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# Annotated type catalogue of lymnaeid snails (Mollusca, Gastropoda) in the collection of the Natural History Museum, Berlin

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## Abstract

The article deals with examination of the type materials of sixty-one species and variety of lymnaeid snails (Mollusca: Gastropoda: Lymnaeidae) housed in molluscan collection of the Natural History Museum Berlin, Germany (ZMB). Each taxon is discussed following the same scheme, including synomymy, information on the type materials, current taxonomic allocation, taxonomic and nomenclatorial remarks.

## Key Words

Pond snails
taxonomy
nomenclature
type series
history of malacology

## Introduction

The malacological collection of the Berlin Natural History Museum, Germany (ZMB hereafter) is among the richest molluscan repositories of the World. A brief information on the origin of the collection and its founders and former curators may be found in Glaubrecht and Zorn (2012) that allows me to omit it here. From the nomenclatorial point of view, the most valuable part of ZMB collection is that including the type materials of species described either by ZMB employes and associates (von Martens, Simroth, Thiele) or by scientists from other scientific institutions and / or countries. The systematic description of the type collection and publication of annotated catalogues of the type materials of molluscan species has started in 1960s (Kilias 1961, 1967) and is continuing now. In total, more than ten papers devoted to examination of the ZMB type materials have appeared in the last two decades. Most of them deal with terrestrial snails and slugs of various families (Köhler 2007; Glaubrecht and Zorn 2012; Breure 2013), others are devoted to cephalopods (Glaubrecht and Salcedo-Vargas 2000), freshwater snails (Köhler and Glaubrecht 2006), and brakishwater bivalves (Glaubrecht et al. 2007).

In this article, I present the results of my examination of the type series of species belonging to the family Lymnaeidae Rafinesque, 1815 housed in ZMB. This diverse family of aquatic pulmonates includes, according to different authorities, from 40 (Hubendick 1951) to several hundreds (Kruglov 2005) living species, most of which are characterized by substantial variation in shell traits. High phenotypical plasticity demonstrated by lymnaeids is the main cause that systematics of this family has been overloaded by synonyms. Hubendick (1951) listed more than 1000 names of the species group introduced by malacologists in their attempts to arrange the

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lymnaeid diversity, and it is by no means the exhaustive list. Though the vast majority of these names have been thrown out to the limbo of synonyms, many of them are still available for nomenclatorial acts. A relatively recent example of the resurrection of a long-forgotten lymnaeid name is Falkner et al. (2002) proposition to replace the species name *Radix peregra* (O.F. Müller, 1774) with almost ignored one, *R. labiatus* (Rossmässler, 1835), which was not in use since the middle of the 19th century. The current advances in molecular taxonomic studies also may create a situation when a long neglected name should be resurrected out of the limbo as being the oldest available label for a designation of a certain cryptic species not recognized by earlier, morphology-based, taxonomy. It makes both examination of the type specimens and publication of their images a challenging business, rather than a sort of activity once thought to be the destiny of old-fashioned museum curators and amateur conchologists.

## Material and methods

This study is a part of my recent project devoted to identification and publication of the Lymnaeidae types from European repositories. I worked with ZMB collection in April of 2015 searching for type materials of lymnaeid species described by Franz Hermann Troschel, Wilhelm Dunker, Eduard von Martens, Frank C. Baker and other, less prominent, malacologists of the 19th – first half of the 20th century. Some of these type series were identified earlier by Kilias (1961, 1967), who listed them and published illustrations of type specimens of a few of these species. However, the closer examination has shown Kilias overlooked nearly 30 type series kept in ZMB. In two his papers, the type materials of 31 lymnaeid taxa of species and below species rank were characterized, whereas in 2015 I managed to identify and examine as many as sixty one type series represented by dried shells exclusively. All these sixty one type series are presented below with images of syntypes (or lectotypes), shell dimensions, brief synonymies and various remarks concerning taxonomy, nomenclature and distribution of the taxa. The taxa accounts are arranged in the alphabetic order. The generic and suprageneric taxonomy used here follows my previously published system (Vinarski 2013). The structure of the article as well as the taxa accounts is based on the recently published catalogues of ZMB collection. As the nearest example to mimic I chose Köhler's (2007) article. The scheme of measurements of a turbospiral shell corresponds to shemes used in recent taxonomic monographs (Glöer 2002; Kruglov 2005).

Abbreviations of shell dimensions are as follows. SH – shell height, SW – shell width, SpH – spire height, BWH – body whorl height, AH – aperture height, AW – aperture width, WN – whorls number. All dimensions in the taxa accounts are given in millimeters.

**Abbreviations of the malacological repositories**

BMNH – British Museum (Natural History), London, UK; MNHN – National Museum of Natural History, Paris, France; NHMV – Natural History Museum in Vienna, Austria; NMG – Natural History Museum in Gothenburg, Sweden; ZIN – Zoological Institute, the Russian Academy of Sciences, Saint-Petersburg, Russia; ZMB – Berlin Natural History Museum, Germany.

## Systematic list of species and varieties arranged in alphabetical order

### *alfredi* Suter, 1890

Fig. 1

*Limnaea alfredi* Suter 1890: 229, pl. 15, figs. 17, 17a.
*Limnaea tenisoni* var. β *Alfredi* Suter 1893: 230.
*Lymnoëa alfredi* Suter 1913: 604, pl. 24, fig. 10.
*Limnaea alfredi* Dell 1956: 74, figs. 8, 9, 11, 12.
*Limnaea alfredi* Kilias 1967: 337.
*Lymnaea truncatula* Climo and Pullan 1972: 6, figs. 2C–E, 3D.

**Type material.** The lectotype is housed in the Museum of New Zealand (Te Papa Tongarewa) under accession number M 125077 (see Dell 1956, fig. 8; Climo and Pullan 1972, fig. 2 E). ZMB collection possesses two paralectotypes kept under accession number 47038. The largest of the two is 7,2 mm height.

**Type locality.** New Zealand, Southern Island, Governors Bush, Hooker Valley, Mount Cook Hermitage (fide Kilias 1967). leg. H. Suter.

**Current taxonomic allocation.** Climo and Pullan (1972) considered it to be a synonym of *Galba* (*Galba*) *truncatula* (O.F. Müller, 1774) introduced to New Zealand after advent of Europeans, however Dell (1956: 74) noted some slight conchological differences between *L. alfredi* and *G. truncatula* and stated that *L. alfredi* "has had a history in New Zealand that pre-dates European influence" and that "it is a truly indigenous form". Hubendick (1951) synonymized *L. alfredi* with *Limnaea tenella* Hutton, 1885, but Dell (1956) was able to show that the latter species name was based on juvenile shells of the introduced from Europe *Lymnaea stagnalis* (L., 1758).

### *amnicola* Westerlund, 1890

Fig. 2

*Limnaea* (*Gulnaria*) *ovata* var. *amnicola* Westerlund 1890: 147.
*Limnaea ovata* var. *amnicola* Kilias 1967: 337.

**Type material.** It is known that Westerlund often distributed parts of the type series of taxa described by him among several European museums (Vinarski et al. 2013), therefore in many cases the syntypes of the same species or variety are kept now in more than one repository. I

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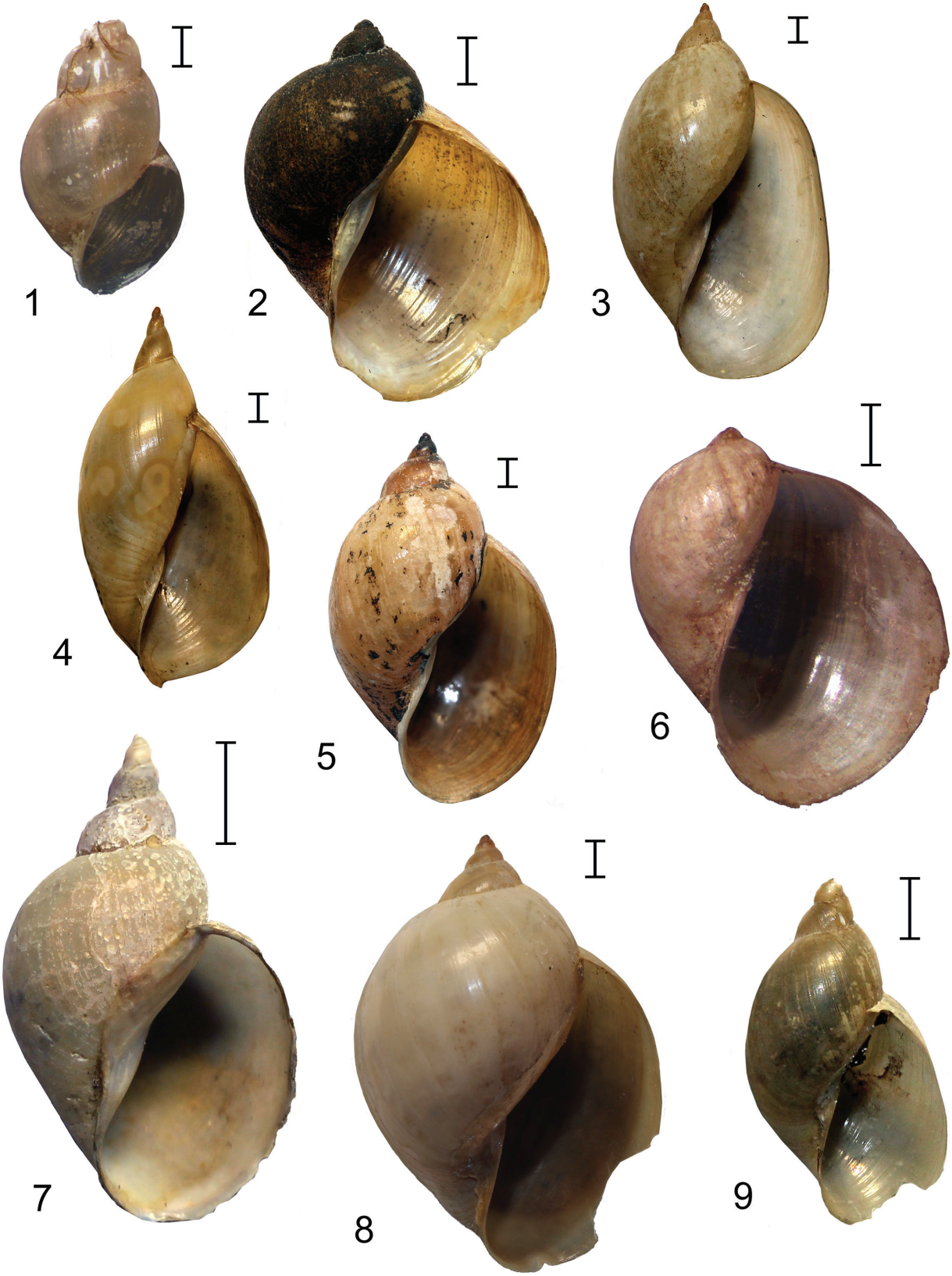


**Figures 1–9.** Type specimens of Lymnaeidae (ZMB). **1** – *Limnaea alfredi* Suter, 1890, a paralectotype. **2** – *Limnaea ovata* var. *amnicola* Westerlund, 1890, a syntype. **3, 4** – *Limnaeus amygdalum* Troschel, 1837, two syntypes. **5** – *Limnaea javanica* var. *angustior* von Martens, 1881, a syntype. **6** – *Limnaea brevispira* von Martens, 1897, the holotype. **7** – *Limnaea stagnalis* var. *baltica* Lindström, 1869, a syntype. **8** – *Limnaeus cerasum* Troschel, 1837, a syntype. **9** – *Limnaea columella* var. *championi* von Martens, 1899, a syntype. Scale bars: 1 mm (**1**), 2 mm (**2–6, 8–9**), 5 mm (**7**).

