Peter Glöer

The Freshwater Gastropods of the West-Palaearctis

Volume I
Fresh- and brackish waters except spring and subterranean snails

Identification key, Anatomy, Ecology, Distribution

2019

This is the first identification key for the freshwater gastropods of the West Palaearctis of which the progress of malacological research of the last decades has been considered. Nearly all species have been depicted by high quality photos and in a way that species identification is possible. Additional descriptions and identification keys, which refer to the typical characters of the species, support the depictions. For most species photos of the anatomy are provided. Altogether there are 424 photo-plates with more than 1,600 professional individual photos.

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Book: hardcover, thread-stitching
Format: 17 x 24 cm

This book can be ordered via e-mail at:

info@malaco.de

The book will be published in October 2019.

Price: € 75.00 plus shipping and handling

The freshwater gastropods of the West Palaearctis

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Identification key, Anatomy, Ecology, Distribution

von PETER GLÖER, Hetlingen

Volume I

Neritidae, Hydrocenidae, Ampullariidae, Viviparidae, Thiaridae, Potamididae, Melanopsidae, Bithyniidae, Cochliopidae, Tateidae, Hydrobiidae, Lithoglyphidae, Bythinellidae, Emmericiidae, Truncatellidae, Assiminiidae, Valvatidae, Lymnaeidae, Physidae, Planorbidae, Acroloxidae, Ellobiidae, Otinidae.

With 424 color plates
and more than 1600 individual photos
in addition to some drawings

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Preface

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The distribution maps are only rough made and shall give a first glance on the distribution of the species only.

I follow the established principle, that a moderate "taxonomic splitting" in well-founded cases is better for future research than "taxonomic lumping" of species, because these cannot be separated in later times.

The focus of this book is on the identification keys and the descriptions of the 347 species of freshwater molluscs in the region under discussion.

If we want to protect gastropods we must know their names and have to know which species are living in the region of interest. By this it makes no sense to lump distinct species together because we put at risk that threatened species are not recognized. The result will be that we lose or overlook threatened species.

Recent investigations in the countries of the Mediterranean revealed many new species especially of the hydrobioid gastropods which would beyond the scope of this book. The second volume will focus on these species living in springs and subterranean waters.

Materials for photos I kindly got from Christian Albrecht (Univ. Giessen), Roy Anderson (Ireland), Karl-Heinz Beckmann (†), Hans Boeters (Munich), Diana Delicado (Univ. Giessen), Robert T. Dillon jr. (Charleston SC), Jozef Grego (Banská Bystrica), Mustafa M. Gürlek (Burdur), Joaquin Lopez-Sorioano (Barcelona), Deniz Odabasi (Canakkale), Vladimir Pešić (Podgorica), Sergio Quiñonero-Salgado (Barcelona), Peter L. Reischütz (Wien), Francis F. Sands (Univ. Giessen), Ioan Sîrbu (Sibiu), Valentina Slavenska Stamenković (Skopje), Maxim V. Vinarski (St. Petersburg), and Tom Wilke (Univ. Giessen).

In addition I thank Zoltán Fehér (HNHM), Jochen Gerber (FMNH, Chicago), Bernhard Hausdorf (CeNaK, Hamburg), Ronald Janssen and Sigrid Hof (SMF, Senckenberg Museum Frankfurt am Main), Ted von Proschwitz (GNM, Göteborg), Heike Reise (SMG, Görlitz), Thomas von Rintelen and Christine Zorn (MNB, Berlin) that they made some species under their care available to me to take photos.

Hetlingen, September 2019 PETER GLÖER

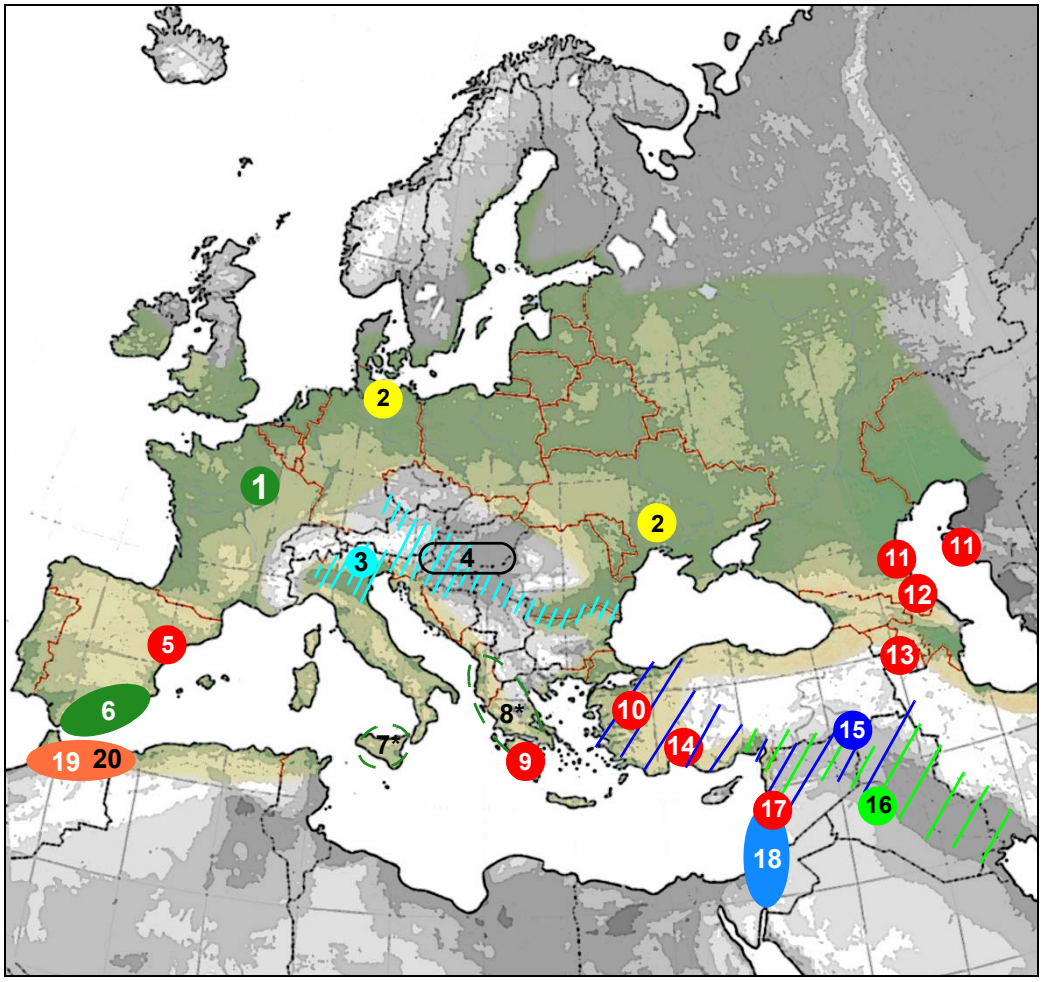


Figure 12. The distribution of *Theodoxus* spp. in the West-Palaearctic region.
1 (colored map) = *Th. fluviatilis*, **2**: *Th. sarmaticus*, **3** (cyan hachures) = *Th. danubialis*, *Th. transversalis*,
4 (thermal waters): *Th. prevostianus*, **5**: *Th. valentinus*, **6**: *Th. baeticus*, **7***: *Th. baeticus* or *Th. meridionalis*,
8*: *Th. baeticus* or *Th. callosus*, **9** = *Th. peloponensis*, **10**: *Th. gloeri*, **11**: *Th. schultzii*, **12**: *Th. pallasi*,
13: *Th. mesopotamicus*, **14**: *Th. altenai*, **15** (blue hachures): *Th. anatolicus*,
16 (light green hachures): *Th. jordani*, **17**: *Th. syriacus*, **18**: *Th. macrii*, **19**: *Th. marteli*, **20**: *Th. numidicus*.

The characters for identification of *Theodoxus* species

Many species have formerly been described on the basis of shell morphology and especially on the patterns or the color of the shells. Many of these nominal taxa belong at least to *Theodoxus fluviatilis*. E.g. in Central Europe *Th. fluviatilis* has patterns of drop shape, while it has in Spain zig-zag lines, in the Balkans we find a combination of both patterns. In addition in every region black shells occur which depends on the substratum (camouflage) (GLÖER 2015). Molecular biological studies revealed that there are about 20 *Theodoxus* spp. which occur in the Westpalaearctis (SANDS 2019).

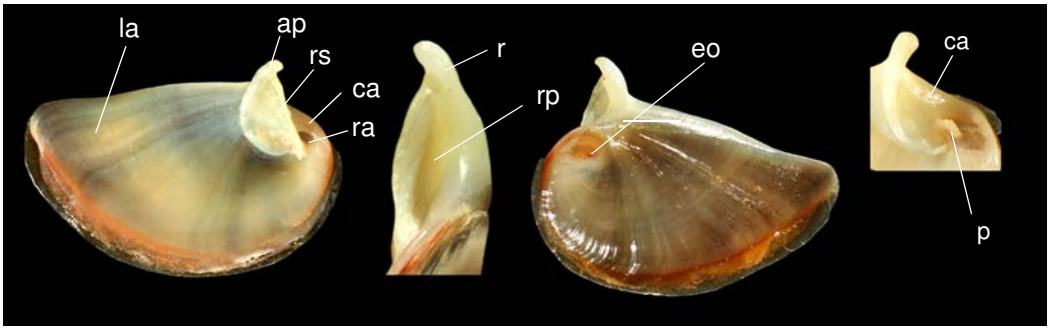


Figure 13. The operculum. Abbreviations: **ap** = apophysis, **ca** = callus, **eo** = embryonic operculum, **la** = left adductor, **p** = pseudo-apophysis, **ra** = right adductor, **rp** = apophysis pouch, **rs** = apophysis shield.

Shell characters like the spire which can be elevated or not, are in many species (e.g. in *Theodoxus fluviatilis*) variable and not suitable for identification. In some specimens the columellar plate can be used as distinguishing character, which can be rectangular or nearly triangular (or trapeziform).

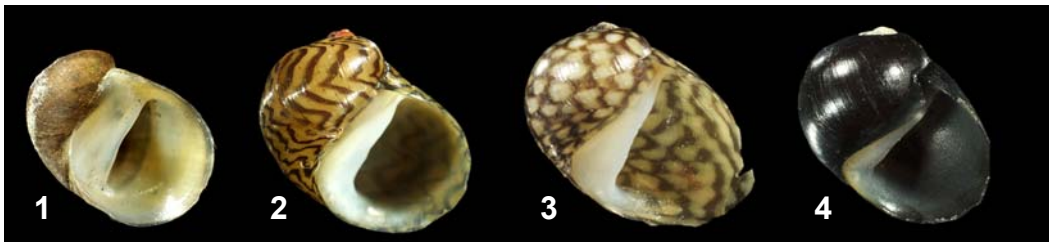


Figure 14. The shells of *Theodoxus* spp. with different columellar plates. 1: *Th. fluviatilis* (rectangular), 2: *Th. danubialis* (rectangular), 3: *Th. peloponensis* (trapeziform), 4: *Th. numidicus*. (triangular)

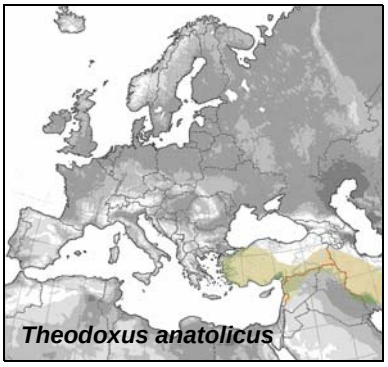
Figure 15. **Types of opercula of *Theodoxus***. **1**: *Th. fluviatilis* without a pseudo-apophysis, **2**: *Th. danubialis* with a small pseudo-apophysis, **3**: *Th. transversalis* with a long pseudo-apophysis, **4**: *Th. pallasi* with a thin pseudo-apophysis, **5**: *Th. anatolicus* with a strong pseudo-apophysis.

However, in doubt, the only character which is suitable to distinguish between *Theodoxus* spp. is the morphology of the operculum. The most important characters are the apophysis and the pseudo-apophysis, and in some species the rib-shield and the callus are of interest for identification.

Theodoxus anatolicus (RÉCLUZ, 1841)

1841 *Nerita Anatolica* RÉCLUZ, 1841: p. 342
Type locality: "Hab. à Smyrne, Alep., Sidon et Scio, dans les fontaines Olivier".

Figure 20. ***Theodoxus anatolicus*** (Anamur, Turkey). **1-2**: shell, **3**: operculum.



