BADENIAN SMALL GASTROPODS FROM LĂPUGIU DE SUS (FĂGET BASIN, ROMANIA). RISSOIDAE FAMILY

Alexandra Tamaș1, Dan Mirea Tamaș2 & Mirela Violetta Popa3

Abstract We have sampled two outcrops along Cosului Valley (Lăpuigu de Sus, Romania). The processed samples have revealed a rich and diverse small gastropod fauna. The Rissoidae family is dominating. We have systematically assigned, described and illustrated 15 species. The Rissoina subfamily (12 species) is represented by seven species of genus Alivania: Alivania (Alivania) productilis, Alivania (Alivania) perregularis, Alivania (Alivania) ampuila, Alivania (Alivania) heleinae, Alivania (Alivania) transiens, Alivania (Alivania) oceani and Alivania sp., two species of genus Manzonia: Manzonia (Manzonia) scalaris, and Manzonia sp., as well as three species of genus Rissoa: Rissoa clotho, Rissoa acuticoasta, and Rissoa costeiensis. Additionally, subfamily Rissoininae is represented by three species of genus Rissoina: Rissoina (Phosinella) steinabrummensis, Rissoina (Rissoina) vindobonensis, and Rissoina (Rissoina) pusilla.

Keywords: gastropods, Rissoidae, Lower Badenian, Lăpuigu de Sus, Romania

INTRODUCTION

Lăpuigu de Sus is located south from Mureș River, in Făget Basin, a post-tectonic Neogene basin representing an eastwards extension of the Pannonian Basin (Muthac, 1990) (Fig. 1). The basement is represented by the Poiana Ruscă crystalline rocks consisting of graphitic schists, chloritic-sericitic schists, sericitic-chloritic schists, sericitic phyllites, black quartzites, crystalline limestones and dolomites of the Ghelar and Padeș Series (Gheraszi et al., 1968). The oldest sedimentary rocks in the region are Mesozoic in age, and are represented by limestones and flysch deposits overlain by epicontinental neritic sedimentary deposits (Dușa, 1969). On their top, Badenian marly-clayey deposits with thin interlayers of sands and clayey deposits with thin interlayers of sands and clayey-clayey deposits (Dușa, 1969), Pontian sands, gravels and clays (Orâșanu et al. 1970) and Quaternary sediments mainly consisting of terraces (Dușa, 1969), develop. Magmatic products were also described from this area, i.e., andesitic agglomerates petrographically represented by andesites with pyroxenes and amphiboles (Dușa, 1958) (Fig. 1).

The Badenian deposits from Lăpuigu de Sus contain a rich fauna and flora; accordingly, they have been intensely studied. A large number of mollusc species, especially bivalves and large gastropods have been published already in the 19th century by Neugeboren (1858), Höernes (1851–1856), Hauer & Stache (1863), Halavats (1876), or Koch (1900). After that, numerous other authors have contributed to a better understanding of the regional geology and to an increase of the faunal inventory of the area (Nițulescu, 1930; Moisescu, 1955; Petrescu et al., 1990; Chira, 2000; Chira and Voia, 2001; Caze et al., 2010). However, small gastropods have been only mentioned, for example by Koch (1900), Nițulescu (1930), or Moisescu (1955), while Șuraru and Papp (1993) describe and illustrate several species of small gastropods, among which six species of rissoids. The rissoids are small gastropods that are still omnipresent in marine environments. As a rule, they prefer shallow waters, while the greatest species diversity is present in littoral areas (Ponder, 1985). A few genera, such as Rissoa and Rissoina are exclusively littoral organisms (Ávila et al., 2012). Most of the rissoids live on the surface of algae, underneath rock fragments, corals or any other sheltering objects. In Central Paratethys, genera Rissoa and Alivania are known at least starting with the Lower Miocene (Egggenburgian). The Rissoidae’s greatest diversity was recorded in the Lower Badenian (Kowalke and Harzhauser, 2004).

