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## Taxonomical notes on Euro-Siberian freshwater molluscs.

### 1. *Turbo patulus* Da Costa, 1778 is not a senior synonym of *Limneus ampla* Hartmann, 1821 (Mollusca: Gastropoda: Lymnaeidae)

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**ABSTRACT.** The nomenclatorial history and the current taxonomic treatment of the species name *Limneus ampla* Hartmann, 1821 (Gastropoda: Pulmonata: Lymnaeidae) have been reviewed. It was established that this name cannot be regarded as a junior synonym of *Turbo patulus* Da Costa, 1778, as it has been suggested by Kruglov and Starobogatov [1983]. The original description of *Turbo patulus* contradicts the original drawing of the shell; moreover, the species's author obviously used this name in a quite wide sense, therefore it might be attached to different Palaearctic species of the (sub)genus *Radix* Montfort, 1810. Moreover, the species *L. ampla* does not occur in waterbodies of Britain, therefore it hardly could be described by Da Costa under the name *Turbo patulus*. To prevent possible troubles with using of these taxonomic names in future, we designate the lectotypes of *Turbo patulus* (based on its original picture) and *Limneus ampla* here.

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The basic principles of the zoological nomenclature are stability and universality in the scientific names as well as the priority of publication. These rules force taxonomists to look for the oldest available name among a set of names that can be attached to a given taxon [International Commission..., 1999]. In many well-investigated animal groups, such as freshwater molluscs, the history of taxonomic studies can be traced up to the middle of the XVIII century [Linnaeus, 1758, 1767] that sometimes creates a special problem for malacologists who want to judge on the identity of one or another species. It is well known that most species names introduced in older taxonomic papers are often not accompanied with clear and detailed description or differential diagnosis as well as with adequate drawings of whole animals or their diagnostically significant parts. The two last editions of "Systema Naturae" [Linnaeus, 1758, 1767] can present an excellent example of this kind.

One can imagine at least three possible ways to

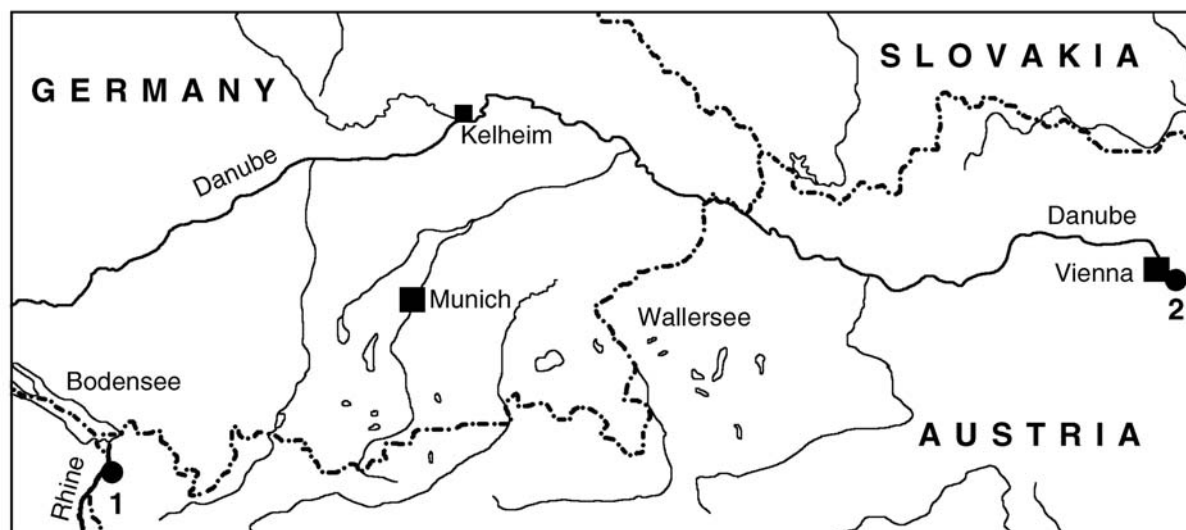
avoid these intrinsic disadvantages of earliest taxonomic publications:

1. We may examine the type materials of a given species. This is the most reliable way, though some of older taxonomists' collections are not available now [Dance, 1986]. If the type specimen has not been clearly designated by the author, one can designate a lectotype of a given species. It is worthy to note that a lectotype can be designated on the basis of the original description or drawings, if a reviser is aware that the type series is lost [ICZN Art. 74.4].