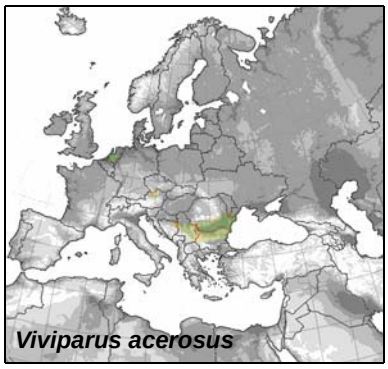
Description: The usually black shell is semi globose with fine striae and corroded apex. Shell height 7-10 mm and length 8-11 mm.
Operculum: There is strong diagonal pseudo-apophysis connected with the apophysis which is characteristic for this species.
The species can be **c o n f u s e d** with *Th. callosus* but in *Th. anatolicus* the pseudo-apophysis is much stronger and usually not twisted as it is in *Th. callosus*.
Ecology: Lives in flowing waters on stones.
Distribution: Regarding YILDIRIM (1999) it is widely distributed in Anatolia, restricted to the western and southern areas of Turkey.

Theodoxus baeticus (LAMARCK, 1822)

1822 *Neritina Bætica* LAMARCK, p. 188, no. 21
1845 *Neritina elongatula* – Morelet, p. 96
Type locality: "Habite dans les eaux douces de l'Andalousie"

Figure 21. ***Theodoxus baeticus*** (topotype). **1-2**: shell, **3**: operculum.

Description: Shell thick and globose, dark brown, usually unicolored, body whorl ventricose, and descended. Columellar plate broad and triangular, the inner border slightly concave. Shell 6-7 mm in height, 7-8 mm in length.



Ecology: *V. acerosus* lives in rivers and lakes.
Distribution: Danubian. – In Germany in the Danube below the Geislinger barrage. In Austria from Vienna downstream the Danube (KLEMM 1954), in addition in Hungary common (PINTÉR et al. 2004). In the Czech Republic in Moravia common in the region of Moravia and Dyje rivers. In Slovak Republic common in the danube valley and Tisa river (HORSÁK *et al*. 2013). The southern part of European Russia and Ukraine (basins of the Danube, Dnieper and Dniester rivers, now through the entire Dnieper River and basin of the Zapadnaya Dvina River, vicinities of Togliatti and Pyatigorsk cities (VINARSKI & KANTOR 2016).

Viviparus ater (DE CRISTOFORI & JAN, 1832)

1832 *Paludina atra* CRISTOFORI & JAN, p. 3
Type locality: "Ital. bor." [N Italy]

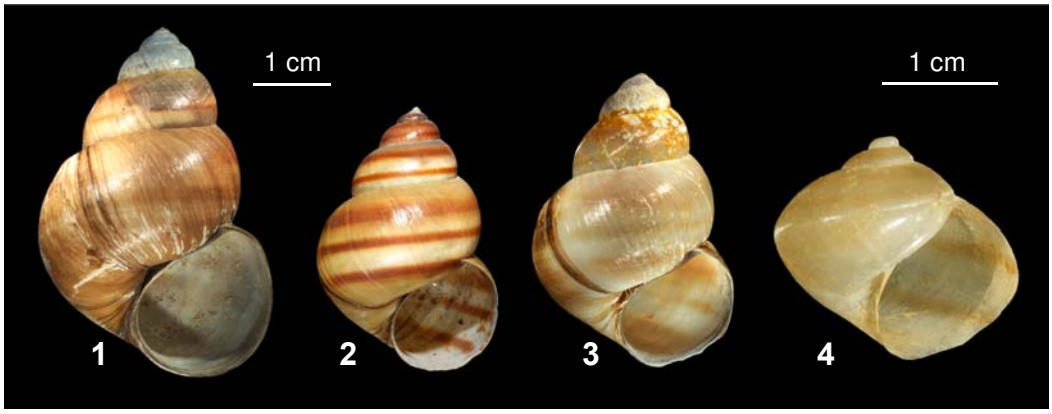
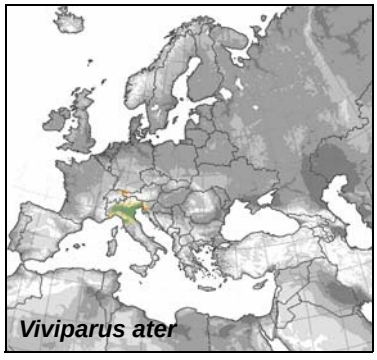


Figure 53. ***Viviparus ater***. **1-2**: Lake Constance, **3**: Lake Como, **4**: embryonic shell.

Description: The shell is greenish brown with three reddish brown bands more or less visible. The apex is acute. The 5.5-6 slightly convex whorls are regularly growing. The umbilicus is narrow but open. Shell height 45 mm, 35 mm width.
Juveniles are canted on the body whorl, the adults are not. It can be **c o n f u s e d** with *V. acerosus* in which the first whorls are slowly and not regularly growing. In doubt it must be identified zoogeographically: *V. ater* does not live in the Danube region where *V. acerosus* occurs.



Biology: The species are at the age of two years mature. The lifetime is about 10 years (RIBI & GEBHARDT 1986).
Ecology: *V. ater* lives in rivers and lakes. In Lake Constance in the litoral zone in the westbay of Hinterhorn common. In Lake Garda it occurs syntopic with *V. contectus* (TRÜB 1990). *V. ater* feeds on periphyton (grazer), on organic mud and detritus (filter feeder). Predators are rats and waterfowls (TURNER et al. 1998).
Distribution: S-alpine. This species has been introduced from Upper Italy to Switzerland and Lake Constance.

Distribution: European-Western Siberia. – Not in Norway (Økland 1990) and Finland (SCHLESCH & KRAUSP 1942).
N - E u r o p e : Some findings in South-East of Sweden (NILSSON *et al*. 1998), in Denmark widely distributed (MANDAHL-BARTH 1949, SCHLESCH 1934).
C e n t r a l - E u r o p e : In the lowlands of Britain and Ireland but in decline (KERNEY 1999). In The Netherlands common (GITTENBERGER *et al.* 1998), as well as in Belgium (ADAM 1960). In Switzerland in Lago Maggiore, up to 420 m asl. (TURNER *et al*. 1998). In entire Austria except Tyrol (KLEMM 1960).
G e r m a n y : in N-Germany common to the uplands, in S-Germany rare.
E - E u r o p e : From the Baltic States (SCHLESCH 1938, 1942), in Poland common in the lowlands and uplands (PIECHOCKI *et al.* 2018). In the Czech and Slovak Republics in the lowlands (HORSÁK *et al.* 2013) and in Hungary (PINTÉR *et al.* 2004) widely distributed. In European part of Russia to Western Siberia (VINARSKI & KANTOR 2016).
S - E u r o p e : In Atlantic and Continental regions of France (FALKNER et al. 2002), in Italy from Northern to Central mainland of Italy (COSSIGNANI T. & V. 1995). Not In Spain and Portugal and not in the Balkans.

Viviparus costae (HELDREICH in MOUSSON, 1863)

1863 *Paludina costae* HELDREICH in MOUSSON, p. 290
Type locality: "environs de Constantinople". [Istanbul, Turkey]

Figure 55. *Viviparus costae*. 1: Imereti, Tkibuli, Georgia; 2-3: Guria, 3 km NW of Supsa, (Georgia); 4: operculum [shells not fully grown, Frank Walter leg.)]

Description: The conical shell is yellowish brown with 3 reddish brown bands. Apex acute but often corroded. The 5 whorls are slightly convex and regularly growing, body whorl prominent. The apex is acute, umbilicus slit-like. Shell height 26-30 mm, width 23 mm.
Concerning the size and shell shape it can be **c o n f u s e d** with *V. viviparus* but both species can be distinguished by the apex, obtuse in *V. viviparus* and acute in *V. costae*.
Ecology: The species lives in rivers.
Distribution: western Transcaucasia, north of Asia Minor (STAROBOGATOV *et al*., 2004).

Viviparus fennicus (KOBELT, 1909)

1909 *Vivipara contecta* (?) *fennica* KOBELT, 9, pl. 394, fig. 2265-2267.
Type locality: Russia, Gulf of Finland of the Baltic Sea near Lakhta village (nowadays, a district of Sankt-Petersburg City) ["Finnischer Meerbusen beim Dorfe Lachta (Gouv. St. Petersburg)", see ZILCH, 1955: 51].

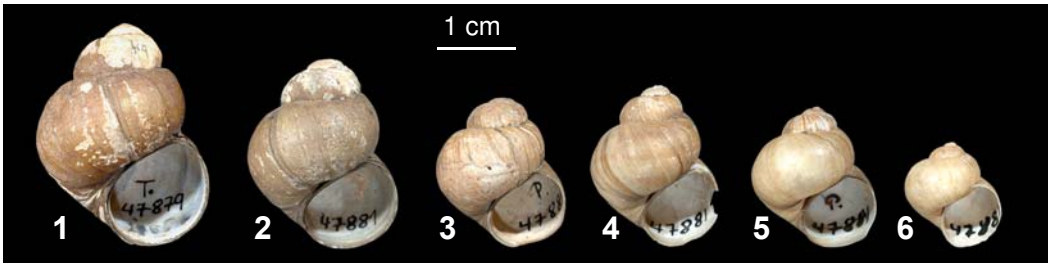
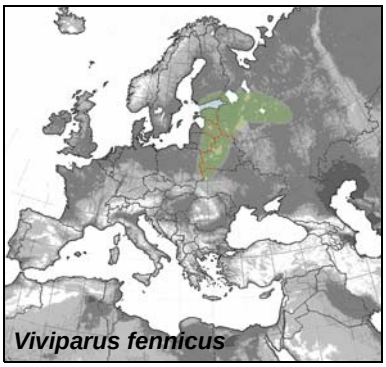


Figure 56. *Viviparus fennicus* (sytypes and lectotype: SMF 47879).

Description: The relatively small brownish shells are ventricose without bands. The apex is small and blunt, The 4.5 whorls are convex with a deep suture. The shell is 23-29 mm high and 2.3-2.5 mm broad.
The species can be **c o n f u s e d** with *V. viviparus* which is larger and less globular.



Taxonomic remark: KOBELT described it as a subspecies of *V. contectus* but as the apex is blunt - and not acute as in *V. contectus* - it can be a degenerate form of *V. viviparus* similar to *V. viviparus penticus*, the form living in streams or rivers.
Distribution: North of the European part of Russia: lakes of the Baltic Sea Basin, upper basin of the Volga River (the Pleshcheevo Lake, Yaroslavl' Region), freshwater parts of Gulf of Finland, and in the Shatsk Lakes, Western Ukraine (VINARSKI & KANTOR 2016).

Viviparus hellenicus CLESSIN, 1879

1879 *Vivipara hellenica* CLESSIN, p. 3
1880 *Viviparus blanci* BOURGUIGNAT, p. 11
Type locality: "Missolunghi"

Figure 57. *Vivipaus hellenicus*. 1-2: Lake Trichonis (Greece), 3: operculum, 4: juvenile.

General distribution of the *Bithynia* spp.

The most widespread species is *Bithynia tentaculata*, common in all European lowlands. In Central Europe the lowland species *B. leachii* occurs while the species *B. transsilvanica* has a more eastern distribution from Hamburg to Siberia with its southern border along the northern border of the Balkans and the Black Sea. In the Literature many records can be found of *B. leachii* in the Mediterranean but up to now it could not be found there in fact. I the mountainous region of the Mediterranean many small *Bithynia* spp. occur which are distinct from *B. leachii*. In Italy the similar looking species *B. boissieri* and *B. italica* occur, which are of different size, *B. boissieri* with a shell height of 5-7 mm and *B. italica* with a height of 7-12 mm. Both live in the lowlands of the coastal regions in Italy, partly sympatric. The most species diversity can be found in the Mediterranean, along the coastal region of the Balkans, as well as in Greece and Turkey.

