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Middle Miocene Buccinoidea (Neogastropoda) assemblage from the Făget Basin (Romania) in the collection of the Hungarian Natural History Museum, Budapest

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Abstract – An early Badenian (middle Miocene) Buccinoidea (Colubrariidae, Eosiphonidae, Tudiclidae, Fasciolariidae, Melongenidae, Pisaniidae and genus *Euthriofusus*) assemblage – that was collected from Coşteiu de Sus, Lăpugiu de Sus, and Nemeşeşti (W Romania), and stored in the collection of the Hungarian Natural History Museum, Budapest – is revisited. *Fasciolaria moravica* Hoernes et Auinger, 1890 is considered as a junior synonym of *Turrilatirus patruelis* (Bellardi, 1884) new comb. Other new combinations: *Cumia deshayesi* (Michelotti, 1847) new comb., *Eosipho hoernesi* (Bellardi, 1872) new comb., *Pseudolatirus rothi* (Beyrich, 1856) new comb., *Aplus lapugyensis* (Hoernes et Auinger, 1890) new comb., *Aplus transsylvanicus* (Hoernes et Auinger, 1890) new comb. *Pseudolatirus boettgeri* is a new name for *Fusus sublamellosus* Boettger, 1906. Neotype is designated for *Aptyxis palatina* (Strausz, 1954). With 100 figures.

Key words – Badenian, Buccinoidea, Central Paratethys, Coşteiu de Sus, Făget Basin, Hungarian Natural History Museum, Lăpugiu de Sus, middle Miocene, Nemeşeşti, Romania

INTRODUCTION

The aim of this paper is to review the early Badenian Colubrariidae, Eosiphonidae, Tudiclidae, Melongenidae, Fasciolariidae, Pisaniidae and genus *Euthriofusus* material that was collected at three localities in the Făget Basin (W Romania) during the late 19th and early 20th centuries. As the area belonged to the Kingdom of Hungary until 1918, the material has been deposited in the palaeontological collection of the Hungarian Natural History Museum, Budapest.

Coşteiu de Sus (*Kostej* in Hungarian), Lăpugiu de Sus (*Felső-Lapugy*), and Nemeşeşti (*Nemesesty*) are well-known Paratethyan middle Miocene fossiliferous sites (Fig. 1). All three are located in the small Neogene Făget Basin that represents a connection between the Pannonian and Transylvanian basins. The localities are characterized by tuffites, clays, and silts of the lower Badenian Dej Formation; the early Badenian molluscs are typical of the Central Paratethys. Neogene deposits of the region have been known since the mid-19th century,

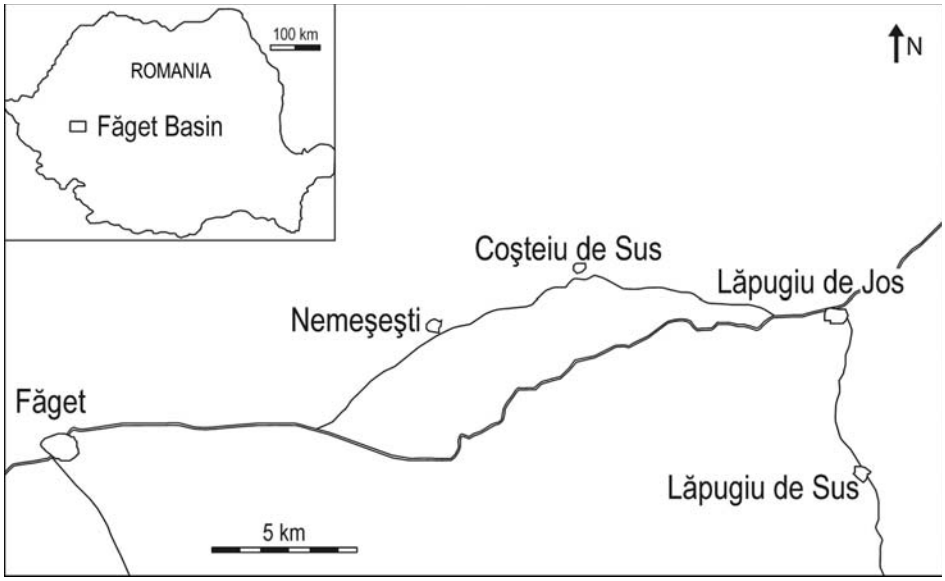


Fig. 1. The Făget Basin in Romania

and numerous papers have dealt with the rich fauna and especially with the mollusc assemblages. Buccinoids from Coşteiu and Lăpugiu were first illustrated by Hoernes & Auinger (1884–1890), later a rich assemblage from Coşteiu was studied by Boettger (1897–1907). The history of the mollusc research of the area was summarized by Kovács & Balázs (2016) and Kovács (2019) with additional references. The region is of special interest as the families studied herein display the highest diversity in this small basin in the Miocene Central Paratethys. This fact is well-represented by the gastropod collection of the HNHM.

MATERIAL AND METHODS

All specimens illustrated in this paper were collected in the Făget Basin at the above mentioned localities, and are stored in the palaeontological collection of the Hungarian Natural History Museum, Budapest (HNHM). The suprageneric classification of the Buccinoidea is based on Kantor *et al.* (2021). From the Hungarian literature mainly the species-level revisions and the latest records are cited. Abbreviations used in the text: SL = shell length in mm.

SYSTEMATIC PALAEONTOLOGY

Order Neogastropoda Wenz, 1938
Superfamily Buccinoidea Rafinesque, 1815

Family Colubrariidae Dall, 1904
Genus *Colubraria* Schumacher, 1817

Colubraria karreri (Hoernes et Auinger, 1884)
(Figs 2–5)

1884 *Triton* (*Epidromus*) *karreri* nov. form. – Hoernes & Auinger, p. 182, pl. 22, figs 8–10.
1906 *Eutritonium* (*Epidromus*) *karreri* (Hoernes et Auinger) – Boettger, p. 39.
1960 *Colubraria* (*Colubraria*) *karreri* (Hoernes et Auinger) – Kojumdgieva, p. 139, pl. 38, fig. 6.

Material – M.60.7940/8., M.60.10267. (Lăpugiu de Sus), M. 60.6902., M.60.6909., M.60.10240. (Coşteiu de Sus).

Remarks – The rare species is a Paratethyan endemic taxon. It differs from *Colubraria subobscura* by smaller and broader shell, ovate aperture, narrower varices and less developed columellar shield, while from *Cumia deshayesi* by bearing weakly developed columellar folds and coarser sculpture.

Distribution – Middle Miocene. Badenian: Central Paratethys (Bulgaria, Romania).

Colubraria subobscura (Hoernes et Auinger, 1884)
(Figs 6–9)

1884 *Triton* (*Epidromus*) *subobscurum* nov. form. – Hoernes & Auinger, p. 181, pl. 22, figs 4–7.
1902 *Triton* (*Epidromus*) *subobscurus* Hoernes et Auinger – Boettger, p. 25.
1960 *Colubraria* (*Colubraria*) *subobscura* (Hoernes et Auinger) – Kojumdgieva, p. 139, pl. 38, fig. 3.
2017 *Colubraria subobscura* (Hoernes et Auinger) – Vicián *et al*., p. 271, pl. 3, figs 6–9.

Material – M.60.7940/1–7., M.60.10143., M.68.612. (Lăpugiu de Sus), M.59.1924., M. 60.6887., M.60.6903/1–2. (Coşteiu de Sus).

Remarks – *Colubraria subobscura* is also an endemic species to the Badenian Central Paratethys. It is distinguishable from its Paratethyan congeners by larger and broader shell with prominent columellar shield and broader varices.

Distribution – Middle Miocene. Badenian: Central Paratethys (Austria, Bulgaria, Hungary, and Romania).

