

Middle Miocene Risssoidea (Caenogastropoda) of Letkés (Hungary)

KOVÁCS, Zoltán^{1,2}, STEIN, Gerhard³

¹Department of Palaeontology, Eötvös Loránd University, H-1117 Budapest, Pázmány Péter sétány 1/A, Hungary

²Hungarian Natural History Museum, H-1083 Budapest, Ludovika tér 2, Hungary

E-mail: kzkovacsoltan@gmail.com. Orcid.org/0000-0001-7276-7321

³Lüneburg, Georg-Böhm-Straße 15, D-21337, Germany

E-mail: gerhard-stein.lg@t-online.de

Középső miocén Risssoidea (Caenogastropoda) Letkésről (Magyarország)

Összefoglalás

Tanulmányunk Letkés (Börzsöny hegység) kora badeni (középső miocén) gastropoda-faunájának ismeretéhez járul hozzá a Risssoidea öregcsalád tíz nemzetségéhez tartozó 19 faj leírásával és ábrázolásával. A közismert lelőhely agyagos és homokos üledékei a Lajtai Mészke Formáció alsó badeni Pécsszabolcsi Tagozatát képviselik, és a Pannon-medence magyarországi részének leggazdagabb badeni tengeri molluszkanyagát tartalmazzák. Az itt bemutatott anyag az öregcsalád legmagasabb diverzitású megjelenését igazolja a Pannon-medencében, emellett kilenc faj jelenlétét először sikerült dokumentálni hazai lelőhelyről. A szakirodalom áttekintése alapján új nevet, *Rissoa federicoi* nom. nov. javasolunk a fiatal homonimát jelentő *Rissoa* (*Turboella*) *acuticosta* Sacco, 1895 helyett.

Tárgyszavak: középső miocén, badeni, Pannon-medence, Letkés, Littorinimorpha, Risssoidea

Abstract

A Middle Miocene (Early Badenian) Risssoidea assemblage with 19 species representing ten genera is described and illustrated here from a fossiliferous locality at Letkés (Börzsöny Mts., Hungary). The material represents the most highly diverse occurrence of the superfamily in the Pannonian Basin System. Nine species are recorded for the first time in this region. *Rissoa federicoi* nom. nov. is proposed here as a new name for the junior homonym *Rissoa* (*Turboella*) *acuticosta* Sacco, 1895.

Keywords: Middle Miocene, Badenian, Pannonian Basin, Letkés, Littorinimorpha, Risssoidea

Introduction

The aim of this paper is to report the Early Badenian (early Middle Miocene) Risssoidea material in the mollusc assemblage of Letkés (N Pannonian Basin, Hungary) as a contribution to the description of the highly diverse gastropod material of the locality. Letkés is a well-known Middle Miocene fossiliferous site in the western Börzsöny Mts. The studied locality is situated on the low slope of Bagoly Hill, about 400 m eastward from the village (N 47.888319°, E 18.784647°) (Figure 1). The deposits are characterized by resedimented beds consisting of limonitic clayey sand with andesite rock fragments, andesitic tuff and eroded colonial coral blocks. The sediments represent the Lower Badenian Pécsszabolcs Member of the Lajta Limestone Formation that was deposited in littoral–sublittoral zones. The extremely rich macrofauna shows a mixture of taxa derived from different biotopes (KOVÁCS & VICIÁN 2014).

Although numerous papers have dealt with the molluscs of Letkés (e.g., CSEPREGHY-MEZNERICS 1956; see KOVÁCS & VICIÁN 2021 with additional references) the Risssoidea has been under-represented in the previous literature. From the neighboring locality of Szob, 14 risssoidean species were listed by CSEPREGHY-MEZNERICS (1956), while only three were mentioned from Letkés. Intensive field work during the last decade yielded a relatively rich risssoidean material with 19 species from which *Alvania brachia* BOETTGER, 1902; *A. cf. convexispira* BOETTGER, 1907; *A. cf. subcrenulata* APPELIUS, 1869; *Pusillina cf. philippi* (ARADAS & MAGGIORE, 1844); *Chilostigma obsoleta* (HÖRNES, 1856); *Zebinella extranea* (EICHWALD, 1830); *Z. semidecussata* (BOETTGER, 1902); *Zebina cf. taurolaevis* SACCO, 1895 and *Stosicia costata* BOETTGER, 1887 are recorded for the first time in the Pannonian Basin System.

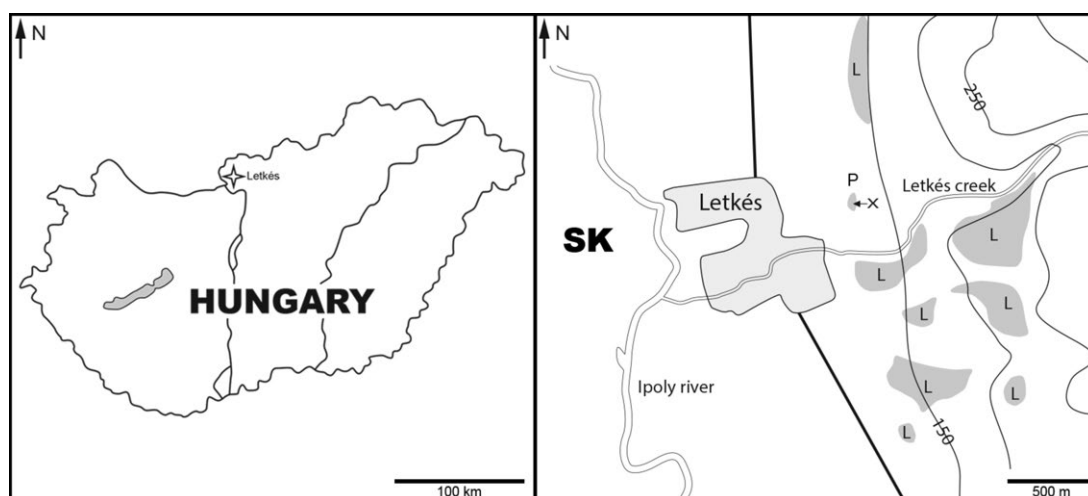


Figure 1. Location, and the Lower Badenian marine deposits at Letkés. P – Pécsszabolcs Member of the Lajta Limestone Formation sensu lato (L), X – locality (Modified from: <https://map.mbfsz.gov.hu/fdt100>)

1. *ábra.* Alsó badeni üledékek Letkés térségében. Lajtai Mésző Formáció sensu lato (L), Pécsszabolcsi Tagozat (P), X – lelőhely (<https://map.mbfsz.gov.hu/fdt100> alapján)

Material and methods

The study material was collected by the authors from the Bagoly Hill locality at Letkés (Northern Hungary), and stored in private collections of Gerhard STEIN (collection hereinafter referred to as Coll. GSL) and Zoltán KOVÁCS (collection hereinafter referred to as Coll. ZK). The Szob and Letkés gastropod assemblages in the palaeontological collection of the Hungarian Natural History Museum, Budapest (HNHM) were also revisited. Illustrations of the study specimens contain only digital images as the shells in the sandy layers of Letkés were not preserved well-enough for SEM studies. Abbreviation: SL indicates shell length in mm.

Systematic palaeontology

Class Gastropoda CUVIER, 1795

Order Littorinimorpha GOLIKOV & STAROBOGATOV, 1975

Superfamily Risssoidea GRAY, 1847

Family Risssoidea GRAY, 1847

Genus *Alvania* RISSO, 1826

Type species: *Alvania europea* RISSO, 1826 (= *Turbo cimex* LINNAEUS, 1758) (type by subsequent designation)

Alvania brachia BOETTGER, 1902

(Plate I, figures 1–5)

1902 *Alvania (Alvania) brachia* n. sp. – BOETTGER, p. 139.

1934 *Alvania (Alvania) brachia* BOETTGER – ZILCH, p. 211, pl. 5, fig. 80.

1975 *Alvania (Alvania) brachia* BOETTGER – BAŁUK, p. 79, pl. 9, fig. 12.

Type – Holotype from Kosteĵ (Coșteiu de Sus, Romania), illustrated by ZILCH (1934, pl. 5, fig. 80).

Material – 112 specimens in Coll. ZK; 53 specimens in Coll. GSL.

Description – Small, solid, conical shell, protoconch of about two rounded whorls. Teleoconch of four whorls, spire whorls slightly rounded, last whorl rounded. Ovate aperture, outer lip thickened by varix, smooth or lirate within. Sculpture of almost straight, rounded, prominent axial ribs (10–12 on adult last whorl) and low, broad spiral cords in strongly concave interspaces, and on base.