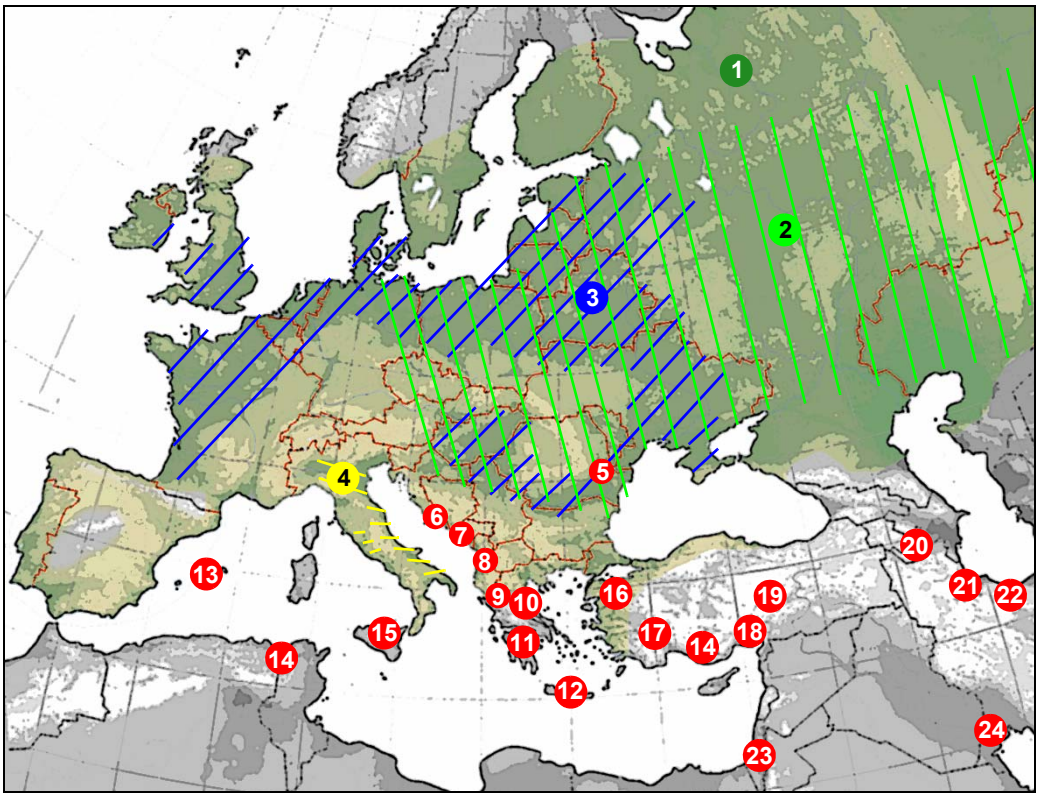


Figure 91. Distribution of the ***Bithynia*** spp. in the W-Palaearctis.
1 (colored map): *B. tentaculata*, **2** (light green hachures): *B. transsilvanica*, **3** (blue hachures): *B. leachii*, **4** (yellow hachures): *B. boissieri*, *B. italica* **5**: *B. danubialis*, **6**: *B. cettinensis*, **7**: *B. mostarensis*, **8**: *B. skadarski*, *B. montenegrinus*, *B. zeta*, **9**: *B. graeca*, *B. kastorias*, *B. prespensis*, *B. shapkarevi*, **10**: *B. graeca*, **11**: *B. hellenica*, **12**: *B. candiota and B. cretensis*, **13**: *B. kobialkai*, *B. majorcina*, *B. quintanai*, **14**: *B. numidica*, **15**: *B. rubens*, **16**: *B. timmi*, **17**: *B. pseudemmericia*, **14**: *B. pesici*, **18**: *B. yildirimi*, **19**: *B. kayrae*, **20**: *B. starmuehlenri*, **21**: *B. forcarti*, **22**: *B. mazandarensis*, **23**: *B. phialensis*, **24**: *B. ejecta*, *B. hareerensis*.

Identification key for Europe except Greece

1	Shell height 5-10 mm, whorls inflated, nucleus of operculum central, Algeria	***Bithynia numidica***, p. 107
–	whorls not inflated	2
2	Shell globular, 9-13 mm high, body whorl prominent, spire height to shell height 0,17, operculum with a dent at the top	***Bithynia mostarensis***, p. 106
–	shell not globular	3
3	Shell 8-11 mm conical, whorls convex, not stepped, operculum ovate, angled at the top, umbilicus closed	***Bithynia tentaculata***, p. 113
–	Dalmatia (OmiŠ), Lake Skadar or Majorca	4
4	umbilicus slit-like, Cetina river OmiŠ	***Bithynia cettinensis***, p. 95
–	Lake Skadar or Majorca	5
5	umbilicus closed, Lake Skadar	***Bithynia montenegrinus*, p. 106**
–	umbilicus slit-like	6
6	Majorca	***Bithynia majorcina***, p. 104
–	whorls convex or stepped	7
7	whorls stepped, shell 4-6 mm	***Bithynia leachii***, p. 103
–	shell larger 6 mm	8
8	nucleus shifted down, Italy	***Bithynia boissieri***, p. 94
–	nucleus not shifted down	9
9	nucleus shifted right, Italy	***Bithynia italica***, p. 101
–	outside Italy	10
10	umbilicus open, nucleus shifted down, Majorca	***Bithynia kobialkai***, p. 103
–	nucleus not shifted down	11
11	shell 8-10 mm, umbilicus slit-like to closed, nucleus central	***Bithynia transsilvanica***, p. 115
–	whorls convex	12
12	shell 5-6 mm, umbilicus open, body whorl prominent, Majorca	***Bithynia quintanai***, p. 110
–	umbilicus closed	13
13	shell 6-8 mm, body whorl prominent, Sicily	***Bithynia rubens***, p. 111
–	outside Sicily	14
14	shell 7-8 mm, convex whorls with clear suture, Montenegro	***Bithynia skadarski***, p. 112
–	shell smaller	15
15	shell 4-5 mm, stepped whorls with deep suture, Montenegro	***Bithynia zeta***, p. 117
–	Bulgaria	***Bithynia danubialis***, p. 97
–	Republic of Macedonia	***Bithynia shapkarevi***, p. 111

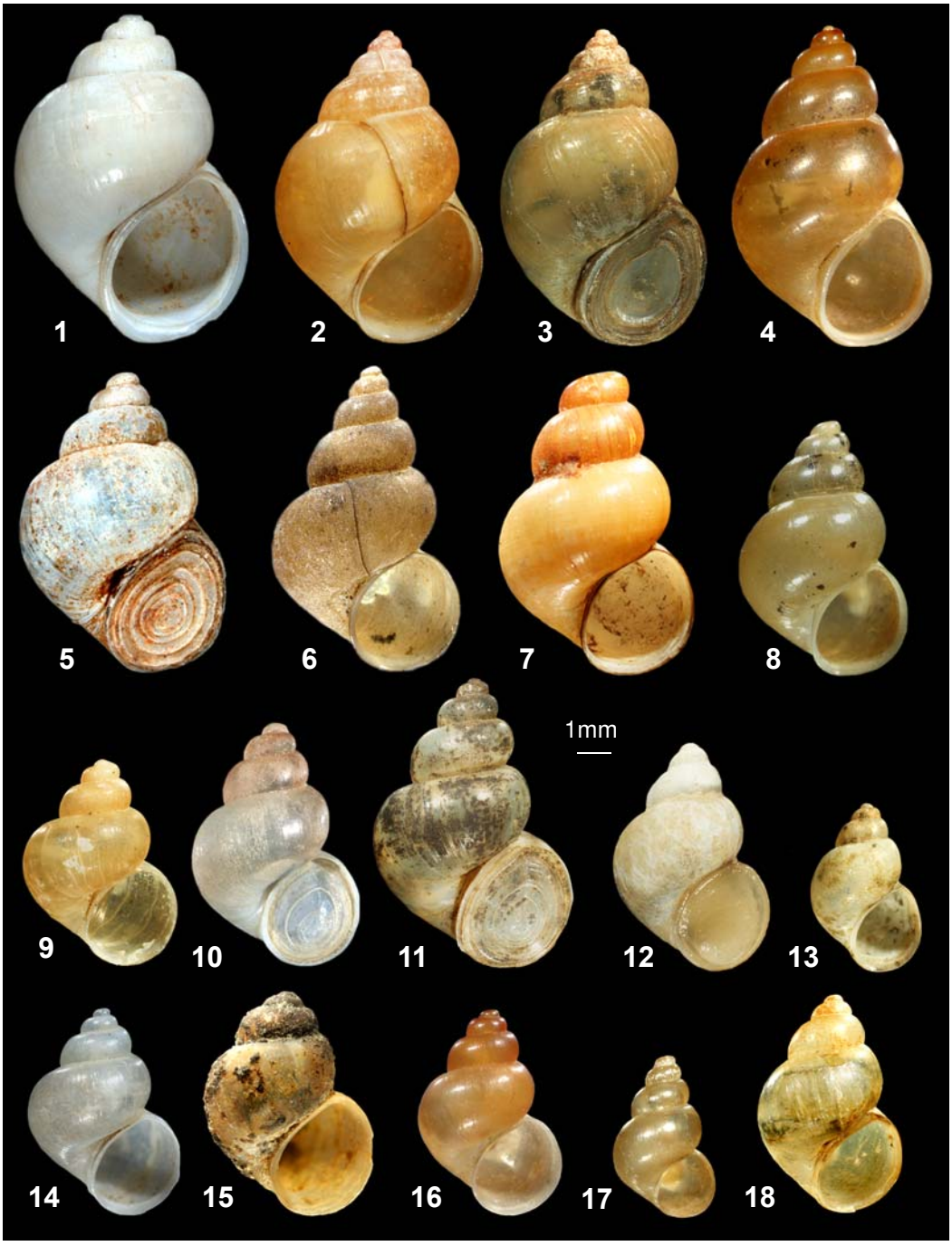


Figure 92. *Bithynia* spp. 1: *B. mostarensis*, 2: *B. tentaculata*, 3: *B. montenegrinus*, 4: *B. majorkina*, 5: *B. cettinensis*, 6: *B. transsilvanica*, 7: *B. numidica*, 8: *B. skadarski*, 9: *B. leachii*, 10: *B. boissieri*, 11: *B. italica*, 12: *B. shapkarevi*, 13: *B. phialensis*, 14: *B. quintanai*, 15: *B. rubens*, 16: *B. kobialkai*, 17: *B. zeta*, 18: *B. danubialis*

Figure 130. ***Pseudobithynia irana***. 1: radula (SEM), 2: egg capsules, 3: embryonic shell, 4: penis.

General distribution of the *Pseudobithynia* spp.

There are three hot spots of *Pseudobithynia* spp., 10 species in Greece, Turkey with 6 species, and the Levant with 5 species. We can split the *Pseudobithynia* spp. in Greece into three groups: (i) those that live endemically in ancient lakes, (ii) those that live endemically on islands, and (iii) *P. zogari*, which is widely distributed in the lowlands of Greece. In Turkey the *Pseudobithynia* spp. are all locally endemic while in the Lenvant only *P. saulcyi* is locally endemic, the other four species are widely distributed in this region.

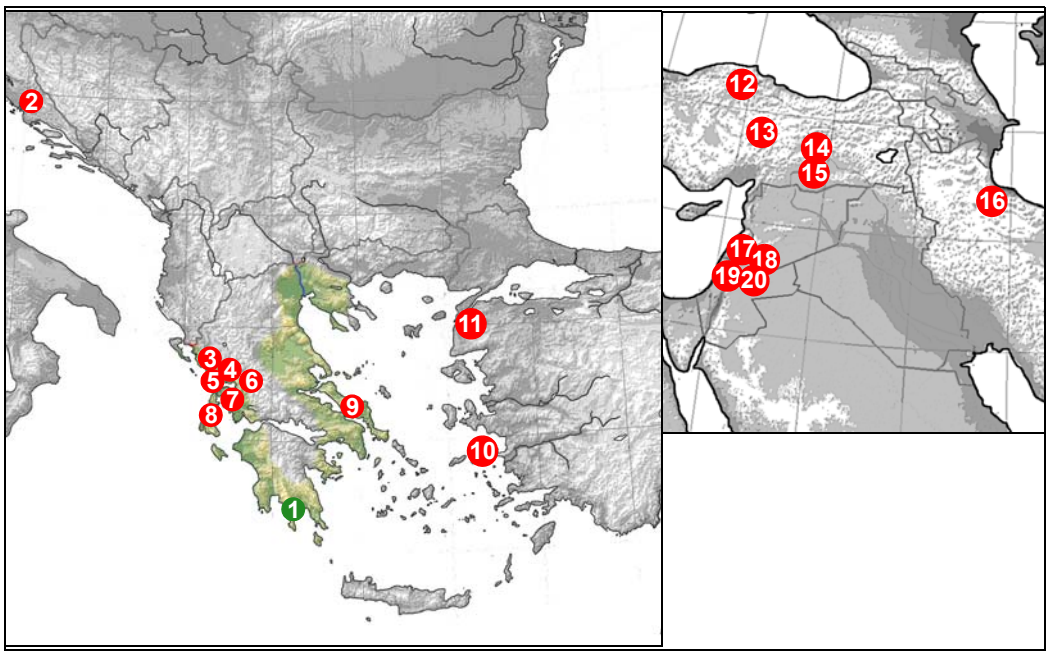


Figure 131. **Distribution of *Pseudobithynia* spp.**
1 (colored map): *P. zogari*, **2**: *P. kirka*, **3**: *P. trichonis* and *P. westerlundi*, **4**: *P. ambrakis*, **5**: *P. falniowskii*, **6**: *P. hemmeni*, **7**: *P. panetolis*, **8**: P. renei, **9**: *P. euboeensis*, **10**: *P. gittenbergeri*, **11**: *P. yildirimi*, **12**: *P. guldeni*, **13**: *P. pentheri*, **14**: *P. cocussusica*, **15**: P. *adiyamanensis*, **16**: *P. irana*, **17**: P. *hamicensis*, **18**: *P. saulcyi*, **19**: *P. badiella*, **20**: *P. kathrinae*.