1Department of Geology, Babeș-Bolyai University, Kogălniceanu 1, 400084 Cluj-Napoca, Romania, popa_alessandraa@yahoo.com
2Department of Geology, Babeș-Bolyai University, Kogălniceanu 1, 400084 Cluj-Napoca, Romania, tamas_dan_mirea@yahoo.com
3Department of Geology, Babeș-Bolyai University, Kogălniceanu 1, 400084 Cluj-Napoca, Romania, mirela.popa@ubbcluj.ro
MATERIAL AND METHODS

We have sampled two outcrops along Coșului Valley near Lăpușiu de Sus. Thirteen samples were taken from each outcrop, numbered L1 to L13 for the first one and Lp1 to Lp13 for the second one. The samples have been processed following standard sample processing protocols: drying at 104.5° C into an oven, rehydration, boiling in water with Na$_2$CO$_3$, and rinsing by using the 63 μm-mesh sieve. After processing we found that the most abundant and well preserved rissoids were present in the samples L5, Lp2, Lp4 and Lp10. The fossils were selected, measured, identified, described and systematically classified based on microscopic observations under binocular. Photographs of the specimens were taken by using a Cannon PowerShot A640 camera attached to the Zeiss Stemi 2000-C stereomicroscope, while image processing was achieved by using the Photoshop CS6 software. All the specimens illustrated in this paper have been registered in the collection of the Museum of Paleontology of the Babeș-Bolyai University in Cluj-Napoca (PMBBU).

SYSTEMATIC PALEONTOLOGY


Rissoa acuticosta (Sacco, 1895)

Fig. 2a
1895 Turbella [sic!] acuticosta Sacc. - Sacco, p. 23
1954 Turbella acuticosta Sacco - Friedberg, p. 368, pl. 22, fig. 1
1973 Rissoa acuticosta Sacco - Bohn - Havas, 1039, pl. 3, fig. 7
1975 Turboella (Turboella) acuticosta Sacco - Baluk, p. 69, pl. 8, figs. 9, 10
partim 1981 Turboella acuticosta Sacco - Krach, p. 47, pl. 15, fig. 20
1981 Turboella (Turboella) acuticosta Sacco - Švagrovský, p.121, pl. 37, figs. 8, 9
2000 Turboella (Turboella) acuticosta Sacco - Popa and Iancu, p. 84, pl. 2, fig. 3
2004 Rissoa acuticosta (Sacco) - Kowalke and Harzhauser, p. 116, fig. 4C

Material: 11 specimens, (four from L5, one from Lp2, two from L3 and four from Lp10) (one specimen PMBBU 23850)

Description: Conic, turritculated shell, consisting of six spire whors up to 2.90 mm in height and 1.60 mm in width. The protoconch consists of about 2.5 convex spire whors. The teleoconch shows slightly flattened profile, more convex above the incised sutures. On the first whorl, the ornaments are represented by finer, sinusoidal axial ribs that become more prominent and straight towards the last whorl. Fine spiral threads are noticeable in the interspaces between the axial ribs. The last whorl represents about 65% of the total height of the shell; it displays 12-14 axial ribs as ornaments. Five spiral threads are present on the base of the shell. The aperture is drop-like, the inner lip partly covering the umbilicus, while the external one is thickened because of the varices.


Rissoa clotho Höernes, 1856

Fig. 2b
1856 Rissoa clotho sp. nov. - Höernes, p. 574, pl. 48, fig. 20 a,b
1975 Turboella (Turboella) clotho (Höernes) - Baluk, p. 70, pl. 8, fig. 8
2004 Rissoa clotho Höernes - Kowalke and Harzhauser, p.117, fig. 4D

Material: 13 specimens, five from L5, four form Lp2, one from Lp3 and three from Lp10 (one specimen PMBBU 23851)

Description: Conical-elongated shell consisting of six whors reaching up to 3 mm in height and 1.5 mm in width. The protoconch is build-up of 2.25 convex whors. The teleoconch displays convex whors separated by an incised suture. Ornamentation consists of prominent axial ribs that become more convex over the suture. On the last whors, in their lower half, one can notice fine spiral threads, more obvious on the last whorl. This latter represents about 55% of the total shell height and is ornamented with 12 axial ribs. Oval aperture, the inner lip covers the umbilicus while the external lip displays varices.