Remarks – The specimens illustrated herein correspond perfectly to the original description (BOETTGER 1902) and the description of BAŁUK (1975). *Alvania brachia* is similar in morphology to *A. lachesis* (BASTEROT) but clearly differs by its more robust shell bearing stronger and straight ribs and deeper and more concave interspaces. *Alvania brachia* is a new record in the Pannonian Basin, and it is the most abundant *Alvania* species at Letkés.

Distribution – Middle Miocene: Central Paratethys (Badenian): Hungary (this paper), Poland, Romania.

Alvania cf. convexispira BOETTGER, 1907
(Plate I, figures 6–7)

cf. 1907 *Alvania (Actonia) convexispira* n. sp. – BOETTGER, p. 159.

cf. 1934 *Alvania (Actonia) convexispira* BOETTGER – ZILCH, p. 213, pl. 5, fig. 89.

? 1981 *Alvania (Actonia) convexispira* BOETTGER – ŠVAGROVSKÝ, p. 120, pl. 36, fig. 5.

Type – Lectotype from Kosteĵ (Coșteiu de Sus, Romania), illustrated by ZILCH (1934, pl. 5, fig. 89).

Material – 2 specimens in Coll. GSL.

Description – Elongated shell, protoconch of about 2½ rounded whorls with trace of very fine spiral sculpture, teleoconch of 3.5 rounded whorls with deeply incised suture. Wide, ovate aperture, outer lip bearing nine weakly developed, rounded denticles within. Spiral sculpture of strong, narrow cords (two on the first, six on the penultimate teleoconch whorls) and narrow, prominent axial ribs giving

the surface a moderately finely cancellate appearance. At the intersections there are small rounded tubercles, the sub-sutural cord is characterized by coronate appearance.

Remarks – Identification not entirely certain. BOETTGER (1907) points out the similarity to the Recent *Alvania testae* (ARADAS & MAGGIORE). The species is similar to *Alvania transiens* SACCO but with significantly narrower sculptural elements.

Distribution – Middle Miocene: Central Paratethys (Badenian): Hungary (this paper), ?Slovakia, Romania.

Alvania perregularis SACCO, 1895
(Plate I, figures 8–10)

- 1856 *Rissoa mariae* – HÖRNES, p. 563, pl. 48, fig. 9 (non D'ORBIGNY, 1852)
1895 *Alvania* [*Acinus*] *mariae*? var. *perregularis* SACCO – SACCO, p. 25.
1956 *Alvania perregularis* SACCO – CSEPREGHY-MEZNERICS, p. 379, pl. 1, figs 25–28.
? 1966 *Rissoa* (*Alvania*) *perregularis* SACCO – STRAUZ, p. 73, pl. 46, figs 12–13.
1973 *Alvania perregularis* SACCO – BOHN-HAVAS, p. 1103, pl. 3, figs 1–2.
2004 *Alvania* (*Alvania*) *perregularis* (SACCO) – KOWALKE & HARZHAUSER, p. 120, fig. 7B.
2013 *Alvania perregularis* (SACCO) – LANDAU et al., p. 72, pl. 6, fig. 6 (*cum syn.*)
2013 *Alvania* (*Alvania*) *perregularis* (SACCO) – TĂMAȘ et al., p. 60, fig. 2f.

Type – SACCO refers to HÖRNES (1856, pl. 48, fig. 9) as an illustration for this “variety” and further reports the variety from S. Agata, Montegibbio (“Tortoniano”). Since there is no description, the illustration must be interpreted as the typification of the species. The lectotype (HÖRNES 1856, pl. 48, fig. 9) was designated by ŠVAGROVSKÝ (1981: 118).

Material – One specimen in Coll. ZK, two specimens in Coll. GSL.

Description – Teardrop-shaped shell with six slightly rounded whorls and deeply canaliculated suture. Drop-shaped aperture, outer lip with strong labral varix and bearing 10–11 denticles within. Finely reticulate teleoconch sculpture of 24–33 fine axial ribs and 8–10 spiral cords on last whorl.

Remarks – *Alvania perregularis* is similar to *A. transiens*, but differs by its lower protoconch, and finer teleoconch sculpture with 6–7 spiral cords on penultimate whorl. The specimen illustrated by STRAUZ (1966, pl. 46, figs 12–13) was regarded as *Alvania tenuicostata* BALUK by LANDAU et al. (2013). The latter species is characterized by its much finer sculpture, and smooth outer lip within (see BALUK 1975). *Alvania perregularis* is a new record at Letkés.

Distribution – Middle Miocene: Central Paratethys (Badenian): Austria, Bosnia, Bulgaria, Czechia, Hungary, Poland, Romania, Slovakia, Ukraine; Proto-Mediterranean Sea (Serravallian): Türkiye. Late Miocene: Proto-Mediterranean Sea (Tortonian): Italy.

Alvania cf. *subcrenulata* APPELIUS, 1869
sensu BALUK (1975)
(Plate I, figures 11–12)

- ?1869 *Alvania subcrenulata* SCHWARTZ – APPELIUS, p. 191.
?1884 *Alvania subcrenulata* SCHWARTZ – BUCQUOY et al., p. 293, pl. 36, figs 11–13.
1907 *Alvania* (*Acinus*) *subcrenulata* SCHWARTZ – BOETTGER, p. 157.
1975 *Alvania* (*Turbona*) *subcrenulata* (SCHWARTZ) – BALUK, p. 86, pl. 9, fig. 16.

Type – Described from Livorno and Castiglioncello, fossil shells from “Quaternario di Livorno”.

Material – 11 specimens in Coll. GSL.

Description – Small, conical shell, protoconch of about 2½ rounded whorls with a very fine adapical spiral striation before the transition into the teleoconch. Teleoconch of three slightly rounded whorls, incised suture. Wide, suboval aperture, outer lip bearing six rounded denticles within. Spiral sculpture of well-developed cords (seven on the last whorls) and broad, prominent axial ribs (11–13 on the last whorl), beaded intersections.

Remarks – The shell figured herein corresponds perfectly to the description of BALUK (1975). However, BALUK mentioned smooth protoconch whorls. In fact, the protoconch has a very fine ornamentation on its last part, which, however, is only recognizable in very well preserved specimens. *Alvania subcrenulata* is currently attributed to the authorship of BUCQUOY, DOLLFUS and DAUTZENBERG and the name introduced by APPELIUS is considered a nomen nudum. In fact, APPELIUS refers to a description by SCHWARTZ VON MOHRENSTERN, which was never published and is therefore not available, but on the other hand he gives a definition: “*Questa specie che è molto affine alla precedente [Alvania crenulata], e che io considerava come una varietà piccola di essa [...]*” that characterizes the species, which is in accordance with ICZN Art. 12.1.

Distribution of *Alvania subcrenulata* APPELIUS *sensu* BALUK (1975) – Middle Miocene: Central Paratethys (Badenian): Hungary (this paper), Poland, Romania.

Alvania transiens SACCO, 1895
(Plate I, figures 13–14, Plate II, figures 1–5)

- 1856 *Rissoa venus* – HÖRNES p. 565, pl. 48, fig. 10 (non D'ORBIGNY, 1852)
1895 *Alvania* [*Acinopsis*] *sculpta*? var. *transiens* SACCO – SACCO, p. 27.
1956 *Alvania venus danubiensis* COSSMANN et PEYROT – CSEPREGHY-MEZNERICS, p. 379, pl. 2, figs 15–16.
1966 *Rissoa* (*Alvania*) *venus danubiensis* COSSMANN & PEYROT – STRAUZ, p. 72, pl. 46, figs 17–18.
2004 *Alvania* (*Alvania*) *transiens* (SACCO) – KOWALKE & HARZHAUSER, p. 121, fig. 7C.
2013 *Alvania transiens* (SACCO) – LANDAU et al., p. 73, pl. 6, fig. 8 (*cum syn.*)
2013 *Alvania* (*Alvania*) *transiens* (SACCO) – TĂMAȘ et al., p. 61, fig. 2i.
2019 *Alvania transiens* (SACCO) – THIVAIU et al., p. 340, fig. 5H1–H4.

Type – SACCO refers to HÖRNES (1856, pl. 48, fig. 10) as an illustration for this “variety” and continues to report the variety from Colli torinese, Sciolze (“Elveziano”), Stazzano, S. Agata, Montegibbio (“Tortoniano”), Zinola, Bordighera (Piacenziano). Since there is no description, the illustration must be interpreted as the typification of the species. Therefore, we hereby determine the specimen shown by HÖRNES as the lectotype.

Material – Four specimens in Coll. ZK, ten specimens in Coll. GSL. Presumed transitional morph: 30 specimens in Coll. ZK, 53 specimens in Coll. GSL.