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managed to find syntypes of *L. ovata* var. *amnicola* in NMG (accession number 3727), ZIN (accession number 1) and ZMB (three syntypes kept under No. 49530). The lectotype was not designated.

**Type locality.** Ronneby and Kristianstad, Sweden (Westerlund 1890).

**Current taxonomic allocation.** An obvious junior synonym of *Radix* (*Peregriana*) *balthica* (L., 1758).

### *amygdalum* Troschel, 1837

Figs 3, 4

*Limnaeus amygdalum* Troschel 1837: 168.
*Limnaeus amygdalum* Küster 1862: 35, pl. 6, figs 15, 16.
*Limnaea acuminata* var. *amygdalum* von Martens, 1881: 76, pl. 14, figs 7, 8.
*Limnaea acuminata* var. *amygdalum* Preston 1915: 107.
*Limnaea acuminata* f. *typica* Annandale and Rao 1925: 180.
*Lymnaea auricularia* race *rufescens* Hubendick 1951: 157, fig. 344.
*Lymnaea* (*Pseudosuccinea*) *acuminata* Subba Rao 1989: 126, figs 254–265, 272.

**Type material.** Two samples of *L. amygdalum* from the Ganges River in ZMB (Nos. 72991 and 109767) contain, in total, 12 syntypes. The largest syntype is 30.0 mm height. The syntypes are visibly different in their proportions (compare figs 3 and 4).

**Type locality.** India, the Ganges River.

**Current taxonomic allocation.** *Radix* (*Radix*) *rufescens* (Gray, 1822).

### *angustior* von Martens, 1881

Fig. 5

*Limnaea javanica* var. *angustior* von Martens, 1881: 88, pl. 16, fig. 8.
*Limnaea javanica* var. *angustior* von Martens, 1897a: 4.
*Limnaea javanica* var. *angustior* Kilias, 1961: 162.

**Type material.** 49 syntypes collected in Makassar (Celebes Island, Indonesia) and kept under No. 8136. The largest of these shells reaches 26.2 mm height. Kilias (1961) reported that he intended one of these shells to become the lectotype of *Limnaea javanica* var. *angustior* and separated it under accession number 8136a, however I was not able to find this specimen in ZMB collection. Probably, it is still placed among other syntypes under No. 8136.

**Type locality.** Indonesia: Java Island (Batavia and Tjisurupan), Celebes Island (Makassar). leg. von Martens.

**Current taxonomic allocation.** *Cerasina luteola* (Lamarck, 1822). Hubendick (1951) synonymized *L. javanica* var. *angustior* with the race *rubiginosa* of *Radix auricularia* (L., 1758).

### *baltica* Lindström, 1868

Fig. 7

*Limnaea stagnalis* var. *baltica* Lindström 1868: 22.
*Limnaea stagnalis* var. *baltica* Westerlund 1885: 29.
*Limnaea stagnalis* f. *baltica* Kilias 1961: 162.

**Type material.** ZMB collection contains six specimens (presumably syntypes) of this variety from Westerlund's collection. The largest of them is 24.2 mm height (Lindström [1868] reported the maximum shell height for this variety equal to 30 mm). The current location of other shells from the type series is unknown.

**Type locality.** Baltic Sea, east shores of the Gotland Island (Östergarn, Legraf, Haugröne and Fårosund).

**Current taxonomic allocation.** *Lymnaea* (*Lymnaea*) *stagnalis*. This variety represents a dwarf morph of the great pond snail inhabiting the Baltic Sea (Westerlund 1885).

### *brevispira* von Martens, 1897

Fig. 6

*Limnaea brevispira* von Martens 1897a: 2, pl. 1, figs 1, 2; pl. 13, figs 1, 3.
*Lymnaea brevispira* Hubendick 1951: 165, fig. 356.
*Lymnaea brevispira* Kilias 1961: 163.

**Type material.** A single specimen is kept in ZMB under accession number 101157. The original description of the species was based on this single specimen (von Martens 1897a) and thus this specimen must be regarded as the holotype by monotypy.

**Holotype dimensions.** WN 2.50; SH 10.9; SW 9.5; SpH 1.2; BWH 10.4; AH 9.6; SW 6.8.

**Type locality.** Indonesia, Sumatra Island, Manindjau Lake.

**Current taxonomic allocation.** This is valid species with unclear generic position. It may belong to either genus *Austropeplea* Cotton, 1942 or to the genus *Bullastra* Bergh, 1901.

### *cerasum* Troschel, 1837

Fig. 8

*Limnaeus cerasum* Troschel 1837: 170.
*Limnaea acuminata* var. *cerasum* Preston 1915: 108.
*Lymnaea luteola* Hubendick 1951: 161, fig. 349.

**Type material.** There are three samples of *L. cerasum* from the Ganges River in ZMB kept under accession numbers 8650 (six syntypes), 72989 (a single syntype), and 109766 (two syntypes). The largest syntype's shell is 23.3 mm height.

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**Type locality.** India, the Ganges River.

**Current taxonomic allocation.** A junior synonym of *Cerasina luteola*.

### *championi* von Martens, 1899

Fig. 9

*Limnaea columella* var. *championi* von Martens 1890-1901: 378, pl. XIX, fig. 12.
*Limnaea columella* var. *championi* Kilias 1961: 162.

**Type material.** Two syntypes collected in Bugaba (South Panama) by Champion and kept in ZMB collection under No. 51244. The largest of these shells reaches 12.4 mm height. Kilias (1961) reported that he intended one of these shells to become the lectotype of *Limnaea columella* var. *championi* and separated it under accession number 51244a, however I was not able to find this specimen in ZMB collection. Probably, it is still placed among other syntypes under No. 51244. Both type specimens represent subadult shells.

**Type locality.** Panama (southern), Bugaba.

**Current taxonomic allocation.** *Pseudosuccinea columella* (Say, 1817).

### *coreana* von Martens, 1886

Fig. 10

*Limnaea auricularia* var. *coreana* von Martens 1886: 80.
*Lymnaea auricularia* var. *coreana* Kilias 1967: 338, fig. 2.
*Lymnaea* (*Radix*) *coreana* Bogatov and Zatravkin 1990: 112, fig. 28 в.
*Lymnaea* (*Radix*) *coreana* Kruglov and Starobogatov 1993a: 92, fig. 14 C.
*Lymnaea* (*Radix*) *coreana* Starobogatov et al. 2004: 316, pl. 132, fig. 2.

**Type material.** 11 syntypes in two samples: No. 38440 (seven syntypes) and No. 55594 (4 syntypes), leg. Gottsche (without date).

**Type locality.** Korea, "Changjin, Prov. Hangyöngdo".

**Current taxonomic allocation.** *Radix* (*Radix*) *coreana*.

**Syntypes dimensions.** See Table 1.

**Remarks.** Hubendick (1951) considered *L. auricularia* var. *coreana* as a synonym of *R. auricularia*, whereas the Russian authors (Bogatov and Zatravkin 1990; Kruglov and Starobogatov 1993; Kantor et al. 2010) accept its validity. Kilias (1967) stated he separated one of the syntypes under the museum number 38440a – to become the lectotype of this taxon. However, I failed to find this specimen in the collection. Currently none of the syntypes either is labelled as the syntype or is placed in a separate container with number 38440a.

### *costulata* von Martens, 1874

Fig. 11

*Limnaea lagotis* var. *costulata* von Martens 1874: 26, pl. II, fig. 24.
*Limnaea lagotis* var. *costulata* Nevill 1878: 8.
*Limnaea lagotis* f. *costulata* Annandale & Rao 1925: 153, fig. 7.
*Limnaea auricularia* var. *lagotis* f. *costulata* Zhadin 1933: 95.
*Lymnaea costulata* Hubendick 1951: 72, fig. 154.
*Radix lagotis* var. *costulata* Zhadin 1952: 170, fig. 67.

**Type material.** I could not recognize the syntype(s) of this variety in ZMB collection. However, there are several specimens (subadult shells) labelled as *L. lagotis* var. *costulata* and collected in Charik-Kul' Lake (Uzbekistan, in vicinities of Katta-Kurgan Town) by Fedchenko (see Fig. 11). Martens (1874: 27) discussed shells from this locality in his monograph under the name *L. lagotis* but did not assign them to a certain variety of this species. It is unclear who and when identified shells from Charik-Kul' as *L. lagotis* var. *costulata*.

**Type locality.** Uzbekistan, Tashkent City, leg. A.P. Fedchenko.

**Current taxonomic allocation.** *Radix* (*Peregriana*) *lagotis* (Schrank, 1803) or *Radix* (*Radix*) sp.

**Remark.** In 1897, von Martens (1897a) described a new variety *Limnaea javanica* var. *costulata* from Indonesia (Java Island). I was not able to find the type series of it in ZMB collection.

### *cubensis* Pfeiffer, 1839

Fig. 12

*Limnaeus cubensis* Pfeiffer 1839: 354.
*Limnaeus cubensis* Küster 1862: 32, pl. 6, figs 6–8.
*Limnaea cubensis* von Martens 1899: 378.
*Galba* (*Galba*) *cubensis* Baker 1911: 204, pl. 27, figs 9–16.
*Lymnaea cubensis* Hubendick 1951: 128, fig. 310.
*Limnaeus cubensis* Kilias 1961: 163.
*Fossaria* (*Bakerilymnaea*) *cubensis* Burch 1989: 174, fig. 587.
*Fossaria cubensis* Pointier et al. 2005: 38, textfigs

**Type material.** Two syntypes kept under No. 101522. leg. Pfeiffer.

**Type locality.** "Cuba", without precise location.

**Syntypes dimensions.** (1) WN 5.25; SH 8.1; SW 4.4; SpH 4.5; BWH 5.9; AH 3.8; SW 3.1; (2) WN 5.25; SH 7.6; SW 4.1; SpH 4.1; BWH 5.2; AH 3.6; SW 2.7.