Distribution: identified in Austria (Kowalke and Harzhauser, 2004), Poland (Baluk, 1975).

Rissoa costeiensis Kowalke and Harzhauser, 2004

Fig. 2c
2004 Rissoa costeiensis sp. nov. - Kowalke and Harzhauser, p. 117, fig. 5B

Material: 12 specimens, 10 from L5, one from Lp2 and one from Lp10 (one specimen PMBBU 23852)

Description: Conical, elongated shell reaching up to 3 mm in height and 1.5 mm in width, with six whors. The protoconch includes three convex whors. The teleoconch shows convex whors with incised suture and ornamentation consisting of prominent axial ribs with higher convexity in their median part. Fine spiral threads noticeable in the interspaces between the axial ribs, more prominent in the inferior half of the whorl. The last whorl is about 60% from the total height of the shell. It is ornamented with 16 axial ribs intersected by 12 spiral threads. Toward the base, 6-8 additional spiral threads are visible. Oval aperture, the inner lip partly covers the umbilicus, while the external one is thickened because of the varix.
Badenian small gastropods from Lăpugiu de Sus (Făget Basin, Romania). Rissoidae Family

Fig. 2 - a Rissoa acuticosta (Sacco, 1895). b Rissoa clathro Hörnes, 1856. c Rissoa costeiensis Kowalke & Harzhauser, 2004. d Alvania (Alvania) ocellata (d’Orbigny, 1852). e Alvania (Alvania) productilis Boettger, 1906. f Alvania (Alvania) perregularis (Sacco, 1895). g Alvania (Alvania) ampulla (Eichwald, 1853). h Alvania (Alvania) heleneae Boettger, 1901. i Alvania (Alvania) transiens (Sacco, 1895).
Distribution: identified in Romania (Kowalke and Harzhauser, 2004).

Genus *Alvania* Risso, 1826
Subgenus *Alvania* Risso, 1826
Type species: *Turbo cinctus* Linnaeus, 1758

*Alvania* (*Alvania*) *oceani* (d’Orbigny, 1852)

**Fig. 2d**
1852: *Rissoa oceani* d’Orb. - d’Orbigny, p. 29, nr. 368
1954: *Alvania oceani* d’Orb. - Friedberg, p. 377, pl. 22, fig. 13
1975: *Alvania (Alvania) oceani* (d’Orbigny) - Baluk, p. 82, pl. 9, fig. 17
1981: *Alvania oceani* d’Orbigny - Krach, p. 49, pl. 15, fig. 1
2004: *Alvania (Alvania) oceani* (d’Orbigny) - Kowalke and Harzhauser, p. 120, fig. 7A.

Material: two specimens, one from L5 and one from L2 (one specimen PMBBU 23859)

Description: Elongated conical shell with five whorls; up to 2.7 mm in height and 1.40 mm in width. The protoconch is only partly preserved, as more than 2 convex whorls. Ornamentation is not visible under the stereomicroscope. Teleoconch with flattened first whorls and a last convex whorl with canaliculate suture. Ornamentation consisting of rounded axial ribs intersected by finer spiral threads; the latter become more pronounced towards the base of the shell. The last whorl represents about 65% of the total shell height. It is ornamented with 21 axial ribs intersected by 8 spiral threads. The shell base is covered by 5 spiral threads. Drop-like aperture, with inner lip covering the umbilicus and external lip showing inner denticles. Varices are present on the last-but-one whorl and in the aperture area.

Distribution: identified in Austria (Kowalke and Harzhauser, 2004), Poland (Friedberg, 1954; Baluk, 1975; Krach, 1981).

*Alvania* (*Alvania*) *productilis* Boettger, 1906

**Fig. 2e**
1906: *Alvania (Alvania) productilis* n. sp. - Boettger, p. 156, nr. 539
1934: *Alvania (Alvania) productilis* Boettger - Zilch, p. 212, pl. 5, fig. 83
1975: *Alvania (Alvania) productilis* Boettger - Baluk, p. 81, pl. 9, fig. 6
1981: *Alvania (Alvania) productilis* (Boettger) - Švagrovský, p.117, pl. 36, fig. 6, 7

Material: two specimens from L5 (one specimen PMBBU 23854)

Description: Conical shell consisting of five whorls, up to 2.10 mm in height and 1.25 mm in width.

