and general distribution);

– Pershko, 2011 (karyology, distribution in Ukraine).

General distribution. Lower Danube and rivers of northwestern basin of the Black Sea (Yuzhnyi Bug and Pripyat).

Remarks. At present, both above-mentioned species are not recognized in the West European fauna of the Danube. The latter fauna is considered as containing only one species, *Esperiana esperi* [Čejka, Ševčíková, 1999; Košel, 2005; Şeşen, Schütt, 2009; Cioboiu, 2010].

The first mentioning of the generic name *Esperiana* was given by Bourguignat [1877], without a diagnosis but with an

indication of the type species – *Melanopsis esperi* Férussac, 1823 and accompanied with a small note on the composition of the group: 10 species from the Danube Basin, Persia and rivers of Anatolia and Mesopotamia. In 1884, Bourguignat gave a detailed description of the new genus *Fagotia* subdivided into 4 groups (subgenera): *Esperiana*, *Locardiana*, *Letourneuxiana* and *Aroxiana*. According to the Art. 12.2.5 of the ICZN, *Fagotia* Bourguignat, 1884 has been recently considered as a junior synonym of *Esperiana* Bourguignat, 1877 [Fischer, 1994; Glaubrecht, 1996; Bank et al., 2001]. However, both names are sometimes used in publications. It can be mentioned that, according to the results of molecular analysis, Smolen and Falniowski [2009] suggest to synonymize *Fagotia* (i.e., *Esperiana*) with *Melanopsis* Férussac, 1807.

Syntypes of *E. berlani* and *E. danubialis* are more similar to each other in the shell slenderness than shells of the same names stored in the ZIN (Fig. 2C, F). The syntypes differ mainly in the aperture shape: the aperture is oval in *E. danubialis*, with nearly straight apertural lip, whereas in *E. berlani* it is rounded-oval, with a well-expressed curved apertural lip. The used characters for the species identification [Starobogatov et al., 2004]: apical angle is less than 41° in *danubialis* and 43 to 47° in *E. berlani*, are most probably within

Fig. 2. A–C – *Esperiana berlani*: **A, B** – syntype, MHNG, Bourguignat collection, No. 11045, H=14.9 mm; **C** – Yuzhnyi Bug River, Ukraine, H=15.3 mm, det. Starobogatov, ZIN No. 10; **D–F** – *Esperiana danubialis*: **D, E** – syntype, MHNG, Bourguignat collection, No. 11048, H=12.7 mm; **F** – Tzaregradskoe girlo of the Dniester mouth, H=21.0 mm, det. Starobogatov, ZIN No. 3; **G–K** – *Melanopsis minutula*: **G, H** – syntype, MHNG, Bourguignat collection, No. 11186, H=11.4 mm; **I, J** – «Tzkhaltuba», Kutaisi, Georgia, H=7.4 mm, det. Lindholm, ZIN. No. 1; **K** – «Tzkhaltuba», vicinities of Kutaisi, Georgia, det. Rosen, H=6.4 mm; **L–O** – *Microcolpia canaliculata*: **L, M** – syntype, MHNG, Bourguignat collection, No. 11098, H=36.25 mm; **N** – Ekaterinoslav (=Dnepropetrovsk), Dnieper rapids, Ukraine, det. Starobogatov, H=22.0 mm, ZIN. No. 1; **O** – Ekaterinoslav (=Dnepropetrovsk), Dnieper rapids, Ukraine, det. Starobogatov, H=18.3 mm, ZIN. No. 1; **P–S** – *Microcolpia potamactebia*: **P, R** – syntype, MHNG, Bourguignat collection, No. 11116, H=34.5 mm; **S** – lower Danube near Izmail, Ukraine, H=16.1 mm, det. Starobogatov, ZIN No. 3.

the framework of infraspecific variability of *E. esperi* characterized by high ecological tolerance. Pershko [2003], having employed a statistical analysis of 4 indices of the shell, did not find any significant differences between specimens identified by her as *berlani* and *danubialis*. It should be noted that a wide-scale polymorphism within one biological species embracing three nomenclatural species requires an explanation.

Melanopsis minutula
Bourguignat, 1884
Fig. 2G–K

Melanopsis minutula Bourguignat, 1884: 92–93.

Type locality. «Fontaine froide du Hamman à Brousse (Anatolie); Nahr-Antalies dans le Liban (Syrie); puits artésien de Tamerna-Kedima, dans le Ziban (Algérie)» [Turkey, Lebanon, and Algeria].

Types. More than 30 syntypes, MHNG, Bourguignat collection, Nos. 11186, 11187, 11188.

History of the name application.

Melanopsis minutula – Izzatullaev, Starobogatov, 1984 (key to identification, distribution);
– Kantor, Sysoev, 2005; Kantor et al., 2009 (information about types, type locality and general distribution).

General distribution. Western Georgia.

Remarks. Specimens from vicinities of Kutaisi, initially identified by Rosen and Lindholm as *Melanopsis minutula* and stored in the ZIN, were subsequently re-identified by Z. Izzatullaev as *Melanopsis buccinoidea* (Olivier, 1801) (or *M. praemorsa buccinoidea*). There are no other published data on records of *M. minutula* in waterbodies of Georgia. Probably, *Melanopsis minutula* Bourguignat, 1884 should be excluded from the continental fauna of Russia and adjacent countries, although the species validity or its synonymization require additional studies.

Microcolpia canaliculata

Bourguignat, 1884
Fig. 2L–O

Microcolpia canaliculata Bourguignat, 1884: 62.

Type locality. «Le Danube à Ibraïla» [Danube at Braila, Romania].

Types. 1 syntype, MHNG, Bourguignat collection, No. 11098.

History of the name application.

Microcolpia canaliculata Starobogatov et al., 1992 (shell description, distribution);

– Anistratenko, 1998 (key to identification, shell description, distribution);

– Pershko, 2003 (shell morphology);

– Starobogatov et al., 2004 (key to identification);

Microcolpia canaliculata Kantor, Sysoev, 2005; Kantor et al., 2009 (information about the types, type locality and general distribution);

– Pershko, 2011 (karyology).

General distribution. Lower Danube and rivers of north-western Black Sea basin.

Remarks. See below.

Microcolpia potamactebia
(Bourguignat, 1870)

Fig. 2P–S

Melanopsis potamactebia Bourguignat, 1870: 67–68.

Type locality. «Le Danube ... de Brahilov, ... des environs de Belgrade» [Danube at Braila, Romania; Belgrade, Serbia].

Types. 1 syntype, MHNG, Bourguignat collection, No. 11116.

History of the name application.

Microcolpia canaliculata – Starobogatov et al., 1992 (shell description, distribution);

– Anistratenko, 1998 (shell description, key to identification, distribution);

– Pershko, 2003 (shell morphology);

– Starobogatov et al., 2004 (key to identification, distribution);

– Kantor, Sysoev, 2005; Kantor et al., 2009 (information about the types, type locality and general distribution);

– Pershko, 2011 (karyology).

