

# Descriptions of new and little-known land snail taxa from Turkey, and establishment of a new genus (Gastropoda, Pulmonata: Lauriidae, Enidae and Vitrinidae)

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## INTRODUCTION

Terrestrial molluscs show a high level of endemism (> 60%) in Turkey. Some 750 (sub)species are known; about one third of them have been described in the last four decades. However, many (sub)species are still waiting for its discovery. In this paper we describe 13 new (sub)species: *Leiostyla paphlagonica subangulosa* subsp. nov., *Leiostyla eikenboomi* spec. nov., *Turanena (Turanena) elegantula* spec. nov., *Turanena (Turanena) andronakii salpinx* subsp. nov., *Imparietula inflexa* spec. nov., *Ljudmilena callosa* spec. nov., *Ljudmilena mariannae* spec. nov., *Clausilioides berendinae* spec. nov., *Clausilioides palatalis* spec. nov., *Amphiscopus sturmii marmoratus* subsp. nov., *Amphiscopus moolenbeeki* spec. nov., *Multidentula reducta* spec. nov., and *Megavitrina imperatoria* spec. nov. The new genus *Megavitrina* has been established to accommodate the species *imperatoria* (Turkey: Nemrud Dağ) and *libanica* (Lebanon: various localities). *Buliminus corpulentior* is redefined, and notes are given for the almost forgotten *Clausilioides filifer* and *Multidentula squalina acutior*.

Key words: Gastropoda, taxonomy, *Amphiscopus*, *Buliminus*, *Clausilioides*, *Imparietula*, *Leiostyla*, *Ljudmilena*, *Megavitrina*, *Multidentula*, *Turanena*, Turkey.

The first terrestrial snails from Turkey were recorded by the French scientist G.A. Olivier in 1801, followed by the German scientist J.R. Roth in 1839. For more than two centuries, Turkey has been surveyed with respect to its continental malacofauna, and much has been achieved. Especially in the last four decades a considerable amount of papers have been published, adding about one third of the number of taxa accepted today as valid. The area of Turkey is large (about 1500 km from west to east, and about 650 km from north to south), and it harbours a multitude of biotopes, ranging from extremely humid subtropical to almost desert-like conditions. This, in combination with the rich array of geomorphological structures, the geologically old age, and the fact that on its territory several important biogeographic zones overlap, has resulted in a rich malacofauna with an endemism level of above 65%.

Despite the intense collecting and research efforts over the past two centuries, our knowledge on the land snails of Turkey is still unsatisfactory, and some highly interesting areas, such as many of the densely forested mountain ranges, are almost completely unknown. It is therefore to be expected, that many



**Figs 1-3.** *Leiostylax* taxa from Turkey. **1.** *Leiostylax paphlagonica paphlagonica* Hausdorf 1990, holotype SMF 307492 (4.0 mm), Turkey, Vil. Kastamonu, Kapisuyu. **2.** *Leiostylax paphlagonica subangulosa* subsp. nov., holotype NMBE 544659 (H = 3.7 mm), Turkey, Vil. Amasya, 10.3 km NE. Amasya. **3.** *Leiostylax eikenboomi* spec. nov., holotype NMBE 544682 (H = 3.4 mm), Turkey, Vil. Karabük, Suçatı Tüneli 9 km ESE. Yenice. All photographs Bochud & Neubert,  $\times 15$ .

species are still awaiting their discovery. About 750 land snail (sub)species have currently been recognized as living within the Turkish territory, but it has been estimated that the total number of (sub)species living in Turkey probably surmount 1000 taxa (Gümüş & Neubert, 2009: 109). Biotic surveys are critically important to obtain an accurate picture of the true levels of species richness. Extensive field studies need to be carried out in the near future, as it is known that non-marine molluscs decline globally (Lydeard et al., 2004). Turkey is likely not to be an exception: there are observations, albeit anecdotal, that several (sub)species may already approach the verge of extinction (Gümüş & Neubert, 2009: 107).

In this manuscript, 13 new species are described, collected during privately paid collection trips by Messrs Hausdorf, Menkhorst and Neubert. It reveals that there is indeed still much to discover, even in areas that are in the spotlight of tourism. An example is the discovery of a huge Vitrinidae species (shell di-

ameter > 15 mm) at the summit of the Nemrud Dağ, a World Heritage Site of UNESCO.

#### ABBREVIATIONS

For the collections the following abbreviations are used: HMK = collection H.P.M.G. Menkhorst, Krimpen aan de IJssel; MNHN = Muséum National d'Histoire Naturelle, Paris; NMBE = Naturhistorisches Museum der Burgergemeinde Bern; RBA = collection R.A. Bank, Hoogezand; RMNH = Naturalis Biodiversity Center, Leiden; SMF = Senckenberg Natural History Museum, Frankfurt am Main; SMNS = Staatliches Museum für Naturkunde, Stuttgart; ZIN = Zoological Institute of the Russian Academy of Sciences, St.-Petersburg; ZMH = Zoological Museum Hamburg.

For the measurements (sizes expressed in millimeters), the following abbreviations are used (see also Bank & Neubert, 2016: fig. 2B): H = shell height;

LWH = last whorl height; MH = mouth height; LWD = last whorl diameter (without mouth); LWM = last whorl diameter with mouth; MD = mouth diameter; NW = number of whorls (counted according to the method of Knipper [1939: 332]). For the apertural folds of the Enidae the nomenclature is used as explained by Bank & Neubert (2016: 4, fig. 2A).

#### SYSTEMATIC PART

Superfamilia Pupilloidea Turton, 1831

Familia Lauriidae Steenberg, 1925

#### *Leiostyla* R.T. Lowe, 1852

*Leiostyla* R.T. Lowe, 1852: 276. Type species (by subsequent designation of Pilsbry, 1922: 67): *Pupa* [*Leiostyla*] *vincta* R.T. Lowe, 1852.

The genus *Leiostyla* has a disjunct distribution pattern (Manganelli, Giusti & Delle Cave, 1990) and has been split into two genera by Schileyko (1998a), namely *Leiostyla* and *Euxinolauria* Lindholm, 1924. In addition, Schileyko divided both genera into several subgenera. However, the split between *Leiostyla* and *Euxinolauria* is already problematic, as has been discussed by Gittenberger & Pieper (1988), Hausdorf (1990), Pokryszko & Waldén (1992) and Walther & Hausdorf (2015). Therefore, we do not follow the system that was proposed by Schileyko, and continue to use *Leiostyla* in its classical sense.

A considerable number of *Leiostyla* species live in Turkey, especially in the northeastern part of the country (Caucasian region). Some species have been described west of this region: *L. schweigeri* Götting, 1963; *L. superba* Hausdorf, 1990; the polytypic *L. paphlagonica* Hausdorf, 1990; *L. crassilabris* Hausdorf, 1990; and *L. zilchi* Subai, 1993. Because of the marked differences between *L. superba* and *L. zilchi* and the large geographical disjunction, we consider the latter a separate species, and not a subspecies of *L. superba* as was originally proposed by Subai (1993). Here we describe another subspecies of *L. paphlagonica*, and describe a new species that is morphologically related to *L. superba* and *L. zilchi*.

#### *Leiostyla paphlagonica subangulosa* subsp. nov. (Fig. 2)

Type locality & type specimens. – Turkey, Vilayet Amasya, 10.3 km NE. Amasya (in the direction of Yenice/Direkli), 380 m (40.7018°N 35.9608°E), H.P.M.G. Menkhurst leg., 3.viii.1992. Holotype NMBE 544656, paratypes NMBE 544657/11, HMK/>50, RBA/3, RMNH/3, ZMH/3.

Diagnosis. – A subspecies of *L. paphlagonica* with a basal keel, a small subangularis or, alternatively, a well developed parietal callus between the angular lamella and the palatal insertion of the peristome.

Description. – Shell dextral, elongated oviform in outline with conical spire, with closely arranged, distinctly and rather regularly, oblique striae; there are no spiral striae. The 7.4-7.8 whorls are convex with a deep suture. Shell rather solid, somewhat translucent, dark horn-coloured. The last whorl has a lengthy impression below the palatalis inferior on the outer wall, resulting in a distinct basal keel. Umbilicus open, deep and narrow. Peristome strongly reflected at right angles to form a flat, thickened, whitish lip. There is a marked thickening below the parieto-palatal angle of the peristome. Columellar and palatal insertion of the peristome connected by a clearly visible parietal callus, which slightly thickens near its ends. Angular lamella prominent, high, without appendages; it does not reach the border of the parietal callus. The angular lamella is fused with the palatal insertion of the peristome by a well developed callus; alternatively, a small subangular thickening is present that fuses on one side with the palatal insertion and on the other side with the angular lamella. Parietalis rather weak, deep inside the aperture; it is not connected with the angular lamella. Palatalis inferior very long and well developed; it does not reach the lip. The columellaris is horizontally projected at or above the middle of the columellar side of the aperture.

Measurements (n = 6). – H = 3.6-4.0 (mean 3.8); LWH = 1.8-1.9 (mean 1.9); MH = 1.2-1.4 (mean 1.3); LWD = 1.7-1.8 (mean 1.8); LWM = 1.8-1.9 (mean 1.8); MD = 1.1-1.2 (mean 1.1); NW = 7.4-7.8 (mean 7.6).

Localities. – Known from the locus typicus only (see above).

Derivatio nominis. – Named after the presence of the subangularis, which is missing in *L. paphlagonica incisa* Hausdorf, 1990.

Differentiation. – *Leiostyla p. subangulosa* differs from *L. p. paphlagonica* (Fig. 1) by the presence of a spiral furrow on the outer wall of the last whorl; this furrow is located below the palatalis inferior. Furthermore, the parietal callus is clearly less thickened, and the angular lamella and parietalis are more weakly developed. In addition, the radial striae are less regular and less densely packed. *Leiostyla p. subangulosa* differs from *L. p. incisa* by the presence of a subangularis or, alternatively, the more prominently developed parietal callus (which fuses the angular lamella to the palatal insertion of the peristome) and the less diffuse palatalis inferior.

Remarks. – So far only three populations have been recorded for *L. paphlagonica*, each population



having its own subspecific status (*paphlagonica*: Vilayet Kastamonu, Kapisuyu, *incisa*: Vilayet Kastamonu, Azdavay; *subangulosa*: Vilayet Amasya, Amasya). Much more field work has to be carried out to delineate the precise distribution area and subspecies boundaries of this polytypic species.

***Leiostyla eikenboomi* spec. nov. (Fig. 3)**

Type locality & type specimens. – Turkey, Vilayet Karabük, Suçatı Tüneli 9 km ESE. Yenice, 190 m (41.1897°N 32.4349°E), H.P.M.G. Menkhorst leg., 22.x.2008. Holotype NMBE 544682, paratypes NMBE 544644/2.

Diagnosis. – A conic, densely ribbed *Leiostyla* species with a prominent angular lamella, as well as a prominent parietalis, palatalis inferior, and columellaris; a basalis and supracolumellaris is missing and there is a prominent two-peaked thickening between the columellar insertion of the peristome and the angular lamella.

Description. – Shell dextral, conic in outline, with closely, distinctly and regularly, oblique ribbing; there are no spiral striae. The 6.7-7.2 whorls are convex and separated by a deep suture. Shell rather solid, not or hardly translucent, dark horn-coloured. The last whorl has a lengthy but shallow gutter, corresponding in its position to the palatalis inferior on the outer wall, but there is no distinct basal keel. Umbilicus open, deep and narrow. Peristome strongly reflected at right angles to form a flat, thickened, somewhat yellowish coloured lip. Columellar and palatal insertion connected by a clearly visible parietal callus. Angular lamella prominent, high, without appendages; it almost reaches the border of the parietal callus. The angular lamella is fused with a sharp, triangle-like subangularis that faces the palatal wall and that on its turn is fused with the palatal insertion of the peristome. The subangularis creates a small sinulus. A small sinulus at the columellar insertion of the peristome is created by a two-peaked prominent thickening situated below the border of the parietal callus. Parietalis prominent, high, rather deep inside the aperture; it is not connected with the angular lamella. Palatalis inferior very long and well developed; it just stops in front of the lip (i.e. it does not fuse with it). A very small, dot-like palatalis superior is present just above the anterior end of the palatalis inferior, close to the thickened lip. The columellaris is horizontally projected above the middle of the columellar side of the aperture. There is a marked thickening below the parieto-palatal angle of the peristome.

Measurements (n = 2). – Holotype: H = 3.4; LWH = 1.8; MH = 1.4; LWD = 1.9; LWM = 2.0; MD = 1.2; NW = 7.2. Paratype: H = 3.3; LWH = 1.8; MH = 1.4; LWD =

1.9; LWM = 2.1; MD = 1.3; NW = 6.7.

Localities. – Known from the locus typicus only (see above).

Derivatio nominis. – Named after Joop C.A. Eikenboom, a well-known Dutch malacologist and for forty years an inspiring friend of the second author.

Differentiation. – *Leiostyla superba* differs from *L. eikenboomi* by its more densely packed and finer ribbing, the less conical outline, the denticulate peristome, the presence of a basalis and supracolumellaris, the more prominent palatalis superior, the more prominent tooth-like thickening of the palatal peristome just above the palatalis superior, and the missing of a two-peaked thickening below the border of the parietal callus. *Leiostyla zilchi* differs from *L. eikenboomi* by the presence of a basalis and supracolumellaris, the more developed palatalis superior, and the missing two-peaked thickening below the border of the parietal callus.

Superfamilia Enoidea B.B. Woodward, 1903 (1880)

Familia Enidae B.B. Woodward, 1903 (1880)

Subfamilia Buliminusinae Kobelt, 1880

*Buliminus* H. Beck, 1837

*Bulimina* Ehrenberg, 1831: folio D [2, 4]. Type species (by monotypy): *Bulimus labrosus* Olivier, 1804. Preoccupied by *Bulimina* d'Orbigny, 1826 (Foraminifera).