Identification key for *Pseudobithynia* of the Balkans

1	Shell large (10 mm high), conical, like *B. tentaculata*	***Pseudobithynia kirka***, p. 128
–	Shell smaller	2
2	Sell slim elongate conical, 6 mm high, males smaller, Lake Pamvotis, Greece	***Pseudobithynia westerlundi***, p. 133
–	Shell not slim, whorls stepped	3
3	Umbilicus closed, whorls slightly convex with a clear suture, nucleus of operculum cochleate (Samos), margin of aperture sinuated ...	***Pseudobithynia gittenbergeri***, p. 125
–	Margin of the aperture straight (lateral view)	4
4	nucleus of operculum cochleate	5
–	nucleus of operculum not cochleate	7
5	Whorls regularly growing, umbilicus slit-like to opened, males 2 mm smaller than females (Lake Trichonis, NW-shore)	***Pseudobithynia panetolis***, p. 130
–	difference between males and females about 1 mm	6
6	Umbilicus opened, whorls slightly convex, aperture nearly rounded Peloponnes	***Pseudobithynia zogari***, p.135
–	Shell 6-7 mm, conical with stepped whorls, nucleus of the operculum coiled (Lake Pamvotis and vicinity)	***Pseudobithynia hemmeni***, p. 127
7	Umbilicus opened, whorls slightly convex with a clear suture, aperture ovate, (Lake Trichonis, NE shore)	***Pseudobithynia trichonis***, p. 132
–	outsiede Lake Trichonis	8
8	body whorl prominent, umbilicus wide and deep, males are slimmer than females, Corfu	***Pseudobithynia renei***, p. 131
–	Umbilicus small to slit-like, not deep	9
9.	Shell 5-6 mm high, males are slimmer than the females, nucleus of the convex operculum shifted right	***Pseudobithynia ambrakis***, p. 122
–	males are much smaller and slimmer than the females	***Pseudobithynia falniowskii***, p. 124

Figure 132. The *Pseudobithynia* sp. of the Balkans. **1**: *Pseudobithynia kirka*, **2**: *P. ambrakis*, **3**: *P. euboeensis*, **4**: *P. falniowskii*,

Subfamila Mercuriinae BOETERS & FALKNER, 2017

Genus *Mercuria* BOETERS, 1971

Type species: *Cyclostoma simile* DRAPARNAUD, 1805

Diagnosis: The shell is milky whitish, especially in the region of the umbilicus. The penis posses a large and flat triangular or rounded appendix. The operculum is light orange.
As only a few *Mercuria* spp. are widely distributed, the others are mostly endemic or regionally endemic, thus the latter *Mercuria* spp. can be identified geographically.

Anatomy of *Mercuria*

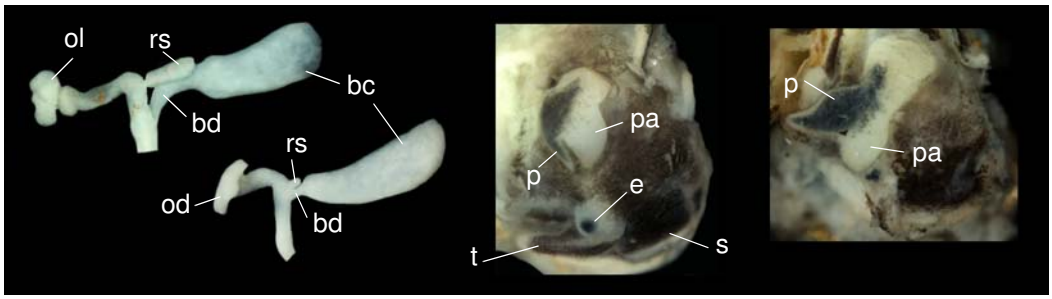


Figure 184. The penis and the female sex tract of Mercuria.
Abbreviations: bc = bursa copulatrix, bd = bursa duct (pedunculus), e = eye, od = oviduct,
ol = oviductual loop, p = penis, pa = penial appendix, rs = receptaculum esminis, s = snout, t = tentacle.

General distribution of *Mercuria* spp.

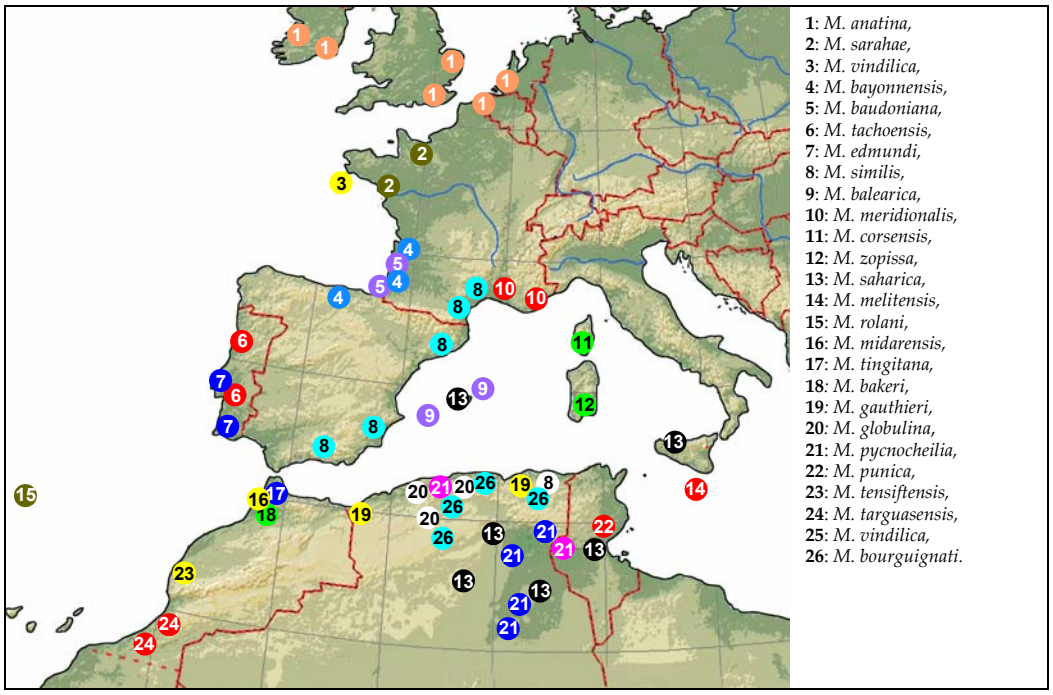


Figure 185. Distribution of ***Mercuria*** species in the Mediterranean region and Madeira.

Identification key for *Emmericia* spp.

1	No bulge behind the outer lip of aperture	2
–	bulge behind the outer lip exists	3
2	shell nearly ovate, Dubrovnik to Kotor Bay	***Emmericia expansilabris***, p. 181
–	shell globular, upper course of Cettina river	***Emmericia ventricosa***, p. 183
3	shell with a keel, lower part of Neretva river	***Emmericia narentana***, p. 182
–	shell not keeled, Monfalcone (Italy) to Neretva river, or Munich region	***Emmericia patula***, p. 183

Figure 223. ***Emmericia*** spp. **1**: *E. patula*, **2**: *E. ventricosa*, **3**: *E. narentana*, **4**: *E. expansilabris*.

Emmericia expansilabris BOURGUIGNAT, 1880

1880 *Emmericia expansilabris* BOURGUIGNAT, p. 58
1880 *Emmericia montenegrinus* BOURGUIGNAT, p. 83
1880 *Emmericia piniana* BOURGUIGNAT, p. 33
1904 *Emmericia ecarinata* BRUSINA, p. 161
1904 *Emmericia stagnensis* BRUSINA, p. 161
Type locality: Ombla spring [source of River of Dubrovnik]

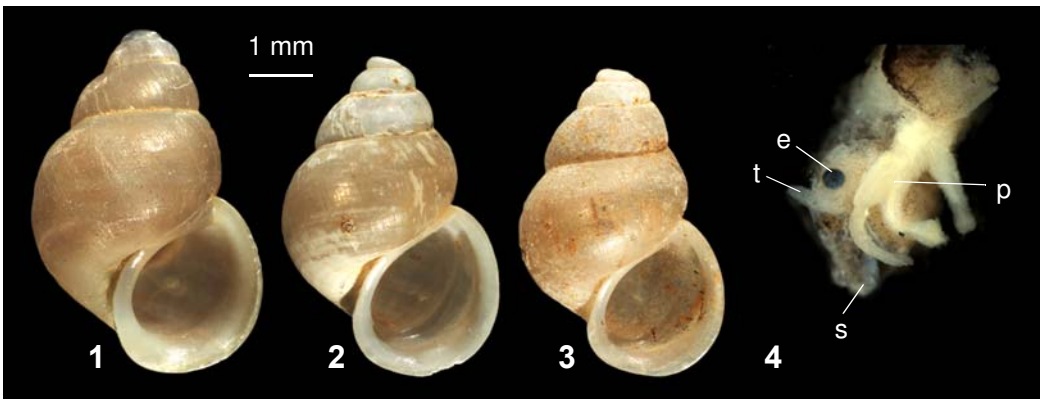


Figure 224. ***Emmericia expansilabris.*** **1**: Grude distr. Bosnia & Hercegovina, **2-3**: Ombla spring (topotypes), **4**: penis. Abbreviations: e: eye, p = penis with penial appendices, s = snout, t = tentacle.

General distribution of the *Valvata* spp.

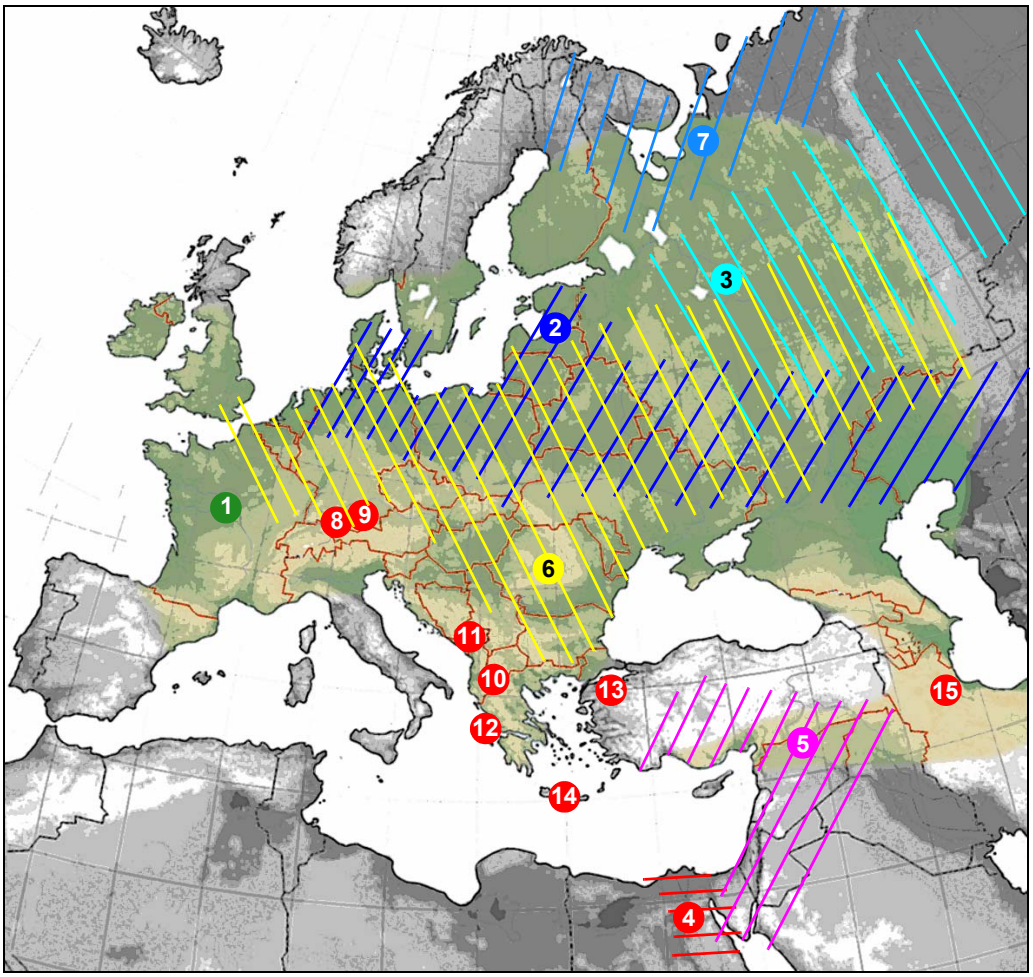


Figure 242. The distribution of the ***Valvata*** spp. in the West-Palaearctic.
1 (colored map): *V. cristata* and *V. piscinalis*, 2 (blue hachures): *V. ambigua*,
3 (cyan hachures): *V. kliniensis* and *V. lilljeborgi*, **4** (red hachures): *V. nilotica*,
5 (magenta hachures): *V. saulcyi*, **6** (yellow hachures): *V. macrostoma*, **7** (light blue hachures): *V. sibirica*
8: *V. studeri*, **9**: *V. alpestris*, *V. geyeri*, **10**: *V. klemmi*, *V. stenotrema*, *V. hirsutecostata*, *V. rhabdota*, *V. relicta*,
11: *V. montenegrinus*, **12**: *V. theotokii*, **13**: *V. kebapcii*, **14**: *V. kournasi*, **15**: *V. nowshahrensis*.