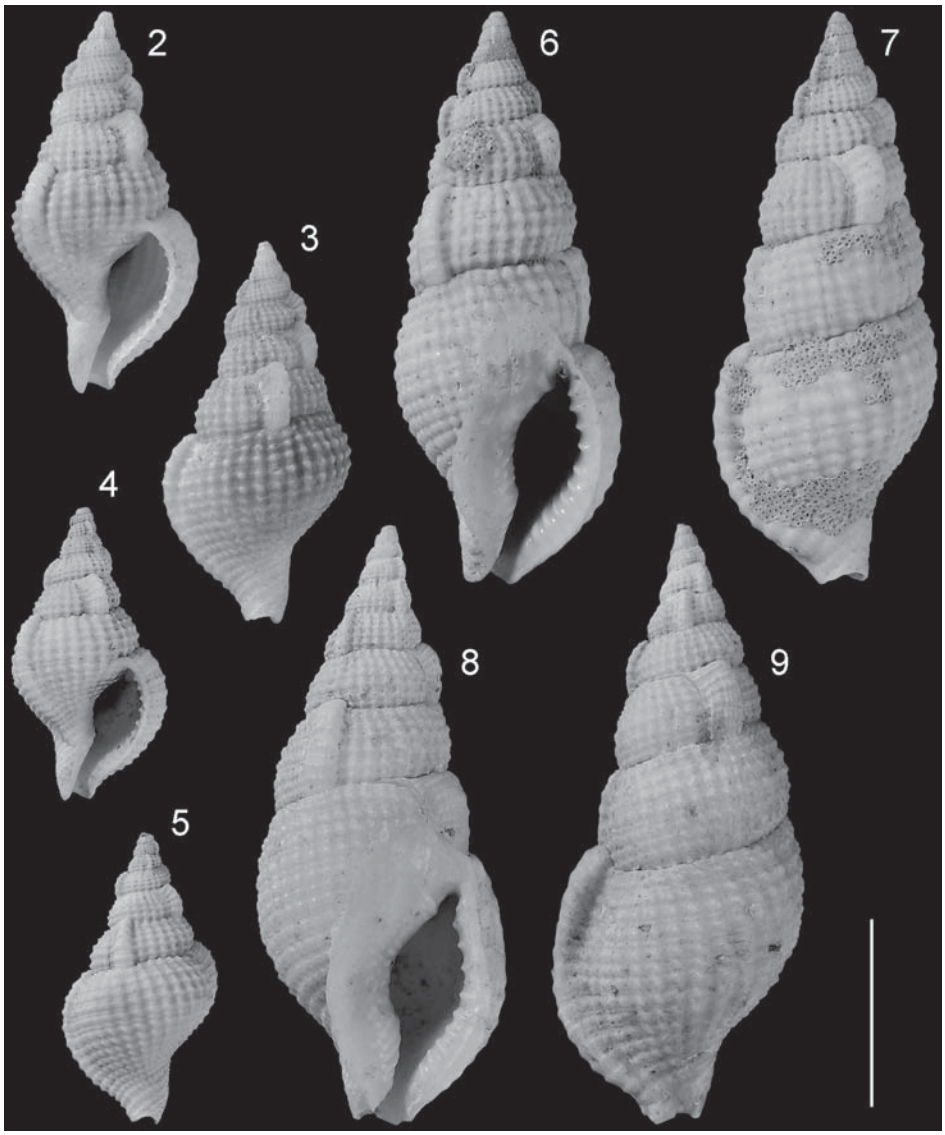
Genus *Cumia* Bivona-Bernardi, 1838

Cumia deshayesi (Michelotti, 1847) new comb.
(Figs 10–13)

1872 *Triton deshayesi* Michelotti – Bellardi, p. 229, pl. 14, fig. 15.
1884 *Triton* (*Epidromus*) *deshayesi* Michelotti – Hoernes & Auinger, p. 180, pl. 22, figs 2–3.
1906 *Eutritonium* (*Epidromus*) *deshayesi* (Michelotti) – Boettger, p. 38.

Material – M.60.6916/1–2., M.60.10503. (Coşteiu de Sus).

Remarks – "*Triton*" *deshayesi* is characterized by a slender shell with multispiral protoconch of approx. three smooth and rounded whorls, smooth columel-



Figs 2–5. *Colubraria karreri* (Hoernes et Auinger), apertural and abapertural views. – **Figs 2–3.** M.60.7940/8., SL 20.4. – **Figs 4–5.** M.60.6902., SL 15.3. – **Figs 6–9.** *Colubraria subobscura* (Hoernes et Auinger), apertural and abapertural views. – **Figs 6–7.** M.60.7940/2., SL 30.6. – **Figs 8–9.** M.60.7940/1., SL 32. Scale bar: 10 mm

la, and fine spiral and axial sculpture. Based on the morphological features of *Cumia* (Watters 2009: 272), the species is assigned here to this genus.

Distribution – Middle Miocene. Langhian: Proto-Mediterranean Sea (Italy), Badenian: Central Paratethys (Bulgaria, Romania).

Genus *Metula* H. Adams et A. Adams, 1850

Metula major (Grateloup, 1845)
(Figs 14–17)

1845 *Fusus mitraeformis* var. A *major* – Grateloup, pl. 24, fig. 37.
1853 *Fusus mitraeformis* – Hörnes, p. 283, pl. 31, fig. 7 (non Brocchi).
1902 *Metula mitriformis* (sic!) (Brocchi) – Boettger, p. 36.
2013 *Metula submitraeformis* (d'Orbigny) – Landau *et al*., p. 167, pl. 53, fig. 17, pl. 79, fig. 11 (*cum syn.*).
2017 *Metula submitraeformis* (d'Orbigny) – Vicián *et al*., p. 271, pl. 3, figs 4–5.
2021 *Metula major* (Grateloup) – Lozouet, p. 11 (pars), pl. 7, figs 1–4.

Material – M.59.2088. (Lăpugiu de Sus), M.60.7554/1–2. (Coşteiu de Sus).

Remarks – The taxonomic revision of the species was arranged by Lozouet (2021), and *Metula submitraeformis* d'Orbigny was recognized as a junior synonym of *M. major*. The species differs from the similar Pliocene *M. mitraeformis* (Brocchi) by bearing multispiral protoconch and reticulated early teleoconch whorls.

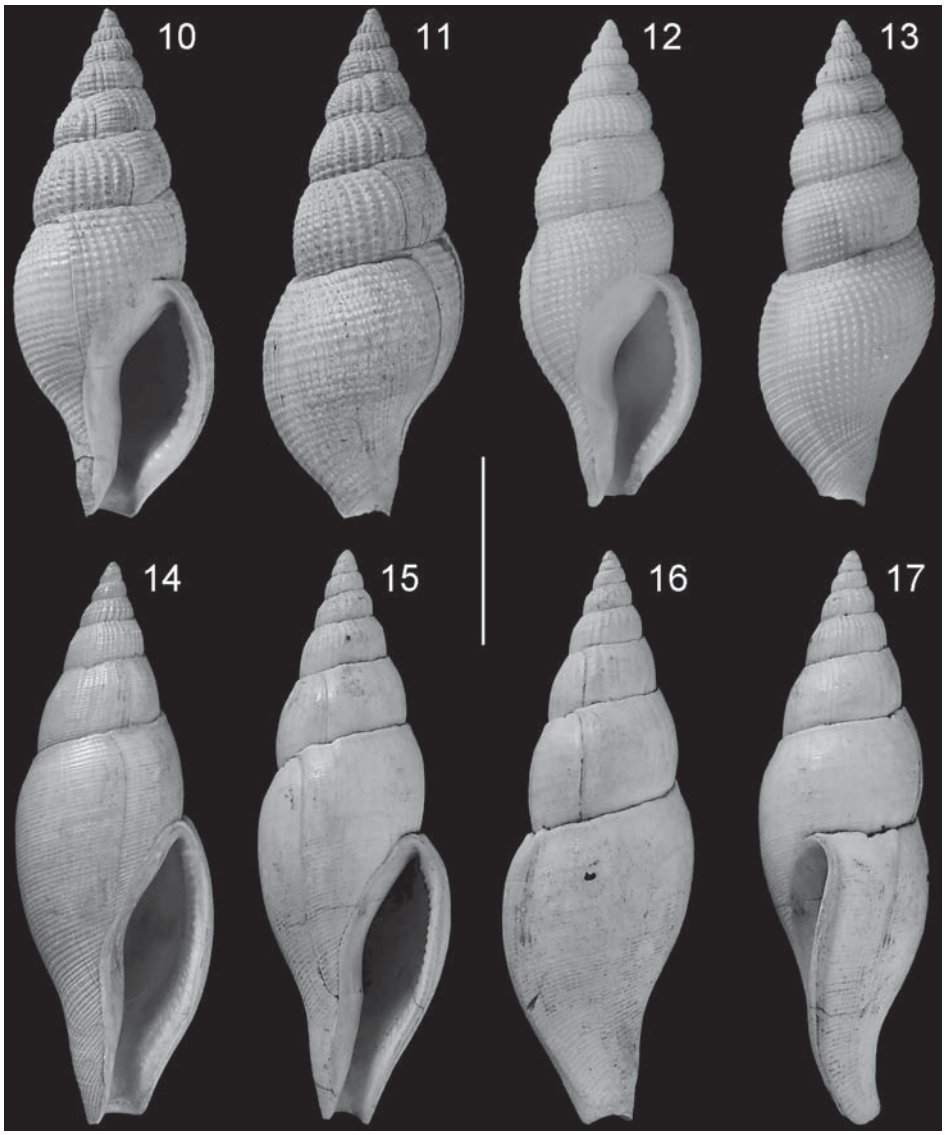
Distribution – Early–middle Miocene. Burdigalian–Langhian: North Sea Basin (the Netherlands), NE Atlantic (France), Badenian: Central Paratethys (Austria, Bulgaria, Hungary, and Romania), Serravallian: Proto-Mediterranean Sea (Turkey).