General distribution. Lower Danube and rivers of north-western Black Sea basin.

Remarks. There are nine lots of *M. potamactebia* in the Bourguignat collection. Two of them are marked as syntypes. However, their site of collection («La Save (=Sava) à Agram (=Zagreb), Croatie») does not correspond to the type locality as stated in the original publication. Therefore, only the lot No. 11116 should be considered as the type series.

According to Bank et al. [2001], *Microcolpia* Bourguignat, 1884 is a subgenus of *Esperiana*, and this subgenus includes only one species, *E. (M.) daudebartii* [Prevost, 1821] with 3 subspecies. One of the latter, *E. (M.) daudebartii acicularis* (Férussac, 1823), is most similar to *M. canaliculata* and *M. potamactebia*.

Most shells identified as *M. canaliculata* and *M. potamactebia* in the ZIN collection are similar to the respective syntype in the general shell shape. Like in the above-mentioned species of *Esperiana*, the differences between syntypes of *M. canaliculata* and *M. potamactebia* seem to be much smaller than those between shells stored in the ZIN under these species names. At the same time, the differences between the syntypes are probably age-related, whereas those between some ZIN specimens seem to be populational.

Family **Cochliopidae** Tryon, 1866

Subfamily **Littoridininae** Thiele, 1928

Thalassobia coutagnei

(Bourguignat in Coutagne, 1881)

Fig. 3A–E

Paludestrina coutagnei Bourguignat – Coutagne, 1881: 26–27.

Type locality. «L'étang de Berre, à l'extrémité nord de l'anse de Saint-Chamas» [south-eastern France].

Types. MHNG, Bourguignat collection No. 5611.

History of the name application.

Thalassobia coutagnei – Anistratenko, 1991 (taxonomic remarks);

– Anistratenko, Stadnichenko, 1994 (shell morphology, distribution);

– Anistratenko, 1998 (key to identification, distribution);

– Starobogatov et al., 2004 (key to identification, distribution);

– Prydatko, 2006 (distribution);

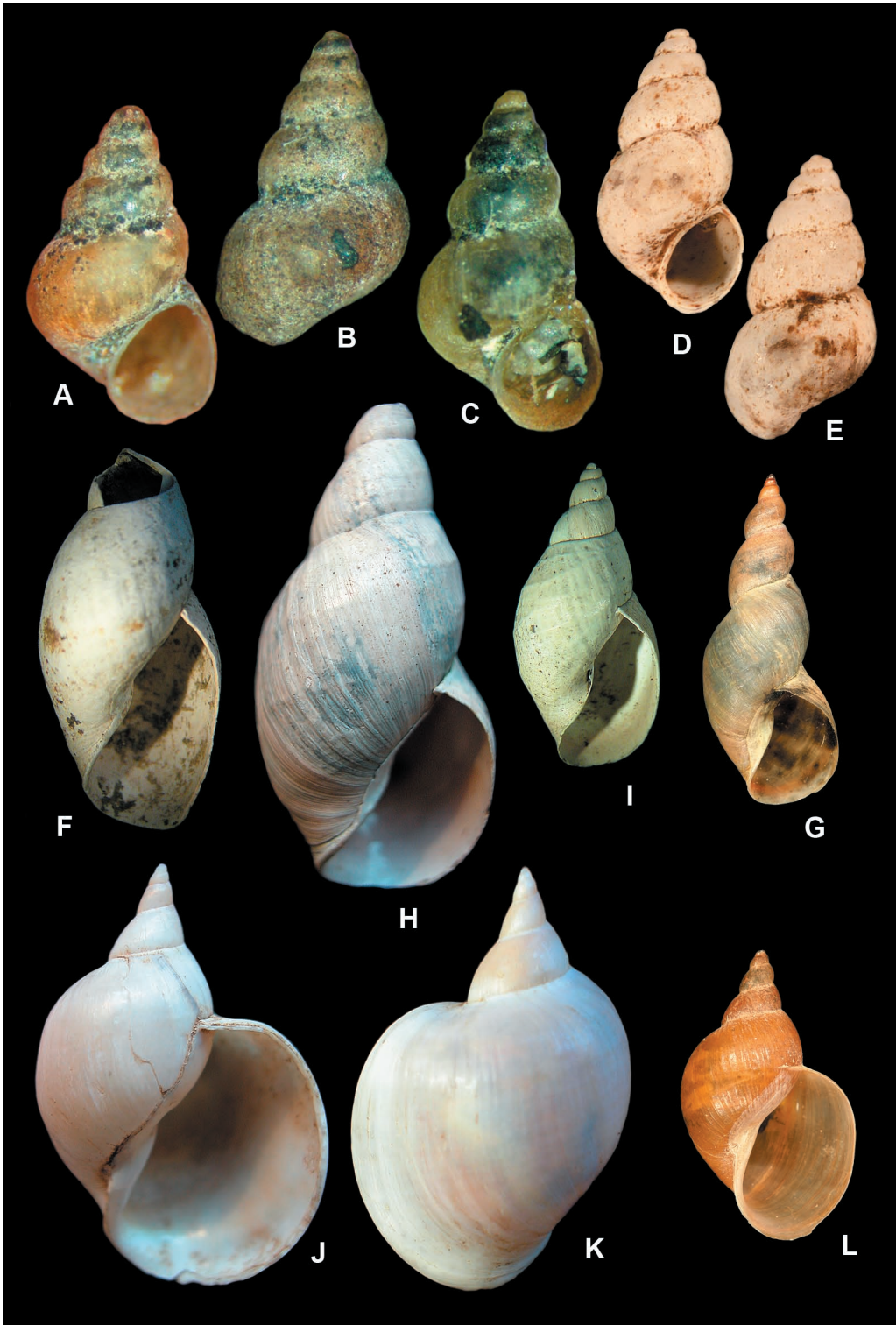
– Khaliman et al., 2006 (distribution);

– Kantor, Sysoev, 2005; Kantor et al., 2009 (information about the types, type locality and general distribution).

General distribution. Mostly brackish-water areas of the Black (Tendovsky Bay, Khadzhibei Liman, Novorossiysk, Molochnyi Liman) and Azov seas.

Remarks. Due to the absence of exact data on the types of the species at the moment of studying the collection, only the lot No. 5506 (Tunisia) was investigated (Fig. 3A–C). Anyway, these shells have been identified by Bourguignat as *Paludestrina coutagnei*.