*Buliminus* H. Beck, 1837: 68. Type species (by typification of replaced name): *Bulimus labrosus* Olivier, 1804. Unjustified emendation of *Bulimina* Ehrenberg, 1831, but placed on the "Official List of Generic Names in Zoology" by Opinion 2018 (2003: 63).

*Petraeus* Albers, 1850: 183. Type species (by subsequent designation of E. von Martens, 1860: 233): *Bulimus labrosus* Olivier, 1804.

*Sesteria* Bourguignat, 1884: 135-136. Type species (by monotypy): *Sesteria gallandi* Bourguignat, 1884.

Several *Buliminus* taxa have been reported from Turkey by Gittenberger & Menkhorst (1991). These are *B. akkumensis* Gittenberger & Menkhorst, 1991; *B. alepensis* (L. Pfeiffer, 1841); *B. carneus* (L. Pfeiffer, 1841); *B. corpulentus* Gittenberger & Menkhorst, 1991; *B. exquisitus* Nägele, 1901; *B. labrosus labrosus* (Olivier, 1801) and *B. labrosus egregius* Nägele, 1902. We follow the opinion of Heller (1974, 1975), and consider *Buliminus* and *Pene* Pallary, 1929, as separate genera. Consequently, the taxa mentioned by Gittenberger & Menkhorst (1991) under *Buliminus* (*Pene*) are not considered species of *Buliminus*. The epithet *corpulentus* has been replaced by Gittenberger & Menkhorst (2006) by *corpulentior*, as it was preoccupied by *Buliminus cantori* var. *corpulenta* Gredler, 1884. Furthermore,





Fig. 4. *Buliminus corpulentior* E. Gittenberger & Menkhorst 2006, NMBE 544684 (H = 33.5 mm), Turkey, Vil. Gaziantep, 1.5 km E. Yesilce. All photographs Bochud & Neubert,  $\times 2$ .

Schütt & Şeşen (2001) added another *Buliminus* species to the fauna of Turkey, by revealing that *Sesteria gallandi* Bourguignat, 1884, belongs to *Buliminus*. Bank & Neubert (2016: 11), in their revision of the Iranian Enidae, made remarks on several Turkish *Buliminus* taxa. They showed that *egregius* is best regarded a separate species (not a subspecies of *labrosus*), and that the *labrosus labrosus* shells from Turkey cannot be designated to *labrosus*. Bank & Neubert assumed that the latter taxon might be undescribed. A revision of the entire available material from Turkey revealed us, that the shells can be assigned to *B. corpulentior*, and that *B. corpulentior* has therefore a wider distribution and is more variable as previously thought. We therefore give an improved description of this little-known taxon.

*Buliminus corpulentior* E. Gittenberger & Menkhorst, 2006 (Fig. 4)

*Buliminus* (*Buliminus*) *corpulentus* E. Gittenberger & Menkhorst, 1991: 79-82, figs 4, 10 (shell), 24 (genitals), 29 (distribution). Type locality: Turkey, "İçel: 3 km W. of Aydıncık (= Gölindire), 0-50 m alt., WE 29". Primary homonym of *Buliminus cantori* var. *corpulenta* Gredler, 1884. Holotype in RMNH MOLL 56517.

*Buliminus* (*Buliminus*) *labrosus labrosus* – Gittenberger & Menkhorst, 1991: 83 (without original reference), figs 11 (shell), 29 (distribution).

*Buliminus* (*Buliminus*) *corpulentior* E. Gittenberger & Menkhorst, 2006: 101. New name (nomen novum) for *Buliminus* (*Buliminus*) *corpulentus* E. Gittenberger & Menkhorst, 1991.

Description. – Shell big to very big, slender ovoid to cylindrical-conic in outline, with an open, slit-like umbilicus. The 6.1-7.0 whorls are moderately convex, and separated by a moderately deep suture. Teleoconch with irregular, fine, oblique striae. At the upper part of the teleoconch and close to the curved peristome there is some very fine granulation; the lower part of the teleoconch shows delicate, irregular, fine spiral striae. Shell solid, not translucent, glossy, bluish-white to light horn-brown; there is a thin whitish band behind the peristome. Aperture more or less ovoid, peristome thickened and strongly reflected, the columellar and palatal insertion connected by rather well developed callus which is more thickened near the columellar peristome as well as the palatal peristome. The thickened callus at the palatal peristome forms a small subangularis that often fuses with the insertion of palatal peristome. The reflected peristome is thin; it mostly curls around itself (i.e. it is curved backwards). The clearly visible columellar ledge reaches halfway to below the middle of the columellar side of the aperture.

Measurements (n = 20). – H 26.6-43.1 mm; LWD 13.3-21.7 mm.

Localities. – Vilayet Mersin: Aydıncık, 3 km towards Gözsüzce (36.1345°N 33.2938°E) (Gittenberger & Menkhorst, 1991: 79 – sub *corpulentus*); Sipanhili, 2 km towards Büyükeçeli (36.1579°N 33.4803°E) (Gittenberger & Menkhorst, 1991: 79 – sub *corpulentus*); Yenikaş (36.1328°N 32.2856°E) (SMNS/4); Sipanhili, 7 km towards Aydıncık (36.1682°N 33.4803°E) (SMNS/1). Vilayet Gaziantep: 17 km E. Sakçagöz (37.17464°N 37.0990°E) (Gittenberger & Menkhorst,

1991: 83 – sub *labrosus*); 20 km E. Sakçagöz (37.1781°N 37.1262°E) (Gittenberger & Menkhorst, 1991: 83 – sub *labrosus*); 1.5 km E. Yeşilce (37.1732°N 37.2233°E) (Gittenberger & Menkhorst, 1991: 83 – sub *labrosus*). Vilayet Hatay: 6 km NE. Samandağı (36.1268°N 36.0364°E) (Gittenberger & Menkhorst, 1991: 83 – sub *labrosus*); Harbiye, 1 km towards Yayladağı (36.1278°N 36.1546°E) (SMNS/6); Tekebaşı, 2 km towards Meydan (36.0399°N 35.9847°E) (SMNS/6).

Differentiation. – *Buliminus labrosus* differs clearly from *B. corpulentior* by its dense (but delicate) granulation over its entire teleoconch; spiral striae are missing. *B. jordani* has the same microsculpture as *B. corpulentior*, but the whorls are more flattened and the last whorl is more stout. *B. zarudnyi* lacks spiral striae, lacks granulation and has a less prominent parietal callus.

Remarks. – The shells from the surroundings of Aydıncık are exceptionally large and geographically rather isolated; however, some shells from Harbiye reach essentially the same size as those of Aydıncık. Other populations are markedly smaller than those of Aydıncık, but because there are further no differences in shell morphology or microsculpture, we consider the Turkish populations mentioned as *B. labrosus labrosus* by Gittenberger & Menkhorst (1991) as belonging to *B. corpulentior*. The shell depicted by Schütt (2010: 113 fig. a – sub *B. labrosus labrosus*), which comes from Harbiye, belongs to *B. corpulentior*. The same might be the case with the shell figured by Şeşen & Schütt (2002: 83 fig. 9 – sub *B. labrosus*) from Kastabala, but we cannot exclude an identity with *B. alepensis* without having seen the shell.

Schütt (2010: 111) wrongly mentioned 1991 as the publication date of *corpulentior*: this is the publication date of the preoccupied name *corpulentus*.

The closest relative of *B. corpulentior*, both from a geographical and shell morphological point of view, seems to be *B. jordani*. This species is common in the northwestern part of Jordan (Neubert, Amr, Waitzbauer & Al Talafha, 2015) and the northernmost part of Israel (Heller, 2009: 294); it is not known whether *B. jordani* is also distributed in Lebanon and Syria.

Subfamilia Eninae B.B. Woodward, 1903 (1880)

Tribus Enini B.B. Woodward, 1903 (1880)

*Turanena* Lindholm, 1922;

Subgenus *Turanena* Lindholm, 1922

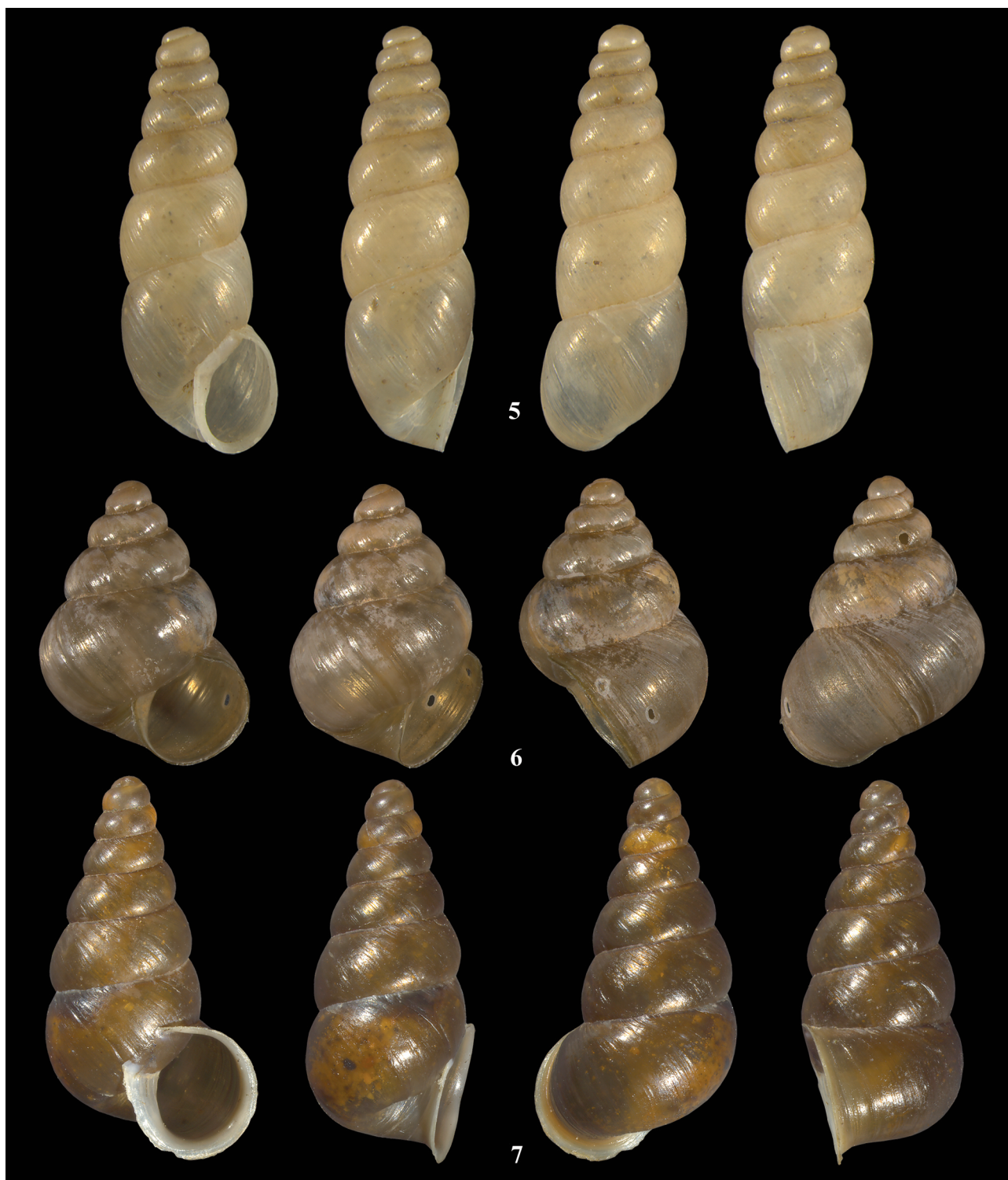
*Turanena* Lindholm, 1922a: 275. Type species (by original designation): *Buliminus (Pseudonapaeus) herzi* O. Boettger, 1889.

The genus *Turanena* has a disjunct distribution: several species are found in Central Asia, whereas others are

known from the Middle East (Israel, Lebanon, Iraq, northern Iran), Armenia, Turkey, and the southeastern islands of Greece. The species of Central Asia have been assigned to the subgenus *Asuranena* Schileyko & Moisseeva, 1995. These are *T. (A.) albolimbata* (Lindholm, 1927); *T. (A.) boamica* Kuznetsov, 1999; *T. (A.) cognata* (Lindholm, 1927); *T. (A.) conicula* (E. von Martens, 1882); *T. (A.) inversa* Schileyko & Moisseeva, 1995; *T. (A.) leptogyra* (Lindholm, 1927); *T. (A.) margaritae* Schileyko & Moisseeva, 1989; *T. (A.) martensiana* (Ancey, 1886) [synonyms: *segregatus* var. *minor* E. von Martens, 1874; *liostracus* Westerlund, 1896]; *T. (A.) meshkovi* Schileyko, 1984; *T. (A.) stschukini* (Lindholm, 1927) and *T. (A.) tenuispira* Schileyko, 1984. The synonymy of *liostracus* with *martensiana* follows Sysoev & Schileyko (2009: 75). They attributed the name *liostracus* to Ancey (1886), but in reality the name has been introduced by Westerlund (1896). The name *martensiana* is a nomen novum for *Buliminus segregatus* var. *minor* E. von Martens, 1874, the latter being a preoccupied name.