Family Eosiphonidae Kantor *et al*., 2021
Genus *Eosipho* Thiele, 1929

Eosipho cinguliferus (De Cristofori et Jan, 1832)
(Figs 18–21)

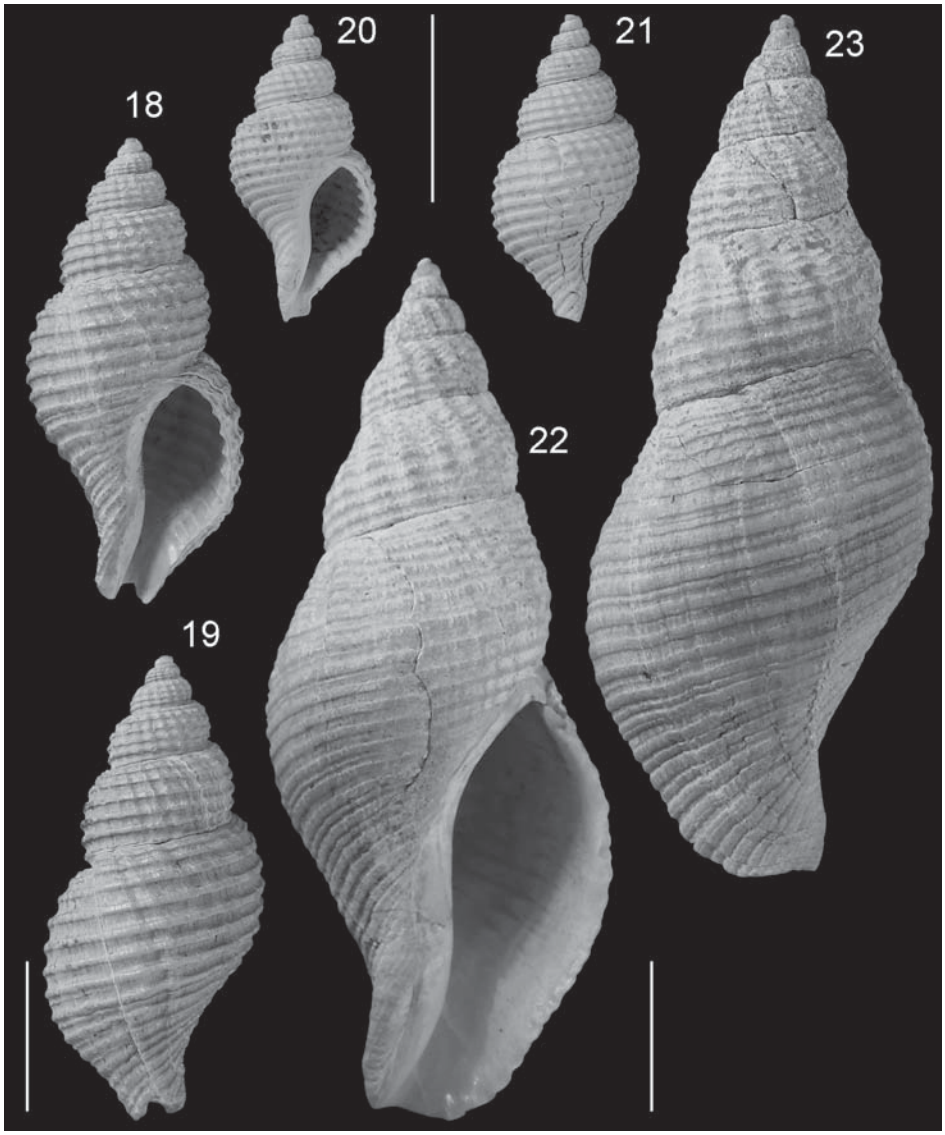
1847 *Fusus glomus* Gené – Michelotti, pl. 9, figs 8–9.
1853 *Fusus glomus* Géné – Hörnes, p. 279, pl. 31, fig. 2.
1872 *Chrysodomus cinguliferus* Jan – Bellardi, p. 151, pl. 11, fig. 11.
1902 *Chrysodomus glomus* (Gené) – Boettger, p. 36.
1969 *Neptunea gloma* (Gené) – Csepreghy-Meznerics, p. 84, pl. 4, fig. 12.
1971 *Neptunea hoernesi* – Stancu *et al*., pl. 8, fig. 5 (non Bellardi).
2016 *Eosipho cinguliferus* (De Cristofori et Jan) – Brunetti & Della Bella, p. 29, fig. 18A–F (*cum syn.*).

Material – M.59.2222., M.60.8042., M.60.10192/1–2., M.64.240, M.68.510/1–2. (Lăpugiu de Sus), M.59.2252., M.60.7071., M.60.7073. (Coşteiu de Sus).



Figs 10–13. *Cumia deshayesi* (Michelotti), apertural and abapertural views. – **Figs 10–11.** M.60.6916/1., SL 26.8. – **Figs 12–13.** M.60.10503., SL 26.3. – **Figs 14–17.** *Metula major* (Grateloup). – **Fig. 14.** M.60.7554/1., apertural view, SL 30. – **Figs 15–17.** M.60.7554/2., apertural, abapertural and lateral views, SL 30.6. Scale bar: 10 mm

Remarks – For the taxonomic history of *Eosipho cinguliferus* see Brunetti & Della Bella (2016). The similar *Eosipho latisulcatus* (Bellardi) differs by bearing more widely spaced spiral cords and by lacking axial riblets and reticulate sculpture on the spire whorls. *Eosipho cinguliferus* is characterized by a moderate



Figs 18–21. *Eosipho cinguliferus* (De Cristofori et Jan), apertural and abapertural views. – **Figs 18–19.** M.60.7071., SL 30.8. – **Figs 20–21.** M.60.7073., SL 16.5. – **Figs 22–23.** *Eosipho hoernesi* (Bellardi), M.60.10188., apertural and abapertural views, SL 57.4. Scale bars: 10 mm

variability in the development of the spiral sculpture: the specimen figured by Hörnes (1853, pl. 31, fig. 2) has a narrower and sharper spiral cord.

Distribution – Middle Miocene–Pliocene. Badenian: Central Paratethys (Austria, Hungary, and Romania), Tortonian–Piacenzian: Mediterranean Sea (Italy).

Eosipho hoernesi (Bellardi, 1872) new comb.
(Figs 22–23)

1853 *Fusus glomoides* – Hörnes, p. 277, pl. 31, fig. 1 (non Bellardi et Michelotti).
1872 *Chrysodomus hörnesi* – Bellardi, p. 153, pl. 11, fig. 14.
? 1902 *Chrysodomus hoernesi* (Bellardi) – Boettger, p. 36.
1969 *Neptunea hoernesi* (Bellardi) – Csepreghy-Meznerics, p. 84, pl. 4, figs 10–14.
non 1971 *Neptunea hoernesi* (Bellardi) – Stancu *et al*., pl. 8, fig. 5 [= *Eosipho cinguliferus* (De Cristofori et Jan, 1832)].
2016 *Chrysodomus hoernesi* Bellardi – Brunetti & Della Bella, fig. 19F.