**Current taxonomic allocation.** *Galba* (*Bakerilymnaea*) *cubensis*. Some authors place this species into the genus *Fossaria* Westerlund, 1885.

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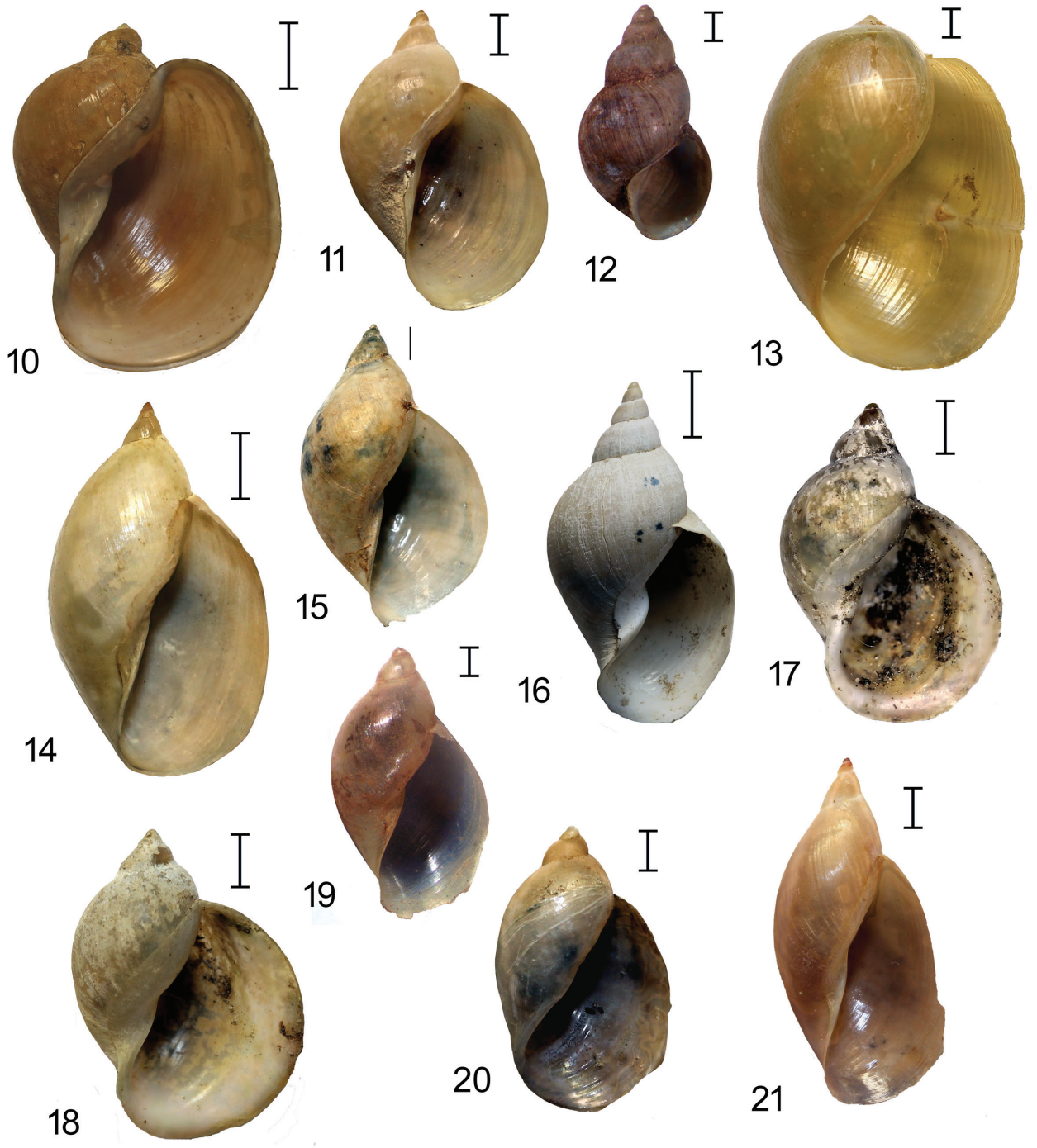


**Figures 10–21.** Type specimens of Lymnaeidae (ZMB, ZIN), continuation. **10** – *Limnaea auricularia* var. *coreana* von Martens, 1886, a syntype. **11** – *Limnaea lagotis* var. *costulata*. **12** – *Limnaea cubensis* Pfeiffer, 1839, a syntype. **13** – *Amphipeplea cumingiana* Pfeiffer, 1845, a probable syntype (ZMB No. 109771). **14** – *Limnaea amygdalum* var. *cycacea* Troschel, 1837, a syntype. **15** – *Limnaea elmeteitensis* Smith, 1894, a syntype. **16** – *Stagnicola elrodi* Baker & Henderson, 1933, a syntype. **17** – *Limnaea ovata* var. *eversa* von Martens, 1882, the lectotype. **18** – *Limnaea ovata* var. *eversa* von Martens, 1882, a paralectotype. **19** – *Limnaeus natalensis* var. *exsertus* von Martens, 1966, the syntype. **20** – *Amphipeplea ampulla* var. *globosa* Suter, 1891, a syntype. **21** – *Limnaea acuminata* var. *gracilior* von Martens, 1881, the syntype. Scale bars: 1 mm (12, 19), 2 mm (**11, 13, 15–18, 20, 21**), 5 mm (**10, 14**). All shells are from ZMB collection, except of 17 (ZIN).

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### *cumingiana* (*cumingi*) Pfeiffer, 1845

Fig. 13

*Amphipeplea cumingiana* Pfeiffer 1845: 68.
*Amphipeplea cumingi* Pfeiffer 1854–1860: 5, pl. II, figs 3-4.
*Lymnaea cumingiana* Hubendick 1951: 162, fig. 355.

**Type material.** Two probable syntypes from Luzon Island kept under No. 109771. leg. Dunker ex coll. Pfeiffer. Another probable syntype from the same island is under No. 109772. The largest of these specimens is 26.1 mm height. The labels bear no information about the nomenclatorial status of the shells, and their identification as probable syntypes may be questioned. The species name on the labels is spelled as "*Amphipeplea cumingi*" (see Remark below).

**Type locality.** Philippines, island of Luzon, Naga, province of South Camerines. leg. Cuming.

**Current taxonomic allocation.** *Bullastra cumingiana*.

**Remark.** Originally, Pfeiffer (1845) described this species as *Amphipeplea cumingiana* but later he re-named it *A. cumingi*.

### *cycacea* Troschel, 1837

Fig. 14

*Limnaea amygdalum* var. *cycacea* Troschel 1837: 170.
*Lymnaea auricularia* race *rufescens* Hubendick 1951: 157, fig. 344.

**Type material.** Five syntypes kept under No. 109768.

**Type locality.** India, the Ganges River.

**Current taxonomic allocation.** *Radix* (*Radix*) *rufescens* (Gray, 1822).

### *elmeteitensis* Smith, 1894

Fig. 15

*Limnaea elmeteitensis* Smith 1894: 167, fig. 5.
*Lymnaea elmeteitensis* Hubendick 1951: 59, fig. 74.
*Limnaea elmeteitensis* Kilias 1961: 163.
*Lymnaea natalensis* Brown 1994: 166, fig. 76 a, b; 79a.

**Type material.** Three syntypes of *L. elmeteitensis* kept under No. 47554. The largest of them is 21.2 mm height. The rest of the type series is, probably, in BMNH.

**Type locality.** Kenya, lakes Baringo and Elmeteita.

**Current taxonomic allocation.** *Radix* (*Radix*) *natalensis* (Krauss, 1848).

### *elrodi* Baker & Henderson, 1933

Fig. 16

*Stagnicola elrodi* Baker and Henderson 1933: 30.

**Type material.** ZMB collection possesses two syntypes kept under No. 90525. Other syntypes are in the University of Illinois Museum of Natural History (No. Z33780) and the University of Colorado Museum (No. 19134) [fide Baker and Henderson 1933].

**Type locality.** USA, Montana, west shore Flathead Lake, 13 1/2 miles north of Poison.

**The largest ZMB syntype dimensions.** WN 5.25; SH 16.3; SW 8.6; SpH 7.6; BWH 13.2; AH 10.2; SW 5.8.

**Current taxonomic allocation.** Hubendick (1951) identified *S. elrodi* with *Lymnaea emarginata* (Say, 1821). It should be noted, however, the ZMB syntypes resemble closely a subadult shell of the Holarctic *L. stagnalis*.

### *eversa* von Martens, 1882

Figs 17, 18

*Limnaea ovata* var. *eversa* von Martens 1882: 35, pl. 4, fig. 7.
*Limnaea auricularia* var. *eversa* Zhadin 1933: 96, fig. 39.
*Lymnaea eversa* Starobogatov & Streletzkaya 1967: 231, fig. 18.

**Type material.** The lectotype of *L. ovata* var. *eversa* (see Fig. 17) was designated by Starobogatov and Streletzkaya (1967). It is housed in ZIN (No. 2 in systematic catalogue). ZIN collection contains also 25 paralectotypes (No. 1 in systematic catalogue). Other 19 paralectotypes (adult and juvenile shells) are in ZMB (accession number 34822).

**Type locality.** Northern Mongolia, Eter River near Dzha-Dzassyk Monastery. leg. Potanin, 1877.

**Current taxonomic allocation.** *Radix* (*Peregriana*) *balthica* (L., 1758). Most of the syntypes correspond to the species *Lymnaea* (*Peregriana*) *intermedia* Lamarck, 1822 sensu Kruglov 2005 = *R. balthica* s. lato.

**ZMB paralectotypes dimensions.** See Table 1.

### *exsertus* von Martens, 1866

Fig. 19

*Limnaeus natalensis* var. *exsertus* von Martens 1866: 101, pl. 3, figs 8, 9.
*Limnaeus natalensis* var. *exsertus* Clessin 1886: 400.
*Limnaea exserta* von Martens 1897b: 136, pl. 6, fig. 7.
*Lymnaea natalensis* Hubendick 1951: 158, figs 345–347.
*Lymnaea natalensis* Brown 1994: 166, fig. 76 a, b; 79a.

**Type material.** A single shell (the syntype) is kept under No. 8586. This shell has 9.4 mm height.

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**Type locality.** Ethiopia (Abyssinia), Aiz Zaba spring near Zasaga.

**Current taxonomic allocation.** *Radix* (*Radix*) *natalensis* (Krauss, 1848).

### *globosa* Suter, 1891

Fig. 20

*Amphipeplea ampulla* var. *globosa* Suter 1891: 93, pl. 18, figs 12a–c.
*Amphipeplea ampulla* var. *globosa* Suter 1893: 231.
*Amphipeplea ampulla* var. *globosa* Suter 1913: 608.
*Simlimnaea tomentosa* Dell 1956: 76, figs 33–48.
*Amphipeplea ampulla* var. *globosa* Kilias 1967: 339.
*Lymnaea tomentosa tomentosa* Climo and Pullan 1972: 8, fig. 1, C–I.