The species outside Central Asia have been assigned to the subgenus *Turanena*. So far, the following species are known:

- T. (T.) albrechti* Rähle, 1988 (Turkey: Vilayets Afyonkarahisar, Antalya, Burdur and Isparta)
- T. (T.) andronakii* (Lindholm, 1913) (Turkey: Vilayets Artvin and Erzurum) [synonym: *yusufelensis* E. Gittenberger & Menkhorst, 1993]
- T. (T.) benjamitica* (Benson, 1859) (Israel; Lebanon) [synonym: *enabensis* Pallary, 1939]
- T. (T.) bilgini* Schütt & Şeşen, 2002 (Turkey: Vilayets Diyarbakır and Siirt)
- T. (T.) carpathia* (O. Boettger, 1885) (Greece: Karpathos, Rhodes)
- T. (T.) cochlicopoides* E. Gittenberger & Menkhorst, 1993 (Turkey: Vilayets Gaziantep and Osmaniye)
- T. (T.) conelongata* E. Gittenberger & Menkhorst, 1993 (Turkey: Vilayets Batman, Bitlis, Siirt and Van)
- T. (T.) demirsoyi* Gümüş & Neubert, 2012 (Turkey: Vilayet Erzincan)
- T. (T.) forcartiana* P. Schnell, 1979 (Turkey: Vilayets Adıyaman, Antalya, Çorum, Mersin, Sivas and Tokat)
- T. (T.) hemmeni* Bank & Butot, 1990 (Turkey: Vilayets Adana, Denizli, Mersin and Muğla; Greece: Samos)
- T. (T.) hermonensis* (Forcart, 1981) (Israel: Mount Hermon)
- T. (T.) herzi* (O. Boettger, 1889) (Armenia; Iran: provinces Azarbayjan-e-Gharbi, Azarbayjan-e-Sharqi, Kordestan, Kermanshah, Alborz and Semnan) [synonym: *scalaris* Nägele, 1902]
- T. (T.) katerinae* E. Gittenberger, 1996 (Greece: Crete, Cyprus)
- T. (T.) macfadyeni* (Pallary, 1939) (Iraq: Sinjar Mountain)
- T. (T.) pseudobscura* Bank & Neubert, 2016 (Iran: prov. Gilan)
- T. (T.) tuccari* E. Gittenberger, 1986 (Turkey: Vilayets Antalya and Isparta)
- T. (T.) zilchi* E. Gittenberger & Menkhorst, 1993 (Turkey: Vilayets Diyarbakır, Hakkâri, Siirt and Van).



**Figs 5-7.** *Turanena* taxa from Turkey. 5, *Turanena (Turanena) elegantula* spec. nov., holotype NMBE 544664 (H = 9.0 mm), Turkey, Vil. Van, 4 km SE. Göründü. 6, *Turanena (Turanena) zilchi* E. Gittenberger & Menkhorst 1993, NMBE 546171 (H = 6.1 mm), Turkey, Vil. Hakkâri, 7 km S. Hakkâri. 7, *Turanena (Turanena) andronakii salpinx* subsp. nov., holotype NMBE 546173 (H = 8.1 mm), Turkey, Vil. Artvin, 1 km S. Oruçlu. All photographs Bochud & Neubert,  $\times 8$ .

The synonymy of *enabensis* with *benjamitica* follows Mienis (1977: 83, 84) and was confirmed by us; the synonymy of *yusufelensis* with *andronakii* was established by Gittenberger & Menkhorst (2006), and the synonymy of *scalaris* with *herzi* has been established by

Bank & Neubert (2016: 14). The publication date of *bilgini* is 2002, not 2001 as Schütt (2010: 86) mentioned. Although a description of *bilgini* appeared in the 2001 book of Schütt (: 86, 89 fig. b), being a year before the original description by Schütt & Şeşen in 2002, the 2001



description is not valid, as no holotype was selected or no syntypes were fixed, which is required for a zoological taxon described after 1999 (International Code of Zoological Nomenclature, Article 16.4).

Clearly, a major radiation of *Turanena* is seen in Turkey. Here we add another two new taxa to the fauna of Turkey. We are further aware of two new taxa from Lebanon and Iran, but these will be described elsewhere.

***Turanena (Turanena) elegantula* spec. nov. (Fig. 5)**

Type locality & type specimens. – Turkey, Vilayet Van, 4 km SE. Göründü, 1650 m (38.3271°N 42.9331°E), H.P.M.G. Menkhurst leg., 21.viii.1992. Holotype NMBE 544664, paratypes NMBE 544665/1, HMK/50, RBA/2, RMNH/2, ZMH/2.

Diagnosis. – A slender, spindle-shaped light horny-yellowish coloured *Turanena* species with a well developed parietal callus, a slightly thickened, not reflected, peristome, and a juxtaposed columellar and palatal insertion of the peristome.

Description. – Shell dextral, elongated spindle-like in outline, with an open, relatively wide, slit-like umbilicus. The 6.5-7.6 whorls are quite convex with a deep suture. Teleoconch with irregular, fine, oblique striae; there are no spiral striae. Shell moderately solid, somewhat translucent, glossy, yellowish to horny-yellowish coloured; there is no whitish band behind the peristome. Aperture elliptical-rounded, peristome not reflected (only slightly at the columellar part) and only slightly thickened. Columellar and palatal insertion connected by a well developed callus (which is often thickened near its ends). A subangularis is not present (the thickened parietal callus does not form a subangularis but normally fuses with the palatal insertion of the peristome). The somewhat oblique columellar ledge reaches halfway to above the middle of the columellar side of the aperture.

Measurements (n = 6). – H = 7.3-9.1 (mean 8.4); LWH = 4.1-4.7 (mean 4.4); MH = 2.2-2.7 (mean 2.4); LWD = 2.9-3.1 (mean 3.0); LWM = 3.0-3.4 (mean 3.2); MD = 1.7-1.9 (mean 1.8); NW = 6.5-7.6 (mean 7.1).

Localities. – Known from the locus typicus only (see above).

Derivatio nominis. – Derived from *elegans* (graceful, elegant), which relates to the slenderness of the shell.

Differentiation. – *Turanena elegantula* differs from *T. cochlicopoides* by its larger size, the more elongated shape, the higher number of whorls, the more prominent parietal callus, and the more clearly thickened peristome. *T. conelongata* is less slender, the whorls are more convex, the peristome is sharp, the parietal callus is weaker, and the peristome is clearly more reflected at its columellar insertion.

Remarks. – Only a single locality is known for *T. elegantula*, which is located at the southern shore of Van Gölü. From the same area, *T. conelongata* and *T. zilchi* has been described, originally also from a single locality. However, the latter two species have now been recorded from a wider area: *T. conelongata* from Kozluk (vil. Batman), Baykan (vil. Siirt) and Tatvan (vil. Bitlis) (Schütt, 2010: 87, 89 fig. e), and *T. zilchi* from Baykan and Siirt (vil. Siirt), as well as Silvan, Ergani, Eğil, Çatakköprü and Kulp (vil. Diyarbakır) (Şeşen & Schütt, 2000: 80, fig. 8; Schütt, 2010: 88, 89 figs j+k). We can now add another record of *T. zilchi*, namely Vilayet Hakkâri, 7 km S. Hakkâri, along the road D400, 1230 m. We here provide a picture (Fig. 6) of this little-known species, so as to become acquainted with its variability.

***Turanena (Turanena) andronakii salpinx* spec. nov. (Fig. 7)**

Type locality & type specimens. – Turkey, Vilayet Artvin, 1 km S. Oruçlu, 270 m (41.0994°N 41.8221°E), H.P.M.G. Menkhurst leg., 5.ix.2010. Holotype NMBE 546173, paratypes NMBE 546174/1, HMK/19, RBA/2, RMNH/2, ZMH/2.

Diagnosis. – A middle-sized, pyramidal-conical shaped *Turanena* with a dark brown colour, a trumpet-like aperture and a relatively wide umbilicus.

Description. – Shell dextral, pyramidal-conical in outline, with an open, relatively wide, slit-like umbilicus. The 6.6-7.1 whorls are fairly strong convex with a well impressed suture. Teleoconch with irregular, fine, oblique striae; there are no spiral striae. Shell moderately solid, somewhat translucent, glossy, dark brown; there is only a faint, small whitish band behind the peristome. Aperture rounded, trumpet-like, peristome clearly reflected and somewhat thickened. Columellar and palatal insertion connected by a moderately developed but clearly visible callus (which is often thickened near its ends). A subangularis is not present (the thickened parietal callus does not form an angularis, and often extends underneath the palatal insertion of the peristome). The rather indistinct columellar ledge reaches above the middle of the columellar side of the aperture. Palatal peristome at its insertion strongly curved (forming a wide arc), so that the columellar and palatal insertion are juxtaposed.

Measurements (n = 6). – H = 6.7-7.9 (mean 7.3); HLW = 3.8-4.3 (mean 4.1); MH = 2.6-3.0 (mean 2.8); LWD = 3.4-3.6 (mean 3.5); LWM = 3.9-4.4 (mean 4.2); MD = 2.3-2.8 (mean 2.6); NW = 6.6-7.1 (mean 6.9).

Localities. – Known from the locus typicus only (see above).

Derivatio nominis. – The name relates to the somewhat trumpet-like aperture.



**Figs 8-9.** New *Ljudmilena* taxa from Turkey. **8**, *Ljudmilena callosa* spec. nov., holotype NMBE 544659 (H = 6.6 mm), Turkey, Vil. Artvin, Kaymaz, left bank Çoruh Nehri. **9**, *Ljudmilena mariannae* spec. nov., holotype NMBE 544661 (H = 8.8 mm), Turkey, Vil. Artvin, 8 km E. Yusufeli. All photographs Bochud & Neubert, × 8.

**Differentiation.** – *Turanena a. salpinx* differs from *T. a. andronakii* by its smaller size, the more pyramidal-conical outline, the more trumpet-like aperture, the wider umbilicus, the more indistinct columellar ledge, and the slightly deeper suture.

**Remarks.** – Gittenberger & Menkhorst (1993: 81-83, figs 2, 6-8, pl. 1 figs 5-8) previously described *T. a. andronakii* under the name *T. yusufelensis*. They mentioned and figured (:83, pl. 1 figs 7-8) also a small form (“Kleinform”), but apart from the smaller dimensions it hardly differs from the nominotypical form. The “Kleinform” is not identical with *T. a. salpinx*.

The lectotype of *T. a. andronakii* has been figured by Schileyko (1984: 313, 315, fig. 223-III) and Sysoev & Schileyko (2009: 57, fig. 23A), who considered *andronakii* a species of the genus *Akramovskiella* Schileyko, 1984, as did Schütt (2010: 90). However, there is much uncertainty about the identity of its type species *Buliminus (Napaesus) umbrosus* Mousson, 1873,

as has been discussed by Bank & Neubert (2016: 63), who also depicted a syntype of *umbrosus* (: plate 22 fig. 3). The species *andronakii* seems to fit very well into *Turanena*, as was originally proposed by Gittenberger & Menkhorst (1993: 81 – under the name *yusufelensis*). The genus name *Akramovskiella* has been misspelled as *Akramowskiella* by Sysoev & Schileyko (2009) and Schütt (2010).

An isolated locality of *T. andronakii* inside Turkey (vil. Siirt, Kozluk) has been reported by Şeşen & Schütt (2000: 80, fig. 9). However, the provided picture is too vague to draw any conclusion about the identity of the shell; the identification really needs to be confirmed.

#### *Imparietula* Lindholm, 1925

*Imparietula* Lindholm, 1925: 30, 39. Type species (by monotypy):  
*Bulimus leucodon* L. Pfeiffer, 1846.

Forcart (1940: 206) considered *Pseudochondrula* a synonym of *Imparietula*, which was followed by Gittenberger (1967: 130-137), Akramowski (1976: 154-158) and Hausdorf (1999: 153). Schileyko (1984: 288, 306) separated *Pseudochondrula* from *Imparietula*, which was followed by Bank & Neubert (1998: 81). In his latest edition of the Turkish land snails, Schütt (2010: 97-99) also separated *Pseudochondrula* from *Imparietula*, and included the following taxa into the latter genus: *altenai* (Gittenberger, 1967), *pelidne* (Biggs, 1946), *leucodon* (L. Pfeiffer, 1846) (with *lasistanicus* as a synonym), *brevior* (Mousson, 1876) and *ridvani* Schütt, 1995. Following a taxonomic revision, Páll-Gergely & Bank (in press) raised *lasistanica* (Lindholm, 1914) to species level, and excluded *brevior* as a representative of *Imparietula*. By doing so, *Imparietula* has become a genus that is endemic for the northeastern part of Turkey. We here introduce another species to the genus.

### *Imparietula inflexa* spec. nov. (Fig. 20)

Type locality & type specimens. – Turkey, Vilayet Giresun, 5 km N. Tamdere (= S. Yavuzkema), 1430 m (40.5397°N 38.3575°E), H.P.M.G. Menkhorst leg., 6.viii.1992. Holotype NMBE 544683.

Diagnosis. – A small, hornbrown coloured *Imparietula* species with a granulated sculpture, a strong palatalis superior and a biarcuate last whorl.

Description. – Shell dextral, spindle-shaped in outline, with an open, slit-like umbilicus. The 7.9-8.1 whorls are convex with a rather deep suture. Teleoconch with irregular, dense, rather pronounced, oblique striae crossed by irregular, indistinct, incised spiral striae producing a granulated sculpture. Shell fairly solid, not translucent, dull, hornbrown coloured, with a whitish band behind the peristome. Peristome reflected, thickened by a labial callus, the columellar and palatal insertion connected by a thin callus, which is thickened near its ends. The thickening of the parietal callus at the palatal insertion of the peristome resembles a subangularis. A prominent palatalis superior is present. The last whorl is biarcuate, being strongly looped inward the middle; there is a prominent impression at the palatalis superior. The columellar ledge reaches halfway of the columellar side of the aperture. There is an additional thickening running from the insertion of the columellar ledge to the basal part of the peristome.