Material – M.59.2117/1–2., M.60.8019/1–2., M.60.8035., M.60.8048/1–2., M.60.8490., M.60.10188. (Lăpugiu de Sus).

Remarks – The generic arrangement of the species has been discussed in the literature (Harzhauser *et al.* 2014; Brunetti & Della Bella 2016). Based on the morphological similarity of *hoernesi* and *Chrysodomus* (*Sipho*) *smithi* (Schepman), the type species of *Eosipho*, Bellardi's species is placed within this genus in this paper. The specimens of the gastropod assemblage of Lăpugiu de Sus bear stronger spiral sculpture than those of Hörnes' material from the Austrian North Alpine Foreland and Vienna basins (see Hörnes 1853, pl. 31, fig. 1). *Eosipho hoernesi* differs from *E. cinguliferus* by possessing a more elongate shell with higher spire, and bearing finer and denser spiral cords. The middle Miocene *Eosipho bombiccii* (Nelli) from Italy is a very similar form but distinguishable by less rounded whorls and less curved siphonal canal (Nelli 1903, pl. 9, figs 11–12).

Distribution – Middle–late Miocene. Badenian: Central Paratethys (Austria, Hungary, and Romania), Tortonian: Mediterranean Sea (Italy).

Family Tudiclidae Cossmann, 1901
Genus *Euthria* Gray, 1850

Euthria adunca (Bronn, 1831)
(Figs 24–25)

1890 *Fusus (Euthria) aduncus* Bronn – Hoernes & Auinger, p. 259, pl. 31, figs 5–8.
1906 *Euthria adunca* (Bronn) – Boettger, p. 33.
1994 *Euthria* (*Euthria*) *adunca* (Bronn) – Nikolov, p. 53, pl. 2, figs 9–10.
1995 *Euthria adunca* (Bronn) – Bałuk, p. 243, pl. 34, fig. 7.
2016 *Euthria adunca* (Bronn) – Brunetti & Della Bella, p. 10, fig. 5/A–F (*cum syn*.).

Material – M.59.2120., M.59.2114., M.59.2223/1–2., M.60.8025., M.60.8054/1–2., M.68.516. (Lăpugiu de Sus), M.59.2145., M.60.7068. (Coşteiu de Sus).

Remarks – The morphological variability of the species was discussed by Brunetti & Della Bella (2016). *Euthria adunca* differs from its Miocene congeners by large, elongate shell with rounded spire whorls bearing pronounced axial ribs.

Distribution – Middle Miocene–Pleistocene. Badenian: Central Paratethys (Austria, Bulgaria, Poland, and Romania), Tortonian–Pleistocene: Mediterranean Sea (Italy), Pliocene: NE Atlantic (France).

Euthria curvirostris (Grateloup, 1845)
(Figs 26–27)

1995 *Euthria intermedia* – Bałuk, pl. 34, fig. 10 *only* (non Michelotti).
1966 *Euthria* (*Euthria*) *cornea* var. *curvirostris* Grateloup – Symeonidis, p. 281, pl. 9, figs 6–7.
2010 *Euthria* sp. – Caze *et al*., fig. 5/J.
2013 *Euthria curvirostris* (Grateloup) – Landau *et al*., p. 165, pl. 25, figs 2–3, pl. 64, fig. 5, pl. 79, fig. 10 (*cum syn.*).
2018 *Euthria curvirostris* (Grateloup) – Kovács, figs 15–18.

Material – M.60.8031/9., M.60.8054/3., M.64.232., M.68.518/1–2. (Lăpugiu de Sus), M.59.2146., M.60.7159/1., M.60.7175. (Coşteiu de Sus).

Remarks – *Euthria curvirostris* is characterized by slightly shouldered whorls, and a relatively long, strongly recurved siphonal canal. Based on the taxonomic revision arranged by Landau *et al.* (2013) the frequent occurrence of the species in the Badenian Central Paratethys has been confirmed. Beside the Letkés material (N Pannonian Basin) (Kovács 2018), it was figured from the mollusc assemblage of Lăpugiu de Sus as *Euthria* sp. by Caze *et al.* (2010, fig. 5/J.), and the *E. intermedia* specimen illustrated by Bałuk (1995, pl. 34, fig. 10) is also a representative of *E. curvirostris* (Kovács 2018).

Distribution – Middle Miocene. Langhian–Serravallian: NE Atlantic (France), Badenian: Central Paratethys (Hungary, Poland, and Romania), Serravallian: Proto-Mediterranean Sea (Greece, Turkey).

Euthria fuscocingulata (Hoernes et Auinger, 1890)
(Figs 28–29)

1906 *Euthria fuscocingulata* (Hoernes et Auinger) – Boettger, p. 33.
1960 *Euthria* (*Euthria*) *fuscocingulata* (Hoernes in Hoernes et Auinger) – Kojumdgieva, p. 171, pl. 43, fig. 12.
2010 *Euthria* (*Euthria*) *fuscocingulata* (Hoernes in Hoernes et Auinger) – Caze *et al*., fig. 5/I.

Material – M.59.2220/1–2., M.60.8007/1–5., M.60.8031/3–8., M.68.510/3., M.68.513/1–2., M.68.515/1–12., M.68.517/1–2., M.68.627. (Lăpugiu de Sus), M.59.2144., M.60.7065. (Coşteiu de Sus).

Remarks – *Euthria fuscocingulata* is a very distinctive species bearing 8–9 reddish-brown, widely spaced, narrow spiral bands on the last whorl.

Distribution – Middle Miocene. Badenian: Central Paratethys (Austria, Bulgaria, and Romania).

Euthria intermedia (Michelotti, 1847)
(Figs 30–31)

1853 *Fusus intermedius* Michelotti – Hörnes, p. 281, pl. 31, figs 4–5.
1890 *Fusus* (*Euthria*) *intermedia* (Michelotti) – Hoernes & Auinger, p. 259.
1995 *Euthria intermedia* (Michelotti) – Bałuk, p. 243, pl. 34, figs 8–9, 11–12 *only* [fig. 10: *Euthria curvirostris* (Grateloup, 1845)].
2018 *Euthria intermedia* (Michelotti) – Kovács, figs 10–12, 19–20.

Material – M.59.2221/1–2., M.60.8031/1–2., M.60.8054/4–8., M.60.10339. (Lăpugiu de Sus), M.59.2143., M.60.7066., M.60.7067/1–2., M.60.7159/2. (Coşteiu de Sus).

Remarks – *E. intermedia* is variable in shell width, but differs from its congeners by rounded last whorl without subsutural concavity, short and less curved siphonal canal, somewhat rounded spire whorls, reticulate sculpture on the early spire whorls, and generally bearing spiral cords on the last three whorls. According to Bałuk (1995) the small size *Euthria subnodosa* (Hoernes et Auinger) is a junior synonym of *E. intermedia*.

Distribution – Middle Miocene. Langhian–Tortonian: Proto-Mediterranean Sea (Italy), Badenian: Central Paratethys (Austria, Bosnia, Bulgaria, Czechia, Hungary, Poland, Romania, and Slovenia).

Euthria puschi (Andrzejowski, 1830)
(Figs 32–33)

1853 *Fusus puschi* Andrzejowski – Hörnes, p. 282, pl. 31, fig. 6.
1890 *Fusus* (*Euthria*) *puschi* Andrzejowski – Hoernes & Auinger, p. 259.
1902 *Euthria puschi* (Andrzejowski) – Boettger, p. 36.
2013 *Euthria puschi* (Andrzejowski) – Landau *et al*., p. 165, pl. 25, figs 4–5 (*cum syn*.).
2018 *Euthria puschi* (Andrzejowski) – Kovács, figs 21–22.

Material – M.60.7822/1., M.60.8010/1–2., M.60.8052/1–7., M.60.8055/1–5., M.60.8069/1–4., M.60.8428/1–4., M.60.8466., M.60.10191/1–2., M.68.513/3–8. (Lăpugiu de Sus), M.59.2249., M.60.7064., M.60.7131., M.60.10235. (Coşteiu de Sus), M.60.8113. (Nemeşeşti).

Remarks – *Euthria puschi* is distinguishable from its congeners by a tuberculate spiral sculpture. It is the most common *Euthria* species in the Central Paratethys.