**Type material.** There are three syntypes in ZMB kept under No. 47040. The largest of them is 11.6 height. Another syntype is housed in the Museum of New Zealand (Te Papa Tongarewa) under accession number M 125108. leg. Suter.

**Type locality.** New Zealand, Southern Island, Governors Bush, Hooker Valley.

**Current taxonomic allocation.** *Austropeplea tomentosa* (Pfeiffer, 1855) [fide Climo and Pullan 1972].

### *gracilior* von Martens, 1881

Fig. 21

*Limnaea acuminata* var. *gracilior* von Martens 1881: 77.
*Limnaea acuminata* var. *gracilior* Preston 1915: 109.
*Lymnaea auricularia* race *rufescens* Hubendick 1951: 157, fig. 344.
*Lymnaea* (*Pseudosuccinea*) *acuminata* Subba Rao 1989: 126, figs 254–265, 272.

**Type material.** There is a single specimen (the syntype) of *L. acuminata* var. *gracilior* in ZMB (accession number 9362). Its shell height is equal to 22.5 mm (von Martens reported SH = 24.0 mm).

**Type locality.** India, Bengal (without precise location).

**Current taxonomic allocation.** *Radix* (*Radix*) *rufescens*.

### *gutta* Villa & Villa, 1871

Fig. 22

*Limnaea gutta* Villa and Villa 1871: 92 (nomen nudum).
*Limnaea gutta* Kilias, 1967: 339.

**Type material.** There is a single specimen (syntype) of *L. gutta* in ZMB (accession number 17739). Its shell height is equal to 6.6 mm.

**Type locality.** Italy, Lombardy (from the Villa and Villa's work title).

**Current taxonomic allocation.** The syntype of *L. gutta* may be identified as a juvenile *R.* (*Peregriana*) sp. Possibly, this shell belongs to *R. balthica* or *R. ampla* (Hartmann, 1821).

**Remark.** Villa and Villa (1871) published this species name without diagnosis or other information that would make it available under article 12 of the International Codex of Zoological Nomenclature.

### *humerosa* von Martens, 1897

Fig. 23

*Limnaea humerosa* von Martens 1897b: 135, pl. 6, fig. 1.
*Lymnaea natalensis* Hubendick 1951: 158, figs 345–347.
*Limnaea humerosa* Kilias 1961: 163.
*Lymnaea natalensis* Brown 1994: 166, figs 76 a, b; 79a.

**Type material.** The lectotype (ZMB No. 101518) and six paralectotypes (No. 101519) in ZMB collection. The lectotype was designated by Kilias (1961), its shell height is 23.4 mm.

**Type locality.** Uganda, Mengo, in an artificial pond leg. Stuhlmann (05.01.1891) – locality of the lectotype. von Martens (1897b) mentioned more locations of this species in Uganda and other regions of East Africa.

**Current taxonomic allocation.** *Radix* (*Radix*) *natalensis*.

### *impedita* Baker, 1934

Fig. 24

*Stagnicola impedita* Baker 1934: 20.
*Stagnicola impedita* Kilias 1961: 163.

**Type material.** Originally, the type series consisted of four specimens (the holotype and three paratypes) housed in the Geological Department of the Stanford University under accession number 5776 (Baker 1934). Later, two of the paratypes were given to ZMB and are kept now under No. 90524. Their label contains an indication that the shells origin "from type lot". The larger of two shells is 12.8 mm height that a little less than size reported by Baker (1934).

**Type locality.** USA, Utah, near Logan, Cash Co.

**Current taxonomic allocation.** Hubendick (1951) believe *S. impedita* to be a synonym of *Lymnaea palustris* (O.F. Müller, 1774), but it is incredible since this Palearctic species does not live in North America (Burch 1989; Johnson et al. 2013).

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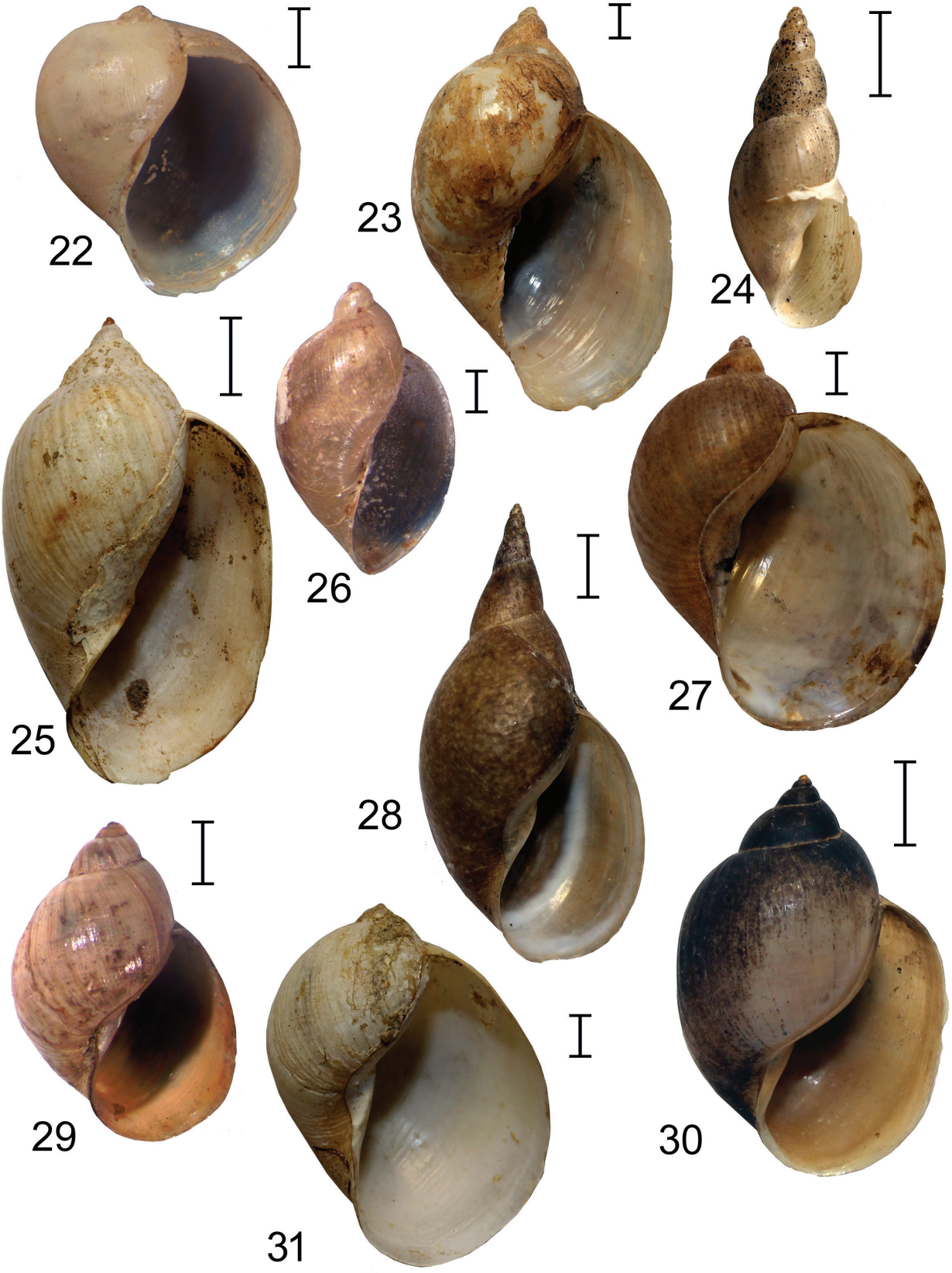


**Figures 22–31.** Type specimens of Lymnaeidae (ZMB), continuation. **22** – *Limnaea gutta* Villa & Villa, 1871, the syntype. **23** – *Limnaea humerosa* von Martens, 1897, the lectotype. **24** – *Stagnicola impedita* Baker, 1934, a paratype. **25** – *Limnaeus javanicus* var. *intumescens* von Martens, 1867, a syntype. **26** – *Limnaea kempi* Preston, 1911, the syntype. **27** – *Limnaea limosa* var. *ovata* f. *margaritacea* Westerlund, 1865, a syntype. **28** – *Limnaea stagnalis* var. *westerlundi* f. *nereni* Westerlund, 1894, a syntype. **29** – *Limnaea nitidella* von Martens, 1885, the lectotype. **30** – *Limnaeus nucleus* Troschel, 1837, a syntype. **31** – *Limnaea nyansae* von Martens, 1892, a syntype. Scale bars: 1 mm (**22, 26, 29**), 2 mm (**23, 24, 27, 31**), 5 mm (**25, 28, 30**).

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### *intumescens* von Martens, 1867

Fig. 25

*Limnaeus javanicus* var. *intumescens* von Martens 1867: 223.
*Limnaea javanica* var. *intumescens* von Martens 1881: 88, pl. 16, figs 2, 3.
*Limnaea javanica* var. *intumescens* von Martens 1897a: 3.
*Limnaea javanica* var. *intumescens* Kilias 1961: 163.

**Type material.** Three shells of syntypes collected in Surabaya (Java Island, Indonesia) and kept under No. 8140. The largest of these shells reaches 26.6 mm height. Kilias (1961) reported that he intended one of these shells to become the lectotype of *Limnaeus javanicus* var. *intumescens* and separated it under accession number 8140a, however I was not able to find this specimen in ZMB collection. Probably, it is still placed among other syntypes under No. 8140.

**Type locality.** Indonesia: Java Island (Surabaya, Passuruan, Rogodjampi). leg. von Martens and Zollinger.

**Current taxonomic allocation.** *Cerasina luteola*. Hubendick (1951) synonymized *L. javanica* var. *intumescens* with the race *rubiginosa* of *Radix auricularia*.

### *kempi* Preston, 1912

Fig. 26

*Limnaea kempi* Preston 1912: 190, pl. 32, fig. 1.
*Lymnaea natalensis* Hubendick 1951: 158, figs 345–347.
*Limnaea kempi* Kilias 1961: 163.
*Lymnaea natalensis* Brown 1994: 166, figs 76 a, b; 79a.

**Type material.** A single (subadult) specimen, the syntype, is kept in ZMB under accession number 62382. Its shell height is 7.4 mm.

**Type locality.** East Africa, Victoria Lake.

**Current taxonomic allocation.** *Radix* (*Radix*) *natalensis*.

### *margaritacea Westerlund, 1865*

Fig. 27

*Limnaea limosa* var. *ovata* f. *margaritacea* Westerlund 1865: 91.
*Limnaea lagotis* var. *margaritacea* Westerlund 1873: 334.
*Limnaea lagotis* var. *margaritacea* Westerlund 1885: 34.
*Limnaea lagotis* var. *margaritacea* Kilias 1961: 164.