2. We may try to collect topotypic specimens to add new information to an original description. This method has repeatedly been used in freshwater gastropod systematics [Meier-Brook, 1964, 1983; Falkner, 1984, 1985; Jackiewicz, 1988; Paraense, Pointier, 2003], though it has certain restrictions as well. For example, the type habitat might be not indicated by the species's author or be indicated in rather fuzzy manner ("Habitat in Siciliae", "frequens in Europea stagnis" and so on). Besides, the type habitat may have been altered or destroyed completely. If topotypic specimens are available, there is a possibility of designating a neotype [ICZN Art. 75.3.6; 75A] to provide stable application of a given name.

3. At last, we can exploit the tradition of cross-referencing, which is used in European scientific literature since the medieval epoch. As a rule, taxonomists of XVIII-XIX centuries supplied their species descriptions with lists of synonyms, indicating, who of their predecessors or contemporaries discuss this species. Thus, the tracing of these references allow us to produce well-grounded hypotheses about identity of species under disputation, even if the type materials and habitats are lost.

In this note, we investigate some nomenclatorial questions concerning the freshwater gastropod species name *Turbo patulus* Da Costa that was ambiguously used in subsequent malacological literature during XIX-XX centuries.



Loci typici mentioned by Hartmann 1821: ●1= Rheineck near Bodensee, ●2= Danube, Vienna.

FIG. 1. Past (mentioned by Hartmann) and recent findings of *Radix ampla* within its type locality.

РИС. 1. Исторические (отмеченные автором вида) и современные места нахождения *Radix ampla* в пределах типового местообитания.

## Material examined

To use the original author's materials of *Turbo patulus*, the request to the Natural History Museum, London (British Museum) was sent, since there is an opportunity that the Da Costa's collection (partly, at least) is housed there [Dance, 1986]. Unfortunately, we have been answered that the type series requested could not be found [J. Ablett, pers. comm.] and, most probably, it is lost. The author did not designate the type locality of *T. patulus* exactly, therefore we are not able to exploit any topotypic specimens of this species.

To decide, what is *R. ampla* Hartmann, 1821, we studied the original type series (housed in the Naturmuseum Saint Gallen, Switzerland) as well as several topotypic specimens of this species collected in the upper course of the Rhine River and in the Danube River basin in Austria. The examination of snails collected in quite remote habitats is possible as Hartmann [1821] gives rather indistinct notion about the locus typicus of *R. ampla*. The author writes that the species was found in the canals of the Rhine near Rheineck in Switzerland as well as in vicinity of Vienna. Thus, the original specimens of *R. ampla* have originated from at least two waterbodies lying far from each other (Fig. 1). The extant type series of the species, however, was collected in the only habitat (originally labeled as Rheineck). It includes 7 dried shells of different size and age. Besides, we examined two samples of *R. ampla* originated from waterbodies situated within the ter-

ritory delineated above (Fig. 2): 1) Wallersee, Austria. 10.08.1995. 14 fixed specimens (1 was dissected) leg. R. Patzner, and 2) vicinity of Kelheim, Bavaria, Germany. 26.10.1994. 1 dried shell, leg. G. Falkner & P. Glöer. The structure of the reproductive system of the dissected specimen corresponds to that of *Lymnaea (Peregrina) patula* sensu Kruglov and Starobogatov [1993; Kruglov, 2005]. We were not able to find any *R. ampla* specimens in a vast collection of Bodensee shells (P. Glöer collections), however, a great number of shells of this species are illustrated by D. Geyer in a series of his papers [Geyer, 1925, 1929a, b] specially devoted to the Bodensee gastropods. Besides, nearly 150 specimens of *Lymnaea (Peregrina) patula* sensu Kruglov and Starobogatov [1983] from different waterbodies of the Urals and Western Siberia were examined. These materials are housed in the Museum of Siberian Water Molluscs (Omsk, Pedagogical University).

## Taxonomic history of the species name *Turbo patulus*

The lymnaeid genus [or subgenus, according to many authors; see Jackiewicz, 1998; Kruglov, 2005] *Radix* Montfort, 1810 includes a lot of species, the exact number of which in Europe is, however, not determined yet. Thus, Hubendick [1951] and Jackiewicz [1993, 1998] suppose that there are only two species of the genus in European waterbodies, whereas Kruglov and Starobogatov [1993] believe that