Measurements (n = 3). – H = 12.3-12.8 (mean 12.6); LWH = 5.9-6.5 (mean 6.3); MH = 3.8-4.3 (mean 4.0); LWD = 4.3-4.7 (mean 4.4); LWM = 4.2-4.6 (mean 4.4); MD = 2.9-3.1 (mean 3.0); NW = 7.9-8.1 (mean 8.0).

Localities. – Vilayet Giresun: type locality (see above); 6 km N. Tamdere (HMK/1); Giresun, 75 km towards Şebinkarahisar, 1500 m (NMBE/1).

Derivatio nominis. – Named after the inwards curved aperture near the palatalis superior.

Differentiation. – *I. inflexa* differs from *I. pelidne* by its dimensions, the stronger palatalis superior, the biarcuate last whorl, and the additional thickening inside the aperture at the columellar-basal margin. *I. leucodon* also has a prominent palatalis superior, but it differs from *I. inflexa* by its dimensions, the less biarcuate last whorl, the less pronounced oblique striae and the less pronounced granulation, the much stronger developed parietal callus, and the absence of an additional thickening in the aperture at the columellar-basal margin.

Remarks. – The description is based on only three specimens, none of them being well-preserved.

*Ljudmilena* Schileyko, 1984

*Ljudmilena* Schileyko, 1984: 244, 309. Type species (by original designation): *Chondrus sieversi* Mousson, 1873.

The genus *Ljudmilena* is distributed in the northeastern part of Turkey, the northwestern part of Iran, and the southern part of the Caucasus (Georgia, Armenia). Both sinistral and dextral species are known. Despite the availability of a plethora of shell characters, the taxonomy is still in a deplorable state. There are two revisions, carried out by Schütt & Yıldırım (1996) and Schütt (2004), but the results of the 2004 revision are quite different from that of the 1996 revision. The discovery of two new species forced us to revise the genus once more. The outcome is fundamentally different from the two mentioned revisions. In summary, we found that *L. adjarica* sensu Schütt & Yıldırım (1996) is *L. euxina* and that *L. adjarica* sensu Schütt (2004) is a mixture of *L. euxina* and our new species *L. mariannae*. *Ljudmilena euxina* sensu Schütt & Yıldırım (1996 and 2004) is indeed *L. euxina*. *Ljudmilena araxena* sensu Schütt & Yıldırım (1996) is *L. mariannae*, whereas *L. araxena* sensu Schütt (2004) is *L. cespitum*. *Ljudmilena armeniaca* sensu Schütt & Yıldırım (1996) and Schütt (2004) is *L. tricollis*, whereas *L. tricollis* sensu Schütt & Yıldırım (1996) and Schütt (2004) is *L. tricollis* and *L. excellens*, respectively. *Ljudmilena excellens* and *L. cespitum* as interpreted by Schütt & Yıldırım (1996) and Schütt (2004) belong indeed to *L. excellens* and *L. cespitum*. However, *L. bayburti* newly described by Schütt (2004) also belongs to *L. cespitum*. Furthermore, *L. sieversi* sensu Schütt & Yıldırım (1996) is also *L. cespitum*, whereas *L. sieversi* sensu Schütt (2004) is indeed *L. sieversi*. The results of our revision is presented in Table 1.

It should be noted that the shell of fig. 1 (Schütt, 2004) is the same shell as the one depicted on fig. 7 (Schütt, 1996), but the legend differs: "Ispir, Stadtge-



Schütt & Yıldırım (1996)	Schütt (2004)	This paper
fig. 1 – <i>L. adjarica</i>	fig. 8 – <i>L. adjarica</i>	<i>L. euxina</i>
fig. 2 – <i>L. adjarica</i>	:129 – <i>L. adjarica</i>	<i>L. euxina</i>
fig. 3 – <i>L. adjarica</i>	figure not mentioned	<i>L. euxina</i>
fig. 4 – <i>L. araxena</i>	:129 – <i>L. adjarica</i>	<i>L. mariannae</i>
fig. 5 – <i>L. armeniaca</i>	fig. 7 – <i>L. armeniaca</i>	<i>L. tricollis</i>
fig. 6 – <i>L. cespitum</i>	:126 – <i>L. cespitum</i>	<i>L. cespitum</i>
fig. 7 – <i>L. cespitum</i>	fig. 1 – <i>L. cespitum</i>	<i>L. cespitum</i>
fig. 8 – <i>L. euxina</i>	fig. 5 – <i>L. euxina</i>	<i>L. euxina</i>
fig. 9 – <i>L. excellens</i>	figure not mentioned	<i>L. excellens</i>
fig. 10 – <i>L. excellens</i>	fig. 6 – <i>L. excellens</i>	<i>L. excellens</i>
fig. 11 – <i>L. sieversi</i>	:129 – <i>L. bayburti</i>	<i>L. cespitum</i>
fig. 12 – <i>L. sieversi</i>	fig. 15 – <i>L. bayburti</i>	<i>L. cespitum</i>
fig. 13 – <i>L. tricollis</i>	figure not mentioned	<i>L. tricollis</i>
fig. 14 – <i>L. ? werneri</i>	:129 – <i>L. ? werneri</i>	<i>Chondrula werneri</i>
	figs 2 + 3 – <i>L. sieversi</i>	<i>L. sieversi</i>
	fig. 4 – <i>L. tricollis</i>	<i>L. excellens</i>
	fig. 9 – <i>L. adjarica</i>	<i>L. mariannae</i>
	figs 10 + 11 – <i>L. araxena</i>	<i>L. cespitum</i>
	figs 12 + 13 + 14 – <i>L. bayburti</i>	<i>L. cespitum</i>

**Table 1.** Results of the revision of *Ljudmilena* Schileyko, 1984.

biet" (SMF 318769a) versus "Çoruh-Fluß, etwa 10 km N Ispir, Böschung unterhalb Köç" (SMF 318769b), respectively. The legend of 2004 is in fact the same as the label of fig. 6 of the 1996 paper, but this is a different shell.

The *Ljudmilena* species can easily be identified by means of their armature and coiling direction (see below; only diagnostic criteria are mentioned):

#### Shell sinistral

*L. excellens* (Retowski, 1889): Infraparietalis present, subangularis very prominent (often fused with the infraparietalis). Synonyms: *acampsica* Lindholm, 1923; *duodecimgyrata* Lindholm, 1923.

*L. tricollis* (Mousson, 1876): Infraparietalis absent, subangularis less prominent. Synonyms: *minor* O. Boettger, 1880; *armeniacus* Ancey, 1893; *carseana* Lindholm, 1923.

#### Shell dextral

*L. cespitum* (Mortillet, 1853): infraparietalis absent, dot-like columellaris on peristome, oblique palatalis superior, parietalis reaches close to the peristome, prominent subangularis. Synonyms: *araxena* Lindholm, 1923.

*L. euxina* (Retowski, 1883): small infraparietalis, no columellaris (the columellar ledge looks like a col-

umellaris!), horizontally placed palatalis superior, parietalis deep inside the aperture, less prominent subangularis. Synonyms: *adjaricus* Retowski, 1889.

*L. sieversi* (Mousson, 1873): as in *cespitum*, but subangularis highly reduced, and palatalis superior less oblique and less prominent. Synonyms: *hoplites* West-erlund, 1890.

*L. callosa* spec. nov.: as in *sieversi*, but columellaris missing and subangularis more prominent.

*L. mariannae* spec. nov.: as in *euxina*, but dot-like columellaris present, and no infraparietalis.

#### *Ljudmilena callosa* spec. nov. (Fig. 8)

Type locality & type specimens. – Turkey, Vilayet Artvin, Kaymaz (= 18 km SW. Yusufeli), left bank Çoruh Nehri, 770 m (40.712°N 41.392°E), E. Neubert leg., 28.vii.1988. Holotype NMBE 544659, paratypes NMBE 544660/>50, HMK/2, RBA/2, ZMH/2.

Diagnosis. – A dextral *Ljudmilena* species with a prominent white thickening on the basal part of the apertural wall and with an oblique palatalis superior; a columellaris is missing.

Description. – Shell dextral, somewhat cylindrical, with a low conical upper part. Umbilicus open, but very narrow. The 7.9-9.5 whorls are slightly convex with a moderately shallow suture; the whorls of the

upper part of the shell are slightly more convex. The last 3-4 whorls are almost equal in width; the last whorl attenuates towards the base. Teleoconch with irregular, fine, oblique striae; there are no spiral striae. Shell rather solid, somewhat translucent (in fresh specimens the curled columella can be vaguely seen), horny yellow coloured, with a whitish band behind the peristome. The last whorl with a clear impression at the position of the palatalis superior. Aperture irregular U-shaped to V-shaped, whitish inside. Peristome thickened by a labial callus, reflected over its entire length. The columellar and palatal insertion of the peristome is connected by a clear callus, which is most prominent near the columellar insertion. The subangularis is vertically pointing downwards and is connected with the palatal peristome by a callus. The subangularis is connected to the parietalis by a thin callus; this connection is not always present. Parietalis prominent, but deeply recessed. There is no spiralis. Palatalis superior very prominently developed, but not deeply recessed; it is situated quite low on the palatal peristome (i.e. it is close to the position of the infrapalatalis) because it is not placed horizontally but rather at an angle (oblique). There is no infrapalatalis, basalis or columellaris. The columellar ledge is prominent, curled and truncated; it reaches below the middle of the columellar side of the aperture. In frontal view the columellar ledge looks like a supracolumellaris. The apertural wall has a prominent white thickening (callus) ranging from behind the palatalis superior to the end of the truncated columellar ledge.

Measurements (n = 8). – H = 5.9-7.8 (mean 6.7); LWH = 3.0-3.7 (mean 3.4); MH = 2.0-2.7 (mean 2.3); LWD = 2.9-3.3 (mean 3.1); LWM = 2.8-3.2 (mean 3.0); MD = 1.7-2.0 (mean 1.8); NW = 7.9-9.5 (mean 8.4).

Localities. – Known from the locus typicus only (see above).

Derivatio nominis. – The name refers to the thickened basal part of the aperture.

Differentiation. – *Ljudmilena callosa* differs from the next species, *L. mariannae* spec. nov., by the less slender and less cylindrical shell, the somewhat more prominent and densely arranged obliques striae, the oblique palatalis superior, the straight (not comma-shaped) subangularis which is connected (but not fused) with the parietalis, the lack of a columellaris, and the more thickened callus at the basal part of the apertural wall. *Ljudmilena sieversi* has more convex whorls, a triangular-rounded aperture, and a less well developed subangularis; a columellaris is always present. *Ljudmilena cespitum* is more spindle-shaped and has more convex whorls, the aperture is more V-shaped, the columellaris is always present, and the callus at the basal part of the apertural wall is less distinctly thickened.

### *Ljudmilena mariannae* spec. nov. (Fig. 9)

*Ljudmilena araxena* – Schütt & Yıldırım, 1996: 84 (only from Sebeziler and Yusufeli), fig. 4 (shell).

*Ljudmilena araxena* – Schütt, 2004: 129 (partim), fig. 9 (shell).

Type locality & type specimens. – Turkey, Vilayet Artvin, 8 km E. Yusufeli (= 2 km W. crossing Uzundere/Artvin/Yusufeli), 530 m (40.8150N 41.6259E), H.P.M.G. Menkhorst leg., 29.vii.1990. Holotype NMBE 544661, paratypes NMBE 544662/3, HMK/>50, RBA/3, RMNH/3, ZMH/3.

Diagnosis. – A dextral *Ljudmilena* species with a slender and highly cylindrical shell, a small aperture, a pronounced comma-shaped subangularis that is fused with the parietalis, and a horizontally placed palatalis superior.

Description. – Shell dextral, cylindrical, with a low, round-conic upper part. Umbilicus open, but very narrow. It has 10.0-12.2 whorls; the whorls of the upper part of the shell are more convex than the whorls of the remaining part of the shell, which are hardly swollen. The suture is mostly shallow. The whorls are, apart from the whorls of the upper part of the shell, about equal in width; the past whorl is more or less attenuated towards the bottom. Teleoconch with irregular, fine, oblique striae; there are no spiral striae. Overall, the shell has a smooth and glossy appearance. Shell rather solid, somewhat translucent (in fresh specimens the curled columella can be seen), horny yellow coloured, with a whitish band behind the peristome. The last whorl with a clear impression at the position of the palatalis superior. Aperture irregular U-shaped, whitish inside. Peristome thickened by a labial callus, reflected at the columellar and basal part, whereas the palatal part is only reflected underneath the insertion of the palatalis superior. The columellar and palatal insertion of the peristome is connected by a clear callus, which is most prominent near the columellar insertion. The subangularis is comma-shaped, and is connected with the palatal peristome by weak callus. The subangularis is mostly fused with the parietalis, the latter being prominent and deeply recessed. There is no spiralis. Palatalis superior very prominently developed but not deeply recessed; it is horizontally placed on the palatal peristome. The short columellaris is situated as an oblique angle to the columellar peristome; it is fused with the columellar ledge. The columellar ledge is prominent, curled and truncated; it reaches below the middle of the columellar side of the aperture. In frontal view the columellar ledge looks like a supracolumellaris. There is no basalis or infrapalatalis. The apertural wall has a clear white thickening ranging from behind the palatalis superior to behind the columellaris.