**Type material.** Two syntypes are kept in ZMB under accession number 49531. The largest of them is 18.5 height. The other syntypes are in ZIN (No. 1 in systematic catalogue) and NMG (accession number 3690).

**Type locality.** Ronneby, Sweden.

**Current taxonomic allocation.** Most probably, *Radix* (*R.*) *auricularia*.

### *nereni* Westerlund, 1894

Fig. 28

*Limnaea stagnalis* var. *westerlundi* f. *nereni* Westerlund 1894: 196.
*Lymnaea stagnalis* Hubendick 1951: 118, figs 299–300.
*Limnaea stagnalis* var. *westerlundi* f. *nereni* Kilias 1967: 339.
*Lymnaea stagnalis* Glöer 2002: 222, fig. 250.

**Type material.** Two syntypes are kept in ZMB under accession number 49527. The largest of them is nearly 40 mm of height (the shell apex is broken). The four other syntypes are in ZIN (No. 1 in systematic catalogue). Possibly, some syntypes will be found in NMG.

**Type locality.** Skeninge, Sweden.

**Current taxonomic allocation.** *Lymnaea* (*Lymnaea*) *stagnalis*.

### *nitidella* von Martens, 1885

Fig. 29

*Limnaea nitidella* von Martens 1885: 178, pl. 35, figs 16, 17.
*Limnaea nitidella* Kilias 1961: 164.

**Type material.** The lectotype (designated by Kilias 1961) and 18 paralectotypes (ZMB No. 35593).

**Type locality.** Ecuador, region of Chorrera de Agoyan (von Martens 1885).

**Lectotype dimensions.** WN 3.75; SH 7.8; SW 5.1; SpH 2.9; BWH 6.5; AH 5.0; SW 3.3.

**Current taxonomic allocation.** Uncertain. Hubendick (1951) treated it as a species of unclear identity (possibly no lymnaeid). In my opinion, *L. nitidella* is similar to another lymnaeid species described from Ecuador, *L. cousini* (Jousseaume, 1887) [see conchological characterization of this species in Paraense 1995; Pointier et al. 2004] and may represent its senior objective synonym.

### *nucleus* Troschel, 1837

Fig. 30

*Limnaeus nucleus* Troschel 1837: 171.
*Limnaea acuminata* var. *nucleus* von Martens 1881: 82, pl. 15, figs 8, 9.
*Limnaeus nucleus* Clessin 1886: 378, pl. 50, fig. 6.
*Limnaea acuminata* var. *nucleus* Preston 1915: 109.
*Limnaea luteola* f. *ovalis* Annandale and Rao 1925: 184, fig. IV (2)

**Type material.** Ten syntypes are kept in ZMB under accession number 8051. The largest syntype's shell is 23.0 mm height.

**Type locality.** India, the Ganges River.

**Current taxonomic allocation.** A junior synonym of *Cerasina luteola.*

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### *nyansae* von Martens, 1892

Fig. 31

*Limnaea nyansae* von Martens 1892: 16.
*Lymnaea nyansae* Hubendick 1951: 60, fig. 76.
*Limnaea nyansae* Kilias 1961: 164.
*Lymnaea natalensis* Brown 1994: 166, figs 76 a, b; 79a.

**Type material.** 16 shells (syntypes) from the type locality are kept in ZMB under accession number 101521. Kilias (1961) reported that he intended one of these shells to be the lectotype of *Limnaea nyansae* and separated it under No. 101521a, however I was not able to find this specimen in ZMB collection. Probably, it is still placed among other syntypes under No. 101521. The largest shell in this sample reaches 15.3 mm height.

**Type locality.** The western shore of the Victoria Lake, near Bukoba and Towalio.

**Current taxonomic allocation.** *Radix* (*Radix*) *natalensis*.

### *obesus* von Martens, 1867

Fig. 32

*Limnaeus javanicus* var. *obesus* von Martens 1867: 223.
*Limnaea javanica* var. *obesa* von Martens 1881: 87, pl. 16, fig. 1.
*Limnaeus javanicus* var. *obesus* Kilias, 1961: 164, fig. 5.

**Type material.** 14 shells of syntypes collected in Indonesia and kept under No. 8124. The largest of these shells reaches 27.0 mm height. Kilias (1961) reported that he intended one of these shells to be the lectotype of *Limnaeus javanicus* var. *obesus* and separated it under accession number 8124a, however I was not able to find this specimen in ZMB collection. Probably, it is still placed among other syntypes under No. 8124.

**Type locality.** Indonesia: Java Island (Telaga, Patengan). leg. Baron von Richthofen.

**Current taxonomic allocation.** *Cerasina luteola*. Hubendick (1951) synonymized *L. javanica* var. *obesus* with the race *rubiginosa* of *Radix auricularia*.

### *obliquatus* von Martens, 1864

Fig. 33

*Limnaeus obliquatus* von Martens 1864b: 116, pl. 3, figs 9–10.
*Limnaea auricularia* var. *obliquata* Zhadin 1933: 96, fig. 38.
*Radix auricularia* var. *obliquata* Zhadin 1952: 168, figs 65, 66.
*Lymnaea* (*Radix*) *obliquata* Kruglov and Starobogatov 1993: 88, fig. 13B.

**Type material.** Two syntypes (ZMB no. 7164). leg. Semenov.

**Type locality.** "Im Landsee Issyk-Kul am Nordabhang des Thienschan, 4691´ Pariser Fuss über der Meere, 43° N.B" = Kyrgyzstan, nothern shore of the Issyk-Kul' Lake.

**Current taxonomic allocation.** *Radix* (*Radix*) *obliquata*.

**Syntypes dimensions.** (1) WN 3.75; SH 27.1; SW 25.2; SpH 7.3; BWH 26.3; AH 23.3; SW 16.8; (2) WN 4.12; SH 28.8; SW 25.8; SpH 6.8; BWH 27.4; AH 22.4; SW 17.6.

**Remarks.** The type series has been overlooked by Kilias (1961, 1967). Hubendick (1951) considered *L. obliquata* as a junior synonym of *R. auricularia*, whereas the Russian authors (Kruglov and Starobogatov 1993; Kantor et al. 2010) accept its validity.

### *patulus* Troschel, 1837

Fig. 34

*Limnaeus patulus* Troschel 1837: 167.
*Limnaeus patulus* Clessin 1886: 378, pl. 50, fig. 3.
*Limnaea acuminata* var. *patula* Preston 1915: 107.
*Limnaea acuminata* var. *patula* Annandale and Rao 1925: 181, fig. III (9).
*Lymnaea auricularia* race *rufescens* Hubendick 1951: 157, fig. 344.
*Lymnaea acuminata* f. *patula* Subba Rao 1989: 127, figs 256, 257.

**Type material.** The syntypes of *L. patulus* in ZMB are placed in two samples: No. 8044 (25 syntypes) and 72990 (a single syntype). leg. Lamare Piquot.

**Type locality.** India, the Ganges River.

**Current taxonomic allocation.** *Radix* (*Radix*) *rufescens.*

**Syntypes dimensions.** See Table 1.

### *pervius* von Martens, 1867

Fig. 35

*Limnaeus pervius* von Martens 1867: 221.
*Limnaea pervia* von Martens 1882: 40, pl. 4, fig. 11.
*Limnaeus pervia* Clessin 1886: 388, pl. 53, fig. 6.
*Lymnaea pervia* Hubendick 1951: 94, figs 234-235, 248-250.
*Galba pervia* Zhadin 1952: 176, fig. 77.
*Limnaeus pervius* Kilias 1961: 164.

**Type material.** The lectotype (designated by Kilias 1961) and 175 paratypes are kept in ZMB under accession numbers 8143a (the lectotype) and 8143b. The height of the lectotype shell is 11.4 mm.

**Type locality.** Northern China, Chi-foo (= Tschifu). leg. Schottmüller.

**Current taxonomic allocation.** *Orientogalba hookeri* (Reeve, 1850).

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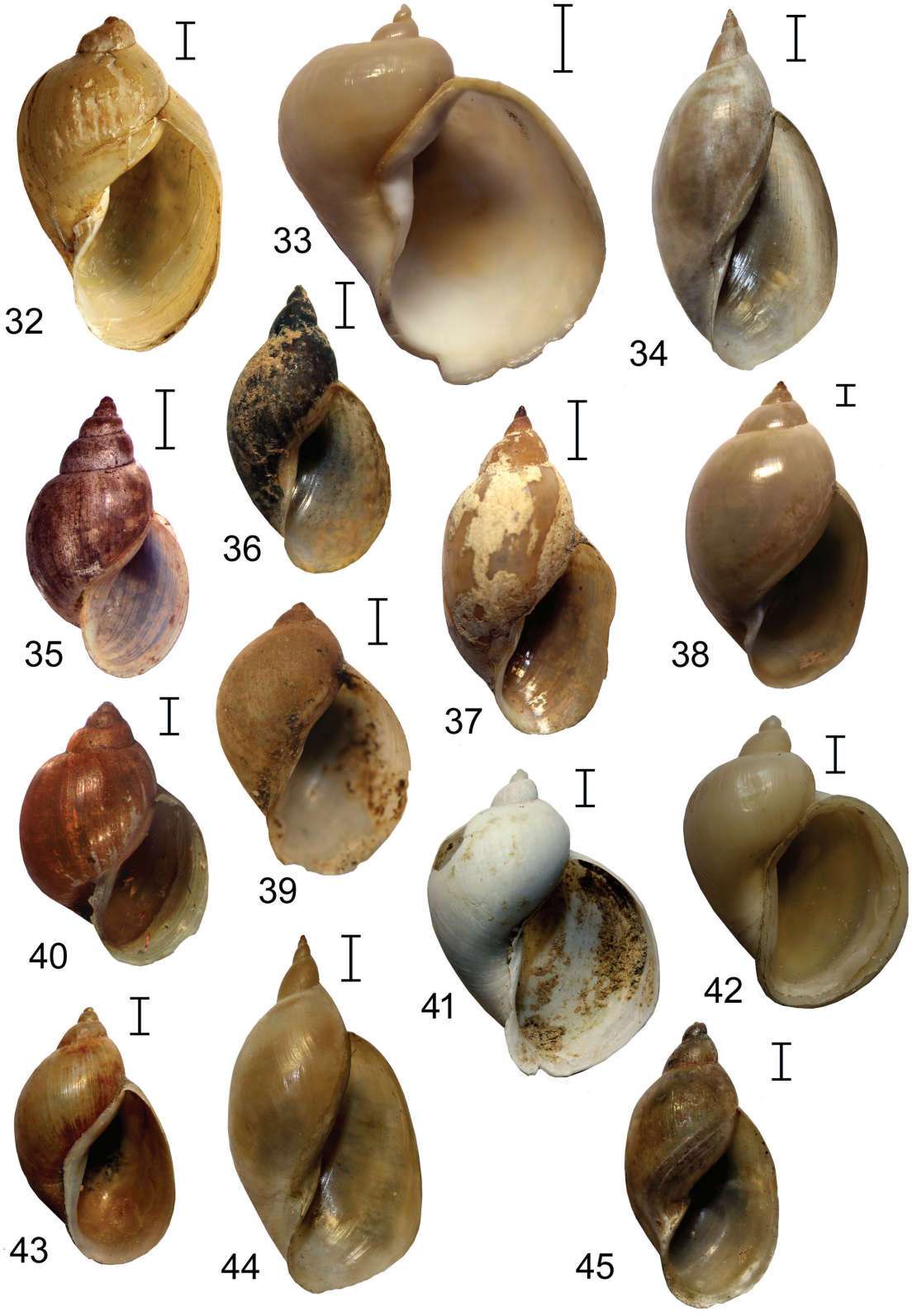