Protoconch consists of two convex whorls ornamented with spiral threads; the transition to the teleoconch is not well noticeable. Teleoconch with convex whorls and a well-defined suture. On the first whorl there are 20 axial ribs intersected by four spiral threads. The last whorl represents about 70% of the total shell height; it is ornamented with 20 axial ribs intersected by spiral threads. The base is ornamented with four spiral threads. The aperture is drop-like. The inner lip covers the umbilicus, while the external none is thickened due to a varix; it presents inner denticles.

Distribution: identified in Poland (Baluk, 1975), Slovacia (Švagrovský, 1981), Romania (Boettger, 1906; Zilch, 1934)

*Alvania (Alvania) perregularis* (Sacco, 1895)

**Fig. 2f**
1895: *Acinus Mariae? var. perregularis* Sacc. – Sacco, 18, p. 25
1954: *Alvania perregularis* Sacco - Friedberg, p. 377, pl. 22, fig 14, 15
1960: *Alvania (Alvania) perregularis* (Sacco) - Kojumdgieva and Strachimirov, p. 100, pl. 30, fig. 16 a, b
1966: *Rissoa (Alvania) perregularis* Sacco - Strausz, p. 73, pl. 46, fig. 12, 13
1973: *Alvania perregularis* Sacco – Bohn-Havas, p. 1037, pl. 3, fig. 1, 2
1975: partim *Alvania (Turbona) perregularis* (Sacco) – Baluk, p. 85, pl. 9, fig. 14, 15
1981: *Alvania (Turbona) perregularis* (Sacco) – Švagrovský, p. 118, pl. 36, fig. 4
1981: *Alvania perregularis* Sacco - Krach, p. 51, pl. 15, fig. 6
1993: *Alvania perregularis* Sacco - Şuraru and Papp, pl. V, fig 18
2000: *Alvania (Turbona) perregularis* (Sacco) - Popa and Ianolui, p. 84, pl. 2, fig. 6
2004: *Alvania (Alvania) perregularis* (Sacco) – Kowalke and Harzhauser, p. 120, fig. 7B

Material: eight specimens, one from L5, one from L2, one from Lp4, and five from Lp10 (one specimen PMBBU 23855)

Description: Conical shell consisting of six whorls; up to 2.63 mm in height and 1.55 mm in width. Protoconch is consisting of about 2.75 convex whorls ornamented with finely grained spiral threads. The transition to the teleoconch is well-defined. The teleoconch shows flat whorls with canaliculate suture. Ornamentation represented by up to 37 axial ribs intersected by up to 14 spiral threads resulting in reticulated pattern with fine knots at the junctions. The last whorl represents about 70% of the total shell height. Drop-like aperture with inner lip partly covering the umbilicus. External lip with inner denticles. The shell shows varices both on the aperture area, and on other locations on the whors.

Distribution: identified in Czech Republic (Kowalke and Harzhauser, 2004), Poland (Friedberg, 1954; Baluk, 1975; Krach, 1981), Slovacia (Švagrovský, 1981), Hungary (Strausz, 1966; Bohn – Havas, 1973), Bulgaria (Kojumdgieva and Strachimirov, 1960), Romania (Şuraru and Papp, 1993; Popa and Ianolui, 2000).