Distribution – Early–middle Miocene. Karpatian: Central Paratethys (Austria), Badenian: Central Paratethys (Austria, Bosnia, Bulgaria, Croatia, Czechia, Hungary, Poland, Romania, and Ukraine). Serravallian: Proto-Mediterranean Sea (Turkey).

Genus *Tudicla* Röding, 1798

Tudicla rusticula (Basterot, 1825)
(Figs 34–35)

1853 *Pyrula rusticula* Basterot – Hörnes, p. 266, pl. 27, figs 1–10.
1890 *Pyrula* (*Spirilla*) *rusticula* Basterot – Hoernes & Auinger, p. 243.
1902 *Spirillus rusticula* (Basterot) – Boettger, p. 35.
1964 *Tudicla rusticula* (Basterot) – Răileanu & Negulescu, pl. 14, fig. 2.
2002 *Tudicla rusticula* (Basterot) – Harzhauser, p. 108, pl. 9, fig. 11 (*cum syn.*).
2021 *Tudicla rusticula* (Basterot) – Lozouet, p. 36, pl. 43, figs 11–14.

Material – M.60.6924., M.60.6960/1–2. (Coşteiu de Sus).

Remarks – This distinctive species is characterized by a high morphological variability in the development of the last whorl (rounded to keeled, bearing one or two rows of tubercles – see Hörnes 1853, pl. 27).

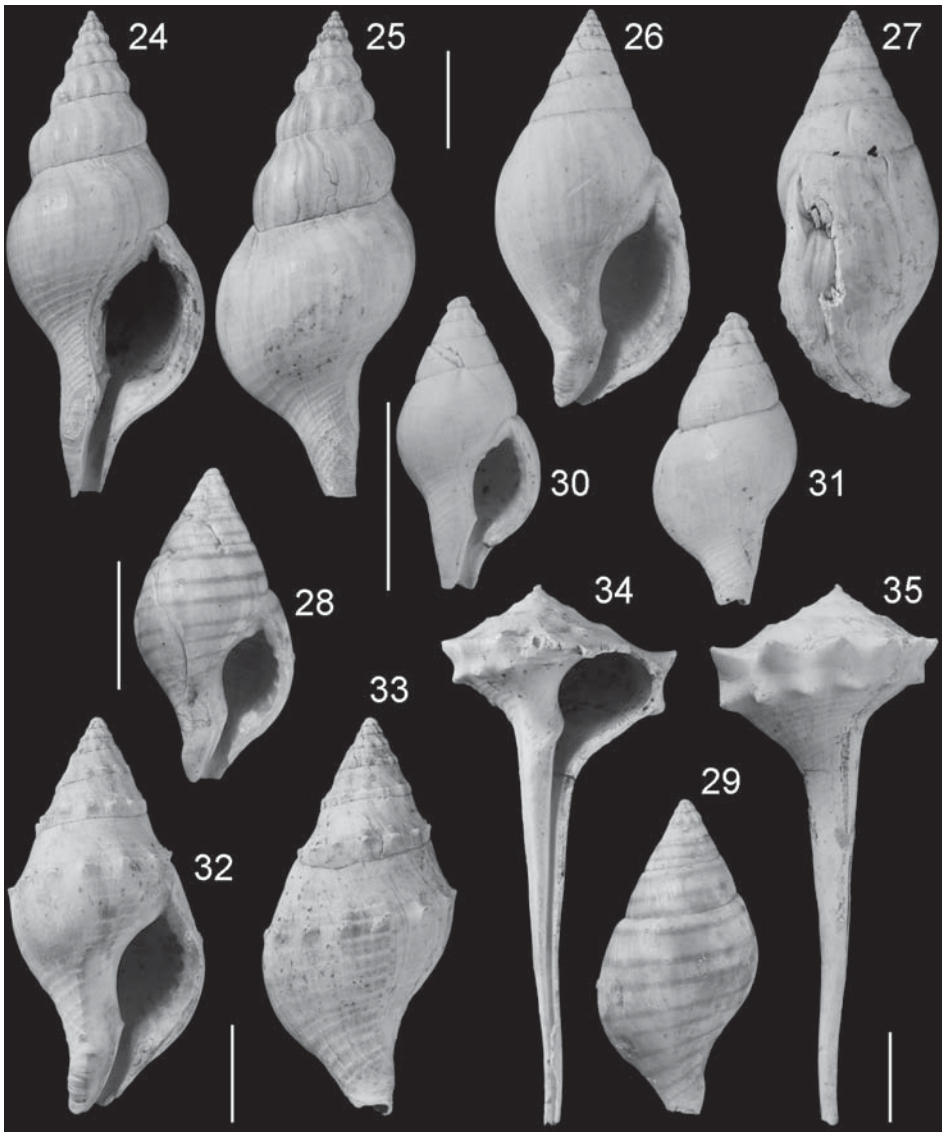
Distribution – Late Oligocene–Miocene. Middle Miocene range: Badenian: Central Paratethys (Austria, Hungary, Poland, Romania, Slovenia, and Ukraine).

Family Fasciolariidae Gray, 1853
Subfamily Fasciolariinae Gray, 1853
Genus *Aurantilaria* Snyder *et al*., 2012

Aurantilaria tarbelliana (Grateloup, 1845)
(Figs 36–38)

1854 *Fasciolaria tarbelliana* Grateloup – Hörnes, p. 298, pl. 33, figs 1–4.
1890 *Fasciolaria tarbelliana* Grateloup varietas *inermis* – Hoernes & Auinger, p. 262, pl. 30, fig. 5.
1890 *Fasciolaria tarbelliana* Grateloup varietas *nodosa* – Hoernes & Auinger, p. 262, pl. 30, figs 6–7.
1902 *Fasciolaria tarbelliana* Grateloup – Boettger, p. 37.
2013 *Aurantilaria tarbelliana* (Grateloup) – Landau *et al*., p. 197, pl. 31, fig. 1 (*cum syn.*).

Material – M.60.8025., M.60.8028., M.60.8043., M.60.8060., M.60.9678., M.60.10190., M.68.608. (Lăpugiu de Sus), M.68.8., M.60.6889/1–2. (Coşteiu de Sus).



Figs 24–25. *Euthria adunca* (Bronn), M.60.7068., apertural and abapertural views, SL 50. – **Figs 26–27.** *Euthria curvirostris* (Grateloup), M.68.518., apertural and abapertural views, SL 41. – **Figs 28–29.** *Euthria fuscocingulata* (Hoernes et Auinger), M.60.8031., apertural and abapertural views, SL 25. – **Figs 30–31.** *Euthria intermedia* (Michelotti), M.60.7067/1., apertural and abapertural views, SL 15.7. – **Figs 32–33.** *Euthria puschi* (Andrzejowski), M.60.10191., apertural and abapertural views, SL 41. – **Figs 34–35.** *Tudicla rusticula* (Basterot), M.60.6960., apertural and abapertural views, SL 60.2. Scale bars: 10 mm

Remarks – The taxonomic revision of the species was arranged by Snyder *et al.* (2012), while the distribution of the genus in the European Miocene was discussed in detail by Landau *et al.* (2013). The Central Paratethyan material of *Aurantilaria tarbelliana* is characterized by a moderate morphological variability in the development of the shoulder of the last whorl (rounded to nodose) (see Hoernes & Auinger 1890; Strausz 1966).

Distribution – Miocene–early Pliocene. Burdigalian–Langhian: NE Atlantic (France), Badenian: Central Paratethys (Austria, Bulgaria, Hungary, Poland, and Romania), Serravallian: Proto-Mediterranean Sea (Turkey), Tortonian: NE Atlantic (Portugal), Tortonian–Messinian: Proto-Mediterranean Sea (Italy), Zanclean: NE Atlantic and W Mediterranean Sea (Spain).