Description – Elongated, egg-shaped shell of six whorls separated by deep sutures. Protoconch of 2¾ rounded whorls bearing trace of fine spiral threads abapically. Teleoconch whorls slightly rounded. Drop-shaped aperture, outer lip thickened by a labral varix and bearing denticles within. Teleoconch sculpture of well-developed spiral cords (four on penultimate, six on last whorl), and axial ribs with equal strength (16–18 on last whorl) forming a regular reticulate pattern.

Remarks – The taxonomical revision of the species was arranged by KOWALKE & HARZHAUSER (2004). The species is characterized by moderate intraspecific variability in strength of sculpture (see the syntypes /MNHN.F.J08925*/ in the palaeontological collection of the Muséum national d’Histoire naturelle, Paris from the Vienna Basin, Austria). Most *Alvania transiens* specimens in the Letkés assemblage are more finely sculptured than the typical form (Plate I, figs 13–14, Plate II, fig. 1) of the species, they are considered herein as transitional morphs between *A. transiens* and *A. perregularis* (Plate II, figs 2–5). Similarly, the *Alvania transiens* specimen figured by TĂMAŞ et al. (2013, fig. 2i) from Lăpuşiu de Sus (Romania) is also regarded herein as belonging to this transitional morph. The species is a new record at Letkés.

Distribution – Early Miocene: Central Paratethys (Eggenburgian): Austria; Proto-Mediterranean Sea (Aquitanian): Greece, (Burdigalian): N Italy. Middle Miocene: Central Paratethys (Badenian): Austria, Bulgaria, Hungary, Poland, Romania, ?Slovakia; Proto-Mediterranean Sea (Serravallian): Türkiye. Late Miocene: Proto-Mediterranean Sea (Tortonian): N Italy. Pliocene: Central Mediterranean Sea: Italy.

*<https://science.mnhn.fr/institution/mnhn/collection/f/item/j08925>

Genus *Manzonina* BRUSINA, 1870

Type species: *Turbo costatus* J. ADAMS, 1797 (type by monotypy) (= *Turbo crassus* KANMACHER, 1798)

Manzonina scalaris (DU BOIS DE MONTPÉREUX, 1831)
(Plate II, figures 6–8)

1831 *Cyclostoma scalare* Nov. – DU BOIS DE MONTPÉREUX, p. 37, pl. 3, figs 40–41.

1856 *Rissoa scalaris* DUBOIS – HÖRNES, p. 567, pl. 48, fig. 12.

1975 *Alvania (Taramellia) scalaris* (DUBOIS) – BAŁUK, p. 75, pl. 8, figs 13–14.

2004 *Manzonina (Manzonina) scalaris* (DUBOIS) – KOWALKE & HARZHAUSER, p. 124, fig. 8D.

2013 *Manzonina (Manzonina) scalaris* (DUBOIS) – TĂMAŞ et al., p. 61, fig. 3b (*cum syn.*)

2014 *Manzonina scalaris* (DUBOIS) – GARILLI & PARRINELLO, fig. 3A.

2018 *Manzonina scalaris* (DUBOIS) – HARZHAUSER et al., pl. 3, fig. 8.

2021 *Manzonina scalaris* (DUBOIS) – CHIRLI & FORLI, p. 218, pl. 173, figs C 1–2, ?3–6, 7–12, pl. 174, figs A 1–5.

Type – Described from Shushkivtsi (= Szuskowce, W Ukraine).

Material – One specimen in Coll. GSL.

Description – The illustrated specimen is not fully grown. Protoconch of about two whorls, ornamentation not recognizable (height 0.3 mm, width 0.4 mm). Aperture thickened, inside smooth. Teleoconch sculpture of last whorl consisting of 11 axial ribs with interspaces about twice as wide and seven spiral cords. The ribs end at the last spiral, which is relatively strong. Base also with two stronger spiral cords.

Remarks – The only specimen available is juvenile; it corresponds to the descriptions given in the literature. The Pannonian Basin records of the species in the earlier literature needs confirmation as no material was illustrated from this region – the figure in STRAUZ (1966, p. 77, fig. 42) is a copy of FRIEDBERG (1923, pl. 23, fig. 4).

Distribution – Middle Miocene: Central Paratethys (Badenian): Austria, Hungary, Poland, Romania, ?Slovakia, Ukraine. Late Miocene: Proto-Mediterranean Sea (Tortonian): N Italy.

Manzonina sp.
(Plate II, figures 9–10)

2013 *Manzonina* sp. – TĂMAŞ et al., p. 63, fig. 3c.

Material – Two specimens in Coll. ZK.

Description – Small shell, protoconch of about 2 smooth, rounded whorls, junction with teleoconch eroded. Teleoconch of three rounded whorls, incised suture, ovate aperture, outer lip moderately thickened, smooth within. Sculpture of narrow, slightly opisthocline, prominent axial ribs (12 on last whorl) overriding by strong, sharp spiral cords (seven on last whorl), three well-developed spiral cords on base, subtle spiral threads between cords on entire shell.

Remarks – The study specimens are closely allied to *Manzonina scalaris* but differ by their lower protoconch, more rounded teleoconch whorls, and higher penultimate whorl. *Manzonina miocrassicosta* SACCO is characterized by less opisthocline axial ribs and fewer spiral cords. The specimen figured herein is very similar to the *Manzonina* specimen in TĂMAŞ et al. (2013, fig. 3c), the subtle spiral threads appear on both materials. The Letkés specimens probably represent a new species.

Distribution – Middle Miocene: Central Paratethys (Badenian): Hungary (this paper), Romania.

Genus *Obtusella* COSSMANN, 1921

Type species: *Rissoa intersecta* WOOD, 1857 (type by monotypy)

Obtusella communis (BOETTGER, 1907)
(Plate II, figures 11–12)

- 1907 *Cingula* (*Cingulina*) *communis* n. sp. – BOETTGER, p. 162.
1934 *Cingula* (*Obtusella*) *communis* BOETTGER – ZILCH, p. 210, pl. 5, fig. 78.
1975 *Putilla* (*Pseudosetia*) *taurominima* – BAŁUK, p. 65, pl. 8, figs 1–3 (non SACCO, 1895).
? 1993 *Pseudosetia taurominima* – ILJINA, p. 49, pl. 5, figs 16–17 (non SACCO, 1895).
1996 *Putilla* (*Pseudosetia*) *taurominima* – KÓKAY, p. 455, pl. 2, fig. 1 (non SACCO, 1895).

Type: Holotype from Kosteş (Coşteiu de Sus, Romania), illustrated in ZILCH (1934, pl. 5, fig. 78).

Material – Three specimens in Coll. GSL.

Description – Minute, globose shell with protoconch of about $2\frac{1}{2}$ smooth, rounded whorls. Teleoconch of two whorls occasionally showing hardly visible, fine spiral ornaments. Ovate aperture, outer lip smooth within, narrow umbilicus.

Remarks – The Paratethyan specimens described herein as *Obtusella communis* (BOETTGER) are similar in size and overall morphology to *Obtusella taurominima* (SACCO) but differ in lack of dense, well-defined spiral sculpture that is typical of the latter species (see the holotype in FERRERO MORTARA et al. 1984, pl. 40, fig. 5). The Serravallian *Obtusella taurominima* shells from the Proto-Mediterranean Sea illustrated by LANDAU et al. (2013, pl. 56, figs 2–3) show a distinct spiral thread just above the suture. *Obtusella communis* is a new record at Letkés.

Distribution – Middle Miocene: Central Paratethys (Badenian): Austria, Hungary, Poland, Romania; ?Eastern Paratethys: (Tshokrakian): Ciscaucasia, S Russia.

Genus *Pusillina* MONTEROSATO, 1884

Type species: *Rissoa pusilla* PHILIPPI, 1836 (= *Rissoa philippi* ARADAS & MAGGIORE, 1844) (type by monotypy)

Pusillina cf. *philippi* (ARADAS & MAGGIORE, 1844)
(Plate II, figures 13–14)

- ? 1836 *Rissoa pusilla* mihi – PHILIPPI, p. 154, pl. 10, fig. 13 (non BROCCHI, 1814).
? 1844 *Rissoa Philippi* Nob – ARADAS & MAGGIORE, p. 136
? 2013 *Pusillina philippi* (ARADAS & MAGGIORE) – LANDAU et al., p. 69, pl. 6, fig. 2, pl. 56, figs 5–6 (*cum syn.*).
? 2020 *Pusillina philippi* (ARADAS & MAGGIORE) – TABANELLI et al., p. 23, pl. 1, fig. 11.