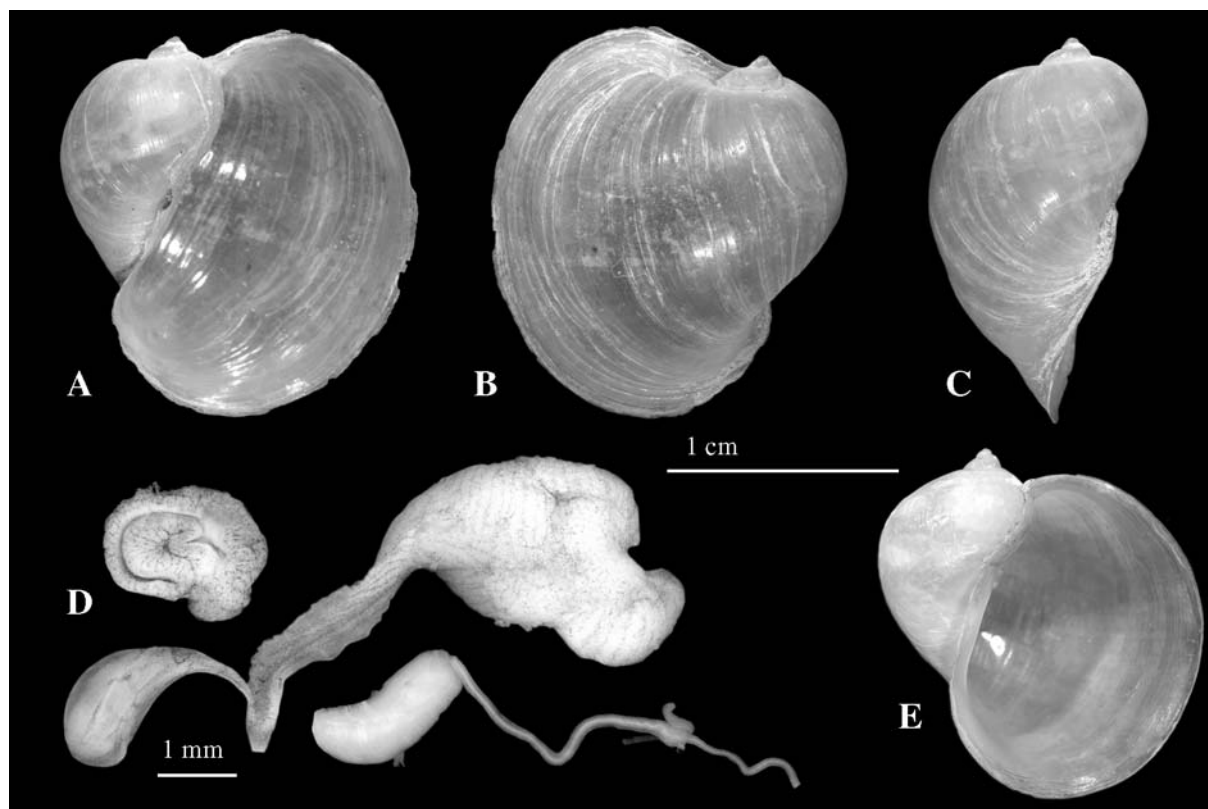


FIG. 2. The shell and part of the reproductive system of *Radix ampla* sensu Glöer [2002] from the type locality. A-D — 10.08.1995, Wallersee, Austria, leg. R. Patzner. E — 26.10.1994, vicinity of Kelheim, Bavaria, Germany, leg. G. Falkner & P. Glöer.

РИС. 2. Раковина и фрагмент половой системы *Radix ampla* sensu Glöer [2002] из типового местонахождения, определенного по данным автора вида. A-D — 10.08.1995, Wallersee, Австрия, сбор R. Patzner. E — 26.10.1994, окрестности Kelheim, Бавария, Германия, сбор G. Falkner & P. Glöer.

the species number should be estimated as not less than 30 species. Moreover, the latter authors have split the genus into two distinct taxa of the subgenus rank: *Radix* s.str. and *Peregriana* Servain, 1881. The intermediate estimations were carried out by the CLECOM-project group [Falkner et al., 2001], R. Bank [Fauna Europaea, 2006], and by P. Glöer [2002] who accept five *Radix* species in the European malacofauna. The validity of these five species has recently been corroborated by methods of molecular genetical analysis [Bargues et al., 2001].

In spite of these controversies, there are forms within the *Radix* group, which are recognized by all malacologists, though their taxonomic rank and names remain disputable. One of these species, which is characterized by an ear-shaped shell with low spire and relatively short bursa duct (Figs. 2-4), is well known among European malacologists under the name *Radix ampla* Hartmann [Kobelt, 1870; Westerlund, 1885; Locard, 1893; Merkel, 1894; Zhadin, 1933; Glöer, 2002]. More often, nevertheless, it has been regarded as a variety or subspecies

of *Radix auricularia* (Linnaeus, 1758), or *R. ovata* (Draparnaud, 1805), though its conchological distinctness from other species of *Radix* is obvious.