Initially, this species was listed within the family Bythinellidae [Locard, 1893], then Germain [1931] synonymized the species with *Paludestrina procerula* Paladilhe, 1869. It was probably the reason why it was not mentioned in literature until the end of the 20th century [Anistratenko, 1991; Anistratenko, Stadnichenko, 1994]. In the fauna of the Black-Azov seas basin, the latter authors recognize both species: *T. coutagnei* (Littoridinidae) and *Hydrobia procerula* (Hydrobiidae). The latter species in European literature is considered a synonym of *Hydrobia acuta acuta* (Draparnaud, 1805) [Hallgass, 2010]. The genus *Semisalsa* Radoman, 1974, synonymized by Anistratenko [1991] with *Thalassobia* Bourguignat in Mabilie 1877, is mentioned in European literature as a subgenus



of *Heleobia* Stimpson, 1865, subfamily Cochliopinae, family Hydrobiidae [Bank et al., 2001]. At the same time, *Semisalsa graeca* Radoman, 1974, which is a junior synonym of *Thalassobia* (= *Paludestrina*) *coutagnei* according to Anistratenko [1991], is recorded in the fauna of Iberian Peninsula as a synonym of *Heleobia* (*Semisalsa*) *stagnorum* (Gmelin, 1791) [Hallgass, 2010]. The studied shells identified by Bourguignat as *Paludestrina coutagnei*, differ from both *Heleobia* (*Semisalsa*) *stagnorum* and snails from the Azov Sea considered to be *Thalassobia coutagnei*.

Family **Lymnaeidae** Rafinesque, 1815

Lymnaea berlani
(Bourguignat, 1870)
Fig. 3F–I

Limnaea berlani Bourguignat, 1870: 44–45.

Type locality. Not stated in the original description (lower Danube – from title).

Types. 1 syntype, MHNG, Bourguignat collection, No. 6785.

History of the name application.

Lymnaea berlani – Starobogatov, 1977 (key to identification);

– Kruglov, Starobogatov, 1986 (shell description, distribution);

– Kruglov, Starobogatov, 1993 (illustration of shell and genitalia);

– Starobogatov et al., 2004 (key to identification, distribution);

– Stadnichenko, 2004 (morphology, distribution in Ukraine);

– Kruglov, 2005 (morphology, distribution, ecology);

– Yurlova, Vodyanitskaya, 2005 (distribution, occurrence);

– Kantor, Sysoev, 2005; Kantor et al., 2009 (information about types, type locality and general distribution);

– Izzatulaev, Stadnichenko, 2010 (distribution in Central Asia);

– Nekhaev, 2011 (life forms).

General distribution. South Europe, northern Caucasus, Transcaucasia, Central Asia.

Remarks. There are three lots in the Bourguignat collection: one from «Le Danube à Braïla» and two from «Varna, Bulgarie». However, the two latter do not correspond to the type locality as stated in the original publication. Thus, only the lot No. 6785 belongs to the type series. Unfortunately, this specimen (Fig. 3F) is broken, with only last and, partly, penultimate whorls remaining. It is, however, like other young specimens from the Bourguignat collection, not very similar to specimens from ZIN identified as *L. berlani*. These latter probably belong to a geographic race of *L. danubialis* or to a new species.

Lymnaea doriana
(Bourguignat, 1862)
Fig. 3J–L

Limnaea doriana Bourguignat, 1862a: 60.

Type locality. «Sicile».

Types. 1 syntype, MHNG, Bourguignat collection, No. 6339.

History of the name application.

– Westerlund, 1885 (as synonym of *L. stagnalis lacustris* Studer, 1820);

Fig. 3. A–E – *Thalassobia coutagnei*: A–C – «Oued-Serrag (=Wadi As Surraq), Tunisie», MHNG, Bourguignat collection, No. 5506, H=4.9 and 5.3 mm, respectively; D, E – Dnieper estuary, Ukraine, H=2.9 mm, det. Anistratenko, ZIN No. 1; F–I – *Lymnaea berlani*: F – syntype, MHNG, Bourguignat collection, No. 6785, H=39.5 mm; G – Krasnooskolsoye water reservoir, Yatzkoye Settlement, Ukraine, det. Starobogatov, H=26.5 mm, ZIN No. 6; H – Varna, MHNG, Bourguignat collection, No. 6786, H=59.2 mm; I – Varna, MHNG, Bourguignat collection, No. 6787, H=28 mm; J–L – *Lymnaea doriana*: J–K – syntype, MHNG, Bourguignat collection, No. 6339, H=53.5 mm; L – Leningrad Region, Lake Ladoga, near Osinovetsky Lighthouse, Russia, det. Starobogatov, H=19.1 mm, ZIN No. 1.

– Germain, 1931 [as *L. lacustris* (= *L. stagnalis* L., 1758)];

Lymnaea doriانا – Kruglov, Starobogatov, 1985 (description, morphology, distribution);

– Kruglov, Starobogatov, 1991 (egg mass morphology);

– Kruglov, Starobogatov, 1993 (illustration of shell and genitalia);

– Prozorova, Sharyi-Ool, 1999 (distribution in Tuva);

– Starobogatov et al., 2004 (key to identification, distribution);

– Stadnichenko, 2004 (morphology, distribution in Ukraine, ecology);

– Kruglov, 2005 (morphology, distribution, ecology);

– Kantor, Sysoev, 2005; Kantor et al., 2009 (information about the types, type locality and general distribution);

– Andreyeva et al., 2010 (key to identification, morphology, distribution);

– Nekhaev, 2011 (life forms).

General distribution. South of East Europe, Caucasus, Central Asia, northern Kazakhstan, Tuva.

Remarks. *L. dorianna* certainly belongs to the group of *L. stagnalis*, but application of the name *L. dorianna* to shells in the ZIN collection is doubtful because they considerably differ from the type in the shape of aperture. Probably, some specimens identified as *L. dorianna* belong to another (new?) species.

Lymnaea persica

(Bourguignat in Issel, 1865)

Fig. 4A–E

Limnaea auricularia var. *persica* Bourguignat – Issel, 1865: 47.

Type locality. «Kerman (Persia meridionale)» [a thermal spring, Kermani, Iran].

Holotype. MHNG, Bourguignat collection No. 6321.

History of the name application.

Westerlund (1885) synonymized *L. persica* with *Lymnaea schirazensis* Busch in Küster, 1862;

Lymnaea auricularia persica – Lazareva, 1967 (shell morphology, distribution);

– Izzatullaev, 1972 (distribution);

Lymnaea persica – Kruglov, Starobogatov, 1989 (morphology, distribution);

– Kruglov, Starobogatov, 1993 (illustration of shell and genitalia);

– Starobogatov et al., 2004 (key to identification);

– Kruglov, 2005 (morphology, distribution);

– Kantor, Sysoev, 2005; Kantor et al., 2009 (information about the types, type locality and general distribution).

General distribution. Afghanistan, Iran, southern Azerbaijan, Tajikistan.