Type – Described from Sicily (Italy).

Material – One specimen in Coll. GSL.

Description – Elongated, thin, rissoiform shell, eroded protoconch of about $2\frac{1}{2}$ convex whorls. Teleoconch of four rounded whorls, incised suture, ovate aperture, simple outer lip smooth within. Sculpture of slightly opisthoclinal, rounded axial ribs (16 on penultimate whorl), spiral sculpture absent.

Remarks – Based on its morphology (rissoiform, thin shell, regularly rounded last whorl, simple outer lip, lack of spiral sculpture) the study specimen is assigned to genus *Pusillina*. The most similar form is *Pusillina philippi* (ARADAS & MAGGIORE), which is characterized by slightly more inflated teleoconch whorls. The Miocene *Pusillina philippi* specimen illustrated by LANDAU et al. (2013, pl. 6, fig. 2) is similar in size and morphology but differs by its more inflated whorls. The Tortonian *Pusillina gallica* LANDAU, CEULEMANS & VAN DINGENEN is smaller in size and has a slenderer shell (see LANDAU et al. 2018, pl. 114). *Pusillina* cf. *philippi* is a new record in the Pannonian Basin.

Distribution of Pusillina philippi – Miocene: Proto-Mediterranean Sea: Italy; (Serravallian): Türkiye. Middle Miocene: Central Paratethys (Badenian): Hungary (this paper). Pliocene–Recent: Mediterranean Sea.

Genus *Rissoa* DESMAREST, 1814

Type species: *Rissoa ventricosa* DESMAREST, 1814 (type by subsequent designation)

Rissoa federicoi nom. nov.
pro *Rissoia* (*Turboella*) *acuticosta* SACCO, 1895 (non
Rissoa acuticosta KOENEN, 1892)
(Plate III, figures 1–3)

- 1856 *Rissoa Lachesis* – HÖRNES, p. 572, pl. 48, fig. 16 (non BASTROT, 1825)
1895 *Rissoia* [*Turbella*] *acuticosta* SACCO – SACCO, p. 23.
1933 *Turbella acuticosta* SACCO – MEZNERICS, p. 329, pl. 13, fig. 7.
1966 *Rissoa turricula acuticosta* SACCO – STRAUZ, p. 69, pl. 46, figs 6–7.
1966 *Rissoa* (*Turboella*) *podhorcensis* (FRIEDBERG) – KÓKAY, p. 37, pl. 2, fig. 20.
1973 *Rissoa acuticosta* SACCO – BOHN-HAVAS, p. 1039, pl. 3, fig. 7.
1975 *Turboella* (*Turboella*) *acuticosta* SACCO – BAŁUK, p. 69, pl. 8, figs 9–11.
2004 *Rissoa acuticosta* (SACCO) – KOWALKE & HARZHAUSER, p. 116, fig. 4C (*cum syn.*).
2013 *Rissoa acuticosta* (SACCO) – TÄMAŞ et al., p. 58, fig. 2a (*cum syn.*).
2021 *Rissoa acuticosta* (SACCO) – CHIRLI & FORLI, p. 14, pl. 1, figs C1–5, pl. 2, figs A1–10.

Type material – SACCO indicated the shell pictured by HÖRNES (1856, pl. 48, fig. 16) as descriptive of the species; therefore, we hereby designate it as the lectotype of *Rissoia* (*Turboella*) *acuticosta* SACCO, and as the holotype of *Rissoa federicoi* nom. nov.

Type strata and locality – Middle Miocene (Early Badenian) sand, Steinebrunn, Vienna Basin, Austria.

Derivation of name – In honour of Federico SACCO (1864–1948), Italian palaeomalacologist.

Study material – Five specimens in Coll. ZK.

Diagnosis – Small shell, conical spire, rounded whorls, aperture with smooth outer lip within, sculpture of low, rounded axial ribs and spiral cords.

Description – Small shell with protoconch of $2\frac{1}{2}$ rounded whorls and about four teleoconch whorls. Conical spire,

drop-shaped aperture, outer lip slightly thickened, smooth within. Axial sculpture of slightly opisthocline, straight, low, rounded ribs with broader interspaces than their width (13-17 on last whorl), spiral sculpture of cords on base, and about eight spiral cords in interspaces on spire whorls.

Remarks – SACCO described the species *acuticosta* in the genus *Rissoia* (an unjustified emendation by BRONN, 1848 for *Rissoia* DESMAREST, 1814) and placed it in the subgenus *Turbella* (incorrect spelling of *Turboella* LEACH, 1847). A peculiarity in SACCO's work is the use of subgeneric names as if they were generic names, although generic and subgeneric names are clearly indicated. Thus, *Rissoia* (*Turboella*) *acuticosta* SACCO, 1895 is a younger primary homonym of *Rissoia acuticosta* KOENEN, 1892 and is hereby replaced by the name *Rissoia federicoi*.

Specimens in the Letkés assemblage correspond to the type (HÖRNES 1856, pl. 48, fig. 16) and the illustration in KOWALKE & HARZHAUSER (2004, fig. 4C). *Rissoia federicoi* differs from the similar *Alvania lachesis* (BASTEROT) in sculpture bearing almost radial and slightly broader axial ribs with fewer, stronger spiral cords. The specimen figured by KÓKAY (1966, pl. 2, fig. 20) from the Herend Sub-basin (Pannonian Basin, Hungary) differs in morphology from the type of *Turbella podhorcensis* FRIEDBERG by its more widely spaced axial ribs (see FRIEDBERG 1923, pl. 22, fig. 3), it is regarded herein as *Rissoia federicoi*. The species is a new record at Letkés.

Distribution – Early Miocene: NE Atlantic (Burdigalian): France; Central Paratethys (Karpatian): Austria. Middle Miocene: Central Paratethys (Badenian): Austria, Czechia, Hungary, Poland, Slovakia, Romania; Eastern Paratethys (Konkian): S Russia. Late Miocene: Proto-Mediterranean Sea (Tortonian): N Italy.

Rissoia sp.

(Plate III, figures 4–5)

Material – Four specimens in Coll. ZK.

Remarks – The specimens in the Letkés assemblage recorded herein as *Rissoia* sp. are closely allied to *R. federicoi* but differ by their fewer and more rounded axial ribs, and weaker spiral cords. They probably represent only a variety of *Rissoia federicoi*.

Family Rissoinidae STIMPSON, 1865

Genus *Chilostigma* MELVILL, 1918

Type species: *Rissoina (Chilostigma) refugium* MELVILL, 1918 (type by monotypy)

Chilostigma obsoleta (HÖRNES, 1856)

(Plate III, figures 6–7)

1856 *Rissoina obsoleta* PARTSCH – HÖRNES, p. 556, pl. 48, fig. 3.

1949 *Rissoina (Zebinella) obsoleta* PARTSCH (in HÖRNES) – GLIBERT, p. 111, pl. 6, fig. 8.

2009 *Rissoina (Rissoina) obsoleta* (PARTSCH) – ZUNINO & PAVIA, p. 56 (pars), pl. 1, fig. 6.

2013 *Rissoina (Zebinella) obsoleta* HÖRNES – LANDAU et al., p. 76, pl. 6, fig. 12, pl. 58, fig. 7 (*cum syn.*)

2018 *Zebinella obsoleta* (HÖRNES) – LANDAU et al., p. 294, pl. 120, fig. 1.

Type – Described from Steinebrunn (Austria).

Material – One specimen in Coll. ZK, one specimen in Coll. GSL.

Description – Conical shell, protoconch missing. Rounded early but flattened late teleoconch whorls, large aperture. Sculpture of weakly developed, slightly opisthocline axial riblets and dense, fine spiral cords forming a fine reticulate pattern.

Remarks – The taxonomical revision of subgenus *Rissoina (Chilostigma)* was arranged by FABER & MOOLENBEEK (2014) and *Chilostigma* was considered at the genus rank including one fossil species, *Rissoina obsoleta* HÖRNES. The genus differs from *Zebinella* by its larger size, almost flattened spire whorls and much finer sculpture. HÖRNES' species is markedly similar in size and morphology both to the type species and *Chilostigma tumida* FABER & MOOLENBEEK, its last whorl is, however, somewhat less inflated than that of its two Recent congeners (see FABER & MOOLENBEEK 2014, figs 1–6). *Chilostigma obsoleta* is a new record in the Pannonian Basin.

Distribution – Early Miocene: Central Paratethys (Karpatian): ?Czechia. Middle Miocene: NE Atlantic (Langhian): France; Central Paratethys (Badenian): Austria, Hungary (this paper), Romania; Proto-Mediterranean Sea (Burdigalian?–Langhian): N Italy; (Serravallian): Karaman Basin, Türkiye. Late Miocene: NE Atlantic (Tortonian–Messinian): France, Portugal; Proto-Mediterranean Sea (Tortonian): N Italy.