Measurements (n = 12). – H = 7.0-9.7 (mean 8.4); LWH = 3.0-3.5 (mean 3.3); MH = 2.0-2.4 (mean 2.2); LWD = 2.8-3.2 (mean 2.9); LWM = 2.7-3.1 (mean 2.9); MD = 1.7-1.9 (mean 1.8); NW = 10.0-12.2 (mean 11.4). Localities. – Vilayet Artvin: type locality (see above); Yusufeli (40.8215°N 41.5434°E) (HMK/23); 4 km N. Yusufeli (40.8577°N 41.5404°E) (HMK/21); 11 km ESE. Yusufeli (40.7958°N 41.6698°E) (Schütt & Yıldırım, 1996: 84, fig. 4 – sub *araxena*); Sebzeçiler (40.8390°N 41.6722°E) (Schütt & Yıldırım, 1996: 84 – sub *araxena*; Schütt, 2004: fig. 9 – sub *adjarica*); Su Kavuşumu (40.8118°N 41.6415°E) (Schütt, 2004: 129 – sub *adjarica*).

Derivatio nominis. – Named after Marian C. Slooff, the indispensable companion of one of the authors (Henk Menkhurst) during all his collecting trips, including those to Turkey.

Differentiation. – *Ljudmilena sieversi* differs from *L. mariannae* by the less slender and the less cylindrical shell, the more convex whorls, the more prominent and denser oblique striae, the larger aperture, the less well developed subangularis and parietalis, the more deeply recessed parietalis, the subangularis and parietalis are not fused, the less horizontally placed palatalis superior, and the less marked impression at the peristome near the palatalis superior.

#### *Clausilioides* Lindholm, 1925

*Clausilioides* Lindholm, 1925: 29, 38. Type species (by monotypy): *Buliminus (Brepheulus) biplicatus* Retowski, 1889.

So far, only two species have been assigned to the genus *Clausilioides*, namely *C. biplicatus* (Retowski, 1889) (synonym: *eplicatus* Lindholm, 1913) and *C. filifer* (Lindholm, 1913). We here describe another two species. The genus seems to be endemic for the north-eastern part of Turkey, although both *biplicatus* and *filifer* have originally been described from Georgia (but only found in deposition of the Çoruh river).

A characteristic feature of the genus is the presence of a well developed palatal fold in the last whorl. This is a rare character within the family Enidae. It has been reported in *Pseudonapaeus entoptyx* (Lindholm, 1925) (the type species of *Siraphorus* Lindholm, 1925), *Siraphoroides moltschanovi* (Likharev & Rammelmeier, 1952) (a monotypic genus), and various species of the genus *Pupopsis* Gredler, 1898. The first two species are known from Kirgizstan, whereas *Pupopsis* is distributed in the northwestern part of China (Xinjiang at the border of Kirgistan and Kazakhstan) as well as in central China (SE Gansu and N Sichuan). For a review on *Pupopsis* see Wu & Gao (2010). Furthermore, a palatal fold is seen in *Buliminus glabratus* (Mousson, 1861) from the central part of Israel.

#### *Clausilioides berendinae* spec. nov. (Fig. 10)

*Clausilioides biplicatus* – Schütt, 2001: figure on page 122 (“Artvin”).

*Clausilioides* spec. – Páll-Gergely, 2009: 73, fig. 4 (castle of Ardanuç).

*Clausilioides biplicatus* – Schütt, 2010: figure on page 121 (Ardanuç).

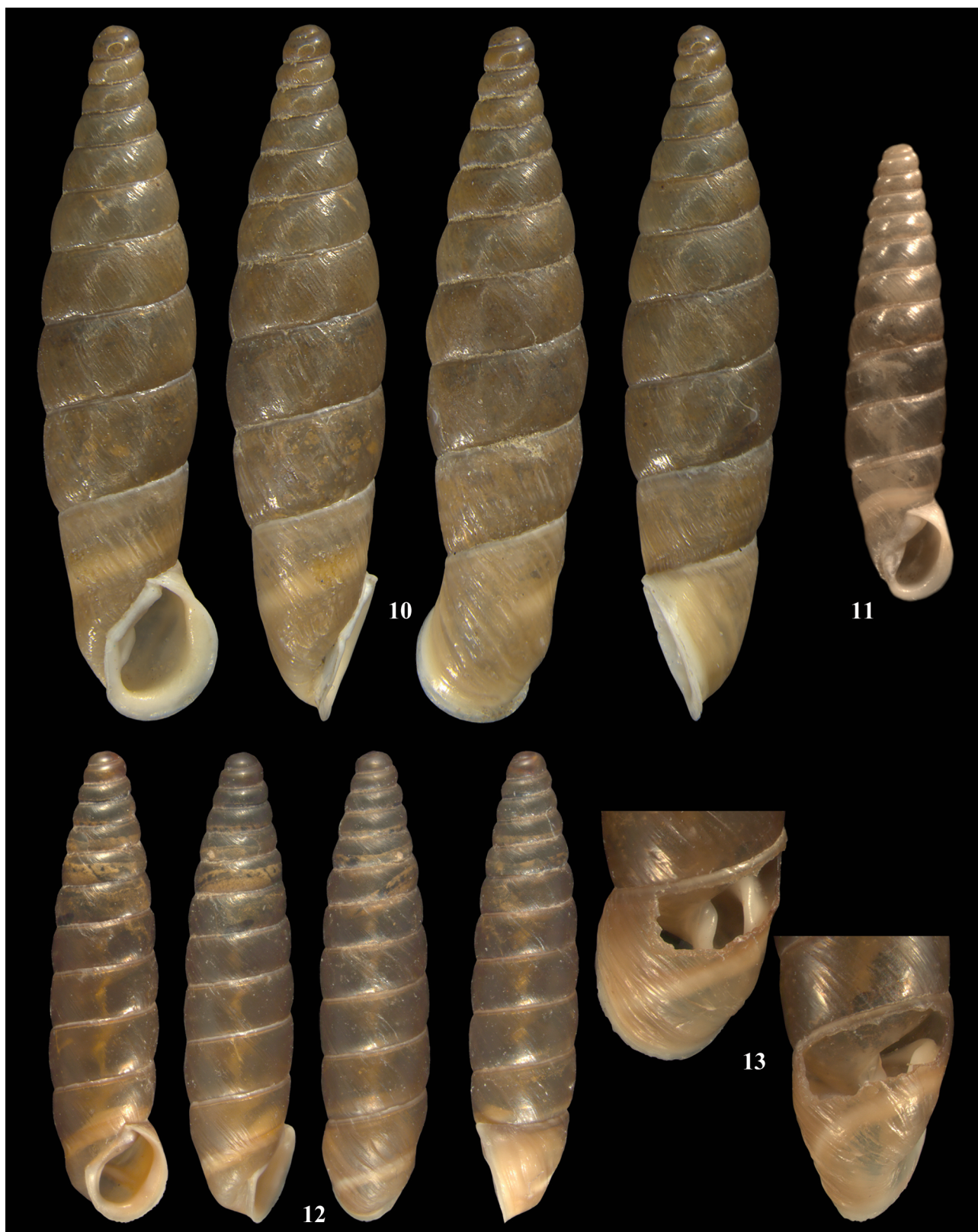
Type locality & type material. – Turkey, Vilayet Artvin, 1 km W. Ardanuç, 500 m (41.1278°N 42.0606°E), H.P.M.G. Menkhurst leg., 7.vii.1986. Holotype NMBE 544672/1, paratypes HMK/47, RBA/3, RMNH/3, ZMH/3.

Diagnosis. – A medium-sized, highly elongated fusiform *Clausilioides* species with a prominent parietal callus and a deeply situated palatal fold that reaches the penultimate whorl.

Description. – Shell dextral, highly elongated fusiform in outline, with a very narrow to about closed, slit-like, umbilicus. The 11.0-11.5 whorls are slightly convex with a shallow suture; the last 1-2 whorls are more flattened. Teleoconch with irregular, fine, oblique striae; there are no spiral striae. Shell rather thin, partially translucent, glossy, uniformly corneous to dark-brown coloured, with a whitish band behind the peristome. Aperture oval to more rounded, horny yellowish on the inside. Peristome well reflected and well thickened by a labial callus (which is often slightly coloured), the columellar and palatal insertion connected by a strongly developed parietal callus which is thick and frequently cylindrical in shape. The parietal callus is even more swollen at both ends; at the palatal end it generates a subangularis, which is connected with the palatal insertion of the peristome by a weakly developed callus. There is a broad, indistinct thickening at the peristome at the position of the palatalis superior. The curled columellar ledge is well developed and reaches to about halfway of the columellar side of the aperture. The last whorl is constricted, thereby contributing to the fusiform shape of the shell. There is a palatal fold deep inside the last whorl (it mostly cannot be seen in the aperture) which is visible through the shell as a well-delineated whitish band; it mostly reaches towards the insertion of the palatal peristome, and can further extend into the end of the penultimate whorl.

Measurements (n = 14). – H = 14.2-17.0 (mean 15.4); LWM = 5.3-5.9 (mean 5.6); HM = 3.1-3.5 (mean 3.4); LWD = 2.6-3.4 (mean 2.9); LWM = 2.8-3.2 (mean 3.1); MD = 2.4-2.6 (mean 2.6); NW = 10.2-12.1 (mean 11.3). For comparison, measurements are here given for *C. biplicatus* (n = 6; collected 5 km NW Artvin, Menkhurst leg.): H 18.8-20.7 (mean 19.7); LWH 7.2-8.0 (mean 7.7); HM 4.2-4.8 (mean 4.5); LWD 3.9-4.4 (mean





**Figs 10-13.** *Clausilioides* taxa from Turkey. **10**, *Clausilioides berendinae* spec. nov., holotype NMBE 544672 (H = 15.1 mm), Turkey, Vil. Artvin, 1 km W. Ardanuç. **11**, *Clausilioides filifer* (Lindholm, 1913), NMBE 544602 (H = 9.9 mm), Turkey, Vil. Artvin, crossing Artvin/Şavşat/Demirkent, 17 km towards Yusufeli, near suspension bridge over the Çoruh Nehri, leg. Neubert, 4.v.1993. **12-13**, *Clausilioides palatalis* spec. nov., holotype NMBE 544676 (H = 10.2 mm), Turkey, Vil. Artvin, 4.3 km NE. Narlık. All photographs Bochud & Neubert, × 8.

4.1); LWM 4.1-4.5 (mean 4.3); MD 3.3-3.7 (mean 3.5); NW 11.0-11.5 (mean 11.3).

Localities. – Vilayet Artvin: type locality (see above); Ardanuç, castle (41.1273°N 42.0549°E) (HMK/15+17; RBA/1; Páll-Gergely, 2009: 73); Ardanuç, 4.9 km towards Yalnızçam Geçidi (41.1009°N 42.1058°E) (HMK/32; RBA/2); Ardanuç, 7 km towards Yalnızçam Geçidi (41.0960°N 42.1154°E) (HMK/23); Ardanuç, 10.2 km towards Yalnızçam Geçidi (41.0814°N 42.1433°E) (HMK/14); 0.5 km W. Ardanuç (41.1241°N 42.0605°E) (HMK/80; RBA/4); 1.5 km NW. Ardanuç (41.1297°N 42.0615°E) (HMK/36); 2 km NW. Ardanuç (41.1298°N 42.0584°E) (HMK/43; RBA/3); 4 km NW. Ardanuç (41.1365°N 42.04267°E) (HMK/2; NMBE 544673/5); 5 km NW. Ardanuç (41.1359°N 42.0334°E) (HMK/27; NMBE 544674/3); 6 km NW. Ardanuç (41.1383°N 42.0248°E) (NMBE 544675/2).

Derivatio nominis. – Named after Maria Berendina van der Ende (24.viii.1958), for encouraging one of the authors (Ruud Bank) over a period of more than 30 years.

Differentiation. – The geographically nearby *C. biplicatus* differs from *C. berendinae* by its larger dimensions, the less convex whorls, the generally less well-developed parietal callus, the more rounded aperture, the less slender apex and the less constricted last whorl. Finally, the palatal fold is situated less deep in the last whorl (its start can be seen deep in the aperture), and reaches often only to the insertion of the columellar peristome or in between the insertion of the columellar and palatal peristome; it never enters the penultimate whorl.

Remarks. – *Clausilioides berendinae* is a species that is common in the surroundings of Ardanuç (east of Artvin). It has been confused with *C. biplicatus*, which lives in a restricted area near Artvin. The shell depicted by Schütt (2010: 121) as *C. biplicatus* from Ardanuç is in fact *C. berendinae*. The same is the case with the shell depicted by Schütt (2001: 122); the given locality "Artvin" is with certainty imprecise. On the other hand, the shell depicted by Schileyko (1998b: 233 fig. 286A) is indeed *C. biplicatus* (its size is 20.0 x 4.2 mm), as is the drawing of the genital organs given by Hesse (1933: 205-206, fig. 35). The holotype of *biplicatus* has been figured by Zilch (1959: 185 fig. 637). The anatomy of *C. berendinae* has been briefly touched upon by Páll-Gergely (2009: 73, fig. 4 – as "an undescribed species of *Clausilioides*").

#### *Clausilioides palatalis* spec. nov. (Figs 12-13)

Type locality & type material. – Turkey, Vilayet Artvin, 4.3 km NE. Narlık, 400 m (41.0022°N 41.7697°E), H.P.M.G. Menkhorst leg., 6.ix.2010. Holotype NMBE 544676, paratypes NMBE 544677/1, HMK/5+4 juveniles.

Diagnosis. – A small, turreted, *Clausilioides* species with a prominent palatal fold that can be seen in the aperture as it almost reaches the peristome.