The most peculiar taxonomic treatment of the species was developed by Kruglov and Starobogatov [1983, 1993] who: i) split *R. ampla* sensu auct. into three distinct species: *Lymnaea (Peregriana) ampla* s.str., *L. (P.) monnardi* (Hartmann, 1844) and *L. (P.) hartmanni* (Studer, 1820); and ii) acclaimed that, following the priority principle, this species should bear the binomial name *Lymnaea (P.) patula* (Da Costa). They followed the opinion of Westerlund [1885] and Hubendick [1951] that the date of *R. ampla* description is 1844, when J.D.W. Hartmann has published the regular part of his treatise on Swiss freshwater gastropods [Hartmann, 1840-1844; see also Heppell, 1966]. Consequently, the binomial name *Lymnaea ampla* is preoccupied by *Limnaea ampla* Mighels, 1843, a North American lymnaeid species described from Maine, USA [see Hubendick, 1951].

Since 1977, when Ya.I. Starobogatov has included the species *Lymnaea patula* in his key of Eastern

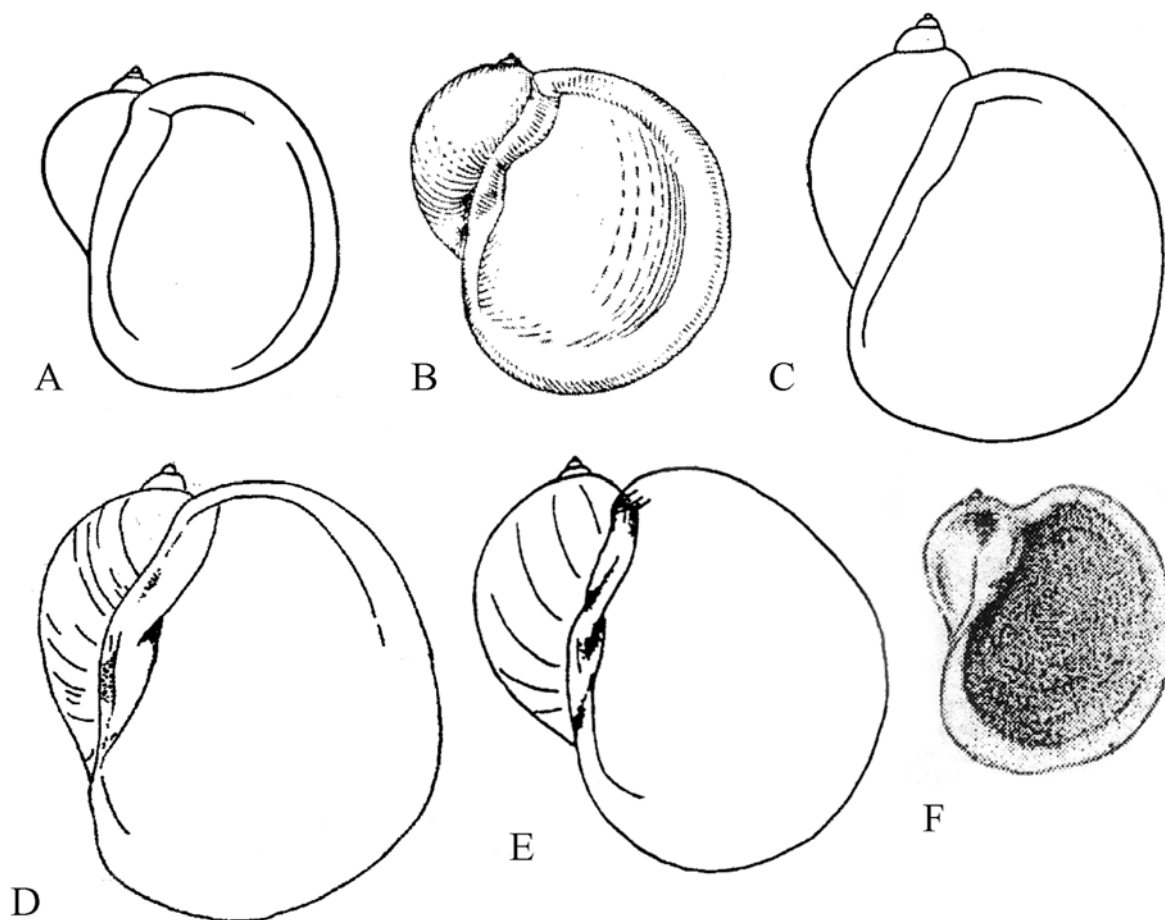


FIG. 3. Shells of *Radix ampla* sensu Glöer, 2002 (= *Lymnaea patula* sensu Kruglov, Starobogatov, 1983, partim) from different waterbodies of Europe and Kazakhstan. A — after Starobogatov [1977, as *Lymnaea patula*]; B — after Soós [1956, as *Radix ovata* var. *ampla*]; C — after Lazareva [1967, as *Lymnaea tobolica*]; D — after Stadnichenko [2004, as *L. patula*]; E — after Kruglov and Starobogatov [1993, as *L. patula*]. F — After Hartmann [1821; original description]. The scale bars are not used in the original sources.

РИС. 3. Раковины *Radix ampla* sensu Glöer, 2002 (= *Lymnaea patula* sensu Kruglov, Starobogatov, 1983, partim) из различных водоемов Европы и Казахстана. А — по Старобогатову [Starobogatov, 1977, как *Lymnaea patula*]; В — по Соós [1956, как *Radix ovata* var. *ampla*]; С — по Лазаревой [Lazareva, 1967, как *Lymnaea tobolica*]; D — по Стадниченко [Stadnichenko 2004, как *L. patula*]; E — по Kruglov, Starobogatov [1993, как *L. patula*]. F — по Hartmann [1821; из первоописания]. Масштабные линейки отсутствуют в оригинальных работах.

European freshwater gastropods [Starobogatov, 1977], using of this binomen in Russian malacological literature became universally accepted [Kruglov, Starobogatov, 1993; Leshko, 1998; Stadnichenko, 2004; Kruglov, 2005], though information from the original description of *Turbo patulus* has not been used neither by Starobogatov [1977] nor by Kruglov and Starobogatov [1983], who revised European species of *Peregriana*. Besides, the lymnaeid species *Lymnaea tobolica* Lazareva, 1967 described from Northern Kazakhstan [Lazareva, 1967, see Fig. 3, C] was regarded by Kruglov and Starobogatov [1983] as a junior synonym of *L. patula*.