On the one hand there are the widely distributed species *V. piscinalis* and *V. cristata* and some more European species which are more restricted in their distribution like *V. macrostoma* and *V. ambigua*. In the arctic region we can find *V. sibirica* and in the Near East there are *V. saulcyi* and *V. nilotica*. In E-Europe the Russian species *V. kliniensis* and *V. lilljeborgi* occur. All other species are endemic or regionally endemic with a hot spot in Lake Ohrid.

Identification key for the subgenera of *Valvata*

1	Whorls tricarinated	***Ohridotropidina***, p. 214
–	Whorls circular rounded	2
2	Shell flat, whorls are wind up in a plane, surface smooth	***Valvata***, p. 195
–	Whorls not wind up in a plane, or if so the surface is ribbed	***3***
3	Spire not noticeable elevated, shell wide umbilicated	***Tropidina***, p. 209
–	Shell not wide umbilicated	4
4	Spire noticeable elevated, clearly but not wide umbilicated	***Cincinna***, p. 196
–	Shell with ribs and periostracal frings ("hairs"	***Costovalvata*** , p. 208

Figure 243. The subgenera of ***Valvata***. **1**: *Valvata*, **2**: *Cincinna*, **3**: *Costovalvata*, **4**: *Tropidina*.

Subgenus *Valvata* O. F. MÜLLER, 1773

Type species: *Valvata cristata* O.F. Müller 1774

Diagnosis: Shell flat, whorls wind up in a plane.

Valvata (*Valvata*) *cristata* O. F. MÜLLER, 1774

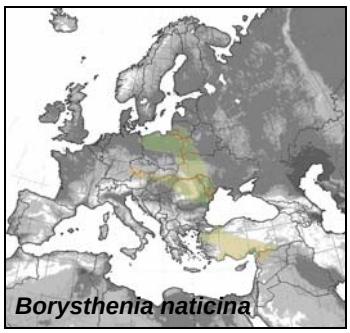
1774 *Valvata cristata* O. F. MÜLLER, p. 198.
Type locality: " In paludosis." [Denmark]

Description: The shell is flat, with three fast growing cylindrical whorls wind up in a plane. The umbilicus is wide and the first whorls are visible. The aperture is circular with a sharp peristome. The circular operculum is depressed in the centre. Shell height 0.6-1.5 mm, width 2.0-3.5 mm.
Ecology: *V. cristata* occurs in springs, slowly flowing waters, in lakes, ponds up to temporary waters. The species is calciphile and prefers to live in the phytal.
Forms: The last whorl can be more or less deflected.

Identification key for the species of the subgenus *Cincinna*

1	last whorl tricarinated, Lake Trichonis, Greece	***Valvata klemmi***, p. 201
–	whorls not carinated	2
2	umbilicus very wide, broader than the body whorl near the aperture	3
–	umbilicus wide, less broad than the body whorl near the aperture	4
3	surface smooth, glossy, H : W = 5.5 : 6.3, alpine	***Valvata alpestris***, p. 198
–	umbilicus moderately wide, H : W = 4 : 5, lowlands	***Valvata ambigua***, p. 199
4	shell higher than broad	5
–	shell not higher than broad	6
5	shell small, whorls inflated, Lake Weissen (Bavaria)	***Valvata geyeri***, p. 200
–	shell large H : W = 6 : 4.5, umbilicus closed, in Lakes	***Valvata antiqua***, p. 199
6	umbilicus semi-wide	7
–	umbilicus narrow to moderately narrow	8
7	umbilicus semi-wide, low spire, Egypt	***Valvata saulcyi***, ***V. nilotica***, p. 206, p. 203
–	umbilicus semi-wide, surface finely striated, alpine	***Valvata studeri***, p. 207
8	umbilicus moderately narrow, H : W = 6.5 : 5.4, Russia	***Valvata kliniensis***, p. 201
–	umbilicus narrow	9
9	Shell globular, finely striated or finely ribbed, umbilicus narrow and slightly covered by the umbilicus	10
–	Shell higher than broad	11
10	Shell finely striated	***Valvata piscinalis***, p. 204
–	Shell finely ribbed, Montenegro	***Valvata montenegrinus***, p. 203
11	Lake Ohrid	***Valvata stenotrema***, p. 206
–	lakes of the Baltic Sea basin, central part of Dnieper basin, south of Western Siberia	***Valvata lilljeborgi***, p. 202

Figure 245. ***Valvata*** spp. of the subgenus ***Cincinna***.
1: *V. alpestris*, **2**: *V. ambigua*, **3**: *V. kliniensis*, **4**: *V. piscinalis*,



E-Europe: In Poland in the Oder and some of its tributaries (PIECHOCKI et al. 2016), in Slovakia in a stretch of the Danube river downstream of Komárno (HORSÁK et al. 2013). In Hungary especially in the Danube (PINTÉR et al. 2004). In Russia in the basins of the Dnieper, Yuzhnyi Bug, Dniester, Danube, Neman, and Visla rivers; the Baltic Sea region (VINARSKI & KANTOR 2018). Recorded from the Western Siberia as invasive species [SHARAPOVA, 2008]. In Bulgaria in the Danube at Svishtov and Ruse (ANGELOV 2000).
Outside Europe: In Turkey in Lake Sapanca, Karataş Lake, Instranca stream, Lake Eğirdir, Kovada Channel, Lake Kovada, Yuvarlaçay (YILDIRIM 1999, GÜRLEK et al. 2019).

Infraclassis Pulmonata CUVIER in BLAINVILLE, 1814

Familia Lymnaeidae RAFINESQUE, 1815

The Lymnaeidae are worldwide distributed and live in all habitats, preferable in rich vegetated waters. Species identification in this group is not always easy and in doubt DNA sequences are needed. For example *Galba truncatula* and *G. schirazensis* the shells of which look similar but molecular genetically they are distinct (BARGUES *et al.* 2011). On the other hand there are species like *Lymnaea stagnalis* and *L. raphidia* which are molecular genetically conspecific but the shells of which are different and the same with *Radix relicta* and *R. pinteri* (AKSENOVA *et al.* 2018).

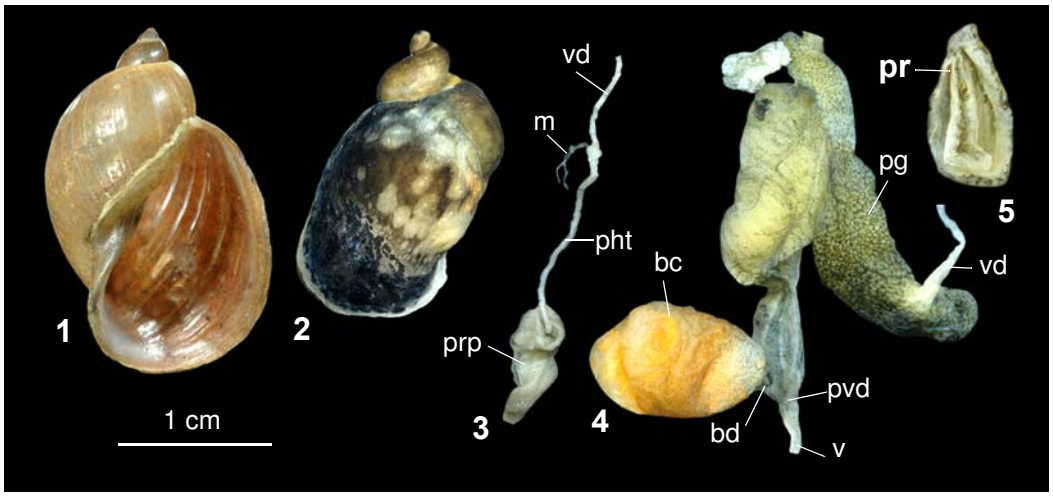


Figure 272. Anatomy of ***Radix balthica***. **1**: shell, **2**: mantle pigmentation, **3**: male copulatory organ, **4**: female sex tract, **5**: cut through prostate gland.
Abbreviations: **bc** = bursa copulatrix, **bd** = bursa duct, **m** = muscle, **pg** = prostate gland, **pr** = cut through prostae gland, **pht** = phallotheca, **prp** = praeputium, **v** = vagina, **vd** = vas deferens.

The anatomy of Lymnaeidae provides in some species good characters which are suitable for species identification. All *Radix* spp. have one prostate fold (fig. 270.5) while *Stagnicola* spp. have 1-4 folds or many folds in *Stagnicola corvus*. The ratio of praeputium (prp, fig. 270.3) to phallotheca (pht, fig. 270.3) can be used for differentiating *Stagnicola* spp. The pigmentation of the mantle (fig. 270.2) can be used in some *Radix* spp. as well as the length of the bursa duct (bd, fig. 270.4). *Galba truncatula* has a characteristic broad provaginal duct (pvd, fig. 273.4).

Freshwater snails of the family Lymnaeidae (Gastropoda) act as intermediate hosts or vectors of numerous digenean trematode species.

Identification key for the Lymnaeidae

1	Shell thin-walled, slim, aperture height higher than spire	***Pseudosuccinea***, p. 252
–	Shell not thin-walled	2
2.	Shell very thin, globular, translucent, light ivory, apex obtuse	***Myxas***, p. 249
–.	Shell not very thin	**3**
3.	Spire elongated, higher or the same height as the aperture	**4**
–	Spire shorter than the aperture height	***Radix***, ***Orientogalba***, p. 232, p. 246
4	Spire long and acute, the first whorls do only slightly extend in width, last whorl broad	***Lymnaea***, p. 246
–	Spire not long and acute	**5**
5	shell slim, whorls grow regularly, last whorl not broadened smaller than 20 mm	***Omphiscola***, p. 250
–	shell not slim	**6**
6	shell conical with more or less stepped whorls, clear suture, smaller than 10 mm	***Galba***, p. 218
–	whorls not stepped	**7**
7	shell elongated conical, slim, prostate gland with one fold, spire three times higher than aperture, East Germany to Siberia	***Ladislavella***, p. 221
–	shell elongated conical, whorls regularly growing, height of the aperture smaller or of same height as the spire	***Stagnicola***, p. 223

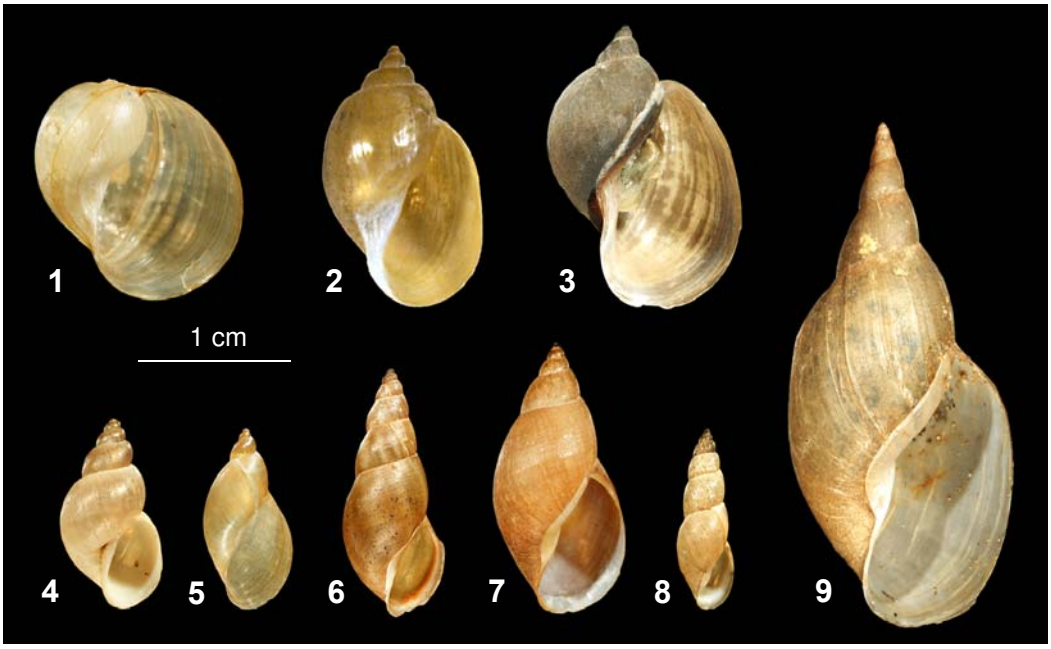


Figure 273. Representatives of the genus groups of the Lymnaeidae.
1: *Myxas*, 2: *Orientogalba*, 3: *Radix*, 4: *Galba*, 5: *Pseudosuccinea*, 6: *Ladislavella*, 7: *Stagnicola*, 8: *Omphiscola*, 9: *Lymnaea*.