Description. – Shell dextral, turreted in outline, with a narrow, slit-like umbilicus. The 10.2-11.6 whorls are moderately convex with a moderately deep suture. Teleoconch with irregular, fine, oblique striae; there are no spiral striae. Shell rather thin, translucent, glossy, uniformly corneous coloured, with a whitish band behind the peristome. Aperture rounded, horny yellowish on the inside, peristome reflected and well thickened by a labial callus (which is mostly slightly coloured). Columellar and palatal insertion connected by a well developed parietal callus; it thickens even more at both ends. The parietal callus generates at the palatal end a subangularis, which is connected to the palatal insertion of the peristome by a mostly weakly developed callus. There is a broad, indistinct thickening at the position of the palatalis superior. The oblique columellar ledge reaches to about halfway of the columellar side of the aperture. There is a prominent palatal fold in the last whorl which is visible as a well delineated whitish band through the shell. It is fully visible in the aperture, as it stops closely in front of the thickened labial callus of the palatal peristome. The palatal fold reaches into the last part of the penultimate whorl, or stops in between the insertion of the columellar and palatal peristome. Interestingly, the palatal fold is partially enlarged towards the penultimate whorl, forming a ridge-like structure.

Measurements (n = 5). – H = 8.2-10.3 (mean 9.1); LWH = 3.3-3.5 (mean 3.4); HM = 2.0-2.2 (mean 2.1); LWD = 2.2-2.4 (mean 2.3); LWM = 2.2-2.6 (mean 2.4); MD = 1.7-1.8 (mean 1.7); NW = 10.2-11.6 (mean 10.7).

Localities. – Vilayet Artvin: type locality (see above); rocks 1.5 km N. Narlık (40.9993°N 41.7829°E) (HMK/1).

Derivatio nominis. – Named after the palatal fold in the aperture, a rather unique character in the Enidae.

Differentiation. – *Clausilioides berendinae* has a fusiform shape (not turreted), it has different dimensions, the columellar ledge is curled and more prominent, the parietal callus is more prominent, the aperture is generally more oval, and the palatal fold does not run to the peristome and does not show a ridge-like structure. *Clausilioides filifer* (Fig. 11) is more fusiform in outline, but most importantly, the palatal fold is located deep in the last whorl, and can therefore hardly be seen in the aperture (see also Lindholm, 1913: 22 "in der Mündung nur bei sehr schiefen Einblick sichtbar"). It is not known whether the palatal fold in *C. filifer* has a ridge-like structure.

Remarks. – *Clausilioides filifer* has been described

on the basis of a single shell which was picked from deposition of the Çoruh Nehri near Kapandidi. This is most likely Maradidi in Georgia, located a few km north of the Turkish border (see also under *Multidentula squalina acutior*). It is not known whether the species actually lives in Georgia, or whether the shell has been transported from Turkey by the Çoruh river. The holotype of *C. filifer* has been figured by Sysoev & Schileyko (2009: fig. 23F). We have seen three specimens of *C. filifer* collected in the Vilayet Artvin, crossing Artvin/Şavşat/Demirkent, 17 km towards Yusufeli, near the suspension bridge over the Çoruh Nehri (Neubert leg.).

*Amphiscopus* Westerlund, 1887

*Amphiscopus* Westerlund, 1887: 3, 55. Type species (by subsequent designation of Westerlund, 1903: 104): *Pupa sturmii* Küster, 1852.

This genus is endemic for Turkey. It is composed of *A. sturmii* (Küster, 1852) (erroneously spelled as *sturmi* by Zilch [1959: 180 fig. 619] and Schileyko [1998b: 211 fig. 260A-C]), *A. substurmii* (Retowski, 1886) and the below described *A. moolenbeeki*. The anatomy of *A. sturmii* has been described by Schileyko (1998b: 209-201, fig. 260B-C). Welter-Schultes (2012: 177) placed *A. sturmii* as a species in the genus *Chondrula*, whereas he (2012: 194) placed *A. substurmii* (Retowski, 1887) in the genus *Multidentula*. This is remarkable, as *Amphiscopus* belongs to the tribus Enini, whereas *Chondrula* and *Multidentula* belong to the tribes Chondrulini and Multidentulini, respectively. Furthermore, Welter-Schultes mentioned that *Imparietula microdon* Schütt, 1995, is a synonym of *substurmii*, but *microdon* is in reality a close relative of *Pseudochondrula seductilis* (Rossmässler, 1837) (tribus Enini). Retowski (1886: 34) described *substurmii* from deposition of the Black Sea washed ashore the Crimea ("auf das Strandgebiet zwischen Theodosia und Sudak"); it actually lives in Turkey.

*Amphiscopus sturmii marmoratus* subspec. nov.  
(Fig. 15)

Type locality & type material. – Turkey, Vilayet Kütahya, Örençik, western part, 950 m (39.4426°N 29.0662°E), B. Hausdorf leg., 21.ix.1987. Holotype NMBE 544670/1, paratypes NMBE 54467/5, HMK/2, RBA/\*2, ZMH/33.

Diagnosis. – A subspecies of *A. sturmii* characterized by the whitish/ marbled colour of the shell, the less well-developed parietal callus and the absence of an impression at the last whorl.

Description. – Shell dextral, turreted, with a relative wide, open, slit-like umbilicus. The 8.3-10.1

whorls are rather convex with a moderately deep suture. Teleoconch with densely packed, rather pronounced, oblique striae; there are no spiral striae. Shell solid, not translucent, glossy, upper part of the teleoconch horny yellow coloured, the remaining part of the teleoconch whitish/ marbled coloured, but below the periphery (i.e. the part of the whorl below the insertion of the palatal peristome) again more horny yellow; there is a prominent white band behind the peristome. The last whorl does not have an impression near the palatalis superior. Peristome not or hardly reflected (with the exception of the columellar part), robustly thickened by a labial callus, the columellar and palatal insertion connected by a clearly visible callus which is often more thickened near the columellar peristome. The subangularis is tear-like and vertically pointing downwards; it is connected with the palatal peristome by a thin callus. The subangularis and parietalis are not connected. The parietalis is well developed, and only moderately deeply recessed. Palatalis superior well thickened, but not deeply recessed. There is no spiralis, infrapalatalis, basalis or columellaris. The columellar ledge reaches halfway or above the middle of the columellar side of the aperture.

Measurements (n = 11). – H = 6.7-9.0 (mean 7.8); LWH = 3.0-3.5 (mean 3.3); MH = 1.9-2.2 (mean 2.1); LWD = 2.3-2.7 (mean 2.4); LWM = 2.3-2.8 (mean 2.6); MD = 1.5-1.8 (mean 1.6); NW = 8.3-10.1 (mean 9.2).

Localities. – Vilayet Kütahya: type locality (see above); 4 km E. Köprüören, 1020 m (39.5115°N 29.8137°E) (ZMH/>50).

Derivatio nominis. – Named after the marble-like colour of the shell.

Differentiation. – *Amphiscopus sturmii sturmii* has a uniform dark-brown coloured shell, more convex whorls, a more prominent parietal callus, and the last whorl has a more or less faint impression at the position of the palatalis superior. *Amphiscopus substurmii* is sinistral and has the same colour pattern as *A. sturmii sturmii*.

*Amphiscopus moolenbeeki* spec. nov. (Fig. 14)

Type locality & type material. – Turkey, Vilayet Tokat, Reşadiye, 8 km towards Çekerek, 770 m (40.1523°N 35.6320°E), H.P.M.G. Menkhorst leg., 19.vii.1990. Holotype NMBE 544668, paratypes NMBE 544669/2, HMK/>50, RBA/3, RMNH/3, ZMH/3.

Diagnosis. – A large, highly turreted *Amphiscopus* species without a parietalis or palatalis superior.

Description. – Shell dextral, highly turreted, with an open, slit-like umbilicus. The 10.4-13.2 whorls are convex with a moderately deep suture. Teleoconch with widely spaced, fine, oblique striae; there are no





**Figs 14-15.** New *Amphiscopus* taxa from Turkey. **14**, *Amphiscopus moolenbeeki* spec. nov., holotype NMBE 544668 (H = 13.8 mm), Turkey, Vil. Tokat, Reşadiye, 8 km towards Çekerek. **15**, *Amphiscopus sturmii marmoratus* subspec. nov., holotype NMBE 544670 (H = 8.2 mm), Turkey, Vil. Kütahya, Örencik, western part. All photographs Bochud & Neubert, × 8.

spiral striae. Shell solid, not translucent, glossy, uniformly horny yellow coloured, with a prominent whitish band behind the peristome. Peristome not or hardly reflected (with the exception of the columellar part), thickened by a labial callus, the columellar and palatal insertion connected by a clearly visible callus which is quite thickened near the columellar peris-

tome. The edge of the palatal insertion forms a wide arc. The dot-like to tear-like subangularis is connected with the palatal peristome by a thin callus. There is no parietalis, spiralis, palatalis superior, infrapalatalis, basalis or columellaris. The columellar ledge reaches halfway or above the middle of the columellar side of the aperture.

Measurements (n = 8). – H = 10.0-14.4 (mean 12.3); LWH = 4.0-4.8 (mean 4.3); MH = 2.6-2.9 (mean 2.7); LWD = 3.0-3.3 (mean 3.1); LWM = 2.9-3.3 (mean 3.1); MD = 1.9-2.2 (mean 2.1); NW = 10.4-13.2 (mean 11.9).

Localities. – Vilayet Tokat: type locality (see above); Reşadiye, 7.5 km towards Çekerek (HMK/1).

Derivatio nominis. – Named after our friend Rob(ert) Moolenbeek, who made numerous important malacological contributions and who curated the molluscan collection of the formerly Zoologisch Museum Amsterdam for decades (now integrated in the Naturalis Biodiversity Center, Leiden).

Remarks. – This taxon has been assigned to *Amphiscopus* because of the overall shape of the shell, the small aperture and the thickened peristome. So far, only the species *sturmii* and *substurmii* has been assigned *Amphiscopus*; therefore *moolenbeeki* is now the third known *Amphiscopus* species. It can be easily recognized from *A. sturmii* and *A. substurmii* by the characters mentioned in the diagnosis.

Tribus Multidentulini Schileyko, 1978

#### *Multidentula* Lindholm, 1925

*Multidentula* Lindholm, 1925: 30, 39. Type species (by monotypy): *Bulinus ovularis* Olivier, 1801.

*Bollingeria* Forcart, 1940: 194. Type species (by original designation): *Chondrus pupoides* Krynicki, 1833.

*Tokatia* Hudec, 1972: 217. Type species (by original designation): *Bulinus lamelliferus* Rossmässler, 1858.

*Improvisa* Schileyko, 1978: 846. Type species (by monotypy): *Chondrus pupoides* Krynicki, 1833.

*Senaridenta* Schileyko, 1978: 846. Type species (by monotypy): *Chondrula (Chondrula) nachicevanjensis* Hudec, 1972.

The genus *Multidentula* is known from the Caucasus, Armenia, Georgia, Azerbaijan, northwestern Iran and the northern half of Turkey; its presence in Cyprus is questionable (Bank & Neubert, 2015: 73). The following species belong to the genus: *lamellifera* (Rossmässler, 1858), *nachicevanjensis* (Hudec, 1972), *ovularis* (Olivier, 1802), *pupoides* (Krynicki, 1833), *ridens* (Nägele, 1906) and *squalina* (L. Pfeiffer, 1848). The latter species is polytypic and is almost endemic for Turkey. Forcart (1940: 197-199, pl. 3 figs 64-65) mentioned *M. s. squalina* and *M. s. eudoxina* (Nägele, 1894) for Turkey. Based on a single shell, Lindholm (1922b: 358-359) described *Chondrula acutior* from Georgia; this shell (holotype) has been figured by Sysoev & Schileyko (2009: fig. 38E) under the name *Euchondrus acutior*. It has never been found again after the description from Lindholm. Our revision revealed that this taxon is also distributed in the northeastern part of Turkey, and that it is a subspecies of *M. squalina*. We

here characterize this virtually unknown subspecies, and also describe a new species from Turkey.

#### *Multidentula squalina acutior* (Lindholm, 1922) (Fig. 18)

*Chondrula acutior* Lindholm, 1922b: 358-359. Type locality: "Von mir im Genist des Fl. Tschoroch bei Kapandidi (unweit Batum) .... in einem tadellos erhaltenen leeren Stücke gefunden (coll. m.)". Holotype in ZIN (Sysoev & Schileyko, 2009: 85, 259, fig. 38E).

Description. – Shell dextral, oval in outline, with a rather wide, open, slit-like umbilicus. The 6.5-7.7 whorls are rather convex with a rather deep suture. Teleoconch with irregular, oblique striae which are mostly rather fine; there are no spiral striae. Shell solid, not or hardly translucent, rather dark brownish coloured, with a whitish band behind the peristome. The last whorl has an impression at the position of the infrapalatalis; the infrapalatalis and palatalis superior are visible outside as blurred white stripes. Peristome somewhat reflected, thickened by a prominent labial callus, the columellar and palatal insertion connected by a clearly visible callus (but the callus is mostly not extra thickened near the insertions). The subangularis is well developed and fused with the palatal peristome. The subangularis is connected to the parietalis by a more or less thickened callus. The very prominent parietalis is curved and deeply recessed. A spiralis is missing. Columellaris perpendicular to the columellar peristome, deeply recessed. Basalis present, well developed. Infrapalatalis and palatalis superior strongly developed; the infrapalatalis is the most prominent one. A suprapalatalis is also present, but is less prominent than the palatalis superior. A weak suturalis is available.

Measurements (n = 13). – H = 5.0-6.3 (mean 5.5); LWH = 2.6-3.1 (mean 2.9); MH = 1.7-2.1 (mean 1.8); LWD = 2.0-2.6 (mean 2.3); LWM = 2.3-2.9 (mean 2.6); MD = 1.5-1.8 (mean 1.6); NW = 6.5-7.7 (mean 7.0).