Genus *Rissoina* D'ORBIGNY, 1841

Type species: *Rissoina (Rissoina) inca* D'ORBIGNY, 1841 (type by monotypy)

Rissoina podolica COSSMANN, 1921

(Plate III, figures 8–12)

1856 *Rissoina pusilla* – HÖRNES, p. 557, pl. 48, fig. 4 (non BROCCHI, 1814)

1921 *Rissoina podolica* nov. sp. – COSSMANN, p. 317, pl. 3, figs 43–44.

1956 *Rissoina podolica* COSSMANN – CSEPREGHY-MEZNERICS, p. 379, pl. 2, figs 13–14.

1966 *Rissoina pusilla podolica* COSSMANN – STRAUZ, p. 79, pl. 12, figs 23–28.

1969 *Rissoina podolica* COSSMANN – CSEPREGHY-MEZNERICS, p. 19, pl. 2, figs 1, 5.

1975 *Rissoina (Rissoina) podolica* COSSMANN – BALUK, p. 90, pl. 10, figs 11–14.

2013 *Rissoina (Rissoina) pusilla* – TÁMAŞ et al., p. 63, fig. 3f (non BROCCHI, 1814).

non 2019 *Rissoina (Rissoina) podolica* COSSMANN – TUREK & HLADILOVÁ, fig. 4.2 (= *Rissoina vindobonensis* SACCO, 1895)

Type – Holotype from Holdy (Brody region, Ukraine) (FRIEDBERG 1928).

(<https://science.mnhn.fr/institution/mnhn/collection/f/item/j04419>)

Material – 133 specimens in Coll. ZK, 17 specimens in Coll. GSL.

Description – Slender shell with eight slightly convex whorls. Ovate aperture, outer lip bearing a strong labral varix. Teleoconch sculpture of narrow, straight to slightly opisthocline axial ribs (22–32 on last whorl), dense, fine spiral threads in interspaces, and weakly developed spiral cords on base.

Remarks – The species is characterized by slight intra-specific variability in sculpture. The holotype bears about 19 sharp, prominent axial ribs – similar specimens were figured from the Central Paratethys e.g. by BAŁUK (1975, pl. 10, fig. 14) and TÁMAŞ et al. (2013, fig. 3f) (see this paper Plate III, fig. 8). Other specimens with identical outline have denser axial ribbing either on the entire shell (e.g., STRAUZ 1966, pl. 12, figs 23–26; ŠVAGROVSKÝ 1981, pl. 38, figs 1–4), or on the penultimate and last whorls (BAŁUK 1975, pl. 10, fig. 13; this paper Plate III, figs 11–12). The specimen on Plate III, figs 9–10 bearing fewer strong ribs is regarded herein as a morphotype of *Rissoina podolica*. The species was reported at Letkés by CSEPREGHY-MEZNERICS (1956).

Availability of *Rissoina podolica* is discussed in the literature; it was synonymized under *R. subconoidea* (GRATELOUP) by LOZOUE ET AL. (2001), LANDAU ET AL. (2013) and STEIN ET AL. (2016). The two species are closely allied in teleoconch morphology but due to a lack of detailed comparison of the protoconchs their separation is provisionally retained in this paper. Another similar species is *Rissoina zboroviensis* FRIEDBERG, which is distinguishable by its more opisthocline and flexuous axial ribs (see FRIEDBERG 1923, pl. 21, fig. 1).

Distribution – Early Miocene: Central Paratethys (Karpatian): Austria. Middle Miocene: Central Paratethys (Badenian): Austria, Bosnia, Bulgaria, Hungary, Poland, Romania, Slovakia, Ukraine.

Rissoina vindobonensis SACCO, 1895
(Plate IV, figures 1–4)

1856 *Rissoina bruguieri* – HÖRNES, p. 558, pl. 48, fig. 5 (non PAYRAUDEAU, 1826).

1895 *Rissoina* [*Rissoina*] *bruguieri* var. *vindobonensis* SACCO – SACCO, p. 35.

1966 *Rissoina bruguieri vindobonensis* SACCO – STRAUZ, p. 80, pl. 12, figs 19–22.

1975 *Rissoina* (*Rissoina*) *vindobonensis* SACCO – BAŁUK, p. 91, pl. 10, figs 6–7.

1993 *Rissoina* (*Rissoina*) *vindobonensis* SACCO – ILJINA, p. 51, pl. 5, figs 20–21.

2013 *Rissoina vindobonensis* SACCO – LANDAU ET AL., p. 75, pl. 6, fig. 10, pl. 58, fig. 6 (*cum syn.*)

2013 *Rissoina* (*Phosinella*) *steinabrunnensis* SACCO – TÁMAŞ ET AL., p. 63, fig. 3d.

2013 *Rissoina* (*Rissoina*) *vindobonensis* SACCO – TÁMAŞ ET AL., p. 63, fig. 3e.

2019 *Rissoina* (*Rissoina*) *podolica* – TUREK & HLADILOVÁ, fig. 4.2. (non COSSMANN, 1921)

Type – Holotype from Steinebrunn, illustrated by HÖRNES (1856, pl. 48, fig. 5).

Material – Eight specimens in Coll. ZK, one specimen in Coll. GSL.

Description – Slender shell with about seven whorls. Eroded multispiral protoconch, rounded teleoconch whorls. Ovate aperture, outer lip bearing a strong varix, smooth within, inner lip bearing a small fold abapically. Teleoconch sculpture of well-developed, widely spaced, opisthocline axial ribs (15–18 on last whorl), and fine spiral cords in the interspaces.

Remarks – All *Rissoina vindobonensis* specimens in the Letkés assemblage slightly differ from the holotype in their spiral ornamentation. The species is distinguishable from *R. podolica* in sculpture by bearing more widely spaced, broader, and generally more opisthocline axial ribs and stronger spiral cords. *Rissoina steinabrunnensis* SACCO differs by its more gradate spire (see HÖRNES 1856, pl. 48, fig. 6; BAŁUK 2006, pl. 4, fig. 1). Slender morph of *Rissoina vindobonensis* (Plate IV, fig. 3) was figured also by KRACH (1981, pl. 15, figs 29–30) from the Polish-Ukrainian Fore-Carpathian Basin (Lublin region). The species was reported by CSEPREGHY-MEZNERICS (1956: 431) at Letkés without any description or illustration.

Distribution – Middle Miocene: Central Paratethys (Badenian): Austria, Bulgaria, Hungary, Poland, Romania, Ukraine; Eastern Paratethys (Konkian): S Russia; Proto-Mediterranean Sea (Serravallian): Türkiye.

Genus *Zebinella* MÖRCH, 1876

Type species: *Helix decussata* MONTAGU, 1803 (type by subsequent designation)

Zebinella extranea (EICHWALD, 1830)
(Plate IV, figures 5–6)

1830 *R[issoa] extranea* m. – EICHWALD, p. 218–219.

1853 *Rissoa cochlearella* – EICHWALD, p. 267 (non LAMARCK, 1804).

1933 *Rissoina* (*Zebinella*) *extranea* EICHWALD – MEZNERICS, p. 326, pl. 13, fig. 4.

1975 *Rissoina* (*Zebinella*) *extranea* (EICHWALD) – BAŁUK, p. 94, pl. 10, figs 10.

2013 *Rissoina* (*Zebinella*) *extranea* (EICHWALD) – LANDAU ET AL., p. 76, pl. 6, fig. 11 (*cum syn.*)

Type – Described from Shukowze (Shushkivtsi, Ukraine).

Material: One specimen in Coll. ZK.

Description – Elongated, slender, conical shell of seven preserved whorls. Ovate aperture, thickened outer lip. Spire whorls slightly rounded, almost flattened, bearing narrow, slightly curved, opisthocline axial ribs (23 on last whorl) and fine, dense spiral threads in interspaces.

Remarks – *Zebinella extranea* differs from *Z. decussata* (MONTAGU) by its more slender shell, somewhat higher spire, and more prominent, curved axial ribs. (For discussion of *Zebinella decussata* see e.g. LANDAU ET AL. 2013,

2018; STEIN et al. 2016). The spire whorls of *Zebinella semidecussata* (BOETTGER) are more rounded, its aperture is larger and its axial ribs are finer, and less curved; while *Z. eleonorae* BOETTGER bears denser, finer, and much curved axial ribs (ZILCH 1934, pl. 6, fig. 1). *Zebinella extranea* is a new record in the Pannonian Basin.