**Figures 32–45.** Type specimens of Lymnaeidae (ZMB), continuation. **32** – *Limnaeus javanicus* var. *obesus* von Martens, 1867, a syntype. **33** – *Limnaeus obliquatus* von Martens, 1864, a syntype. **34** – *Limnaeus patulus* Troschel, 1837, a syntype. **35** – *Limnaeus pervius* von Martens, 1867, the lectotype. **36** – *Limnaea pettiti* Jones & Preston, 1904, a syntype. **37** – *Limnaea javanica* var. *porrecta* von Martens, 1881, a syntype. **38** – *Limnaeus prunum* Troschel, 1837, a syntype. **39** – *Limnaea ovata* var. *sericina* Westerlund, 1890, a syntype. **40** – *Limnaea shantungensis* Jones & Preston, 1904, a syntype. **41** – *Limnaea ovata* var. *solidior* von Martens, 1882, a syntype. **42** – *Limnaea lagotis* var. *solidissima* Kobelt, 1872, a syntype. **43** – *Limnaea solidulus* Villa & Villa, 1871, a syntype. **44** – *Limnaea amygdalum* var. *straminea* Troschel, 1837, a syntype. **45** – *Limnaea javanica* var. *subteres* von Martens, 1881. Scale bars – 1 mm (**40**), 2 mm (**32, 35, 36, 38, 39, 42–43, 45**), 5 mm (**33, 34, 37, 44**).

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**Table 1.** Measurements of shells of syntypes of some lymnaeid species described by von Martens (ZMB). Above lines – limits of variation, below the lines – means ± standard deviations.

| Character / index | *Limnaea auricularia* var. *coreana* | | *Limnaea eversa* | *Limnaeus patulus* |
|---|---|---|---|---|
| | No. 38440 (n = 7) | No. 55594 (n = 4) | No. 34822 (n = 10) | No. 8044 (n = 25) |
| Whorls number | 3.5 – 3.75<br>3.62 ± 0.11 | 3.50 ± 0.00 | 3.87 – 4.50<br>4.08 ± 0.21 | 5.00 – 5.50<br>5.20 ± 0.13 |
| SH, mm | 24.8 – 29.4<br>27.9 ± 1.5 | 27.5 – 31.8<br>28.9 ± 2.0 | 14.4 – 17.3<br>15.7 ± 1.0 | 34.6 – 44.4<br>39.0 ± 2.9 |
| SW, mm | 18.2 – 23.6<br>21.3 ± 1.7 | 22.1 – 26.5<br>23.7 ± 2.0 | 10.4 – 12.3<br>11.2 ± 0.6 | 16.2 – 24.6<br>18.9 ± 2.3 |
| SpH, mm | 3.4 – 5.4<br>4.4 ± 0.7 | 3.3 – 7.1<br>4.7 ± 1.7 | 4.3 – 5.9<br>4.9 ± 0.5 | 9.8 – 16.6<br>13.0 ± 1.7 |
| BWH, mm | 22.8 – 27.3<br>25.6 ± 1.5 | 22.1 – 29.9<br>25.4 ± 3.5 | 12.8 – 15.2<br>13.7 ± 0.8 | 29.4 – 39.3<br>33.7 ± 2.8 |
| AH, mm | 20.2 – 27.4<br>24.5 ± 2.4 | 24.8 – 26.7<br>25.9 ± 0.8 | 11.2 – 13.4<br>12.2 ± 0.8 | 24.8 – 33.8<br>28.2 ± 2.6 |
| AW, mm | 14.6 – 19.8<br>17.8 ± 1.6 | 18.2 – 19.2<br>18.8 ± 0.4 | 8.2 – 10.0<br>8.9 ± 0.8 | 11.8 – 19.1<br>14.5 ± 2.2 |
| SW/SH | 0.73 – 0.80<br>0.76 ± 0.03 | 0.79 – 0.85<br>0.82 ± 0.03 | 0.68 – 0.77<br>0.72 ± 0.02 | 0.42 – 0.55<br>0.48 ± 0.03 |
| SpH/SH | 0.14 – 0.20<br>0.16 ± 0.02 | 0.12 – 0.22<br>0.16 ± 0.04 | 0.27 – 0.35<br>0.31 ± 0.02 | 0.24 – 0.39<br>0.48 ± 0.04 |
| BWH/SH | 0.90 – 0.93<br>0.92 ± 0.01 | 0.79 – 0.94<br>0.88 ± 0.07 | 0.84 – 0.89<br>0.87 ± 0.02 | 0.82 – 0.89<br>0.86 ± 0.02 |
| AH/SH | 0.80 – 0.95<br>0.89 ± 0.05 | 0.84 – 0.93<br>0.90 ± 0.04 | 0.73 – 0.81<br>0.78 ± 0.03 | 0.66 – 0.80<br>0.72 ± 0.03 |
| AW/AH | 0.70 – 0.79<br>0.73 ± 0.03 | 0.70 – 0.76<br>0.73 ± 0.02 | 0.64 – 0.78<br>0.74 ± 0.05 | 0.49 – 0.64<br>0.51 ± 0.04 |

### *pettiti* Jones & Preston, 1904

Fig. 36

*Limnaea* (*Gulnaria*) *pettiti* Jones and Preston 1904: 142, fig. 3.
*Lymnaea pettiti* Hubendick 1951: pl. IV, fig. 12.
*Limnaea pettiti* Kilias 1961: 164.

**Type material.** ZMB collection contains a single syntype (accession number 59228), its shell height is 13.4 mm. Hubendick (1951, pl. IV, fig. 12) illustrated the "type" (? syntype) of this species (BMNH collection).

**Type locality.** East China, "near Chefoo, Shantung" (= Shandong Province).

**Current taxonomic allocation.** Possibly, a synonym of *Radix* (*Radix*) *plicatula* (Benson, 1842).

### *porrecta* von Martens, 1881

Fig. 37

*Limnaea javanica* var. *porrecta* von Martens 1881: 89, figs 9, 10.
*Limnaea javanica* var. *porrecta* von Martens 1897a: 5.
*Limnaea javanica* var. *porrecta* Kilias 1961: 165.

**Type material.** There are 14 shells of this variety collected from the type locality in ZMB (No. 8135). The largest syntype is 28.7 mm height. Kilias (1961) reported that he intended one of these shells to be the lectotype of *Limnaeus javanicus* var. *porrecta* and separated it under accession number 8135a, however I was not able to find this specimen in ZMB collection.

**Type locality.** Timor Island, Kupang. leg. E. von Martens, December 1862.

**Current taxonomic allocation.** *Cerasina luteola* (Lamarck, 1822).

### *prunum* Troschel, 1837

Fig. 38

*Limnaeus prunum* Troschel 1837: 170.
*Limnaea acuminata* var. *prunum* Preston 1915: 108.
*Limnaeus prunum* Kilias 1961: 165.

**Type material.** 12 syntypes of *L. prunum* in ZMB are kept in two samples: No. 101523 (11 syntypes) and 72998 (a single syntype), leg. Lamare Piquot. The shell height of the largest syntype is 27.4 mm.

**Type locality.** India, the Ganges River (Troschel 1837). The label of the syntypes is "Ganges, Bengalien".

**Current taxonomic allocation.** *Cerasina luteola* (Lamarck, 1822).

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### *sericina* Westerlund, 1890

Fig. 39

*Limnaea* (*Gulnaria*) *ovata* var. *sericina* Westerlund 1890: 147.
*Limnaea ovata* var. *sericina* Kilias 1967: 340.

**Type material.** Five syntypes are kept in ZMB under accession number 49529. The largest of them is 13.2 height. The other syntypes are in NMG (accession number 3726).

**Type locality.** Ronneby, Sweden.

**Current taxonomic allocation.** Most probably, *Radix* (*P.*) *balthica*.

**Remark.** The syntypes (ZMB No. 49529) are labelled as "*Limnaea ovata* var. *sericea*", not *sericina* as in Westerlund (1890).

### *shantungensis* Jones & Preston, 1904

Fig. 40

*Limnaea* (*Gulnaria*) *shantungensis* Jones and Preston 1904: 142, fig. 4.
*Lymnaea shantungensis* Hubendick 1951: pl. IV, fig. 10.
*Limnaea shantungensis* Kilias 1961: 165.

**Type material.** ZMB collection contains a single syntype (accession number 59227), its shell height is 8.1 mm. Hubendick (1951, pl. IV, fig. 10) illustrated the "type" (? syntype) of this species (BMNH collection). Another syntype is kept in NHMV (accession number 40698).

**Type locality.** East China, "Shantung, Wei Hai Wei" (= Shandong Province).

**Current taxonomic allocation.** *Orientogalba viridis* (Quoy & Gaimard, 1834).

### *solidior* von Martens, 1882

Fig. 41

*Limnaea ovata* var. *solidior* von Martens 1882: 34, pl. 4, fig. 6.

**Type material.** ZMB collection contains seven syntypes (accession number 34817). The size of the syntypes is very different; the largest shell of this sample is 16.8 height.

**Type locality.** Northwestern China, Dzungaria, Ulungur River. leg. A. Regel, 1879.

**Current taxonomic allocation.** Possibly, *Radix* (*Peregriana*) *lagotis*.

### *solidissima* Kobelt, 1872

Fig. 42

*Limnaea lagotis* var. *solidissima* Kobelt 1872: 77, pl. 2, figs 7, 8.
*Limnaea lagotis* var. *solidissima* Kobelt 1877: 38, pl. 118, fig. 1242.
*Limnaea lagotis* var. *solidissima* Annandale and Rao 1925: 154, fig. I (3, 5).