1949 *Lymnaea pereger* f. *ampla* – MANDAHL-BARTH, p. 73
1979 *Lymnaea pereger* f. *ampla* – RICHNOVSZKY & PINTÉR, p. 84
1961 *Lymnaea balthica* f. *ampla* – S. H. JAECKEL, p. 188
1991 *Lymnaea peregra ampla* – LISICKÝ, p. 64.
Type locality: "Rhine near Reineck" (locality of the lectotype collection). The lectotype, designated by VINARSKI and GLÖER (2007), is housed in Naturmuseum Saint-Gallen, Switzerland.

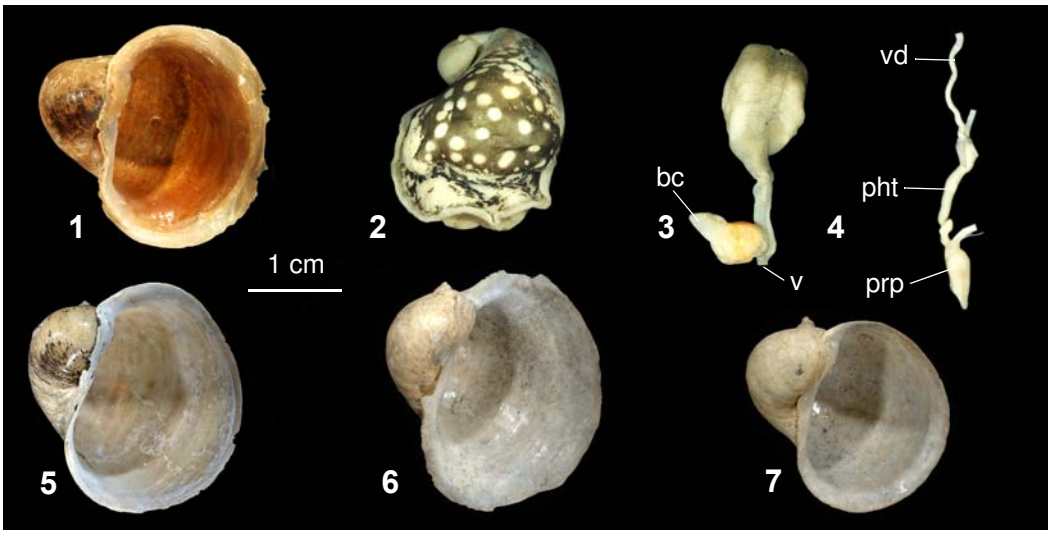
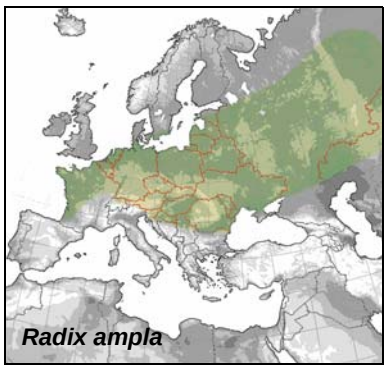


Figure 293. ***Radix ampla***. **1**-**2**, **5**-**7** (**5**-**6** = syntypes): shell, **2**: mantle pigmentation, **3**: female sex tract, **4**: male copulatory organ. Abbreviations: **bc**: bursa copulatrix, **prp** = praeputium, **pht** = phallotheca, **v** = vagina, **vd** = vas deferens.



Description: The spire is very short and acute. Usually the upper border of the aperture overtops the spire. The columellar fold is straight. The shell height is about 20 mm and 19 mm broad.
It can be **c o n f u s e d** with amploid forms of *R. auricularia*, from which it can be distinguished by the long bursa duct in *R. auricularia*. In addition the juveniles of *R. ampla* are already amploid while juveniles of *R. auricularia* have a slim aperture. *Radix auricularia* is the only *Radix* sp. which has speckles on head and foot.
Animal: The mantle is pigmented in black with large white spots. On head and foot there are no speckles.
Anatomy: The bursa duct is very short or missing. The pht is longer than the prp.
Ecology: It lives in large lakes, slowly flowing smaller rivers and river channels.

Distribution: Central-Europe-Siberian.
C e n t r a l - E u r o p e : In Germany especially in large lakes and rivers. In Poland in the lowland as well as Western Sudetes and the Eastern Beskidy Mts (Piechocki 2016). In Czech Republic the Elbe lowlands, in Slovak Republic in the Danube lowland and Tisa river basin (HORSÁK 2013).
O u t s i d e E u r o p e : Southern Siberia eastward to Lake Baikal.
Remark: Formerly this species has often been c o n f u s e d with amploid forms of *Radix auricularia*. Thus older distributional data cannot be trusted in any case.

Radix dolgini (Gundrizer et Starobogatov, 1979)

1979 *Lymnaea dolgini* Gundrizer et Starobogatov, p. 1132, fig. 1(2); 2 (2).

Type locality: Russia, the Krasnoyarsk Territory, a lake in the floodplain of the Kureika River, 20 km upstream of its mouth.

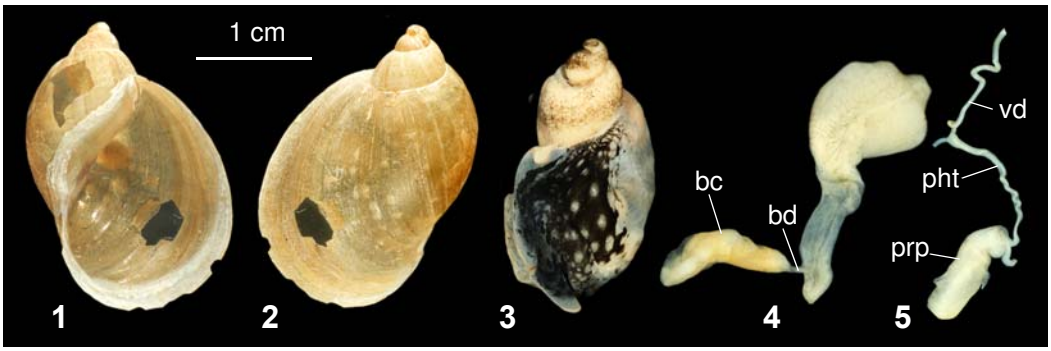
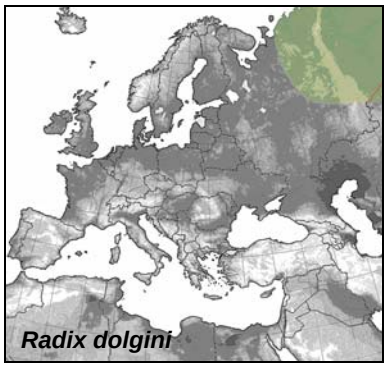


Figure 297. ***Radix dolgini***. **1-2**: shell, **3**: mantle pigmentation. **4**: female sex tact, **5**: male copulatory organg. Abbreviations: **bc** = bursa copulatrix, **bd** = bursa duct, **pht** = phallotheca, **prp** = praeputium, **vd** = vas deferens.



Description: The light yellowish to brown shell is translucent. The 4-4.5 whorls are regularly fast growing in height and width. The lateral line of the spire is straight to slightly convex. The body whorl is prominent with a large aperture the upper margin of which fast decreases. The shell is 11-15 mm high and 8-12 mm broad.

This species can be **c o n f u s e d** with *R. lagotis*, and *R. labiata*. Characteristic for *R. dolgini* is the short bursa duct and the elongated bursa copulatrix.

Distribution: Pechora River basin and Sibiria.

Radix euphratica (MOUSSON, 1874)

1874 *Limnaea euphratica* MOUSSON, 40-41.

Type locality: "Samava" [lower Mesopotamia].

Figure 298. ***Radix euphratica***. **1**: Syntype (ZMZ 520594, Iraq: Samava, coll. Mousson ex Schlaefli 1862, photo: Eike Neubert), **2**: shell (topotypes), **3**: mantle pigmentation, **4**: male copulatory organ, **5**: female sextract. Abbreviations: **bc** = bursa copulatrix, **bd** = bursa duct, **prp** = praeputium, **pht** = phallotheca, **pvd** = provaginal duct, **vd** = vas deferens.

Taxonomic remark: VINARSKI *et al.* (2012) tested *Lymnaea stagnalis* from different sampling sites in Eurasia and N-America. There are two large clades which show almost clear geographic pattern of distribution. One of them includes all snails collected in Western and Central Europe apart from a few exceptions, whereas the second one comprises snails living in Ukraine, Western Siberia and Asia Minor. North American specimens of *L. stagnalis* belong to the 'European' clade. Specimens from Albania and Italy form a third branch that may indicate one more species, *L. raphidia* (BOURGUIGNAT, 1860) (VINARSKI *et al.* 2012).

Lymnaea stagnalis (LINNAEUS, 1758)

1758 *Helix stagnalis* LINNAEUS, p. 774.
1862 *Limnaea doriana* BOURGUIGNAT, p. 60
1850 *Limnaeus fragilis* – STEIN, p. 67
1985 *Lymnaea araratensis* KRUGLOV & STAROBOGATOV, p. 26. fig. 1d, 3d.
Type locality: "Habitat in Europæ stagnis."