Remarks. Shells identified as *L. persica* in the ZIN collection differ morphologically. Probably, only the shells studied by Kruglov (and unknown to us) are similar to the holotype. Specimens with intact apex illustrated here (Fig. 4C–E) are not similar to the holotype of *L. persica*. Seemingly, these shells actually belong to *L. parapsilia* sensu Vinarski and Glöer [2009].

Lymnaea psilia

(Bourguignat, 1862)

Fig. 4 F–H

Limnaea psilia Bourguignat, 1862a: 61.

Type locality. «Rivière de l’Aube, entre Unienville et Dienville (département de l’Aube)» [north-eastern France].

Types. 6 syntypes, MHNG, Bourguignat collection, No. 6432.

History of the name application.

Lymnaea psilia – Izzatullaev, Starobogatov, 1983 (morphology);

– Izzatullaev, Starobogatov, 1985 (distribution);

– Kruglov, Starobogatov, 1989 (morphology, distribution);

– Kruglov, Starobogatov, 1993 (illustration of shell and genitalia);

– Prozorova, 1998 (distribution);

– Prozorova, Sharyi-Ool, 1999 (distribution in Tuva);

- Prozorova, 2001; Prozorova, Kolpakov, 2004 (records in southern Russian Far East);
- Prozorova, Shed'ko, 2003; Prozorova, 2005 (records in northern Russian Far East);
- Starobogatov et al., 2004 (key to identification, distribution);
- Stadnichenko, 2004 (distribution);
- Sitnikova et al., 2004 (distribution);
- Prozorova, Zasypkina, 2005 (record in the Khilok River basin);
- Prozorova et al., 2009 (records in the Lake Baikal basin);
- Kantor, Sysoev, 2005; Kantor et al., 2009 (information about the types, type locality and general distribution);
- Vinarski, Glöer, 2009 (as *L. parapsilia*, morphology, distribution);
- Khokhutkin et al., 2009 (morphology, distribution);
- Izzatulaev, Stadnichenko, 2010 (distribution in Central Asia).

General distribution. Siberia and Russian Far East.

Remarks. Westerlund [1885], and then Germain [1931] suggested to consider *L. psilia* as juveniles of *L. stagnalis* and, correspondingly, synonymized it with the latter.

Vinarski and Glöer [2009] have shown that the type specimens of *L. psilia* in MHNG are different from shells adopted by Kruglov and Starobogatov as *L. psilia*. They described the latter as a new species, *L. parapsilia* Vinarski and Glöer, 2009. Having shown statistically significant differences in morphology of *L. auricularia* Linnaeus, 1758 and *L. parapsilia*, the authors did not mention any non-overlapping character both in shell morphology and in the ratio between penial sheath and praeputium length. This ratio was said by the authors to be 0.62–0.97 in *L. parapsilia* and 0.90–1.41 in *L. auricularia*. The absence of non-overlapping characters makes identification difficult, especially in the case of coexistence of the species (if such

coexistence takes place). Besides, there is a third species similar in conchology and genital morphology: *Lymnaea intercis* Lindholm, 1909. It is characterized by the penial sheath to praeputium length ratio being 0.87–0.90 [Izzatullaev et al., 1983]. This species was originally described as a subspecies (variety) of *L. auricularia* from several inlets of Chivyrkui Bay and Maloe More Strait of Lake Baikal. Subsequently it was recorded in Europe, south of Central Siberia, north-eastern Kazakhstan, and rivers of the Pacific coast of Russian Far East [Starobogatov et al., 2004; Kruglov, 2005]. Types of *L. intercis* were lost but some topotypes are quite similar to *L. psilia* sensu Kruglov, Starobogatov (or *L. parapsilia*) or *L. auricularia*. Thus, the problem of existence of separate biological species *L. auricularia*, *L. parapsilia* and *L. intercis* (but not ecological subspecies of *L. auricularia*) with their possibly apomorphic characters remains to be not resolved completely.

Family **Planorbidae** Rafinesque, 1815

Planorbarius adelosius

(Bourguignat, 1859)

Fig. 4I–N

Planorbis adelosius Bourguignat, 1859: 518, pl. 19, figs. 13–15.

Type locality. «Les marécages de la Toscane, notamment dans les environs de Pise» [northern Italy].

Types. 4 syntypes, MHNG, Bourguignat collection, Nos. 7367, 7368.

History of the name application.

– Maksimova, 1995 (distribution in waterbodies of Smolensk Region, karyology, interbreeding with *P. banaticus* Lang in Bourguignat, 1859);

– Kruglov, Maksimova, 2000 (interbreeding with *P. banaticus*);

– Shikhova, 2004 (distribution in Vyatka basin and Vyatka-Dvina watershed);



– Starobogatov et al., 2004 (key to identification, distribution);

– Vinarski et al., 2007 (distribution in Western Siberia);

– Kantor, Sysoev, 2005; Kantor et al., 2009 (information about the types, type locality and general distribution);

General distribution. Entire Europe, Western Siberia, in small permanent water bodies.

Remarks. Westerlund (1885) regarded *P. adelosius* as only a form of *Pl. penchinati* (Bourguignat, 1870), which in its turn was considered as a variety of *Planorbarius corneus* (Linnaeus, 1758) and has not been subsequently mentioned in European literature. Despite similarity in the shell and aperture shape in the syntypes and snails identified as this species and collected from Russian waterbodies, there are evident differences between them in the whorl expansion rate.

Planorbarius penchinati

(Bourguignat, 1870)

Fig. 4O–Q

Planorbis penchinati Bourguignat, 1870: 39–42, pl. 3, figs. 4–6.

Type locality. «Le Danube».

Types. 8 syntypes, MHNG, Bourguignat collection, No. 7412.

History of the name application.

– Starobogatov et al., 2004 (key to identification, distribution);

– Kantor, Sysoev, 2005 and Kantor et al., 2009 (information about the types, type locality and general distribution).

General distribution. North-western Black Sea maritime area, Baltic Sea basin, in lakes (Starobogatov et al., 2004) – see below.

Remarks. We were unable to trace any records of this species in Russian fauna prior to publication of Starobogatov et al. [2004]. Interestingly, the review of the genus *Planorbis* O.F. Müller, 1774 in the fauna of the former USSR [Soldatenko, Starobogatov, 2000] did not mention this species at all. The search in the ZIN collection did not reveal any specimens collected in Russia and identified as this species. Similarly, E. Soldatenko [pers. comm.] does not know specimens of this species from our fauna. The respective figures in Starobogatov et al. [2004, pl. 141, figs. 7–9] quite differ from the syntype figured here in the shell outline. Therefore, the presence of this species in the fauna of Russia and adjacent countries seems unjustified and rather doubtful.

Planorbarius stenostoma

(Bourguignat in Servain, 1881)

Fig. 5A–F

Planorbis stenostoma Bourguignat – Servain, 1881: 82.