**Type material.** ZMB collection contains a single syntype (accession number 20416).

**Type locality.** East India, Himalaya Mts. (without precise location).

**Syntype dimensions.** WN 4.00; SH 17.4; SW 13.2; SpH 6.6; BWH 15.3; AH 12.9; SW 8.8.

**Current taxonomic allocation.** *Radix* (*Peregriana*) *lagotis*.

### *solidulus* Villa & Villa, 1871

Fig. 43

*Limnaea solidulus* Villa and Villa 1871: 92 (nomen nudum).
*Limnaea solidulus* Kilias, 1967: 340.

**Type material.** There is a single specimen (syntype) of *L. solidulus* in ZMB (accession number 8192). Its shell height is equal to 14.1 mm.

**Type locality.** Italy, Brescia (from the syntype label).

**Current taxonomic allocation.** The syntype of *L. solidulus* may be identified as a juvenile *R.* (*Peregriana*) *balthica* = *Lymnaea intermedia* Lamarck, 1822 sensu Kruglov 2005.

**Remark.** Villa and Villa (1871) published this species name without diagnosis or other information that would make it available under article 12 of the International Codex of Zoological Nomenclature.

### *straminea* Troschel, 1837

Fig. 44

*Limnaea amygdalum* var. *straminea* Troschel 1837: 169.
*Lymnaea auricularia* race *rufescens* Hubendick 1951: 157, fig. 344.

**Type material.** 31 syntypes kept in ZMB under No. 8047. The largest of them is of 35.4 mm height. There is another sample of this variety collected from the type locality in ZMB (without accession number). It contains two probable syntypes.

**Type locality.** India, the Ganges River.

**Current taxonomic allocation.** *Radix* (*Radix*) *rufescens* (Gray, 1822).

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### *subulatus* Dunker in Küster, 1862

Fig. 46

*Limnaeus subulatus* Küster 1862: 24, pl. 4, fig. 24.
*Limnaeus subulatus* Clessin 1886: 395, pl. 16, figs 1, 2.

**Type material.** 11 shells from the type locality in three samples: no. 4613 and two without numbers. One of these shells (see fig. 45) is separated and marked as belonging to the type collection (a syntype). The rest of specimens are not formally labeled as syntypes but probably also origin from the type series.

**Type locality.** Mexico, in Zimapan and Lake of Mexico (Küster 1862). leg. Albers, Dunker.

**Current taxonomic allocation.** *Ladislavella* (*Walterlymnaea*) *elodes* (Say, 1821).

**Syntype dimensions.** WN 7.75; SH 32.2; SW 9.6; SpH 22.1; BWH 18.3; AH 11.8; SW 6.6.

**Remarks.** Not discussed by Kilias (1961, 1967). Hubendick (1951) considered it to be a synonym of *Stagnicola palustris* that is apparently wrong since the latter species does not live in North America (Burch 1989; Johnson et al. 2013). Baker (1911) synonymized *L. subulatus* with *Stagnicola attenuata* (Say, 1829) that seems to be more reliable. Currently, *S. attenuata* is treated as identical with *Stagnicola elodes* (Say, 1821), placed by Vinarski (2012) into the subgenus *Walterlymnaea* Starobogatov & Budnikova, 1976 of the genus *Ladislavella* B. Dybowski, 1913.

### *subteres* von Martens, 1881

Fig. 45

*Limnaea javanica* var. *subteres* von Martens 1881: 88, figs 6, 7.
*Limnaea javanica* var. *subteres* von Martens 1897a: 4.
*Limnaea javanica* var. *subteres* Kilias 1961: 165.

**Type material.** There is a single shell of this variety in ZMB (kept under No. 101520). Kilias (1961) regarded it as the holotype (by monotypy). Its shell height is 17.1 mm.

**Type locality.** Indonesia, Sumatra Island, Palembang. leg. E. von Martens.

**Current taxonomic allocation.** Possibly, a synonym of *Radix* (*Radix*) *rubiginosa* (see Hubendick 1951).

### *sulcatulus* Troschel, 1837

Fig. 47

*Limnaeus sulcatulus* Troschel 1837: 167.
*Limnaea acuminata* var. *sulcatula* Preston 1915: 107.
*Lymnaea auricularia* race *rufescens* Hubendick 1951: 157, fig. 344.

**Type material.** Three samples in ZMB collection contain the syntypes of *L. sulcatulus*: No. 8046 (eight syntypes), No. 109764 (one syntype), and No. 109765 (one syntype). The largest's syntype shell heiht is 41.1 mm.

**Type locality.** India, the Ganges River.

**Current taxonomic allocation.** *Radix* (*Radix*) *rufescens*.

### *tigrinus* Dohrn, 1858

Fig. 48

*Limnaea tugrina* Dohrn 1858: 134.
*Limnaea luteola* f. *ovalis* Annandale and Rao 1925: 184, fig. IV (1).
*Lymnaea luteola* Hubendick 1951: 161, fig. 349.

**Type material.** A single shell (syntype) is housed in ZMB under accession number 13865. Its shell height is equal to 24.7 mm.

**Type locality.** Ceylon (without precise location).

**Current taxonomic allocation.** *Cerasina luteola* (Lamarck, 1822).

### *undussumae* von Martens, 1897

Fig. 49

*Limnaea undussumae* von Martens 1897: 135, pl. I, fig. 18; pl. VI, figs 2, 5.
*Lymnaea undusumae* (sic!) Hubendick 1951: 59, fig. 73.
*Lymnaea natalensis* Brown 1994: 166, figs 76 a, b; 79a.

**Type material.** The lectotype (designated by Kilias 1967) and 22 paratypes are kept in ZMB under accession numbers 54301a and 54301 b. The lectotype' shell height is 19.8 mm.

**Type locality.** Undussuma, in a brook beyond the Tamaro. leg. Stuhlmann, 1891.

**Current taxonomic allocation.** *Radix* (*Radix*) *natalensis*.

### *velutinoides* Bergh, 1901

Fig. 50

*Bullastra velutinoides* Bergh 1901: 254, pl. 20, figs 22–34.
*Lymnaea cumingiana* Hubendick 1951: 162, fig. 355.

**Type material.** The only shell (syntype) is kept in ZMB under accession number 22485. Its apex is corroded; shell height is 18.6 mm. Bergh (1901) reported there was two syntypes of this species in the Berlin Museum.

**Type locality.** Bergh (1901) stated it as "M[are] philippin.", i.e. as the Philippine Sea. Possibly, the author sug-

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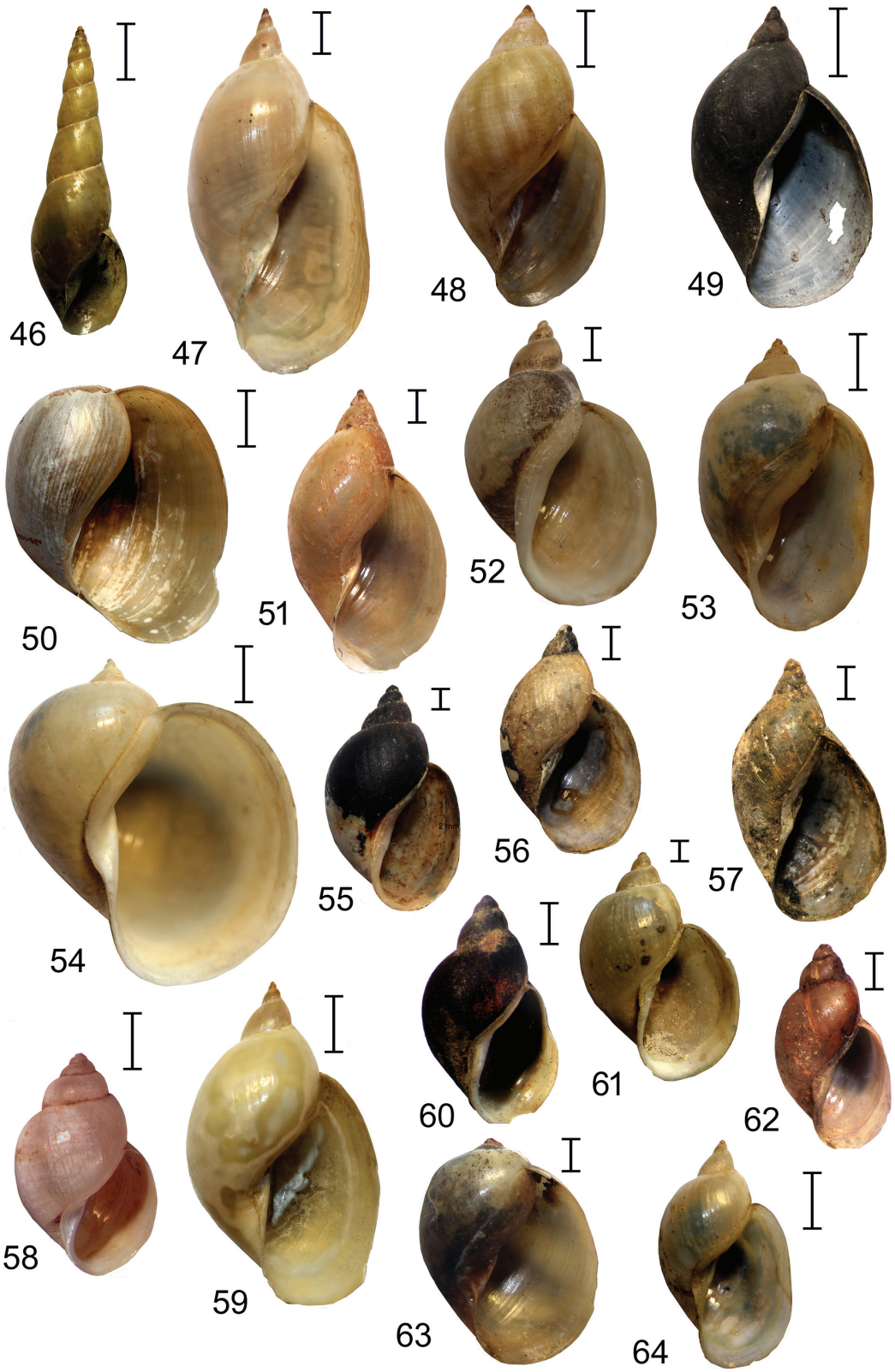


**Figures 46–64.** Type specimens of Lymnaeidae (ZMB), continuation. **46** – *Limnaeus subulatus* Dunker in Küster, 1862, a syntype. **47** – *Limnaeus sulcatulus* Troschel, 1837, a syntype. **48** – *Limnaea tigrina* Dohrn, 1858, the syntype. **49** – *Limnaea undussumae* von Martens, 1897, the lectotype. **50** – *Bullastra velutinoides* Bergh, 1901, a syntype. **51** – *Limnaea whartoni* Jones & Preston, 1904, a syntype. **52** – *Limnaea lagotis* var. *yarkandensis* Nevill, 1878, a syntype. **53** – *Limnaeus coarctatus* Dunker. **54** – *Limnaeus compactus* "Ziegler". **55** – *Limnaea cornea* "Ziegler". **56** – *Limnaea elgonensis* Preston. **57** – *Limnaea fernanensis* Preston. **58** – *Limnaeus nebulosus* Dunker. **59** – *Limnaea acuminata* var. *nevilli* von Martens. **60** – *Limnaeus nigricans* "Ziegler". **61** – *Limnaeus nitens* "Ziegler". **62** – *Limnaeus opacus* "Ziegler". **63** – *Amphipeplea pfefferiana* Dunker. **64** – *Limnaea splendens* Dunker. Scale bars: 2 mm (**51, 52, 55–58, 60–63**), 5 mm (**46–50, 53, 54, 59, 64**).