Distribution – Middle Miocene: Central Paratethys (Badenian): Austria, Hungary (this paper), Poland, ?Slovakia; Proto-Mediterranean Sea (Serravallian): Türkiye.

Zebinella semidecussata (BOETTGER, 1902)
(Plate IV, figure 7)

1902 *Rissoina* (*Rissoina*) *semidecussata* n. sp. – BOETTGER, p. 148.
1934 *Rissoina* (*Rissoina*) *semidecussata* BOETTGER – ZILCH, p. 215, pl. 6, fig. 2.

Type – Lectotype from Kostej (Coșteiu de Sus, Romania), illustrated by ZILCH (1934, pl. 6, fig. 2).

Material – 1 specimen in Coll. ZK.

Description – Elongated shell of seven slightly rounded whorls with incomplete protoconch. Ovate aperture, outer lip smooth within, slightly thickened. Teleoconch sculpture of moderately developed, narrow, opisthocline axial ribs (36 on last whorl), and fine spiral cords in the interspaces.

Remarks – According to BOETTGER (1902) one of the specific features of the type specimen is the lack of spiral striations on the upper half of the last whorl. Apart from that, the shell figured herein corresponds perfectly to the illustration of the lectotype. The species differs from *Zebinella decussata* (MONTAGU) by its higher spire bearing stronger axial sculpture. *Zebinella semidecussata* is a new record in the Pannonian Basin, and is recorded for the first time outside its type locality, Coșteiu de Sus (SW Romania).

Distribution – Middle Miocene: Central Paratethys (Badenian): Hungary (this paper), Romania.

Family Zebinidae COAN, 1964

Subfamily Zebininae COAN, 1964

Genus *Zebina* H. ADAMS & A. ADAMS, 1854

Type species: *Rissoina semiglabrata* A. ADAMS, 1854 (type by subsequent designation)

Zebina cf. *taurolaevis* (SACCO, 1895)
(Plate IV, figures 8–9)

cf. 1856 *Rissoina nerina* – HÖRNES, p. 561, pl. 48, fig. 8 (non D'ORBIGNY, 1852).

cf. 1895 *Rissoina* [*Zebina*] *nerina* var. *taurolaevis* SACCO – SACCO, p. 39, pl. 1, fig. 112.

? 1902 *Rissoina* (*Zebina*) *nerina* – BOETTGER, p. 151 (non D'ORBIGNY, 1852).

cf. 1960 *Rissoina* (*Zebina*) *nerina* var. *taurolaevis* SACCO – KÖJUMDGIEVA, p. 103, pl. 30, figs 22–23.

Type – Described from the Elveziano (Langhian) of the Colli Torinesi.

Material – Two specimens in Coll. ZK, 14 specimens in Coll. GSL.

Description – Shell small for genus, up to about 2.5 mm

long. Protoconch of 3¹/₂ smooth whorls, last whorl narrower than the previous one and slightly keeled before the transition to the teleoconch. About four teleoconch whorls, smooth and glossy, with microscopically recognizable growth lines. First two whorls almost flat, the last two slightly rounded. Suture is perfectly flat, with a faint and not very wide dark band just below. Aperture opisthocline with thickened outer lip, when fully developed with a more or less prominent swelling in the upper area inside outer lip. A second such swelling is not present in any specimens.

Remarks – D'ORBIGNY (1852: 3) described *Rissoa nerina* based on four illustrations in GRATELOUP (1847, pl. 4, figs 63–66). GRATELOUP's shells came from Dax, Gaas and Tartas in Aquitaine. LOZOUET (2015: 24, pl. 5, figs 11–13) restricted the stratigraphic range of *Rissoa nerina* to the Early Oligocene. The shell figured by LOZOUET from Gaas shows that the specimens previously reported with this name from the Middle Miocene are different in morphology. SACCO described shells from the Middle Miocene of the Colli Torinesi as var. *taurolaevis*, including the specimen illustrated by HÖRNES (1856, pl. 48, fig. 8) as *Rissoina nerina*. HÖRNES noted that there were two distinct swellings in the outer lip of his specimen. The species was recorded by HÖRNES at Steinebrunn (Austria) and at Lăpugiu de Sus (Romania). According to BOETTGER (1902) the species was “very common” around Lăpugiu, and also occurred at Coșteiu de Sus (Romania). Since the shells available from Letkés do not completely correspond to those described and illustrated by HÖRNES and no further material from the Paratethys was available for comparison, the species assignment is made with reservations. The Badenian *Zebina neriniformis* BOETTGER differs by the lack of swellings in its outer lip (see BOETTGER 1902, BAŁUK 2006).

Distribution of Zebina taurolaevis – Middle Miocene: Proto-Mediterranean Sea (Langhian): N Italy; Central Paratethys (Badenian): Austria, ?Bosnia, Bulgaria, ?Hungary (this paper), Romania.

Subfamily Stosiciinae FABER & GORI, 2016

Genus *Stosicia* BRUSINA in PILAR, 1871

Type species: *Rissoa buccinalis* GRATELOUP, 1828 (type by monotypy)

Stosicia costata BOETTGER, 1887
(Plate IV, figures 10–11)

1887 *Stosichia costata* n. sp. – BOETTGER, p. 144, pl. 6, fig. 5.

1934 *Stosichia costata* BOETTGER – ZILCH, p. 210, pl. 5, figs 76–77.

Type – Lectotype from Lapugy (Lăpugiu de Sus, Romania), illustrated by ZILCH (1934: pl. 5, fig. 76).

Material – One specimen in Coll. GSL.

Description – The only available specimen is slightly corroded. Shell shape and aperture typical of the genus. Protoconch partially eroded, teleoconch of about four whorls. Aperture opisthocline with a thickened and smooth outer lip within. Sculpture of numerous radial axial ribs (26 on last whorl), with interspaces of approximately equal

width, and narrow spiral cords, also separated by spaces of about the same width.

Remarks – Spelling of genus name was clarified by PONDER (1984: 92) and STEIN et al. (2016: 55). *Stosicia costata* is a new record in the Pannonian Basin.

Distribution – Middle Miocene: Central Paratethys (Badenian): ?Bosnia, Hungary (this paper), Romania.

Stosicia multicingulata BOETTGER, 1887
(Plate IV, figures 12–14)

1856 *Rissoa planaxoides* – HÖRNES, 578, pl. 48, fig. 24 (non GRATELOUP, 1838).

1887 *Stosichia multicingulata* n. sp. – BOETTGER, 142, pl. 6, fig. 3.

1934 *Stosichia multicingulata* BOETTGER – ZILCH, p. 209, pl. 5, figs 72–73.

1966 *Stosichia planaxoides helvetica* COSSMANN et PEYROT – KÓKAY, p. 37, pl. 2, fig. 22.

1975 *Zebina (Stosichia) multicingulata* (BOETTGER) – BAŁUK, p. 73, pl. 8, fig. 26 (cum syn.)

2002 *Stosichia multicingulata* (BOETTGER) – HARZHAUSER, p. 79, pl. 4, fig. 7.

2013 *Stosicia multicingulata* (BOETTGER) – LANDAU et al., p. 77, pl. 6, fig. 13, pl. 58, fig. 8 (cum syn.)

Type – Lectotype from Lapugy (Lăpugiu de Sus, Romania), illustrated by ZILCH (1934, pl. 5, fig. 72).

Material – 19 specimens in Coll. ZK; two specimens in Coll. GSL.

Description – Shell fusiform, thick-walled, protoconch of about two rounded whorls, teleoconch of five slightly rounded whorls, shallow suture. Ovate aperture, outer lip thickened by a varix, three elongate denticles within, inner lip bearing a swelling abapically. Teleoconch sculpture of numerous flat, weakly developed, narrow spiral cords on entire shell.

Remarks – *Stosicia multicingulata* differs from the rare *S. costata* in lack of axial ribs. The species is a new record at Letkés.

Distribution: Early Miocene: Central Paratethys (Karpatian): Austria. Middle Miocene: NE Atlantic (Serravallian): France; Central Paratethys (Badenian): Austria, Bosnia, Croatia, Czechia, Hungary, Poland, Romania, Slovakia, Ukraine; Proto-Mediterranean Sea (Serravallian): Türkiye.