Type locality. «Des bouches du Danube».

Types. Unknown. The Bourguignat collection contains 2 lots (more than 5 specimens): MHNG Nos. 7414 and 7366 collected at «Le Danube à Braila».

Fig. 4. A–E – *Lymnaea persica*: **A–B** – holotype, MHNG, Bourguignat collection No. 6321, H=16.3 mm; **C** – Lake Azbergen-Kul, right part of the Amu-Darya Delta, Mujnaksy District, Uzbekistan, H=15.3 mm, ZIN No. 35; **D** – Lake Kory-Kul, Khiva District, Kharazles Region, Uzbekistan, det. Starobogatov, H=10.2 mm, ZIN No. 33; **E** – Malyi Dzhangalach, Kazakhstan, det. Lazareva, H=8.6 mm, ZIN No. 17; **F–H** – *Lymnaea psilia*: **F–G** – syntype, MHNG, Bourguignat collection, No. 6432, H=7.1 mm; **H** – Odessa, Ukraine, det. Starobogatov, H=16.3 mm, ZIN No. 10; **I–N** – *Planorbarus adelosius*: **I–K** – syntype, MHNG, Bourguignat collection, No. 7367, D=32.5 mm; **L–N** – Salekhard City (Obdorsk), sand bar of the Poluy River, northern Russia, det. Starobogatov, D=25.9 mm, ZIN No. 2; **O–Q** – *Planorbarius penchinati*, syntype, MHNG, Bourguignat collection, No. 7412, D=47.5 mm.

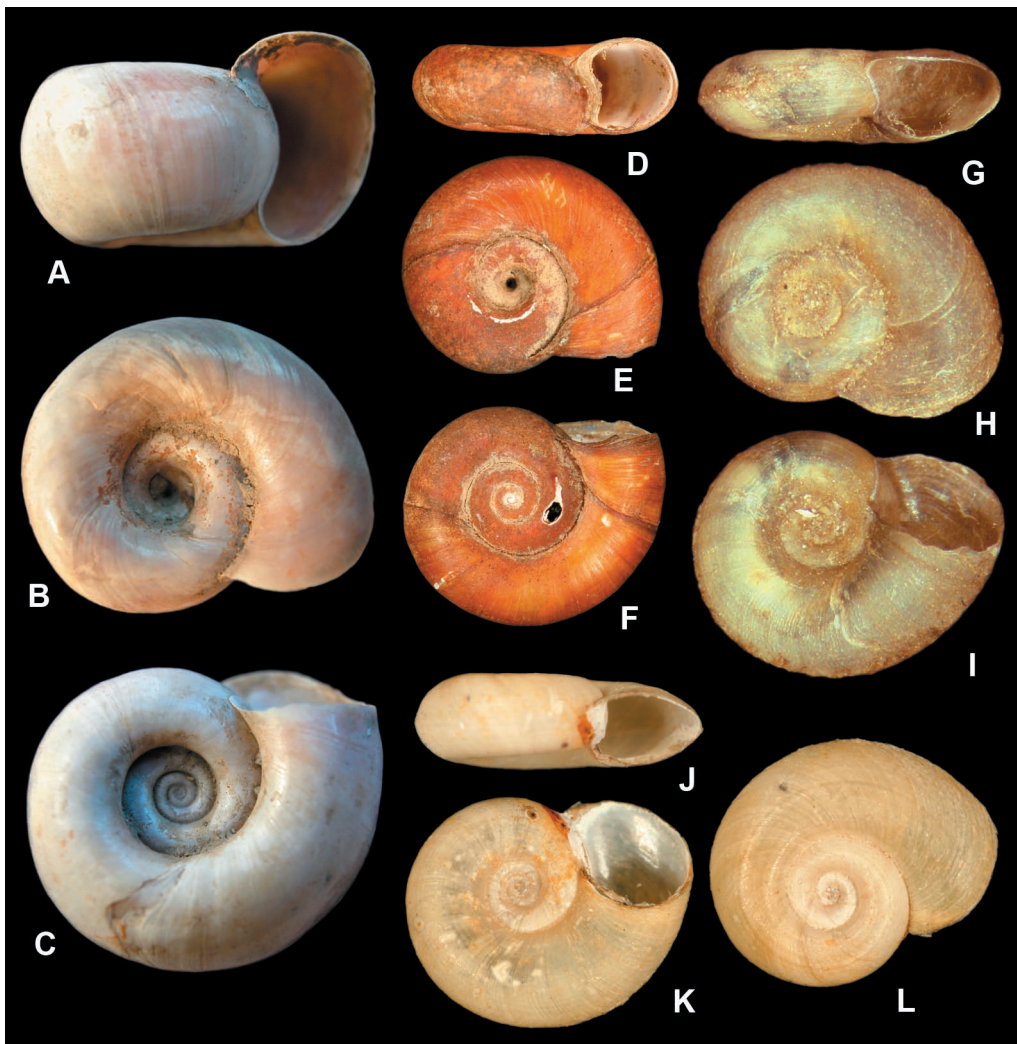


Fig. 5. A–F – *Planorbarius stenostoma*: A–C – syntype, MHNG, Bourguignat collection, No. 7415, D=55 mm; D–F – Girelsan, Transylvania, det. Lindholm, H=17.9 mm, ZIN No. 2; G–L – *Anisus stelmachoeitius*: G–I – syntype, MHNG, Bourguignat collection, No. 7562, D=5.1 mm; J–L – East-Kazakhstan Region, Oktyabrsky District, Bukhtarma water reservoir, Kazakhstan, det. Krivosheina, D=4.6 mm, ZIN No. 14.

History of the name application.

Planorbarius stenostoma – Krivosheina, Starobogatov, 1973 (shell morphology, distribution);
 – Starobogatov, 1977 (key to identification);
 – Starobogatov et al., 2004 (key to identification, distribution);
 – Mezherin et al., 2005 (as non-existing species);
 – Kantor, Sysoev, 2005; Kantor et al., 2009 (information about types, type locality and general distribution);

– Izzatulaev, Stadnichenko, 2010 (distribution in Central Asia).

General distribution. Steppe areas of south Europe and Western Siberia to Altay and Central Asia, in temporary waterbodies.

Remarks. Westerlund [1885] considered *P. stenostoma*, like *P. corneus*, as a separate species. Germain [1931] mentioned only *P. corneus* for European fauna,

whereas Baker [1945] suggested that the genus *Planorbarius* consists of several species including *P. stenostoma*. Presently, only *P. corneus*, sometimes with 4–5 subspecies in the Danube delta, is believed to inhabit Europe [Bank et al., 2001; Falkner et al., 2001; Cioboiu, 2006].