Subfamily Fusininae Wrigley, 1927
Genus *Angustifusus* Vermeij et Snyder, 2018

Angustifusus vindobonensis (Hoernes et Auinger, 1890)
(Figs 39–40)

1853 *Fusus semirugosus* – Hörnes, p. 294, pl. 32, figs 8–10 (non Bellardi et Michelotti).
1890 *Fusus vindobonensis* – Hoernes & Auinger, p. 252, pl. 31, fig. 10.
1906 *Fusus vindobonensis* Hoernes et Auinger – Boettger, p. 48.
1960 *Fusus* (*Fusus*) *vindobonensis* Hoernes et Auinger – Kojumdgieva, p. 190, pl. 46, fig. 5.
1968 *Fusus* (*Fusus*) *vindobonensis* Hoernes et Auinger – Stancu & Andreescu, pl. 5, fig. 57.
1995 *Fusinus vindobonensis* (Hoernes et Auinger) – Bałuk, p. 246, pl. 35, fig. 8.
2018 *Angustifusus vindobonensis* (Hoernes et Auinger) – Vermeij & Snyder, p. 71, fig. 19.

Material – M.59.2116., M.59.2121., M.60.8029/1–6., M.60.8047/1–4., M.68.512/1. (Lăpugiu de Sus), M.59.2250., M.60.7145/1–6., M.60.7148/1–3., M.60.10837. (Coşteiu de Sus), M.60.8130/1–2. (Nemeşeşti).

Remarks – *Angustifusus vindobonensis* is widespread in the Central Paratethys. It is distinguishable from the similar but very rare *Angustifusus hoessi* (Hoernes et Auinger) by higher spire, much finer spiral threads on penultimate and last whorls, and denser axial ribs.

Distribution – Middle Miocene. Badenian: Central Paratethys (Austria, Bulgaria, Hungary, Poland, and Romania).

Genus *Streptochetus* Cossmann, 1889

Streptochetus ornatus (d'Orbigny, 1852)
(Figs 41–42)

1845 *Fasciolaria valenciennesii* – Grateloup, pl. 23, fig. 4.
1853 *Fusus valenciennesi* Grateloup – Hörnes, p. 287, pl. 31, figs 13–15.

1890 *Fusus valenciennesi* Grateloup – Hoernes & Auinger, p. 253.
1906 *Fusus valenciennesi* Grateloup – Boettger, p. 47.
1966 *Fusus* (*Streptochetus*) *valenciennesi* Grateloup – Strausz, p. 347, pl. 27, figs 5–10.
1966 *Latirus crassus* – Strausz, pl. 27, fig. 11, pl. 28, fig. 1 (non Michelotti).
2013 *Streptochetus ornatus* (d'Orbigny) – Landau *et al.*, p. 201, pl. 31, figs 7–9, pl. 67, fig. 9, pl. 80, fig. 1 (*cum syn.*).

Material – M.59.2112., M.59.2227/1–3., M.60.8026/1–2., M.60.8027/1–6., M.60.8048/3., M.60.8051/1–6., M.60.8056/1., M.60.8079/1., M.68.509/1–2., M.68.514. (Lăpugiu de Sus), M.59.2142., M.59.2253., M.60.7142/1–2., M.60.7163. (Coşteiu de Sus), M.60.8114/1. (Nemeşeşti).

Remarks – The taxonomic revision of the taxon was carried out by Landau *et al.* (2013). The *Latirus crassus* specimen figured by Strausz (1966, pl. 27, fig. 11, pl. 28, fig. 1) is a misidentification, the size and morphology of this specimen are identical with those of *Streptochetus ornatus*. (It is worth noting that the author of *Latirus crassus* is Michelotti and not Sismonda – Snyder 2003: 75). The two species are characterized by remarkably different shell morphology (see Bellardi 1884, pl. 2, fig. 8; Peyrot 1928, pl. 7–8).

Distribution – Miocene. Eggenburgian: Central Paratethys (Austria), Serravallian: NE Atlantic (France), Proto-Mediterranean Sea (Turkey), Badenian: Central Paratethys (Austria, Bosnia, Bulgaria, Czechia, Hungary, Poland, Romania, Serbia, and Ukraine), Tortonian: Proto-Mediterranean Sea (Italy).

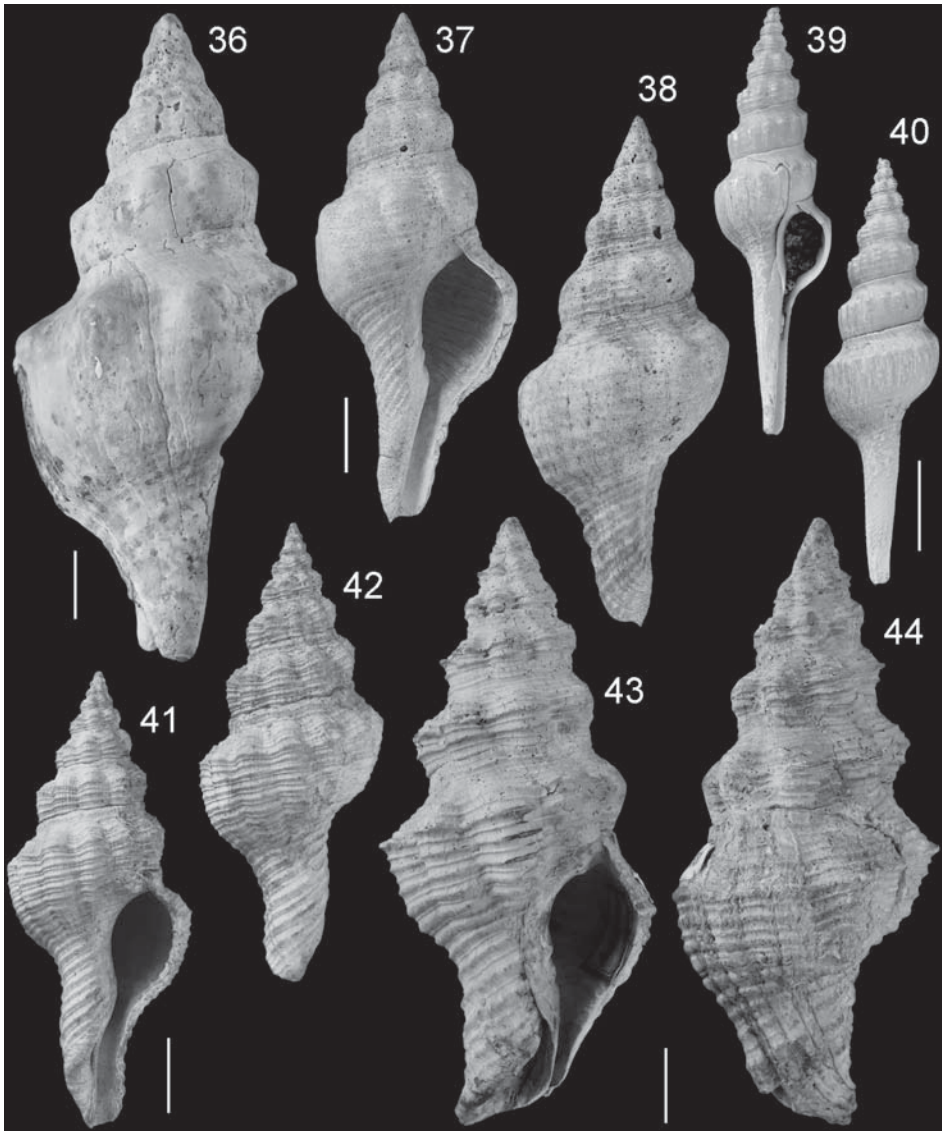
Subfamily Peristerniinae Tryon, 1880
Genus *Polygona* Schumacher, 1817

Polygona lynchi (Basterot, 1825)
(Figs 43–44)

1856 *Turbinella lynchi* Basterot – Hörnes, p. 677, pl. 52, fig. 1.
1890 *Turbinella* (*Latirus*) *lynchi* Basterot – Hoernes & Auinger, p. 267.
1928 *Lathyrus lynchi* Basterot – Peyrot, p. 79, pl. 7, figs 1–2, 5.
? 1960 *Fasciolaria* (*Pleuroploca*) *tarbelliana* – Kojumdgieva, p. 190, pl. 46, fig. 13 (non Grateloup).

Material – M.68.651/1–2. (Lăpugiu de Sus).