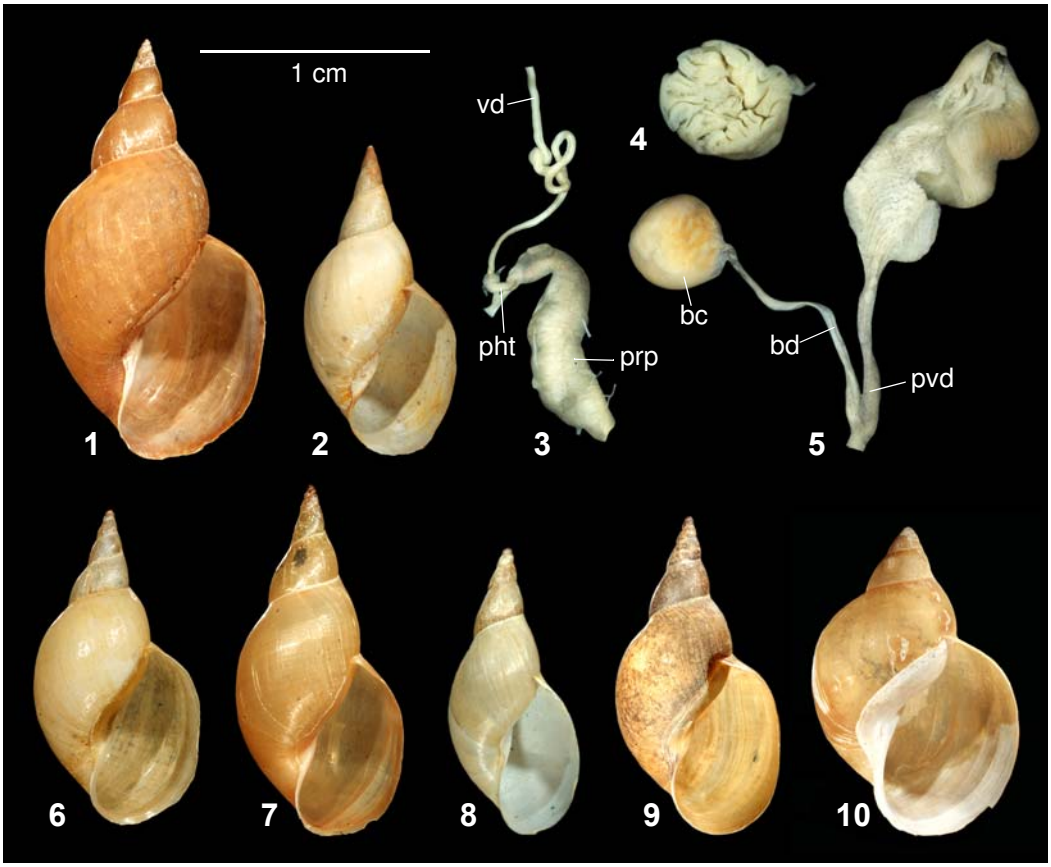


Figure 308. ***Lymnaea stagnalis***. **1**: ditch in Reitbrook (Hamburg), **2**: Lake Constance, **3**: male copulatory organ, **4**: cut through prostate, **5**: female sex tract, **6**-**8**: Westensse (Schleswig-Holstein), **9**: Ackersoll Wittenberg (Mecklenburg Western Pomerian), **10**: Georgia.
Abbreviations: **bc** = bursa copulatrix, **bd** = bursa duct, **pht** = phallotheca, **prp** = praeputium, **pvd** = provaginal duct, **vd** = vas deferens.

Description: The spire of the conical shell is elongated and usually higher than the aperture. The first 5.5 whorls are fast increasing and are straight to slightly convex, thus the lateral line of the

Genus *Physa* DRAPARNAUD, 1801

Type species: *Bulla fontinalis* Linnaeus 1758

Diagnosis: The left coiled shells are yellowish to brownish, glossy and translucent.

Identification key of the genus *Physa*

1	Apex acute	**2**
–	Apex rounded	**3**
2	shell higher than 15 mm, shell height : aperture height = 1 : 2.5	***Physa gyrina***, p. 258
–	shell smaller 13 mm, shell height : aperture height = 1 : 3	***Physa acuta***, p. 256
3	Shell small, up to 6 mm	***Physa skinneri***, p. 259
–	Shell larger	4
4	first whorls fast growing, mantle reticular pigmented	***Physa fontinalis***, p. 257
–	first whorls regular growing, mantle black	***Physa taslei***, p. 260

Figure 316. The ***Physa*** spp. **1**: *Ph. acuta*, **2**: *Ph. fontinalis*, **3**: *Ph. skinnery*, **4**: *Ph. gyrina*, **5**: *Ph.* cf. *taslei*.

Physa acuta DRAPARNAUD, 1805

1805 *Physa acuta* DRAPARNAUD (1805), p. 55, pl. 3, fig. 10, 11.
2002 *Physella acuta* – GLÖER, p. 246, fig. 260
Type locality: "Habite dans la Garonne et les rivières qui s'y jettent."

Figure 317. ***Physa acuta*** (Oder near Reitwein).
1-**3**: shells, **4**: bursa duct and bursa copulatrix, **5**: male copulatory organ.

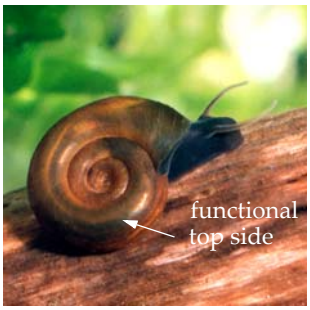


Figure 323. If the left coiled *Planorbis planorbis* (left photo) turns the shell horizontal. the top side becomes the functional underside.

Figure 324. If the species (*Gyraulus rossmaessleri*, right photo) turns the shell vertically the upper side becomes the right side of the shell.

For species identification the shell shape and the prostate diverticula are important characters.

Anatomy of the Planorbidae

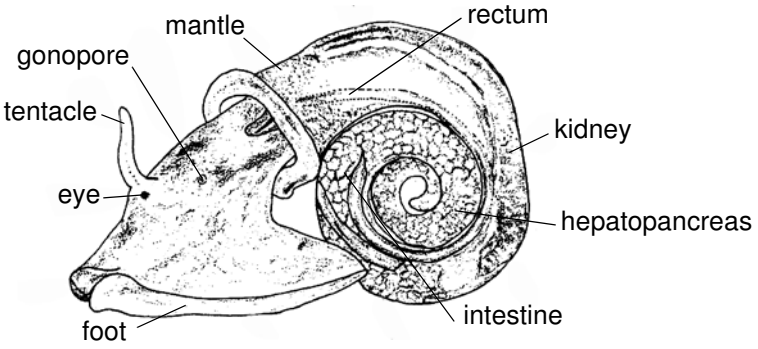


Figure 325. Soft part of ***Gyraulus albus***, shell removed (after MEIER-BROOK 1983).

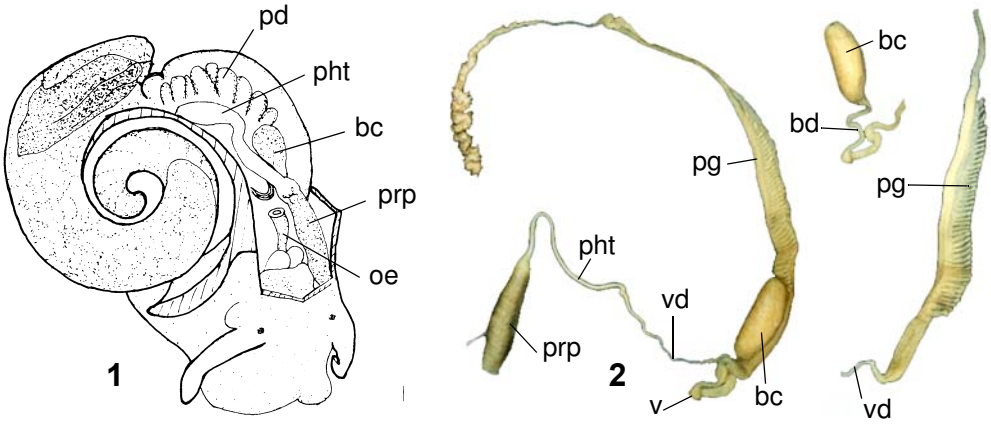


Figure 326. Sex tract of ***Gyraulus***. **1**: drawing after Meier-Brook 1983, **2**: photo of original dissection. Abbreviations: **bc** = bursa copulatrix, **bd** = bursa duct, **pht** = phallotheca, **pd** = prostate diverticula, **pg** = prostate gland, **prp** = praeputium, **v** = vagina, **vd** = vas deferens.

Figure 328. The shells of the Planorbidae. **1**: *Ferrissia*, **2**: *Planorbis*, **3**: *Menetus dilatatus*, **4**: *Anisus*, **5**: *Bathyomphalus*, **6**: *Gyraulus*, **7**: *Hippeutis*, **8**: *Segmentina*, **9**: *Ancylus*.

Genus *Indoplanorbis* ANNANDALE & PRASHAD 1921

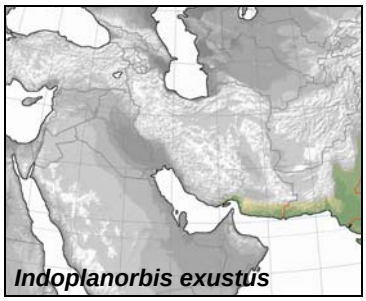
Type species: *Planorbis exustus* DESHAYES 1834

Diagnosis: The species of this monotypic genus are sinistral, discoidal, thick-walled with a deeply impressed suture.

Indoplanorbis exustus (DESHAYES, 1832)

1832 *Planorbis exustus* DESHAYES, p. 417, pl. 1, figs. 11-13
Type locality: Malabar Coast, India

Figure 329. ***Indoplanorbis exustus***, Iran.



Description: The light brownish shell is large and thick-walled. The 4.5-5 whorls are fast increasing which are on the right side deep immersed. Juveniles are proportional higher than the adults. The surface of the shells is striated. The shell is 10-25 mm broad and 9-10 mm high.
Distribution: India, Nepal, Myanmar, Oman, Yemen. In Iran in Seistan and Baluchestan Province (MANSOORIAN 1994) and Hormozgan Province (GLÖER & PEŠIĆ 2012).
Remark: The species serves as intermediate host for many trematodes found in goat, sheep, horse, dog, camel and other cattles.

tion. But the hatching rate by self-fertilization is, however, significant reduced to 5-6 % (COSTIL & DAGUZAN 1995).

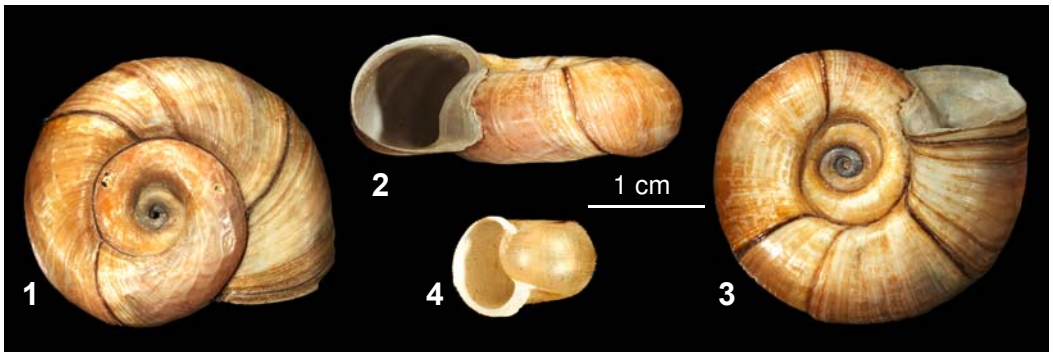
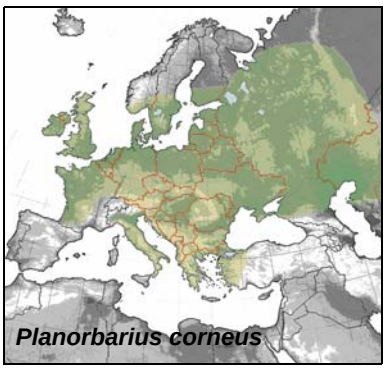


Figure 331. ***Planorbarius corneus***. **1-3**: shell, Lake Westensee (Schleswig-Holstein), **4**: juv.

Ecology: It occurs in rich vegetated, stagnant to slowly flowing waters. *P. corneus* prefers a total hardness over 2-3 °d and pH-values between 6.0-8.8 (ØKLAND 1990). REAVELL (1980) found in the content of the intestine exclusively detritus. *P. corneus* can survive drying up of water bodies over a longer time (MATZKE 1961).



Distribution: European-Siberian.
N-Europe: Only a few sampling sites in S-Norway (ØKLAND 1990), in S-Sweden common in Schonen, and Gotland (HUBENDICK 1947). In Denmark from SE-Jutland in the entire country common, as well as in Bornholm (SCHLESCH 1934, MANDAHL-BARTH 1949).
West- and Central-Europe: In England in the lowlands common, In Scotland scattered, as well as in Ireland (KERNEY 1999). In The Netherlands apart from some gaps common (GITTENBERGER *et al.* 1998). In Belgium nearly in all regions common (ADAM 1960). In Luxembourg only one recent finding, formerly especially in southern Luxembourg distributed (GROH pers. comm. 2002).
In Switzerland no stable populations (TURNER *et al.* 1998). In entire Austria distributed(KLEMM 1960).
Germany: In the North German lowlands common, missing in the uplands, and rare in southern Germany.
E-Europe: In Finland especially in the south (HUBENDICK 1947, AHO *et al*. 1981), in the entire Baltic-States common (SCHLESCH & KRAUSP 1942). In Poland common (PIECHOCKI 1979), in Czech and Slovak Republics scattered (Horsák et al. 2013), as well as in Hungary (PINTÉR et al. 2004). Distributed in the European part of Russia and Western Siberia (Vinarski & Kantor 2018).
S-Europe: In France in atlantic and continental region (Falkner et al. 2002), not south of the Pyrenees, in continental Italy distributed (Cossignagni 1995). In the Balkans along the countries of the Adriatic coast (BANK 2011) to Greece (BANK 2006) and W-Turkey (Yılıdırım et al. 2006, Gürlek et al. 2019).