Until the end of the last century, the fauna of Russia and adjacent territories contained 5 species of *Planorbarius* including *P. stenostoma* [Starobogatov, 1977, Starobogatov, Prozorova, 1990]. Vinarski et al. [2007] believe that, in spite of data of Starobogatov et al. [2004], there are no reliable findings of this species in waterbodies of Western Siberia.

The differences between the syntypes of *P. stenostoma* and the shells identified as this species in the ZIN collection are very high (Fig. 5A–F). Therefore and taking into account the above-said, the positive identification of this species in Russian fauna will be possible only after a revision of this snail group. Until that, we prefer to regard the presence of this species in our fauna as at least doubtful.

Anisus stelmachoeitius
(Bourguignat, 1860)
Fig. 5G–I

Planorbis stelmachoeitius Bourguignat, 1860c: 139–140, pl. 2, fig. 10–13.

Type locality. «Dans un petit ruisseau de la vallée ferrugineuse, près de Dinan» [Brittany, France].

Types. 18 syntypes, MHNG, Bourguignat collection, No. 7562.

History of the name application.

Anisus albus stelmachoeitius – Shadin, 1952 (key to identification);

Anisus stelmachoeitius – Starobogatov, 1977 (key to identification);

– Pirogov et al., 1994 (distribution);

– Prozorova, Sharyi-Ool, 1999 (distribution in Tuva);

– Kruglov, Soldatenko, 2000 (shell, reproductive morphology);

– Prozorova, 2003 (distribution);

– Starobogatov et al., 2004 (key to identification, distribution);

– Kantor, Sysoev, 2005; Kantor et al., 2009 (information about the types, type locality and general distribution);

– Prozorova et al., 2009 (record in the Lake Baikal basin);

– Soldatenko, Sitnikova, 2009 (stylet morphology).

General distribution. Europe, south of Siberia eastward of Transbaikalia (Ivan-Arachlei lakes) and north of Mongolia, in permanent waterbodies.

Remarks. Germain [1931] considered *P. stelmachoeitius* as a variety (subspecies?) of *P. albus* (Müller, 1774), but then Baker [1945] and Meier-Brook [1983] did not mention *P. stelmachoeitius* in *Gyraulus* at all. Only the fauna of Russia and adjacent countries included *A. (G.) stelmachoeitius* as a separate species or subspecies. The ZIN collection contains specimens of *P. stelmachoeitius* but many of them are rather heterogeneous and not similar to the types.

Choanomphalus amauronius
Bourguignat, 1860
Fig. 6A–I

Choanomphalus amauronius Bourguignat, 1860a: 529, pl. 23, figs. 6–10.

Type locality. «Dans la rivière d'Angara ainsi que dans le lac Baïkal, en Sibérie».

Types. 6 syntypes, MHNG, Bourguignat collection, No. 7164.

History of the name application.

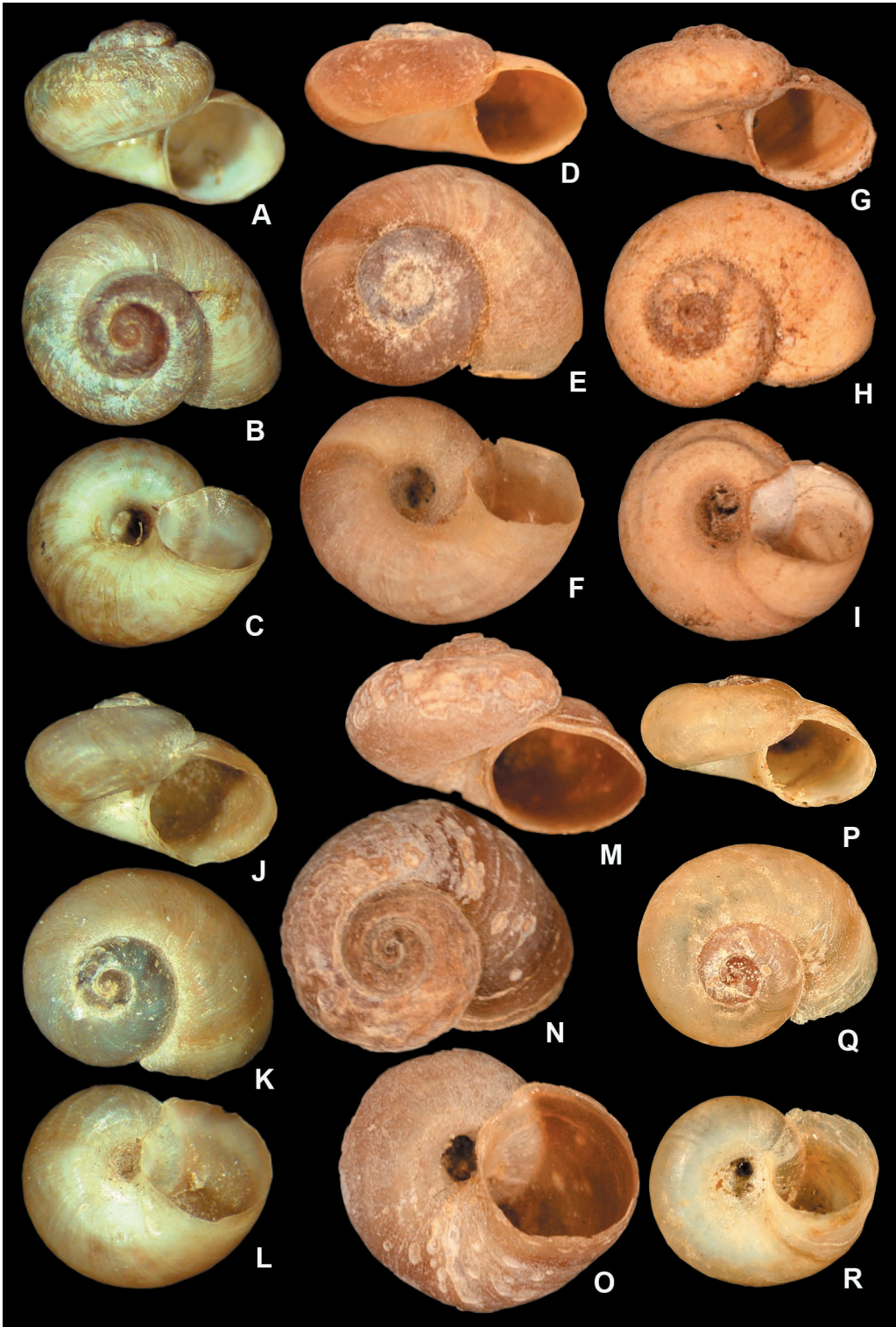
– Dybowski, 1875 (morphology, distribution);

– Lindholm, 1909 (morphology, distribution);

– Dybowski, Grochmalicki, 1925 (morphology);

– Kozhov, 1936 (taxonomy, synonymy, morphology, key to identification, distribution);

– Shadin, 1952 (key to identification);



- Starobogatov, 1970 (distribution);
- Beckman Starobogatov, 1975 (taxonomy);
- Starobogatov, Sitnikova, 1992 (speciation);
- Roepstorf et al., 2003 (feeding);
- Starobogatov et al., 2004 (key to identification, distribution);
- Sitnikova et al., 2004 (distribution);
- Soldatenko, Sitnikova, 2009 (stylet morphology);
- Kantor, Sysoev, 2005; Kantor et al., 2009 (information about types, type locality and general distribution).