*Alvania (Alvania) ampulla* (Eichwald, 1853)

**Fig. 2g**
1853: *Rissoa ampulla m.* - Eichwald, p. 274
1954: *Alvania montagui var. ampulla* Eichw. - Friedberg, p. 376, pl. 22, fig 12
1966: *Rissoa (Alvania) montagui miocaenica* Sacco - Strausz, p. 74, pl. 46, fig. 19, 20
1971: *Alvania (Alvania) montagui ampulla* (Eichwald) - Rado, pl. 4, fig. 70, 86
1975 *Alvania (Alvania) montagui ampulla* (Eichwald) -
Baluk, p. 79, pl. 9, fig. 9
1981 *Alvania montagui ampulla* (Eichwald) - Krach, p. 49, pl. 15, fig. 13-15
2000 *Alvania (Alvania) montagui ampulla* (Eichwald) -
Popa and Ianoliu, p. 84, pl. 2, fig. 5
2004 *Alvania (Alvania) ampulla* (Eichwald) - Kowalke and Harzhauser, p. 119, fig. 6D

Material: 44 specimens, 19 from L5, 11 from Lp2 and 14 Lp10 (one specimen PMBBU 23856)

Description: Conical shell with 5-6 whors; up to 2.25 mm in height and 1.37 mm in width. In adult specimens, the protoconch is only partly preserved; juvenile specimens show protoconch with two convex whors ornamented with fine spiral threads. Teleoconch with slightly convex whors and canalicate suture. The last whorl is about 70% of the total shell height. It is ornamented with more-pronounced 16-20 axial ribs intersected by 6 spiral threads. Towards the base, additional 3-4 spiral threads. Oval aperture, slightly sharper towards the top. The inner lip partly covers the umbilicus while the external one shows inner denticles and external varix.

Distribution: identified in Austria (Kowalke and Harzhauser, 2004), Poland (Friedberg, 1954; Baluk, 1975; Krach, 1981), Hungary (Strausz, 1966), Romania (Rado, 1971; Popa and Ianoliu, 2000).

*Alvania (Alvania) helenae* Boettger, 1901

Fig. 2h
1901 *Alvania (Alvania) helenae* n. sp. - Boettger, p. 140, nr. 432
1934 *Alvania (Alvania) helenae* Boettger - Zilch, p. 211, pl. 5, fig 81
1975 *Alvania (Alvania) helenae* Boettger - Baluk, p. 81, pl. 9, fig. 10

Material: four specimens from L5 (one specimen PMBBU 23857)

Description: Elongated conical shell with 5 whors; up to 2.75 mm in heights and 1.63 mm in width. Protoconch consisting of about two convex whors ornamented with spiral threads. Teleoconch with convex whors ornamented with pronounced axial ribs intersected by finer spiral threads; knots form at the intersection. The last-but-one whorl shows one varix. The last whorl represents 65–70% of the total shell height; ornamented with 14-18 axial ribs intersected by 6 spiral threads. Towards the base, four additional spiral threads are noticeable. Drop-like aperture, with the inner lip covering the umbilicus. External lip with inner denticles and external varix.

Distribution: identified in Poland (Baluk, 1975), Romania (Boettger, 1901; Zilch, 1934).

*Alvania (Alvania) transiens* (Sacco, 1895)

Fig. 2i
1895 *Alvania sculpia? var. transiens* – Sacco, 18, p. 27
1954 *Alvania venus var. danubiensis* Cossm. et Peyr.- Friedberg, p. 379, pl. 22, fig 17
1966 *Rissou (Alvania) venus danubiensis* Cossmann and Peyrot - Strausz, p. 72, pl. 46, fig. 17,18
1975 *Alvania (Acinus) venus transiens* Sacco – Baluk p. 86, pl. 9, fig. 18,19
1981 *Alvania venus transiens* Sacco - Krach, p 51, pl. 15, fig. 9-12
2004 *Alvania (Alvania) transiens* (Sacco) - Kowalke and Harzhauser, p. 121, fig. 7C

Material: five specimens, three from L5 and two from Lp10 (one specimen PMBBU 23858)

Description: Elongated conical shell consisting of six whors; up to 3.25 mm in heights and 1.60 mm in width. Protoconch consisting of about 2.75 convex whors ornamented with spiral threads. Teleoconch with slightly convex whors and canalicate suture. Ornamentation consisting of axial ribs intersected by spiral threads of equal intensity. This leads to the formation of a reticulated network with sharp knots at the intersection. The last whorl is about 65% of the total shell; ornamented with 16–21 axial ribs and six spiral threads. Two additional well-defined spiral threads are noticeable towards the base. Drop-like aperture; the inner lip covers the umbilicus, external lip shows an external varix and inner denticles.