Having examined all available literature on *Radix* systematics along with the original description of *Turbo patulus*, we have found as many as three

serious objections against the synonymization of *Turbo patulus* Da Costa with *Radix ampla* auct., which urged us to discuss some nomenclatorial questions again.

## Discussion

1. Though the type series of *Turbo patulus* is apparently lost now, the original description of the species supplemented with a drawing of the shell (Fig. 7 A) provides a helpful information about identity of the species. Obviously, the Da Costa's original drawing as well as the picture from Martin Lister's old treatise [Lister, 1687], which is quoted by Da Costa (Fig. 7, B), depict a shell quite dissimilar to shell of *Lymnaea patula* sensu Kruglov and Staro-

bogatov (see Figs. 3, A, C-G; 4). Most probably, it belongs to a representative of the common North European lymnaeid species known as *Radix balthica* (L., 1758) [Glöer, 2002; Kruglov, 2005]. This species does not possess an ear-shaped shell that is very characteristic for *L. patula* [Kruglov, 2005; see also above], and this feature is not prone to ecophenotypic changes. Da Costa himself clearly indicated that his *Turbo patulus* is a synonym of *Helix auricularia* Linnaeus, 1758, another species with ear-shaped shell. The picture of *H. auricularia* given by Pennant [1777; see Fig. 7, C] and quoted by Da Costa in his list of *Turbo patulus* synonyms obviously corresponds to current concept of this commonly accepted species [Jackiewicz, 1998; Glöer, 2002; Kruglov, 2005]. The verbal description of *T. patulus* includes characters that can be applied both to *R. auricularia* and *R. ampla*, but may hardly be accepted to describe *R. balthica*. Thus, Da Costa writes that shell of *T. patulus* is “in shape very round or swell’d, the turban forming only a short point... Umbilicus it has none, only a narrow depression lies aside edge of the pillar lip... The mouth is oval, extremely large and wide...” and the body whorl is “so extremely large and swell’d, for the three others, or the turban, are so short, or little produced, that they do not gradually produced from end; they end in an acute point or tip” [Da Costa, 1778]. It is apparently not a description of *R. balthica* shell, even taking into consideration all known conchological variations of the latter. Some subsequent authors, for example Chemnitz [1786] and Mörch [1864], regarded *T. patulus* sensu Da Costa to be an evident synonym of *Helix auricularia*.