General distribution. Southern Lake Baikal and Angara River.

Remarks. No syntypes are fully identical with the figure of Bourguignat. However, the three largest specimens quite correspond to the figure and original description, whereas the three smaller specimens have a slight keel (or angulosity) around the false umbilicus, which is characteristic of the *Choanomphalus maacki* (Gerstfeldt, 1859) group. At least three species, *Ch. amauronius*, *Ch. aorus* Bourguignat, 1860, and *Ch. maacki* have been described from a single lot sampled by Maack in 1855. A portion of that lot with the label «syntypes of *Ch. maacki*» is stored in the ZIN collection and includes, according to Starobogatov's identification, several species of *Choanomphalus*.

Dybowski and Grochmalicki [1901, 1925] described several species which were then synonymized with *Ch. amauronius* by Kozhov [1936]. This has resulted in routine identification of shells differing in conchology as one species. Particularly, identification of *Ch. amauronius* was often based on specimens more similar to the original description of *Ch. valvatoides* Dybowski, 1875 or *Ch. angulatus* Dybowski

et Grochmalicki, 1925, whereas shells with a narrower umbilicus were regarded as *Ch. aorus*. The figured syntype has a higher and more compact shell than those subsequently identified as that species.

Choanomphalus aorus
Bourguignat, 1860
Fig. 6J–R

Bourguignat, 1860a: 530, pl. 23, figs. 11–15.

Type locality. «En Sibérie, dans le lac Baïkal».

Types. 3 syntypes, MHNG, Bourguignat collection, No. 7165.

History of the name application.

- Dybowski, 1875 (morphology, distribution);
- Lindholm, 1909 (morphology, distribution);
- Dybowski, Grochmalicki, 1925 (morphology);

Ch. amauronius aorus – Kozhov, 1936 (morphology, key to identification, distribution);

Ch. amauronius aorus – Shadin, 1952 (key to identification);

Ch. aorus – Starobogatov, 1970 (distribution);

- Beckman, Starobogatov, 1975 (taxonomy);
- Starobogatov, Sitnikova, 1992 (speciation);
- Roepstorf et al., 2003 (feeding);

- Starobogatov et al., 2004 (key to identification, distribution);

- Sitnikova et al., 2004 (distribution);

- Kantor, Sysoev, 2005; Kantor et al., 2009 (information about types, type locality and general distribution).

General distribution. Baikal, Angara River downstream to Bratsk.

Remarks. Of the three syntypes only one, the largest specimen (Fig. 6J–L) corresponds to the figure of Bourguignat [1862a, pl. VI, figs 11–15]. However, this specimen and another, smaller shell are similar to shells being usually identified as *Ch. anomphalus* Dybowski, 1901

Fig. 6. A–I – *Choanomphalus amauronius*: **A–C** – syntype, MHNG, Bourguignat collection, No. 7164, D=5.4 mm; **D–F** – Baikal, Baranchiki, Russia, det. Lindholm, D=6.3 mm, ZIN No. 2; **G–I** – Angara River, Russia, det. Kozhov, D=6.1 mm, ZIN No. 112; **J–R** – *Choanomphalus aorus*: **J–L** – syntype, MHNG, Bourguignat collection, No. 7165, D=5.1 mm; **M–O** – Baikal, Baranchiki, Russia, det. Lindholm, D=6.2 mm, ZIN No. 2; **P–R** – Baikal, Ayaya Inlet, Russia, det. Lindholm, D=4.4 mm, ZIN No. 1.

(=*Ch. dybowskianus* Lindholm, 1909, or *Ch. cryptomphalus* Dybowski, 1901). The latter names were united as a single species, *Ch. dybowskianus* [Kozhov, 1936], or as two separate species, *Ch. anomphalus* and *Ch. cryptomphalus* [Beckman, Starobogatov, 1975]. The absence of type specimens of these last taxa hampers species identification of *Choanomphalus*, which evidently needs a taxonomic revision.

Family **Ancylidae** Rafinesque, 1815

Ancylus benoitianus
Bourguignat, 1862
Fig. 7A–F

Ancylus benoitianus Bourguignat, 1862b: 180–181.

Type locality. «Sicile».

Types. 4 syntypes, MHNG, Bourguignat collection, No. 6010.

History of the name application.
– Soldatenko, Starobogatov, 2004 (description, morphology, distribution);

– Starobogatov et al., 2004 (key to identification, distribution);
– Kantor, Sysoev, 2005; Kantor et al., 2009 (information about types, type locality and general distribution).

General distribution. Western Transcaucasia, northern Ossetia, southern Daghestan, above water level in mountain springs.

Remarks. The lot No. 6010 contains 4 syntypes, three of them possess the apex projecting beyond the shell outline (in upper view) and one with the apex not projecting beyond the shell contour. Other remarks see after *Ancylus jani*.

Ancylus gibbosus
Bourguignat, 1853
Fig. 7G–L

Ancylus gibbosus Bourguignat, 1853: 186.

Type locality. «Département de l’Oise (Baudan), des environs de Verdun (Liénard), enfin de plusieurs petits ruis-

seaux de Vendevre-sur-Barse (Aube)» [northern and north-eastern France].

Types. 72 syntypes, MHNG, Bourguignat collection, Nos. 6022, 6026, 6027, 6028, 6029, 6030, 6031.

History of the name application.

– Soldatenko, Starobogatov, 2004 (description, morphology, distribution);

– Kantor, Sysoev, 2005; Kantor et al., 2009 (information about types, type locality and general distribution).

General distribution. Mountain rivers of Transcaucasia and Ciscaucasia.

Remarks. See below.

Ancylus jani
Bourguignat, 1853
Fig. 7M–R

Ancylus jani Bourguignat, 1853: 185.

Type locality. «Jan, dans la Lombardie» [northern Italy].

Types. Unknown.

History of the name application.

– Akramowski, 1976;

– Soldatenko, Starobogatov, 2004 (description, morphology, distribution);

– Starobogatov et al., 2004 (key to identification);

– Kantor, Sysoev, 2005; Kantor et al., 2009 (information about the types, type locality and general distribution).

General distribution. Mountain rivers of Transcaucasia and Ciscaucasia.