Distribution: identified in Poland (Friedberg, 1954; Baluk, 1975; Krach, 1981), Hungary (Strausz, 1966), Austria (Kowalke and Harzhauser, 2004).

*Alvania sp.*

Fig. 3a

Material: one specimen (PMBBU 23853)

Description: Conical shell consisting of 6 whors up to 2.38 mm in height and 1.55 mm in width. The protoconch consists of 2.5 convex whors ornamented with very fine grained spiral threads. Teleoconch flattened profile and with canalicate suture are. The ornamentation consists of axial ribs intersected by spiral threads; prominent, rounded knots result at the junction. On the first whorl, the ornamentation is represented by three spiral threads intersected by 11 axial ribs. The last whorl represents about 70% of the total shell height. The ornamentation includes 23 axial ribs and 10 spiral threads covering also the base of the shell. The aperture is rounded and slightly sharpened towards the upper part. The inner lip covers the umbilicus. The external lip is thickened due to an external varix; it presents inner denticles.

Remarks: This species is similar to recent *A. cimex* (Pliocene-Recent) in general shape (see Garilli & Parrinello, 2012, fig 6A, B). Sacco (1895, p.24, pl. 1, fig. 56) described from Miocene of Italy *Acinus cimex var. tauroparva* that resemble our specimen (see Ferrero Mortara et al, 1984, pl.38, fig. 9 who illustrates the collection of type species describer by Bellardi and Sacco).

Genus *Manzonia* Brusina, 1870
Subgenus *Manzonia* Brusina, 1870

Type species: *Turbo crassus* Kammacher in J. Adams, 1798

*Manzonia (Manzonia) scalaris* (Dubois, 1831)

Fig. 3b
1831 *Cyclostoma scalare* Nov. - Dubois de Montpereux, p. 47, pl. 3, fig. 40, 41.
Fig. 3 - a Alvania sp. b Manzonia (Manzonia) scalaris (Dubois, 1831). c Manzonia sp. d Rissoina (Phosinella) steinbrunnensis Sacco 1895. e Rissoina (Rissoina) vindobonensis Sacco, 1895. f Rissoina (Rissoina) pusilla (Brocchi, 1814).
1954 *Manzonia scalaris* Dub. - Friedberg, p. 383, pl. 23, fig. 4
1973 *Rissoa (Manzonia) scalaris* Dubois. - Nicorici pl. 2, fig. 15-18
1975 *Alvania (Taramellia) scalaris* (Dubois) - Baluk p. 75, pl. 8, fig. 13
1981 *Alvania scalaris* (Dubois) - Krach, p. 51, pl. 15, fig. 17, 18
2004 *Manzonia (M.) scalaris* (Dubois, 1831) - Kowalke & Harzhauser, p. 124, fig. 8D
2012 *Manzonia scalaris* (Dubois, 1831) - Garilli & Parrinello, fig. A1
Material: two specimens from L5 (one specimen PMBBU 23860)
Description: Scalariform conical shell consisting of five whorls; up to 2.30 mm in height and 1.25 mm in width. Poorly preserved protoconch; thus, transition towards teleoconch or ornamentation could not be observed. Teleoconch with convex whorls separated by a strongly incised suture. Ornamentation consists of strong variculate axial ribs intersected by fine spiral threads. The interspaces between spiral threads are covered by extremely fine spiral threads. The last whorl represents about 65% of the total shell height. It is ornamented by 12 axial ribs intersected by seven spiral threads. Of these, two are very pronounced; they represent the ornamentation of the shell basis. Rounded aperture with strongly thickened holostome-type peristome.