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gested it may be a marine species. According to Kilias (1967), the syntype was collected in Manila by Salmin.

**Current taxonomic allocation.** *Bullastra cumingiana*.

### *whartoni* Jones & Preston, 1904

Fig. 51

*Limnaea* (*Gulnaria*) *whartoni* Jones and Preston 1904: 142, fig. 1.
*Lymnaea whartoni* Hubendick 1951: 72, fig. 152; pl. IV, fig. 14.
*Limnaea whartoni* Kilias 1961: 165.

**Type material.** ZMB collection contains a single syntype (accession number 59226), its shell height is 16.3 mm. Hubendick (1951, pl. IV, fig. 14) illustrated the "type" (? syntype) of this species (BMNH collection). A single shell collected from the type locality and labelled as "M. Preston No. 49" is kept in MNHN (without accession number).

**Type locality.** East China, "Liu Shi Tao, north-east promontory of Shantung".

**Current taxonomic allocation.** Possibly, *Radix plicatula*.

### *yarkandensis* Nevill, 1878

Fig. 52

*Limnaea lagotis* var. *yarkandensis* Nevill 1878: 8.

**Type material.** Nevill (1878) reported he was able to examine more than 70 shells (syntypes) of this variety collected in Northern India. Ten of these specimens are kept now in ZMB (No. 27487). The largest of these shells is 18.0 height. The rest of syntypes may be placed in the Zoological Survey of India (where other type materials of Nevill are kept; see Subba Rao 1989).

**Type locality.** From near Sásak Taka (Nevill 1878: 9).

**Current taxonomic allocation.** *Radix* (*Peregriana*) *lagotis*.

## Supplement

ZMB collection includes several type series belonging to lymnaeid species not mentioned in the taxonomic literature, including the most comprehensive catalogues (Küster 1862; Clessin 1886; Hubendick 1951), and their original descriptions remain unknown to me. Possibly, most of these "types" belong to the so-called "manuscript names" never published formally by their authors as it was not rare in the 19th century. Kilias (1967) listed three such doubtful names but closer examination of ZMB collection revealed as many as 12 lymnaeid species and varieties of unclear status. These are characterized below.

### *coarctatus* Dunker

Fig. 53

*Limnaeus coarctatus* Dunker (? in MS).

**Material.** ZMB collection contains two specimens collected in Sumatra (Indonesia) and marked as 'types'. The largest of two shells is 17.6 mm height.

**Current taxonomic allocation.** *Cerasina luteola*.

**Remark.** The species has not been mentioned in the most inclusive handbooks on lymnaeid taxonomy (Küster 1862; Clessin 1886; Hubendick 1951) as well as in special works devoted to continental malacofauna of the Ost-Indian region (von Martens 1897a).

### *compactus* "Ziegler"

Fig. 54

*Limnaeus compactus* "Ziegler" (? in MS).

**Material.** Two shells collected in the Danube River in Austria are housed in ZMB under accession number 109748. The largest of two shells is 24.8 mm height.

**Current taxonomic allocation.** An obvious synonym of *R. auricularia*.

**Remark.** The species has not been mentioned in the most inclusive handbooks on lymnaeid taxonomy (Küster 1862; Clessin 1886; Hubendick 1951) as well as in special works devoted to the Central and Eastern Europe continental malacofauna, where other species attributed to Ziegler were listed (Rossmässler 1835; Beck 1837; Kobelt 1877; Westerlund 1885; Clessin 1887-1890). I have to add that the very attribution of this species to Ziegler is conventional. As Welter-Schultes (2013) explains, Ziegler was not a scientist. He was a shell dealer in Vienna and "sent labelled shells with new names to researchers, who then described the new species and attributed the names to the dealers. At the end they had many hundreds of names. After 1905 the malacologists agreed that shell dealers should not be regarded as authors of names because they had in most cases not done any scientific work" (Welter-Schultes 2013: 96).

### *cornea* "Ziegler"

Fig. 55

*Limnaea cornea* "Ziegler" (? in MS).

**Material.** Three shells collected in Carniolia (= Kraina, a historical region of Slovenia) and kept in ZMB under accession number 109754 (ex Dunker collection). The largest of the three shells is 13.1 mm height.

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**Current taxonomic allocation.** *Radix peregra* = *R. labiata* sensu Falkner et al. 2002.

**Remark.** *L. cornea* is absent in most taxonomic works devoted to overview of the European continental malacofauna, including those dealing with the species names attributed to Ziegler (Rossmässler 1835; Beck 1837; Küster 1862; Kobelt 1877; Clessin 1887; Hubendick 1951). Dupuy (1851: 473) as well as Westerlund (1885) listed *Limnaea cornea* Zgl. among synonyms of *L. peregra*, but I could not find any evidence that this species was ever described formally.

### *elgonensis* Preston

Fig. 56

*Limnaea elgonensis* Preston (? in MS).

**Material.** A single specimen kept under No. 62871. Its shell height is 12.0 mm.

**Type locality.** Uganda, Mt. Elgon. leg. Preston.

**Current taxonomic allocation.** Probably, a junior synonym of *Radix natalensis*.

**Remark.** I could not find the original description of this species in Preston's works devoted to new taxa of African land and freshwater mollusks (Preston 1910a, b, 1911, 1912, 1913). Preston introduced several tens of species names, including those with the species epithet "*elgonensis*" (for instance, *Ledoulxia elgonensis* Preston, 1914, family Urocyclidae Simroth, 1899), however among lymnaeid taxa described by him the species name *Lymnaea* (or *Limnaea*) *elgonensis* is absent. Both Hubendick (1951) and Brown (1994), in their comprehensive works dealing with the African Lymnaeidae, do not mention such a species. I am not sure Preston ever described it formally.

### *fernanensis* Preston

Fig. 57

*Limnaea fernanensis* Preston (? in MS).

**Material.** A single shell is kept under No. 63775. This shell has 19.2 mm height.

**Type locality.** «British East Africa» (probably Kenya), Fort Fernan.

**Current taxonomic allocation.** *Radix* (*Radix*) *natalensis*.

**Remark.** See remark for *L. elgonensis* above.

### *nebulosus* Dunker

Fig. 58

*Limnaeus nebulosus* Dunker (? in MS).

**Material.** Two shells (labelled as 'types') collected in the Antilles (without precise locality) and kept in ZMB under accession number 9364. The largest of them is of 8.5 mm height.

**Current taxonomic allocation.** Most probably, a synonym of *Galba cubensis*.

**Remark.** This species name is absent in subsequent comprehensive works devoted to overview the New World lymnaeid fauna (Küster 1862; Clessin 1886; von Martens 1890–1901; Hubendick 1951), and it remains unclear if *L. nebulosus* has been ever formally described.

### *nevilli* von Martens

Fig. 59

*Limnaea acuminata* var. *nevilli* von Martens (? in MS).

**Material.** A single shell (SH = 32.3 mm) collected in Bengal (without precise location) by Lamare Piquot is kept in ZMB collection. Its label bears no accession number.

**Current taxonomic allocation.** *Radix* (*Radix*) *rufescens*.

**Remark.** I could not find this variety name in von Martens publications devoted to Indian freshwater snails (von Martens 1881, 1885) as well as in subsequent works on the subject (Preston 1915; Annandale and Rao 1925; Hubendick 1951; Subba Rao 1989).

### *nigricans* "Ziegler"

Fig. 60

*Limnaeus nigricans* "Ziegler" (? in MS).

**Material.** A single shell, 10.8 mm shell height, collected in Neuwaldegg, Austria, is kept in ZMB under accession number 109749.

**Current taxonomic allocation.** An obvious synonym of *Radix* (*Peregriana*) *peregra* (O.F. Müller, 1774) auct. = *Radix labiata* (Rossmässler, 1835) sensu Falkner et al., 2002.

**Remark.** See comment to *Limnaeus compactus* "Ziegler" above.

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***nitens* "Ziegler"**

Fig. 61

*Limnaeus nitens* "Ziegler" (? in MS).

**Material.** Two shells collected in Vienna, Austria, are kept in ZMB under accession number 109747. The largest of them has 12.8 mm shell height.

**Current taxonomic allocation.** Possibly, a synonym of *Radix* (*Peregriana*) *balthica*.

**Remark.** See comment to *Limnaeus compactus* "Ziegler" above.

***opacus* "Ziegler"**

Fig. 62

*Limnaea opaca* Dupuy 1851: 473.
*Limnaeus pereger* var. *opacus* von Gallenstein 1852: 43.
*Limnaea peregra* var. *opaca* Moquin-Tandon 1855: 468.

**Material.** Two shells collected in Carniolia and kept in ZMB under accession number 109755. The largest of two shells is 10.0 mm height.

**Current taxonomic allocation.** Possibly a synonym of *Radix* (*Peregriana*) *peregra* auct. = *Radix labiata* sensu Falkner et al. 2002.

**Remark.** Though a few authors of the 19th century used this taxon name (Dupuy 1851; von Gallenstein 1852; Moquin-Tandon 1855), I could not trace the source where it was described originally. Perhaps, it should be considered as one of those numerous "manuscript names" attributed to the authorship of Ziegler (see also comment to *Limnaeus compactus* above).

***pfeifferiana* Dunker**

Fig. 63

*Amphipeplea pfeifferiana* Dunker (? in MS).

**Material.** Five shells collected somewhere in New Holland (= mainland Australia) are kept in ZMB under accession number 109770. The largest of them is 14.1 mm height.

**Current taxonomic allocation.** Possibly, a synonym of *Austropeplea lessoni* (Deshayes, 1830) .

**Remark.** Like other species names attributed to Dunker and listed in this supplement, *L. pfeifferiana* seems to be a member of the group of so-called "manuscript names", whose original descriptions have been not found in the literature.

***splendens* Dunker**

Fig. 64

*Limnaeus splendens* Dunker (? in MS).

**Material.** Six shells from China (without precise location) kept under accession number 109769. The largest of them is 19.2 mm height.

**Current taxonomic allocation.** Possibly, a synonym of *Radix plicatula.*

**Remark.** See remark to *Amphipeplea pfeifferiana* above.

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