Planorbarius grandis (DUNKER, 1850)

1850 *Planorbis grandis* DUNKER, p. 35, pl. 7, figs 1-3

Type locality: unknown ("Das Vaterland dieser ausgezeichneten Schnecke, die Herrn H. Cuming's Sammlung angehört, ist leider unbekannt.")

Figure 332. ***Planorbarius grandis*** (Prespa Lake), **1-3**: topotype (HNHM 36858), **4**: juv.

Description: The yellowish-brownish shell is glossy and finely striated. The 4.5 whorls, which are higher than broad, are convex and separated by a deep suture. The underside is deeply umbilicated, the right side slightly concave. The shell is 15 mm high and 31 mm broad.

If we do not pay attention to the proportions of the shell it can be confused with *Planorbarius corneus*. But *P. grandis* is much higher than *P. corneus* (34:12) vs. (31:15) in *P. grandis*.

Distribution: Lake Prespa.

Planorbarius metidjnsis (FORBES, 1839)

1839 *Planorbis metidjensis* [*metidgensis* in the text] FORBES, p. 254-255, no. 42, pl. 12. fig. 5.

1846 *Planorbis Dufourii* GRAELLS, p. 11, figs. 11-15

Type locality: "... plain of Metidja." [N-Algeria]

Figure 333. ***Planorbarius metidjensis***. **1**: right side, **2**: left side, **3**: apertural view.

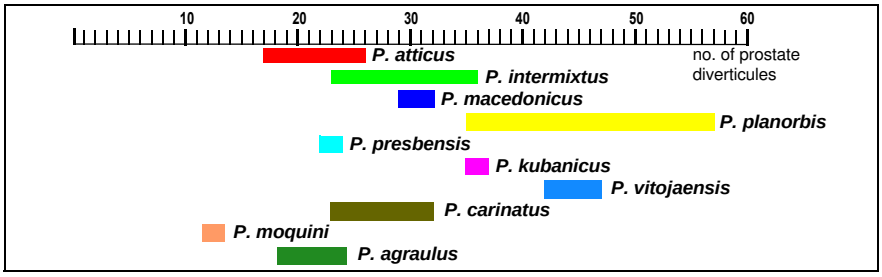


Figure 340. Number of prostate diverticula in the genus *Planorbis*.

General distribution of the *Planorbis* spp.

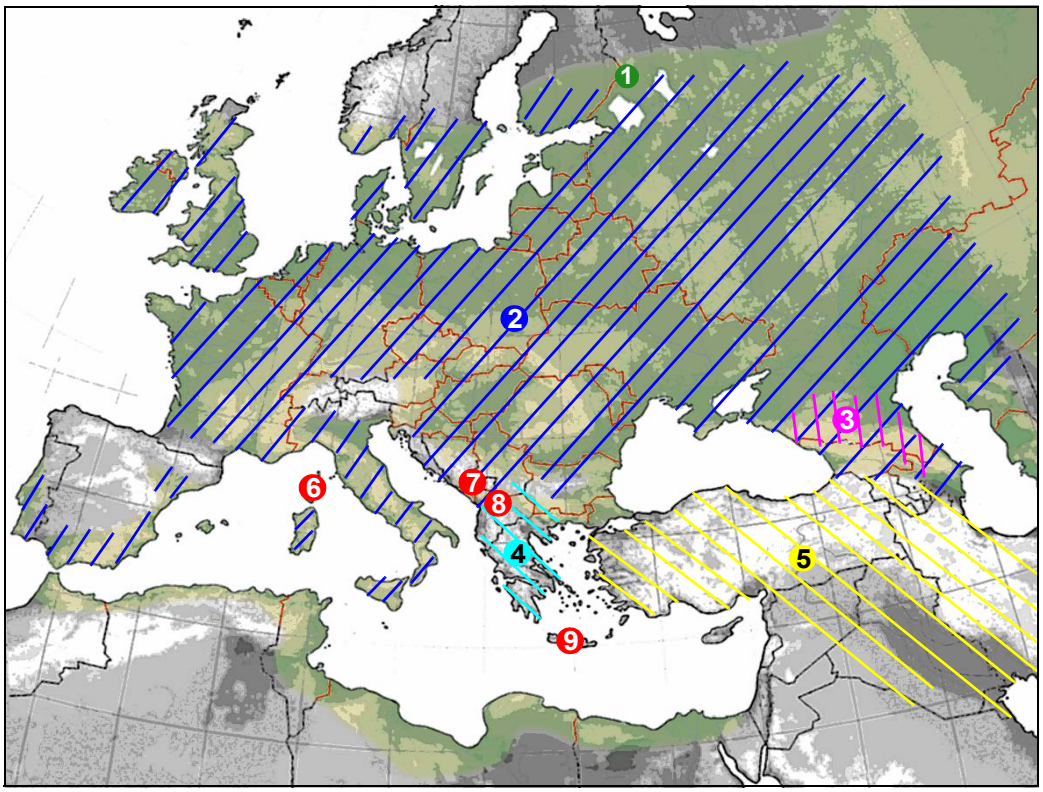


Figure 341. The distribution of ***Planorbis*.** **1** (colored map): *P. planorbis*, **2** (blue hachures): *P. carinatus*, **3** (magenta hachures): *P. kubanicus*, **4** (cyan: hachures) *P. atticus*, **5** (yellow hachures): *P. intermixtus*, **6**: *P. moquini*, **7**: *P. vitojensis*, **8**: *P. macedonicus* and *P. prespensis*, **9**: *P. cretensis*.

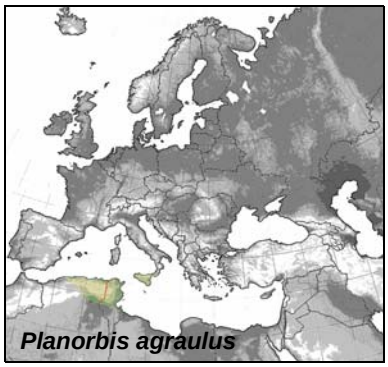
The most widespread *Planorbis* spp. are *P. planorbis* and *P. carinatus*. In Greece occurs *P. atticus* and in Turkey as well as Iraq and Iran *P. intermixtus*, both shells of which are similar to *P. planorbis* but they differ in the number of prostate divericules. Interestingly the number of prostate diverticules of *P. intermixtus* increases towards east. If *P. planorbis*, *P. atticus* and *P. intermixtus* are distinct species in fact should be tested with molecular genetic methods. The shells of *P. kubanicus*, which occurs in Ciscaucasia, are a little similar to *P. carinatus* but differ in the number of prostate diverticules. The other species are locally endemic.

Figure 343. The ***Planorbis*** spp. **1**: *P. macedonicus*, **2**: *P. moquini*, **3**: *P. planorbis*, **4**: *P. prespensis*, **5**: *P. vitojensis*.

Planorbis agraulus BOURGUIGNAT, 1864

1864 *Planorbis agraulus* BOURGUIGNAT, p. 159
Type locality: „Environs de Mostaghanem, dans les eaux tranquilles et un peu marécageuses."

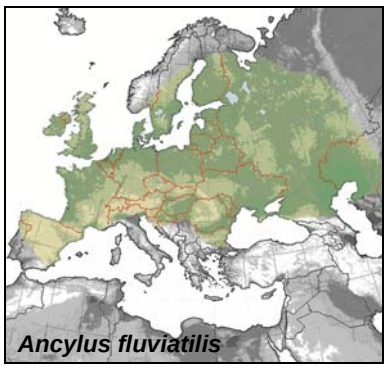
Figure 344. ***Planorbis agraulus*** (topotypes). **1**: apical view, **2**: ventral view, **3**: apertural view, **4**: sex tract. Abbreviations: **bc** = bursa copulatrix, **bd** = bursa duct, **pd** = prostate duct, **pg** = prostate gland, **pht** = phallotheca, **prp** = praeputium, **v** = vagina, **vd** = vas deferens.



Description: The shell is light brown to ivory, and the 3.5-4 whorls are regularly rounded with a deep suture. The first whorls are deep immersed and the right side is wide umbilicated. With the rounded and swollen whorls the right side remembers on *Valvata cristata* O.F. Müller, 1774. The aperture is slightly ovate in the juveniles and becomes more ovate in adult shells. The last whorl is a little descended. The diameter of the shell is 3.5–4 mm, and the height is 0.8-1.0 mm.
Animal: The animal is dark grey, the mantle pigmentation is diffuse without any patterns.
Anatomy: The prostate gland bears 18-24 diverticula, the pro-prostate duct is long, the bursa is spherical to club elongate with a relative long bursa duct.

Distribution: Algeria, Tunisia, Sicily.

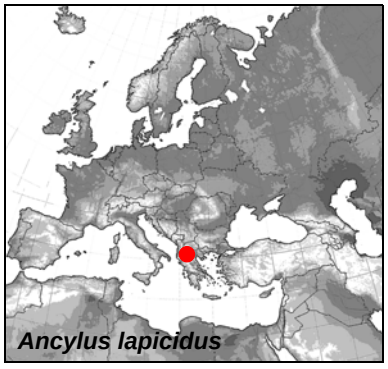
Description: The thin-walled, translucent, whitish yellowish to red brown shell is cap-like with a reticulate structure on the surface, especially in the region of the apex. The apex is situated in the middle of the axis of the shell and is slightly bent to the right. The apex does not reach the back edge of the aperture. The shell is 2-3.5 mm high and 3.5-8 mm long.



Ecology: The species lives in running waters and surf zone of large lakes, sitting on stones. Forages on Diatomeae, *Aufwuchs* and Cyanobacteria. In Norway it prefers pH-values between 6.6-7.8 by a total hardness over 0.40 d° (ØKLAND 1991)
Distribution: European.
N-Europe: In Norway only in the south-east (ØKLAND 1991). In S-Sweden scattered (NILSSON *et al*. 1998). In Denmark scattered in Jutland, Sealand, Lolland, Falster, and Bornholm (SCHLESCH 1934, MANDAHL-BARTH 1949).
West- and Central-Europe: In entire England, Scotland, and Ireland distributed, also in the mountains (KERNEY 1999). In The Netherlands scattered (GITTENBERGER *et al.* 1998), in entire Belgium except Flanders scattered (ADAM 1960), in Luxembourg in the whole country distributed, in the north more common than in the south (GROH & WEITMANN 1997-99).In the lowlands of Switzerland (193 m up to 960 m asl.), from valley of Geneva to Lake Constance (TURNER *et al*. 1998). In entire Austria distributed except S-Tessin and Burgenland (KLEMM 1960).
Germany: In entire Germany distributed but not common, and in decline. In the Erz mountains up to 800 m asl. (JAECKEL 1962).
E-Europe: Common in fast running waters of Finland and the baltic states (SCHLESCH & KRAUSP 1942), as well as in Poland (PIECHOCKI et al. 2016), Czech and Slovak Republics (HORSÁK et al. 2013) and in Hungary (PINTÉR et al. 2004). In the European part of Russia to the Ural and southern Siberia (VINARSKI & KANTOR 2018).
S-Europe: In Portugal and Spain (ALBRECHT *et al*. 2016).

Ancylus lapicidus HUBENDICK, 1960

1960 *Ancylus lapicidus* HUBENDICK, p. 512, pl. 2, figs. 4-6, pl 3. figs. 1-3
Type locality: "... western side of Lake Ochrid ..."



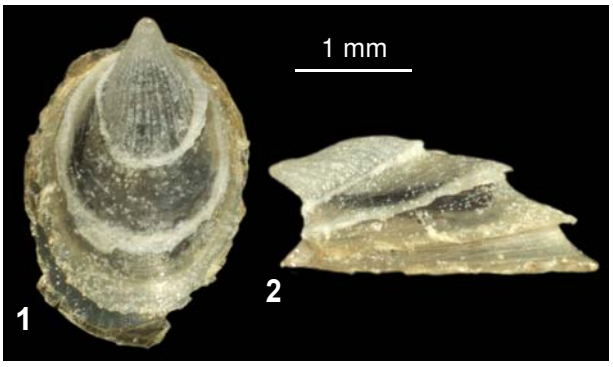


Figure 411. ***Ancylus lapicidus***.(topotype)

Description: The aperture is regularly elliptical, The cornet-shaped apex is proportionally broader than in *A. scalariformis* and *A. tapirulus*. The shell is 2.5 mm long, 1.8 mm broad and 0.95 mm in height (possibly larger as HUBENDICK had only juveniles for his description).
Distribution: only known from Lake Ohrid

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