Conclusion

Nineteen rissooidean species are recorded in this paper from the Early Badenian (early Middle Miocene) deposits of Letkés (N Hungary) (*Rissoa turricula* EICHWALD mentioned by CSEPREGHY-MEZNERICS 1956 from another locality around Letkés does not appear in the newly collected material). This Rissooidea assemblage is more highly diverse than was reported in previous literature, in fact, its alpha diversity is the highest in the Pannonian Basin. Moreover, nine species are new records in this region. Slightly lower diversity with 17 species is known from the small Herend Sub-Basin (Bakony Mts, western Hungary) (KÓKAY 1966). (However, only six species were illustrated from this area. Therefore, the fauna here needs to be reinvestigated.) From the neighboring locality at Szob (Börzsöny Mts, N Hungary) 14 species were recorded by CSEPREGHY-MEZNERICS (1956), and 11 species occur at Várpalota (Bakony Mts) (STRAUSZ 1954, KATONA et al. 2011). In the eastern Mecsek Mts (SW Hungary) the highest alpha diversity with nine species was reported at Hidas (BOHN-HAVAS 1973). The most highly diverse Rissooidea assemblages in the Badenian Central Paratethys with more than 30 species are known in the Korytnica Basin (Poland) (BAŁUK 1975, 2006) and in the Făget Basin (Coșteiu de Sus, Lăpugiu de Sus, SW Romania) (BOETTGER 1902–1907). Occurrence of *Zebinella semidecussata* (Boettger) is recorded herein for the first time outside its type locality, Coșteiu de Sus.

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Plates – Táblák*Plate I – I. tábla*

- Fig. 1. *Alvania brachia* BOETTGER, 1902. SL 3.7 mm (20×), Coll. ZK
Fig. 2. *Alvania brachia* BOETTGER, 1902. SL 2.9 mm (20×), Coll. ZK
Figs 3–4. *Alvania brachia* BOETTGER, 1902. SL 2.7 mm (20×), Coll. ZK
Fig. 5. *Alvania brachia* BOETTGER, 1902. SL 1.4 mm (30×), Coll. GSL
Figs 6–7. *Alvania* cf. *convexispira* BOETTGER, 1907. SL 2.4 mm (25×), Coll. GSL
Fig. 8. *Alvania perregularis* SACCO, 1895. SL 3.6 mm (20×), Coll. GSL
Figs 9–10. *Alvania perregularis* SACCO, 1895. SL 2.6 mm (22×), Coll. GSL
Figs 11–12. *Alvania* cf. *subcrenulata* APPELIUS, 1869. SL 2.1 mm (30×), Coll. GSL
Figs 13–14. *Alvania transiens* SACCO, 1895. SL 2.5 mm (25×), Coll. ZK

Plate II – II. tábla

- Fig. 1. *Alvania transiens* SACCO, 1895. SL 3 mm (22×), Coll. ZK
Figs 2–3. *Alvania transiens* SACCO, 1895. Transitional morph, SL 2.7 mm (22×), Coll. ZK
Fig. 4. *Alvania transiens* SACCO, 1895. Transitional morph, SL 3.2 mm (22×), Coll. ZK
Fig. 5. *Alvania transiens* SACCO, 1895. Transitional morph, SL 2.1 mm (25×), Coll. ZK
Figs 6–8. *Manzonina scalaris* (DU BOIS DE MONTPÉREUX, 1831). SL 1.6 mm (40×), Coll. GSL
Fig. 9–10. *Manzonina* sp., SL 1.9 mm (36×), Coll. ZK
Figs 11–12. *Obtusella communis* (BOETTGER, 1907). SL 1 mm (60×), Coll. GSL
Figs 13–14. *Pusillina* cf. *philippi* (ARADAS & MAGGIORE, 1844). SL 3.1 mm (20×), Coll. GSL

Plate III – III. tábla

- Figs 1–2. *Rissoa federicoi* nom. nov. SL 3.9 mm (16×), Coll. ZK
Fig. 3. *Rissoa federicoi* nom. nov. SL 2.9 mm (16×), Coll. ZK
Fig. 4. *Rissoa* sp. SL 3.8 mm (16×), Coll. ZK
Fig. 5. *Rissoa* sp. SL 4.5 mm (16×), Coll. ZK
Figs 6–7. *Chilostigma obsoleta* (HÖRNES, 1856). SL 9.1 mm (10×), Coll. ZK
Fig. 8. *Rissoina podolica* COSSMANN, 1921. SL 5.5 mm (16×), Coll. ZK
Figs 9–10. *Rissoina podolica* COSSMANN, 1921. SL 4.1 mm (16×), Coll. ZK
Figs 11–12. *Rissoina podolica* COSSMANN, 1921. SL 4.6 mm (16×), Coll. ZK

Plate IV – IV. tábla

- Figs 1–2. *Rissoina vindobonensis* (SACCO, 1895). SL 3.7 mm (17×), Coll. ZK
Fig. 3. *Rissoina vindobonensis* (SACCO, 1895). SL 5.3 mm (14×), Coll. ZK
Fig. 4. *Rissoina vindobonensis* (SACCO, 1895). SL 4.3 mm (15×), Coll. ZK
Figs 5–6. *Zebinella extranea* (EICHWALD, 1830). SL 6.1 mm (13×), Coll. ZK
Fig. 7. *Zebinella semidecussata* BOETTGER, 1902. SL 5.7 mm (15×), Coll. ZK
Figs 8–9. *Zebina* cf. *taurolaevis* (SACCO, 1895). SL 2.5 mm (30×), Coll. ZK
Figs 10–11. *Stosicia costata* BOETTGER, 1887. SL 3.8 mm (16×), Coll. GSL
Fig. 12. *Stosicia multicingulata* BOETTGER, 1887. SL 3.9 mm (14×), Coll. ZK
Figs 13–14. *Stosicia multicingulata* BOETTGER, 1887. SL 5.2 mm (14×), Coll. ZK