Remarks – The supraspecific arrangement of the species is based on Vermeij & Snyder (2006). *Polygona lynchi* is characterized by a highly variable morphology. The specimen figured herein is distinguishable from the Burdigalian NE Atlantic material (see Peyrot 1928) by its broader shell, it is closely allied in morphology to the specimen illustrated by Hörnes (1856, pl. 52, fig. 1) from the Vienna and the North Alpine Foreland basins, but its coarse spiral sculpture resembles that of *Polygona lynchoides acutecostulata* (Sacco). The fragmentary specimen present-



Figs 36–38. *Aurantilaria tarbelliana* (Grateloup). – **Fig. 36.** M.60.8043., abapertural view, SL 96. – **Figs 37–38.** M.60.10190., apertural and abapertural views, SL 67.6. – **Figs 39–40.** *Angustifusus vindobonensis* (Hoernes et Auinger), M.60.7148., apertural and abapertural views, SL 47.5. – **Figs 41–42.** *Streptochetus ornatus* (d'Orbigny), M.59.2142., apertural and abapertural views, SL 60.6. – **Figs 43–44.** *Polygona lynchi* (Basterot), M.68.651/1., apertural and abapertural views, SL 81. Scale bars: 10 mm

ed by Kojumdgieva (1960, pl. 46, fig. 13) differs from *Aurantilaria tarbelliana* (Grateloup) by a scalate spire with strong spiral sculpture, it probably represents *Polygona lynchi*. These specimens in Austria, Bulgaria, and Romania can be interpreted as representatives of a Central Paratethyan morphotype of the species.

Distribution – Early–middle Miocene. Burdigalian: NE Atlantic (France), Langhian: Proto-Mediterranean Sea (Italy), Badenian: Central Paratethys (Austria, Bulgaria, and Romania).

Genus *Hemipolygona* Rovereto, 1899

Hemipolygona erynacea (Peyrot, 1928) (Figs 45–46)

1854 *Turbinella subcraticulata* – Hörnes, p. 302, pl. 33, fig. 10 (non d'Orbigny).
1890 *Turbinella* (*Latirus*) *subcraticulata* – Hoernes & Auinger, p. 268 (non d'Orbigny).
? 1902 *Latirus* (*Plicatella*) *subcraticulatus* – Boettger, p. 38 (non d'Orbigny).
1928 *Lathyrus erinaceus* nov. sp. – Peyrot, p. 86, pl. 7, figs 27–28.
1956 *Lathyrus crassus vindobonensis* n. ssp. – Csepreghy-Meznerics, p. 407, pl. 7, figs 1–2.
1960 *Latirus* (*Lathyrulus*) *crassus* var. *vindobonensis* Meznerics – Kojumdgieva, p. 189, pl. 46, fig. 3.
1969 *Latirus crassus vindobonensis* Csepreghy-Meznerics – Csepreghy-Meznerics, p. 91, pl. 5, figs 34, 37.
2015 *Cantharus multicostatus transsylvanicus* – Popa *et al*., pl. 3, fig. 5 (non Hoernes et Auinger).

Material – M.59.2229/1–7., M.59.2230/1–9., M.59.6356/1., M.60.8051/7., M.60.8260/1–5., M.60.8263/1–2., M.60.8269/1–14., M.60.9785/1–5., M.60.10332., M.62.6186/1–3., M.64.225. (Lăpugiu de Sus), M.60.7147., M.60.9782/1–2., M.60.10281/1–3. (Coşteiu de Sus).

Remarks – The supraspecific arrangement of Peyrot's taxon follows Vermeij & Snyder (2006). The morphology of „*Latirus crassus vindobonensis*", the Paratethyan morphotype of *Hemipolygona erinacea* was briefly discussed by Landau *et al*. (2013: 200).

Distribution – Middle Miocene. Langhian: NE Atlantic (France), Badenian: Central Paratethys (Austria, Bulgaria, Hungary, and Romania).

Genus *Pseudolatirus* Bellardi, 1884

Pseudolatirus bilineatus (Hörnes, 1853) (Figs 47–48)

1890 *Fasciolaria bilineata* Partsch – Hoernes & Auinger, p. 264.
1906 *Lathyrus* (*Pseudolathyrus*) *bilineatus* (Partsch) – Boettger, p. 49.
2012 *Pseudolatirus bilineatus* (Hörnes) – Stahlschmidt & Fraussen, p. 86, figs 19–28.
2015 *Latirus bilineatus* (Partsch in Hauer) – Popa *et al*., p. 13, pl. 4, fig. 1.

Material – M.59.2105/1–2., M.59.6356/2–7., M.60.8008/1–15., M.60.8027/7., M.60.8045/1–5., M.62.6191/1–3., M.68.512/4. (Lăpugiu de Sus), M.59.2235/1–9., M.60.7138., M.60.7139/1–17., M.60.7152/1., M.60.7169/1–12., M.60.7211/1–5., M.62.6152. (Coşteiu de Sus).

Remarks – The species is endemic to the Central Paratethys.

Distribution – Middle Miocene. Badenian: Central Paratethys (Austria, Czechia, Hungary, Romania, and Slovakia).

Pseudolatirus boettgeri, new name
(Figs 49–56)

1906 *Fusus sublamellosus* n. sp. – Boettger, p. 47 (non Deshayes).
1934 *Fusus sublamellosus* Boettger – Zilch, p. 258, pl. 17, fig. 2.

Material – M.59.2113/1–2., M.60.8038/1–2., M.60.8079/2., M.64.413., M.68.512/5. (Lăpugiu de Sus), M.60.7141. (Coşteiu de Sus).

Remarks – The specimens illustrated herein are characterized by fusiform shell, protoconch of about three smooth and rounded whorls with two-three narrow and concave riblets in front of the junction, seven rounded teleoconch whorls, ovate aperture, outer lip with nine lirae within, columella bearing two weak folds, moderately long, recurved siphonal canal, sculpture of primary and secondary spiral cords, and slightly prosocline, broad, rounded axial ribs.

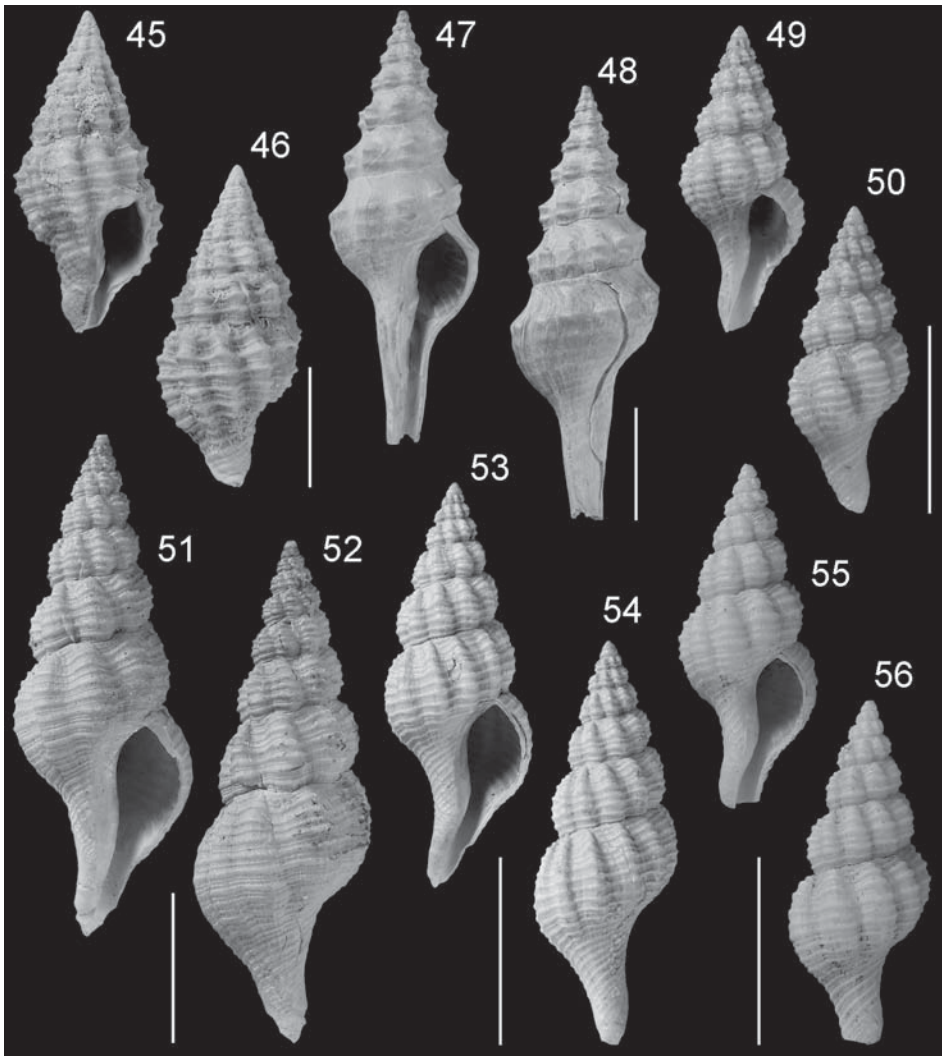
As the Miocene *Fusus sublamellosus* is a junior primary homonym of the Eocene *Fusus sublamellosus* Deshayes, 1834, a new name is proposed here in honour of the author, Oskar Boettger, German zoologist (1844–1910). Based on morphology the species is assigned to genus *Pseudolatirus*. The species resembles the holotype of „*Latirus*" *avus* Bellardi from the Miocene of the Torino Hills (see Ferrero Mortara *et al*. 1981, pl. 40, fig. 5) but the latter bears a well-developed parietal denticle and a different sculpture of narrower and denser spiral cords. *Pseudolatirus boettgeri* is a rare species, endemic to the Central Paratethys, it is known only in the Făget Basin (Romania).