As a result, we can conclude that Da Costa used a newly introduced by him binomial name in a quite wide sense, as his *T. patulus* conforms with at least three distinct *Radix* species of current taxonomy: *Radix auricularia*, *R. ampla* and *R. balthica* (= *R. ovata* auct.). The original description of *T. patulus* shell is more acceptable to the two former species, whereas the shell picture represents, most probably, a specimen of *R. balthica*. This situation may indicate that the original material in the Da Costa’s collection included different shells considered to belong to the same species. However, it is unverifiable hypothesis due to probable loss of this collection.

It is noteworthy that the species *R. ampla* does not occur in the Great Britain waterbodies now [Killeen, 1992; Kerney, 1999; Falkner et al., 2001; Anderson, 2005], and, most probably, did not live there in the Da Costa’s time. Therefore, it is unlikely that the author had shells of this species in his hand and, if he used some ear-shaped shells for the *T. patulus* description, these specimens were belonging to *R. auricularia*.

## 2. The controversies between verbal diagnosis

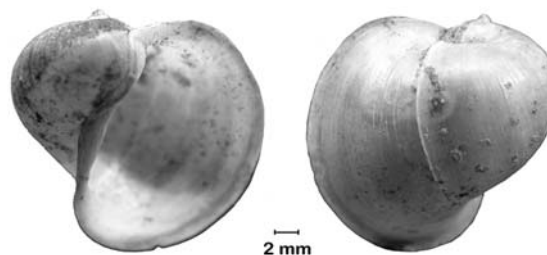


FIG. 4. Shell of *Lymnaea patulus* sensu Kruglov and Starobogatov [1983]. 29.07.2005, Bolshoje Miassovo Lake, Ilmeny Reserve, Russia, coll. M.V. Vinarski & A.V. Karimov.

РИС. 4. Раковина *Lymnaea patulus* sensu Kruglov, Starobogatov [1983]. 29.07.2005, оз. Большое Миассово, Ильменский заповедник, Россия. Сбор М.В. Винарского и А.В. Каримова.

and illustration in the original description of *T. patulus* revealed above have resulted in a quite dissimilar using of Da Costa’s taxonomic name in subsequent malacological literature. For example, most European malacologists of XIX-XX centuries [Clessin, 1876: 373; Kobelt, 1877: 119; Westerlund, 1885: 38; Merkel, 1894: 152; Goldfuss, 1900: 204; Geyer, 1927: 136; Germain, 1931: 490; Ehrmann, 1933: 159; Zhadin, 1933: 171; Grossu, 1955: 107] regarded *T. patulus* as a variety of *Radix ovata* (= *R. balthica* of current nomenclature), that is they attributed this name to a form with ovate or ovate-conical shell, following the Da Costa’s original picture and disregarding the original verbal description. Moreover, all authors quoted above have distinguished between *Radix patula* and *R. ampla*, considering these as two independent taxonomic entities. On the other hand, Starobogatov [1977] and, subsequently, Kruglov and Starobogatov [1983] decided to follow the original description of *T. patulus*, attaching this name to a species with ear-shaped shell.

3. Contrary to opinions of Westerlund [1885], Hubendick [1951] and Kruglov and Starobogatov [1983], the correct date of *R. ampla* description is not 1844. For the first time, this species was established in earlier Hartmann’s taxonomic paper published in 1821 [Hartmann, 1821]. Thus, this name has priority over *Limnaea ampla* Mighels, 1843. So, we may regard *L. ampla* “Hartmann, 1844” as a preoccupied name if we use the generic name *Lymnaea* in a wide sense [Hubendick, 1951; Jackiewicz, 1998; Kruglov, 2005], i.e. as including almost all groups of lymnaeids such as *Radix*, *Stagnicola*, *Galba*, etc. If we accept an alternative approach, regarding these groups as distinct genera, then *Limnaea ampla* Mighels and *Limneus ampla* Hartmann fall to two different taxa, as *L. ampla* Mighels is a synonym of *L. emarginata* (Say), which is now