Plate I. – I. tábla

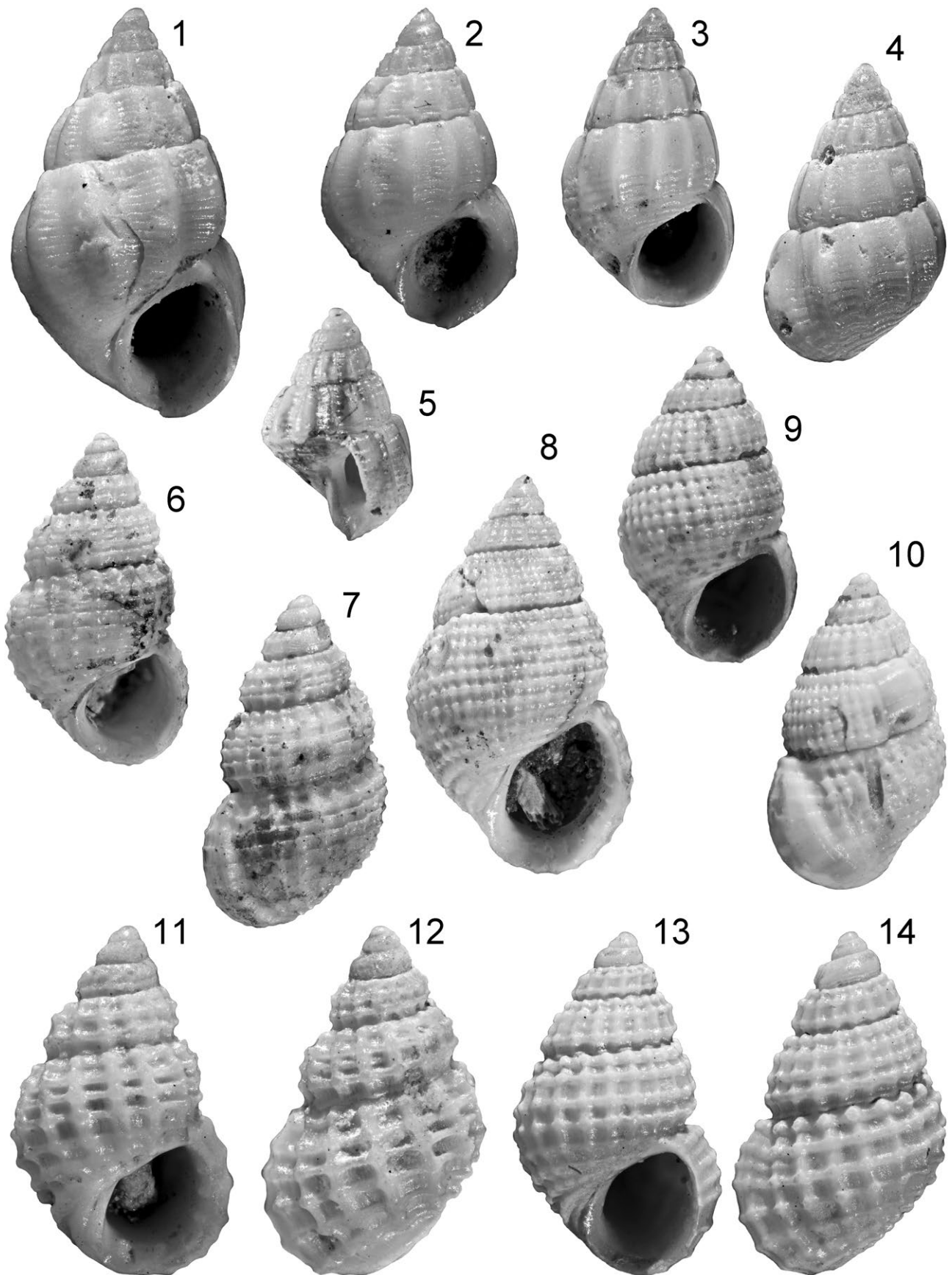


Plate II. – II. tábla

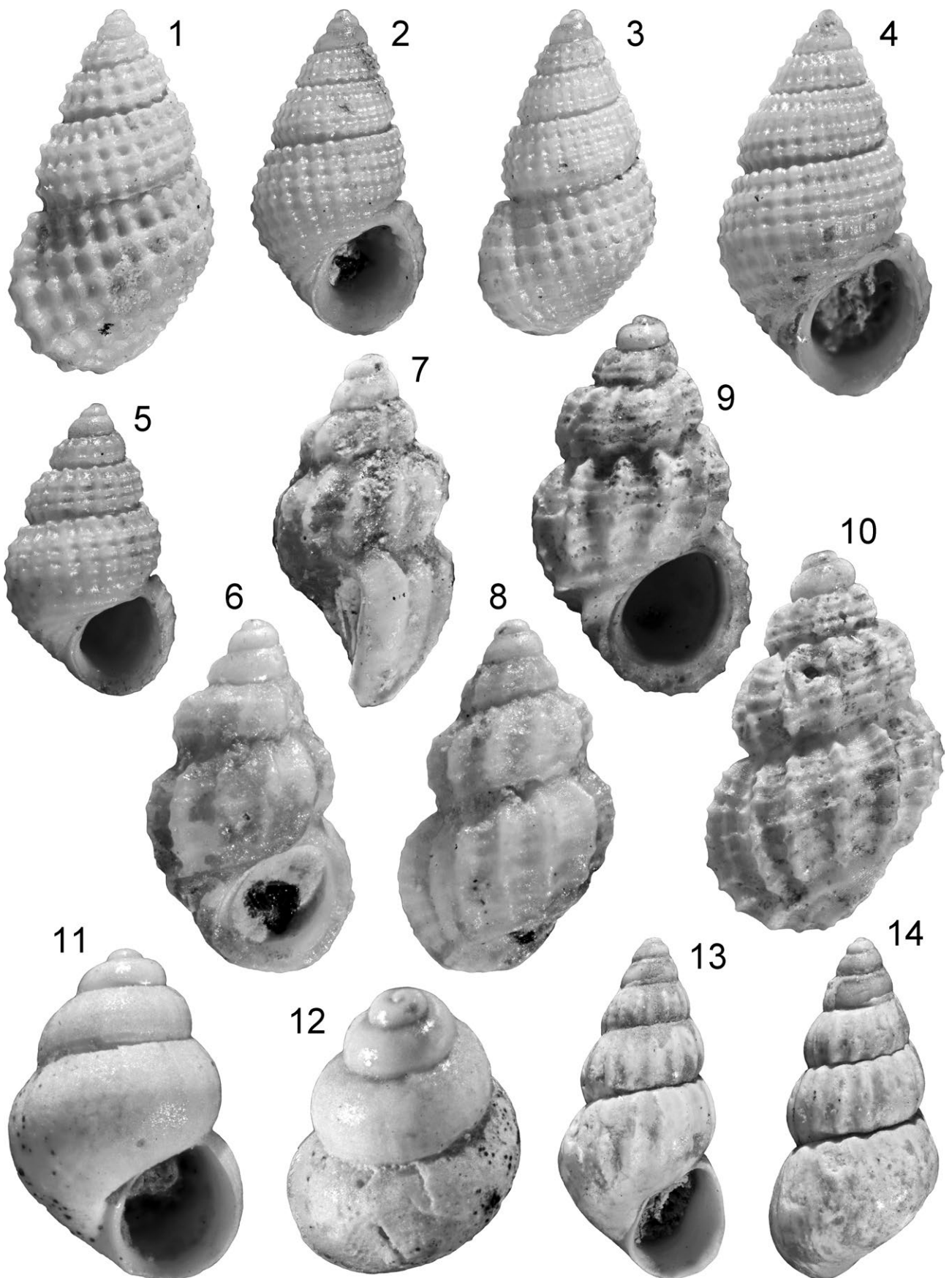


Plate III. – III. tábla

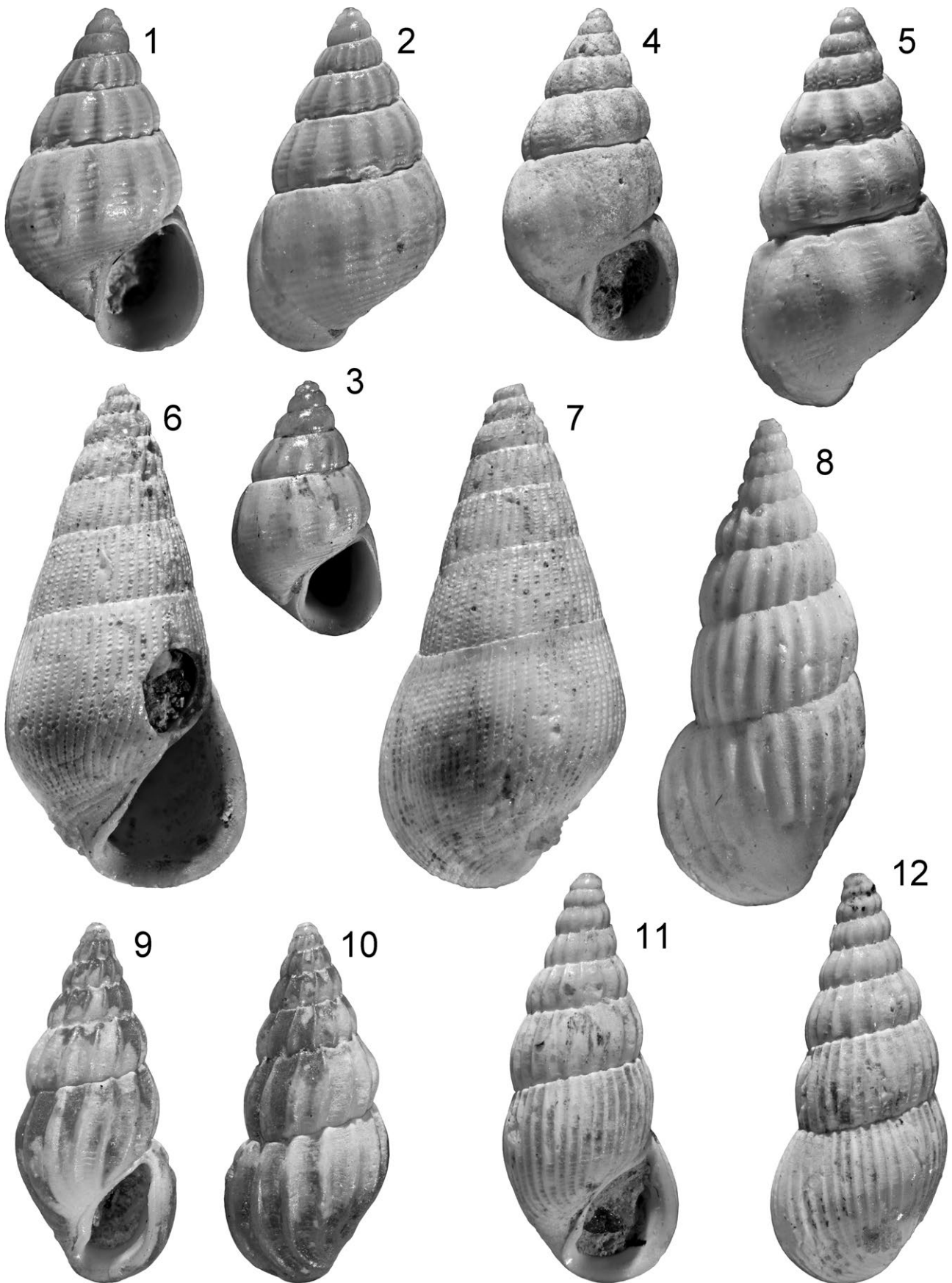


Plate IV. – IV. tábla