*Manzonia* sp.
Fig. 3c
Material: one specimen from L5 (PMBBU 23861)
Description: Juvenile specimen with five scalariform whorls; 1.55 mm in height and 0.9 mm in width. Protoconch contain of about two convex whorls. Ornamentation is not visible under stereomicroscope. Teleoconch ornamented with axial ribs intersected by less-pronounced spiral threads; in-between the main threads one can notice other extremely fine spiral threads. The last whorl represents about 65% of the total shell height. Ornamentation consists of 14 axial ribs intersected by five spiral threads. Two additional, well-defined spiral threads are present towards the base. Round aperture with strongly thickened peristome.
Remarks: This specimen is similar with a juvenile *Manzonia scalaris* in general shape but differ in protoconch larger diameter and more flatten whorls and it also differ from *M. subzetlandica* by its broad opisthocline axial ribs and subordinate spiral threads.

Subfamily Rissoininae Stimpson, 1865
Genus *Rissoina* d’Orbigny, 1840
Subgenus *Phosinella* Mörch, 1876
Type species: *Rissoina inca* d’Orbigny, 1840
*Rissoina* (Phosinella) *steinabrunnensis* Sacco 1895
Fig. 3d
1895 *Rissolina lamellosa* var. *Steinabrunnensis* Sacc. – Sacco, 18, p. 37
1966 *Rissoina* (*Phosinella*) *steinabrunnensis* Sacco - Strausz, p. 80, pl. 12, fig. 15-18
1975 *Rissoina* (*Phosinella*) *steinabrunnensis* Sacco - Baluk, p. 95, pl. 10, fig. 4, 5
1981 *Rissoina* *steinabrunnensis* Sacco - Krach, p 52, pl. 15, fig. 27, 28
2006 *Rissoina* (*Phosinella*) *steinabrunnensis* Sacco - Baluk, p. 189, pl. 4, fig. 1
Material: two specimens from L5 (one specimen PMBBU 23862)
Description: Slender and elongated turriculated shell with about seven whorls; up to 4.20 mm in height and 1.90 mm in width. Protoconch consisting of about 2.5 convex whors lacking ornamentation. Teleoconch with convex whors and deep suture. Ornamentation consisting of prominent axial ribs, arched underneath the suture; this leads to an overall scalariform shell morphology. Fine spiral threads cross-cut the axial ribs. The last whorl represents about 55% of the total shell height. It is ornamented with 17 axial ribs intersected by 13 fine spiral threads, more pronounced towards the base. The oval aperture has an oblique orientation. Weakly incised anterior canal peristome and labrum with external varix.

Subgenus Rissoina d’Orbigny, 1840
*Rissoina* (*Rissoina*) *vindobonensis* Sacco, 1895
Fig. 3e
1895 *Rissoina bruguieri* *vindobonensis* Sacc.- Sacco, 18, p. 35
1960 *Rissoina* (*Rissoina*) *vindobonensis* (Sacco) - Kojumdjieva and Strachimirov, p.102, pl. 30, fig. 20 a, b
1975 *Rissoina* (*Rissoina*) *vindobonensis* Sacco - Baluk, p. 91, pl. 10, fig. 6, 7
1981 *Rissoina* (*Rissoina*) *vindobonensis* (Sacco) - Krach, p 52, pl. 15, fig. 23, 24, 29, 30
Material: one specimen from L5 (PMBBU 23863)
Description: Slender, elongated turriculated shell with more than six whorls; up to 4.3 mm in height and 1.90 mm in width. Protoconch not fully preserved. Teleoconch with 5.5 slightly-convex whors and incised suture. Ornamentation consisting of opisthocline axial ribs, more pronounced on the first whors and finer on the last one. Fine spiral threads in the interspaces between the axial rib area. The last whorl represents 60% of the total shell height. Ornamentation is represented by 22 axial ribs alternating with fine spiral threads. The shell’s base is ornamented with fine more pronounced spiral threads. Large and inclined aperture; covered umbilicus and external lip thickened by varix.