Localities. – Vilayet Artvin: crossing Artvin/Şavşat/Demirkent, 17 km towards Yusufeli, suspension bridge Çoruh Nehri (41.0925°N 41.8146°E) (NMBE/2); 5 km N. Erkinis (= castle N. Demirkent) (40.9258°N 41.7619°E) (HMT/1); N. Kınalıçam (= NNW. Çağliyan) (40.7567°N 41.6449°E) (HMT/41; NMBE 544678/1); Yusufeli (40.8215°N 41.5434°E) (HMT/3); 16 km SE. Yusufeli (40.7826°N 41.6967°E) (HMT/14); 17 km SE. Yusufeli, 5 km N. province boundary Erzurum/Artvin (40.7361°N 41.6651°E) (HMT/47). Vilayet Erzurum: 6 km SE. Çamlıyamaç (40.5854°N 41.5952°E) (HMT/81); Ispir, 38 km towards Yusufeli (40.6517°N 41.2299°E) (NMBE/4); deposition Tortum Gölü (40.6361°N 41.6312°E) (HMT/59); 9 km SW. Uzundere, 2 km S. exit to Dikmen (40.4698°N

41.5019°E) (HMT/117). Vilayet Gümüşhane: 6 km N. Arpalı (= 22 km NW. Bayburt) (40.5792°N 39.1334°E) (HMT/14); Salyazı, deposition Sulama Göleti (40.2446°N 39.8070°E) (HMT/29).

Differentiation. – *Multidentula s. squalina* (Fig. 16) differs from *M. s. acutior* by the more densely packed and more pronounced oblique striae, the more pointed apex, the wider umbilicus, the mostly absent suturalis, the more reflected peristome, the less slender suprapalatalis, and the palatalis superior and infrapalatalis are generally more deeply situated in the aperture (i.e. they are situated further away from the peristome). *Multidentula s. eudoxina* (Fig. 17) has a different dentition compared to *M. s. acutior*. The former lacks a suprapalatalis, the infrapalatalis is rather broad and seems slightly bifid, the palatalis superior is more prominent and the angularis is not fused with the palatal peristome, but instead connected to it by a thin callus.

Remarks. – The type locality "Kapandidi" of *acutior* could not be traced. It is likely that Maradidi is meant, which is located in Georgia along the river Chorocho (= Çoruh Nehri) a few km north of the Turkish border (41.5030N 41.7123E).

An isolated locality from *M. squalina* has been reported by Fehér & Erőss (2009: 12, pl. 1 figs 8-10) from Albania. All other localities of *M. squalina* are restricted to Turkey (except one: the type locality of *acutior*). The shells of Albania (as interpreted from the mentioned figures by Fehér & Erőss as well as those published by Welter-Schultes [2012: 194]) do not belong to the nominotypical subspecies, as the subangularis is not fused with the palatal peristome, the presence of a suturalis, the oblique striae are less pronounced, the whorls are more convex, and the apex is less pointed. Furthermore, in *M. s. squalina* the basalis is shifted to a more subcolumellar position, and the infrapalatalis and palatalis superior are more deeply situated in the aperture. The Albanian subspecies differs from *M. s. acutior* by the less pronounced subangularis which is non-fused.

Another isolated locality of *M. squalina* is within Turkey itself, namely Çivril and Senirkent (both in the Göller Bölgesi area) (Yıldırım & Schütt, 1997: 52, fig. 16; Schütt, 2001: 148, fig. c; Schütt, 2010: 146, fig. c). Unfortunately, the figures are too vague to determine its subspecific state.

### *Multidentula reducta* spec. nov. (Fig. 19)

Type locality & type specimens. – Turkey, Vilayet Sivas, Zara, 16 km towards Imranlı, 1400 m (39.8606°N 37.8765°E), H.P.M.G. Menkhorst leg., 15.vii.1988. Holotype NMBE 544681, paratypes NMBE 544682/1, HMK/12, RBA/1, RMNH/1.

Diagnosis. – A middle-sized, oval *Multidentula* species with fine oblique striae, a missing suprapalatalis and a weakly developed or missing basalis, an oblique infrapalatalis, a non-fused subangularis, and a parietalis that is only slightly curved.

Description. – Shell dextral, oval in outline, with a rather wide, open, slit-like umbilicus. The 6.0-7.2 whorls are convex with a rather deep suture. Teleoconch with irregular, sparse, oblique striae which are mostly rather fine; there are no spiral striae. Shell rather solid, slightly translucent, yellowish to horny yellowish, with a whitish band behind the peristome. The last whorl has no or only an indistinct impression and only the infrapalatalis is visible outside as a blurred white stripe. Peristome well reflected, thickened by a prominent labial callus, the columellar and palatal insertion connected by a clearly visible callus (but the callus is not extra thickened near the insertions). The subangularis is vertically pointing downwards, and is connected (but not fused) with the palatal peristome by a callus. The subangularis and parietalis are connected by a thin callus. Parietalis prominent, slightly curved and deeply recessed. A spiralis is missing. Columellaris ± oblique to the columellar peristome, deeply recessed. The basalis is absent, or present as an indistinct thickening only. Infrapalatalis well developed, oblique, and always stronger developed than the non-oblique palatalis superior. There is no suprapalatalis; a small suturalis is present.

Measurements (n = 6). – H = 5.3-6.9 (mean 6.1); LWH = 3.2-3.8 (mean 3.5); MH = 2.1-2.4 (mean 2.2); LWD = 2.7-2.8 (mean 2.8); LWM = 2.7-3.0 (mean 2.8); MD = 1.7-1.9 (mean 1.8); NW = 6.0-7.2 (mean 6.6).

Localities. – Known from the locus typicus only (see above).

Derivatio nominis. – The name refers to the reduced apertural armature.

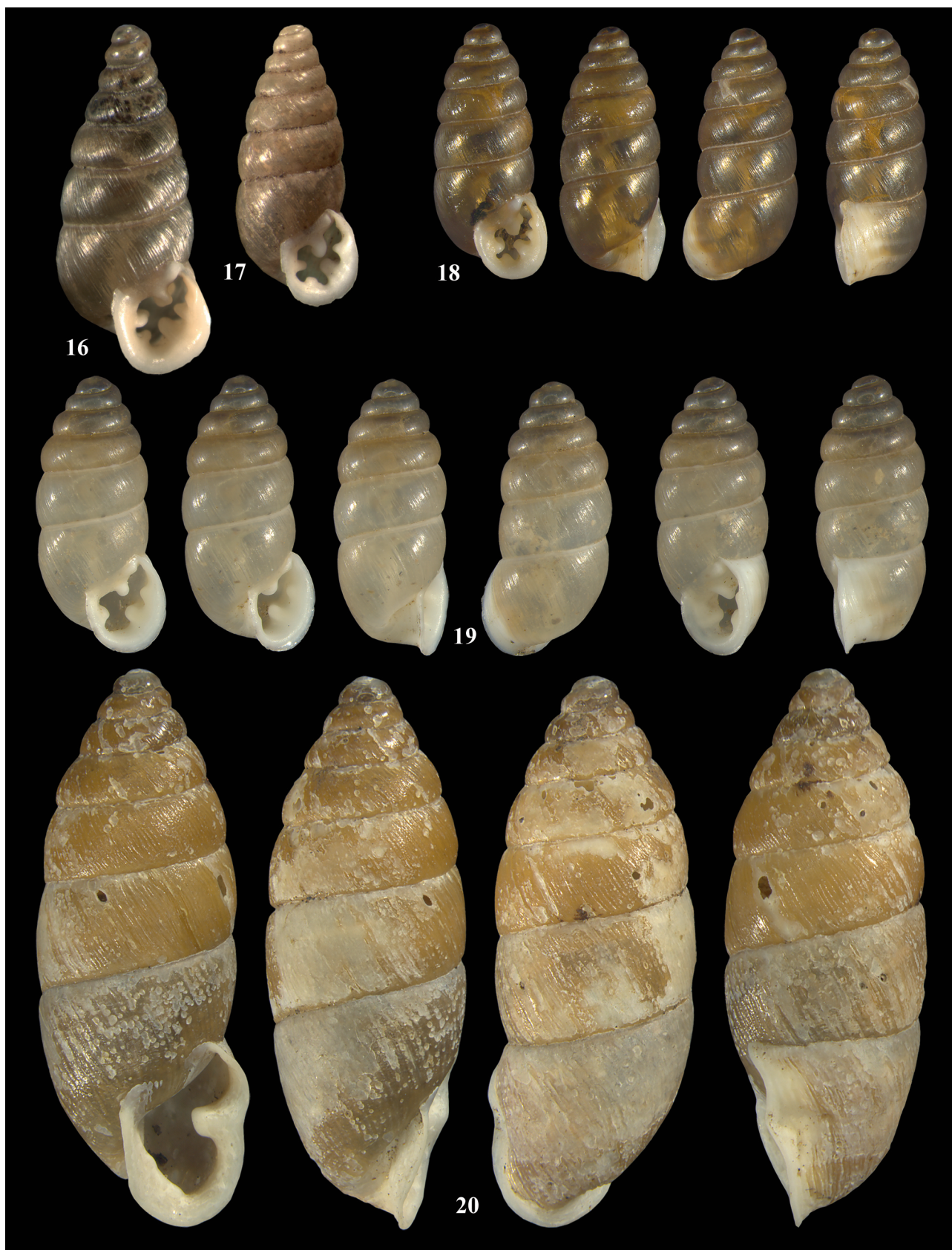
Differentiation. – The armature of *M. reducta* is generally reduced: a basalis is absent or only weakly developed, a suprapalatalis is missing, and the parietalis is not as prominent and less curved as in *M. squalina* or *M. pupoides*. The palatal folds are, compared to *M. squalina*, also less deep in the aperture, but are placed closer to the peristome.

Superfamilia Limacoidea Lamarck, 1801

Familia Vitrinidae Fitzinger, 1833

From the European mainland, Turkey, the Caucasus and northern Africa (Libya and Algeria) several vitrinid genera have been reported, encompassing about 30 species. These are the genera *Eucobresia* H.B. Baker, 1929, *Hessemilimax* Schileyko, 1986, *Oligolimax* P. Fischer, 1878, *Phenacolimax* Stabile, 1859, *Sardovitrina*





**Figs 16-20.** *Multidentula* and *Imparietula* taxa from Turkey. **16**, *Multidentula squalina squalina* (L. Pfeiffer, 1848), NMBE 548313 (H = 7.8 mm), Turkey, Vil. Karabük, eastern part Eskipazar, leg. Hausdorf, 27.ix.1987. **17**, *Multidentula squalina eudoxina* (Nägele, 1894), paralectotype SMF 14195a coll. Kobelt ex Nägele (H = 6.3 mm), Turkey, Vil. Tokat, Tokat. **18**, *Multidentula squalina acutior* (Lindholm, 1922), NMBE 544678 (H = 5.7 mm), Turkey, Vil. Artvin, N. Kınalıçam (= NNW. Çağliyan). **19**, *Multidentula reducta* spec. nov., holotype NMBE 544681 (H = 6.2 mm), Turkey, Vil. Sivas, Zara, 16 km towards Imranlı. **20**, *Imparietula inflexa* spec. nov., holotype NMBE 544683 (H = 12.4 mm), Turkey, Vil. Giresun, 5 km N. Tamdere (= S. Yavuzkema). All photographs Bochud & Neubert,  $\times 8$ .

Manganelli & Giusti, 2005, *Semilimacella* Soós, 1917, *Semilimax* Gray, 1847, *Vitrina* Draparnaud, 1801, and *Vitrinobrachium* Künkel, 1929. None of the species from these genera have a shell with a maximum diameter above 10 mm. The situation is different with respect to Macaronesia (Madeira, Canary Islands, Azores). It is home for 35 endemic species classified into the genera *Azorivitrina* Giusti, Fiorentino, Benocci & Manganelli, 2011, *Canarivitrina* Valido & Alonso, 2000, *Guerrina* Odhner, 1955, *Insulivitrina* P. Hesse, 1923, *Madeirovitrina* Groh & Hemmen, 1986, and *Plutonia* Stabile, 1864. Shells of a number of vitrinids of Macaronesia are relatively large, and reach sizes above 11 mm: *Insulivitrina* and *Madeirovitrina*.

*Calidivitrina* Pilsbry, 1919, is a genus endemic for the African continent. Representatives of this genus are known from Kenya, Uganda, Tanzania and the eastern border of Congo-Kinshasa. These are: *bambuseti* (Thiele, 1911), *cagnii* (Pollonera, 1906), *chyuluensis* (Verdcourt, 2005), *ericinellae* (d'Ailly, 1910), *ibandensis* (Pollonera, 1907), *kiboschoensis* (d'Ailly, 1910), *lactae* Connolly, 1925, *lobeliaecola* (Dautzenberg, 1908), *nigrocincta* (E. von Martens, 1887), *oleosa* (E. von Martens, 1895) [= type species], *ugandensis* (Thiele, 1911), *tenuissima* (Thiele, 1911), *variopunctata* (Connolly, 1931), and *viridisplendens* (d'Ailly, 1910). The maximum diameter of the shell of most *Calidivitrina* species is in the range between 8 and 11 mm; the largest two species are *bambuseti* (12 mm) and *chyuluensis* (13 mm).