Remarks. There are 24 lots of *A. jani* in the Bourguignat collection, MHNG. However, none of them correspond to the type locality, meaning that all of those do not belong to the type series. Nevertheless, we are illustrating a specimen identified by Bourguignat as that species.

Three species of ancylids are either not mentioned at all in current Western publications, or are regarded as synonyms of *Ancylus fluviatilis* (Müller, 1774) [Bank et al., 2001; Hallgass, 2010]. In our

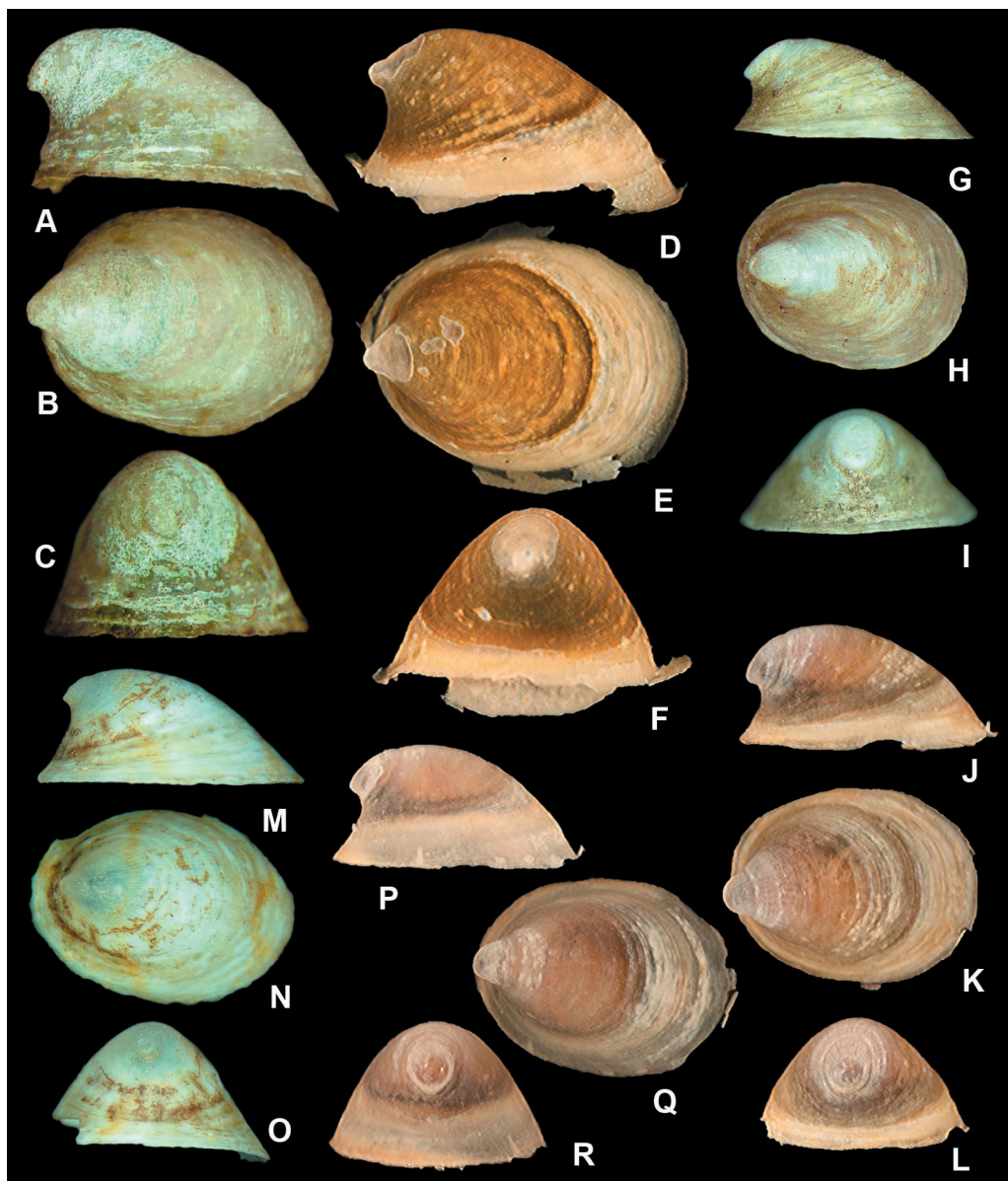


Fig. 7. A–F – *Ancylus benoitianus*: A–C – syntype, MHNG, Bourguignat collection, No. 6010, L=5.2 mm; D–F – Georgia, Ukhra-Tskaro Mountain pass, brook on southern slope, det. Soldatenko, L=5.0 mm, ZIN No. 3; G–L – *Ancylus gibbosus*: G–I – syntype, MHNG, Bourguignat collection, «Fontaine près Mouy, France», No. 6027, L=3.6 mm; J–L – Georgia, Borzhomi District, vicinities of Aykuri village, det. Starobogatov, L=4.9 mm, ZIN No. 1; M–R – *Ancylus jani*: M–O – MHNG, Bourguignat collection, No. 6057, Varèse, Italie, L=3.8 mm; P–R – Nagorno-Karabagh Autonomous Region, Stepanakert – Agdam, spring near Boluidzha River, Azerbaijan, det. Starobogatov, L=4.8 mm, ZIN No. 1.

opinion the shells identified by Bourguignat as *Ancylus gibbosus* (Fig. 7G–I) and *A. jani* (Fig. 7M–O) do not differ signifi-

cantly; also the figures of these species are similar in Soldatenko and Starobogatov [2004, Fig. 5C, D]. Probably, this was

the reason for the absence of *A. gibbosus* in Starobogatov et al. [2004]. In shells of *A. gibbosus* and *A. jani*, identified by Soldatenko and Starobogatov (Fig. 7D–F, J–L and P–R), the apex projects outside of the aperture margin, which is cha-

racteristic of the types of *A. benoitianus* but not of *A. gibbosus* and *A. jani* types. Therefore, there is some confusion, and the problem of real existence of the three species of *Ancylus* described by Bourguignat remains unresolved.

Conclusions

As it could be expected, a comparison of species identified as Bourguignat's ones in the fauna of Russia and adjacent countries to the respective types or specimens with author's identification has revealed a lot of discrepancies. This seems to be quite natural for the situation when such taxonomically complex group as fresh-water snails

was attempted to be revised without a study (impossible at that time)¹ of the type material. This is just additional evidence that the Russian fresh-water molluscan fauna is far from being completely known and taxonomically settled, and we can only hope that this publication will provide some aid to further investigation in this field.

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¹ It should be mentioned that other Soviet malacologists worked mostly on marine faunas actively communicated with Western museums for type search and used photographs of types and respective information in their publications (*Editor*).

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Appendix

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² Список литературы на русском языке приведен для облегчения библиографических поисков русскоязычными исследователями (ред.).

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