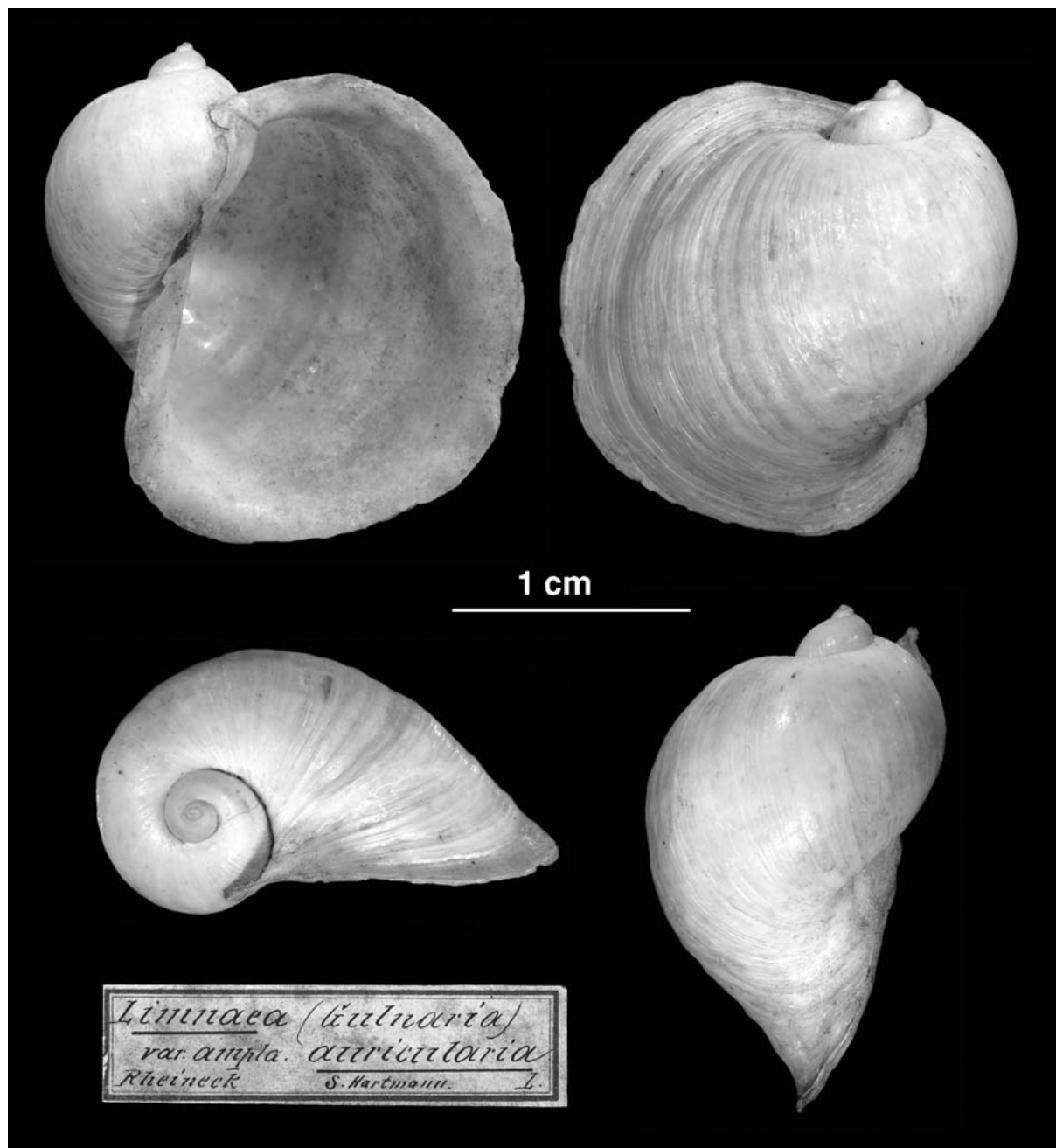


FIG. 5. The *Radix ampla* lectotype (Naturmuseum Saint Gallen, No. M 188).

РИС. 5. Лектотип *Limnaeus ampla* (Naturmuseum Saint Gallen, № M 188).

included in the genus *Catascopia* Meier-Brook et Barges, 2002 [Meier-Brook, Barges, 2002].

#### Nomenclatorial conclusions

The considerations above have led us to proposition that there is no way to judge definitely on the identity of *Turbo patulus* Da Costa. Thus, using of this name for designation of any *Radix* species should be regarded as obviously equivocal since it may

lead us to several discrepant taxonomic opinions. To avoid such discrepancies in future, we are inclined to designate the lectotype of *Turbo patulus*. The Article 74.4 of the ICZN [International Commission..., 1999] permits us to designate a lectotype on the basis of the original drawing of a species. Thus, the Da Costa's picture of the *T. patulus* shell (Fig. 7A) is chosen here to be the lectotype of the species. As it was stated above, we believe that this picture portrays the shell of *Radix balthica* snail and, thus,