The genus *Arabivitrina* Thiele, 1931 is distributed in Yemen and in the southwestern part of Saudi Arabia, namely *A. arabica* (Thiele, 1910) [= type species] and *A. jansseni* Neubert, 1998, as well as in Abyssinia (Ethiopia). The two taxa from Saudi Arabia / Yemen have been reviewed by Neubert (1998); the shell reaches a maximum diameter of about 21 and 18 mm, respectively. From Ethiopia a large number of taxa have been described that might be assigned to *Arabivitrina*. These are *abyssinica* (L. Peiffer, 1848), *antonellii* (Pollonera, 1888), *bianchii* (Pollonera, 1888), *caillaudi* (Morelet, 1872), *chiauzzii* (Bacci, 1940), *conquisita* (Jickeli, 1882), *darnaudi* (L. Pfeiffer, 1856), *demissa* (Pollonera, 1898), *devexa* (Jickeli, 1873), *giuliettii* (Pollonera, 1888), *grossepunctata* (Connolly, 1928), *helicoidea* (Jickeli, 1873), *herbini* (Bourguignat, 1883), *humilis* (Pollonera, 1898), *isseli* (Morelet, 1872), *jamjamensis* (Kobelt, 1905), *jickelii* (Jickeli, 1874), *licatae* (Pollonera, 1888), *martensii* (Jickeli, 1873), *martinii* (Pollonera, 1888), *milneedwardsiana* (Bourguignat, 1883), *modesta* (Pollonera, 1898), *naticoides* (Pollonera, 1888), *neumanni* Thiele, 1933, *olivacea* Thiele, 1933, *perobliqua* (Innes, 1884), *planulata* (Jickeli, 1873), *raffrayi* (Bourguignat, 1883), *ragazzii* (Pollonera, 1888), *riepiana* (Jickeli, 1882), and *semirugata* (Jickeli, 1873). However, the validity of

these taxa is in most cases quite unclear: it is reasonable to assume that, after revision, several names turn out to be synonyms. Furthermore, it is even possible that some names do not belong to *Arabivitrina*, but to members of the superfamily Helicarionoidea. Most of the mentioned taxa have relatively large dimensions, i.e. the maximum diameter of the shell is in the range between 11 and 21 mm. Two species are exceptionally large, namely *licatae* and *ragazzii*, with reported sizes of 23 and 30 mm, respectively. For an introduction into the chaotic state of the African Vitrinidae we refer to Forcart (1956, 1978), Hubendick (1953) and Verdcourt (2005).

Three vitrinid species have been reported from Madagascar: *madagascariensis* E.A. Smith, 1882, *marojeziana* Fischer-Piette, C. Blanc, F. Blanc & Salvat, 1994, and *josephinae* Emberton & Griffiths, 2009. However, the original figures of *marojeziana* and *josephinae* show an animal with a caudal horn; these taxa should therefore be assigned to the superfamily Helicarionoidea, as will undoubtedly be the case for *madagascariensis* as well.

We stumbled upon a large Turkish vitrinid species collected at the Nemrud Dağ, which we cannot assign to one of the above mentioned genera. A most likely closely related -but almost forgotten- species lives at several localities in Lebanon, currently known as *Vitrina libanica* Germain, 1911.

### *Megavitrina* gen. nov. (Figs 21-23)

Type species. – *Megavitrina imperatoria* spec. nov. (by original designation).

Diagnosis. – Shell big (maximum diameter > 13 mm), orthostyl, with a closed umbilicus because of a reflexed (thickened) columellar peristome, and with a lacking membranous margin. Especially characteristic for the genus is the presence of 2 to 3 prominent growth interruptions.

Derivatio nominis. – Named after the large size of the two currently known species when compared to the Vitrinidae taxa living in continental Europe.

Differentiation. – Taxa of *Arabivitrina* have a more dome-shaped, subglobose shell, and lack the characteristic prominent growth interruptions.

Remarks. – It is well known that in some areas vitrinids occur with a relatively large shell, i.e. a shell with a maximum diameter above 11 mm. These areas are Macaronesia (Madeira, Canary Islands), Saudi Arabia, Yemen, and the eastern part of Africa. From a geographical point of view, the below discussed species of Lebanon and Turkey are most closely related to those of Saudi Arabia, i.e. *Arabivitrina*. Neubert (1998: 449) already discussed the new genus in the context of *Arabivitrina*, and stated that a separate



genus should be introduced, but postponed it "until preserved specimens are available for anatomical research". Unfortunately, no such material has become available in the meanwhile. Since shell morphology prohibits the assignment of *libanica* and *imperatoria* into *Arabivitrina* or any other genus, we decided to make a new genus name available, despite the lack of anatomical data.

A marked feature of the new genus is the presence of 2 to 3 very marked growth interruptions; it can also be seen at the inside of the aperture as a radially arranged, whitish, callus. As far as we known, this is a unique feature in the Vitrinidae. The robustness of the growth interruptions can be compared with those seen in the genus *Eopolita* Pollonera, 1916 (family Oxychilidae).

***Megavitrina imperatoria* spec. nov. (Fig. 21)**

"a hitherto undescribed species from eastern Anatolia" – Neubert, 1998: 449.

Type locality & type specimens. – Vilayet Adıyaman, summit Nemrud Dağ (= Commagenes), 2150 m (37.9799°N 38.7406°E), H.P.M.G. Menkhorst leg., 14.vii.1986. Holotype NMBE 548324, paratypes NMBE 548345/1, HMK/2 + 6 subadult shells + 5 juveniles. In addition 2 paratypes in HMK (1 adult, 1 subadult) collected at 15.v.2011. Most of the type specimens are partially broken.

Diagnosis. – See the diagnosis of the genus.

Description. – Shell thin and transparent, discoidal in profile, orthostyl, with a pale greenish tinge. Protoconch (1.7 whorls; diameter 2.4–2.7 mm) very finely punctate; the very fine pits are more or less arranged in spiral rows. Teleoconch without punctuation; only weak irregularly spaced radial growth lines are present and some hardly visible (even at high magnification) spiral striae. Radial growth lines can also be present on the protoconch. The first whorls are rather convex, but the last whorl is rather flattened; the suture is shallow. The spire is small and low. The 3.4 whorls (counting according to Knipper, 1939: 332) enlarge rapidly, the last one being very wide. Last whorl forming distinctly less than half the total breadth as viewed from above, slightly descending, convex and never angled at its periphery. Apertural lip simple, thin and delicate; a membranous margin is lacking (or a mere trace only). The upper part of the columellar peristome is reflexed and therefore markedly thickened, closing the umbilicus completely. A remarkable feature of the shell is the presence of 2 to 3 very clear growth interruptions. The interruption can also be observed at the inside of the aperture, namely as a radial, whitish, callus.

Measurements (n = 3). – Shell height 8.9–9.4 (mean 9.1); last whorl height 8.4–8.8 (mean 8.5); maximum height of peristome 5.3–5.6 (mean 5.4); height of spire 0.6–0.8 (mean 0.7) mm; maximum diameter of shell 16.1–17.1 (mean 16.4); minimum diameter of shell 12.6–13.4 (mean 13.0); maximum diameter of peristome 10.8–11.2 (mean 11.0); diameter last whorl 6.6–7.1 (mean 6.9). The reported maximum diameter of the shell of *V. libanica* is around 15 to 16 mm (Germain, 1911: 32; Tohmé & Tohmé, 1988: 71), and the reported maximum shell height of *V. libanica* is 9 mm.

Localities. – Known from the locus typicus only (see above).

Derivatio nominis. – Named after the emperor Antiochus I Theos Dikaios Epiphanes Philorhomaio Philhellen, who ruled the Kingdom of Commagene between 70 BC and 38 BC. He is the most famous emperor of that kingdom; the ruins of his tomb-sanctuary is atop Nemrud Dağ, being the type locality of this species.

Differentiation. – *Megavitrina imperatoria* has, compared to *M. libanica*, a more depressed and a more oval (due to the more expanded aperture) shell, a slightly less pronounced punctate sculpture on the protoconch, and a fewer number of radial growth lines on the teleoconch. We have two specimens of *V. libanica* at our disposal from the MNHN, with the label: "Beyrouth?".

***Megavitrina libanica* (Germain, 1911) (Figs 22–23)**

*Vitrina libanica* Germain, 1911: 31–32. Type locality: "Je dois à M.

P. Pallary la connaissance de cette espèce recueillie par le Frère Louis, dans la chaîne du Liban. L'indication précise de la localité ne m'a pas été fournie".

*Vitrina libanica* var. *hidachariyensis* Germain, 1911: 32. Type locality: "Marette à Hidachariyé, près de Damas, entre 650 et 700 mètres d'altitude [H. Gadeau de Kerville]".

*Vitrina libanica* – Germain, 1912: 441.

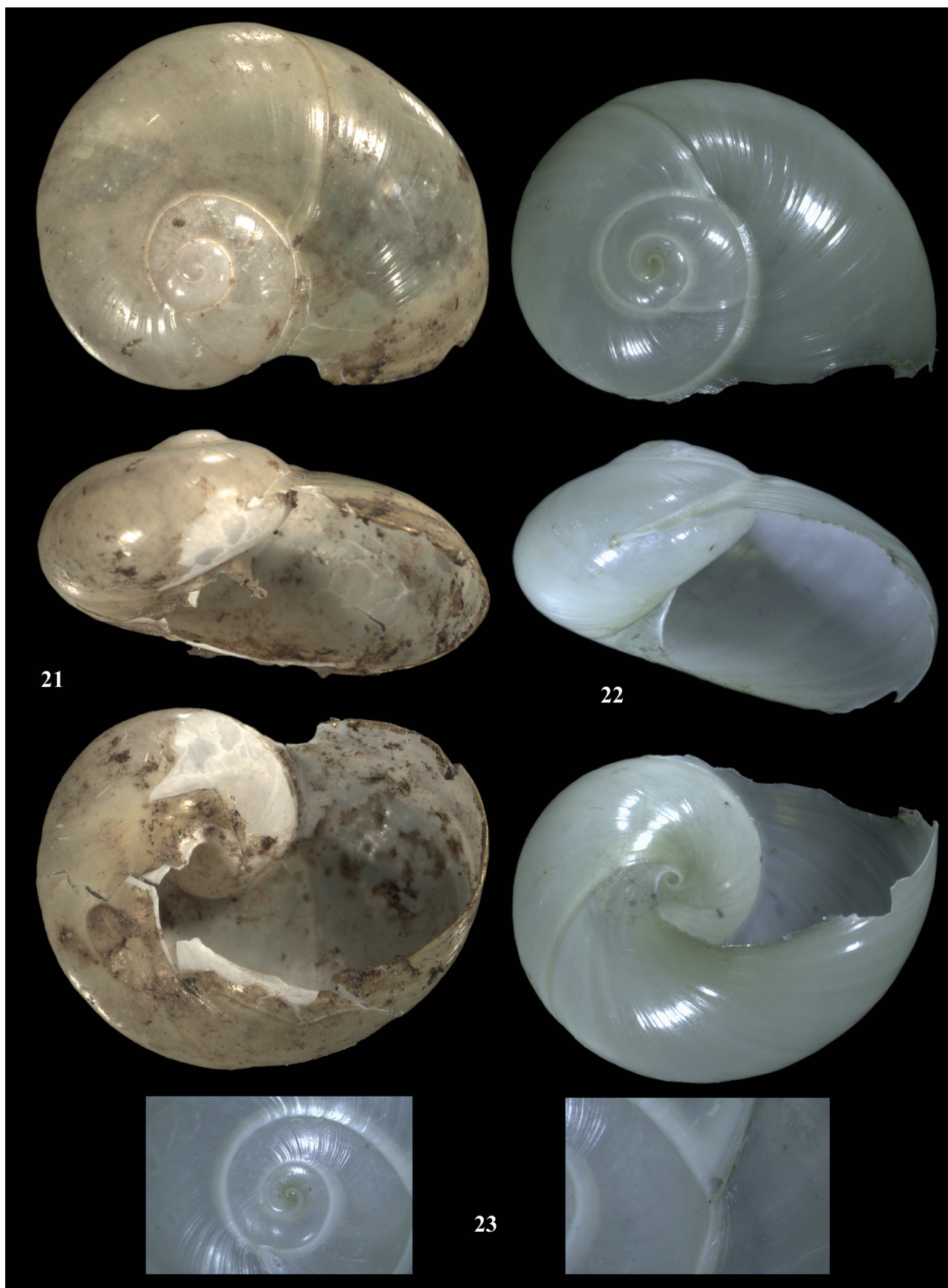
*Vitrina libanica* – Germain, 1921: 13, 34, 82–83 ("découverte par le Frère Louis en divers points de la chaîne du Liban où elle paraît rare ..... Aramoun, Fareit, Hakel et Fédar-Foha".

*Vitrina libanica* – Germain, 1922: 176, pl. 5 figs 7–9 ("Aramoun").

*Vitrina libanica* – Tohmé & Tohmé, 1988: 70–71 ("sous les oliviers de Haqel à 800 m d'altitude"; "Assez commune dans la région de Jbeil, au Kesrouane et au Chouf surtout dans les oliveraies").

Remarks. – Tohmé & Tohmé (1988) claimed that this species is common in several localities in the central part of Lebanon. One of the authors (Neubert) visited the country in 2008 and 2011, aiming to collect *M. libanica* in order to clarify its taxonomic position. These attempts failed as no specimens were found, although all localities mentioned by Tohmé & Tohmé





**Figs 21-23.** *Megavitrina* from Turkey and Lebanon. **21**, *Megavitrina imperatoria* spec. nov., holotype NMBE 548324 (D = 16.2 mm), Turkey, Vil. Adiyaman, under rocks on top of the Nemrud Dağ, 2150 m. **22-23**, *Megavitrina libanica* (Germain, 1911), MNHN (D = 15.3 mm), labelled as "Beyrouth?". All photographs Bochud & Neubert,  $\times 5$ .

were visited. This failure is not simply an artifact caused by visits during summer time (we assume the animals to be active during the humid winter season). In none of the many localities visited all over the country, not even a trace of a shell could be found! This signalizes that we are dealing with a massive decline of the populations of this enigmatic species during the last 30 years, at least.

The species has also been reported from Syria by Germain (1911: 32) under the variety name *hidachariyensis*. Remarkably, neither the variety name nor the locality was mentioned by Germain (1921: 82-83). We have not found its type locality "Hidachariyé" on any studied map.

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