*Rissoina* (*Rissoina*) *pusilla* (Brocchi, 1814)
Fig. 3f
1814 *Turbo pusillus* nob. – Brocchi, p. 181, pl. 6, fig. 5
1954 *Rissoina pusilla* Brocc. - Friedberg, p. 356, pl. 20, fig 22
1960 *Rissoina* (*Rissoina*) *podolica* Cossmann - Kojumdjieva & Strachimirov, p. 102, pl. 30, fig. 19
1960 *Rissoina pusilla podolica* Cossmann - Strausz, p. 79, pl. 12, fig. 23-28

part 1975 *Rissoina (Rissoina) podolica* Cossmann - Baluk, p. 90, pl. 10, fig. 11

1981 *Rissoina (Rissoina) podolica* Cossmann - Švagrovský, p. 122, pl. 38, fig. 1-4

1981 *Rissoina podolica* Cossmann - Krach, p 51, pl. 15, fig. 25, 26, 34, 35

1993 *Rissoina podolica* Cossmann - Șuraru & Papp, pl. V, fig. 22

2004 *Rissoina (Rissoina) pusilla* (Brocchi) - Landau et al., p. 52, pl. 12, fig. 1

Material: two specimens from Lp4 (one specimen PMBBU 23864)

Description: Elongated, incompletely preserved shell; up to 5.25 mm in height and 2.5 mm in width, first whorls not included. Teleoconch with more than five flattened whorls and incised suture. Ornamentation consisting of fine axial ribs showing a straight orientation on the first whorls and a slightly sinusoidal one towards the last ones. There are 22 to 24 ribs on the last whorl. Numerous extremely fine spiral threads present in the interspaces between the axial rib areas. Three spiral threads are more prominent on the last-but-one supra-suture whorl and nine on the last whorl towards the base of the shell. Oval, siphonostome oblique aperture; umbilicus covered by labrum, the latter thickened due to the presence of a varix.

Distribution: identified in: Austria (Kowalke & Harzhauser, 2004), Poland (Friedberg, 1954; Baluk, 1975; Krach, 1981), Slovakia (Švagrovský, 1981), Hungary (Strausz, 1966), Bulgaria (Kojumdjigieva and Strachimirov, 1960), Romania (Șuraru and Papp, 1993).

**CONCLUSIONS**

Rissoids were well-represented in the Badenian seas of the Central Paratethys. They have been described from Austria and Czech Republic (Kowalke and Harzhauser, 2004), Bulgaria (Kojumdjigieva and Strachimirov 1960), Poland (Friedberg, 1954; Baluk, 1975, 2006; Krach, 1981), Slovakia (Švagrovský, 1981) and Hungary (Strausz, 1966; Bohn–Havas, 1973).

In Romania, Rissoids are known from the Transylvanian Basin and from western basins like Fâget Basin, with Costei (Boettger, 1901-1907; Zilch, 1934) and Lăpușiu de Sus being the occurrences with the highest specimen abundance and diversity.

From samples collected from two outcrops along Coșului Valley (Lăpușiu de Sus) we have described, systematically assigned and illustrated 15 Rissoidae species: *Rissoa acuticosta, Rissoa clothe, Rissoa costeiensis, Alvania (Alvania) productilis, Alvania (Alvania) perregulares, Alvania (Alvania) ampulla, Alvania (Alvania) helenae, Alvania (Alvania) transiens, Alvania (Alvania) oceani, Alvania sp., Manzonia (Manzonia) scalaris, Manzonia sp., Rissoina (Phosinella) steinbrunnensis, Rissoina (Rissoina) vindobonensis, Rissoina (Rissoina) pusilla.* They were assigned to two subfamilies: Rissoinacae and Rissoininae, and to four genera: *Rissoa, Alvania, Manzonia and Rissoina.*

**ACKNOWLEDGMENTS**

We would like to thank Dr. Harzhauer Mathias and Dr. Popescu Gheorghe for the careful review and for all the suggestions and help given. We also like to thank Pop Dana for the help she offered with the English translation.

**REFERENCES**


Krach, W., 1981. Badeńskie utwory rafowe na Roztoczu Lubelskim oraz słimaki skrzdyłoni (pteropoda) w miocenie polski i ich znaczenie stratygraficzne. Polska akademia nauk - oddział w Krakowie komisja nauk geologicznych - prace geologiczne, 121: 5-140.
Linnaneus, C., 1758. Systema naturae per regna tria naturae, secundum Classes, Ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Editio Decima, Reformat.