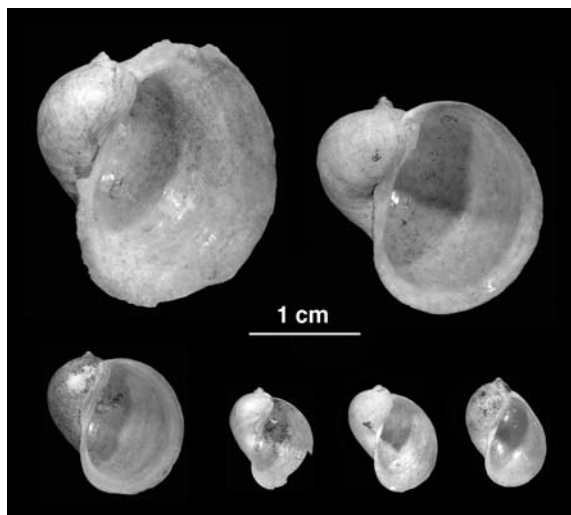


FIG. 6. Paralectotypes of *R. ampla* (Naturmuseum Saint Gallen, No. M 188). The shell in the right lower corner apparently belongs to *Radix balthica*.

РИС. 6. Паралектотипы *Limnaeus ampla* (Naturmuseum Saint Gallen, № M 188). Раковина в левом нижнем углу по-видимому принадлежит *Radix balthica*.

we regard *Turbo patulus* as the junior synonym of the latter. As a result, this species should not be considered as senior synonym of *Limnaeus ampla* Hartmann, 1821.

To prevent any possible non-coordination in the further application of the binomial name *Limnaeus ampla*, the type series of this species has been studied. We failed to find a specimen identical with the original picture of *L. ampla* given by Hartmann (see Fig. 3F) among the syntypes. Moreover, a juvenile shell of *R. balthica* has been found in the type series. So we have to designate a lectotype (ICZN Art. 74.7.3) and the most similar shell from this type series which corresponds to the original description as well as to the given picture has been chosen to become the lectotype (Fig. 5). The dimensions of the lectotype are (in mm): shell height 21.5; shell width 21.0; spire height 1.2; spire width 1.5; body whorl height 20.3; body whorl width 21.0; aperture

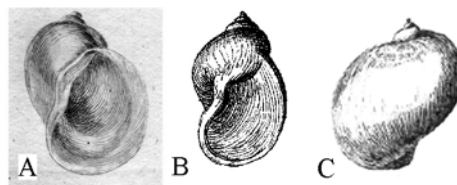


FIG. 7. The reproduction of the original drawing of *Turbo patulus* shell along with two pictures quoted in the original list of synonyms of the latter.

A — *Turbo patulus* [after Da Costa, 1778]. B — *Buccinum pellucidum subflavum, quatuor spirarum, mucrone acutissimo, testae apertura omnium maxima* [after Lister, 1678]. C — *Helix auricularia* [after Pennant, 1777].

РИС. 7. Репродукция оригинального рисунка раковины *Turbo patulus* а также два рисунка, цитируемых в оригинальном описании этого вида.

A — *Turbo patulus* [по Da Costa, 1778]. B — *Buccinum pellucidum subflavum, quatuor spirarum, mucrone acutissimo, testae apertura omnium maxima* [по Lister, 1678]. C — *Helix auricularia* [по Pennant, 1777].

height 20.0; aperture width 17.0. The other shells from the type series (Fig. 6) should be regarded as paralectotypes henceforth. Furthermore, as long as the lectotype of *R. ampla* is established now, the type locality of this species should be quoted as “Rhine near Rheineck” [ICZN Art. 76.2].

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- Таксономические заметки об европейско-сибирских пресноводных моллюсках. 1. *Turbo patulus* Da Costa, 1778 не является старшим синонимом *Limneus ampla* Hartmann, 1821 (Mollusca: Gastropoda: Lymnaeidae)
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- РЕЗЮМЕ.** Нами были рассмотрены история применения видового названия *Limneus ampla* Hartmann, 1821 (Gastropoda: Pulmonata: Lymnaeidae), а также употребление этого биномена в современной систематике. Было установлено, что это видовое название не должно рассматриваться как младший синоним *Turbo patulus* Da Costa, 1778, как было предложено Н.Д. Кругловым и Я.И. Старобогатовым [1983], поскольку оригинальное описание этого вида противоречит сопровождающему его рисунку, а сам автор использовал это название в очень широком смысле, так что оно может быть приложено к целому ряду палеарктических представителей (под)рода *Radix* Montfort, 1810. Кроме того, вид *L. ampla* не обитает в водоемах Британии, поэтому он вряд ли мог быть описан под названием *Turbo patulus*. Во избежание возможных трудностей, связанных с использованием данных названий в будущем, обозначаются лектотипы *Turbo patulus* (на основе оригинального авторского рисунка) и *Limnaeus ampla*.