Distribution – Middle Miocene. Badenian: Central Paratethys (Romania).

Pseudolatirus ligusticus (Bellardi, 1884)
(Figs 57–60)

1854 *Fusus lamellosus* – Hörnes, p. 289, pl. 31, fig. 16 (non Borson).
1890 *Fusus lamellosus* – Hoernes & Auinger, p. 255 (non Borson).
1906 *Fusus lamellosus* – Boettger, p. 47 (non Borson).
1960 *Fusus* (*Aptyxis*) *lamellosus* – Kojumdgieva, p. 190, pl. 46, fig. 13 (non Borson).
2013 *Pseudolatirus ligusticus* (Bellardi) – Landau *et al*., p. 200, fig. 24, pl. 30, figs 7–8.
2015 *Fusinus lamellosus* – Popa *et al*., pl. 3, fig. 7 (non Borson).

Material – M.59.2115/1–2., M.60.8033/1., M.60.8038/1–2., M.60.10325., M.68.509/1–4. (Lăpugiu de Sus), M.59.2141/1–3., M.60.7143/3., M.60.7150/1–8., M.60.7160., M.60.7167/1–2., M.60.7182., M.60.7205/1–9. (Coşteiu de Sus).



Figs 45–46. *Hemipolygona erynacea* (Peyrot), M.60.8269., apertural and abapertural views, SL 27.2. – **Figs 47–48.** *Pseudolatirus bilineatus* (Hörnes), M.60.8008., apertural and abapertural views, SL 38.6. – **Figs 49–56.** *Pseudolatirus boettgeri*, new name, apertural and abapertural views. – **Figs 49–50.** M.68.512., SL 16.5. – **Figs 51–52.** M.60.8079., SL 33.7. – **Figs 53–54.** M.59.2113/1., SL 21.5. – **Figs 55–56.** M.59.2113/2., SL 18.3. Scale bars: 10 mm

Remarks – The taxonomic revision of *Pseudolatirus ligusticus* was discussed by Landau *et al.* (2013), and the Badenian Paratethyan records of *Fusus lamellosus* Borson, 1821 were considered as representatives of *ligusticus*. The studied specimens are characterized by a slight variability of the strength of the spiral cords. The Pliocene *Parvofusus lamellosus* differs by shorter siphonal canal and smooth columella, while *Pseudolatirus ligusticus* bears two columellar folds.

Distribution – Middle Miocene–early Pliocene. Badenian: Central Paratethys (Austria, Czechia, Hungary, and Romania), Serravallian: Proto-Mediterranean Sea (Turkey), Zanclean: Proto-Mediterranean Sea (Italy).

Pseudolatirus rothi (Beyrich, 1856)
(Figs 61–65)

v 1954 *Fusus lamellosus* – Csepreghy-Meznerics, pl. 5, fig. 25 (non Borson).
1966 *Fusus* (*Aptyxis*) *lamellosus* – Strausz, pl. 26, fig. 19 (non Borson).
v 1969 *Fusus austriacus* – Csepreghy-Meznerics, pl. 5, figs 15–16 (non Hoernes et Auinger) (HNHM M.70.551.).
1972 *Fusus ligerianus* Peyrot – Pavnotescu *et al.*, pl. 2, fig. 12.
1994 *Streptolathyrus rothi* (Beyrich) – Cadée & Janssen, p. 84, text-figs 33–34, pl. 6, figs 4–9 (*cum syn.*).

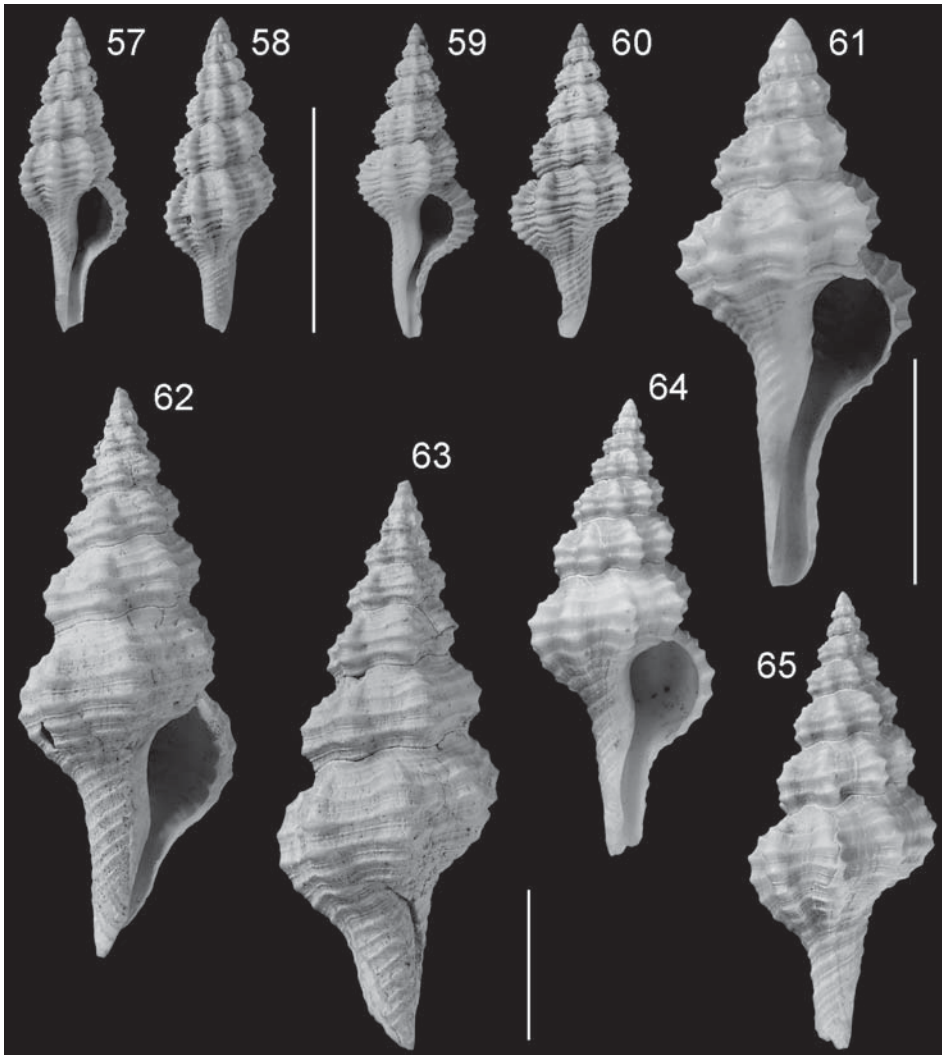
Material – M.59.2118/1–2., M.59.2119/1–2., M.59.2224/1–3., M.59.2225/1–3., M.60.8013/1., M.60.8026/3–5., M.60.8027/8–10., M.60.8039., M.60.8040/1–4., M.60.8046/1–4., M.60.8056/2–11., M.60.10397., M.60.10564/1–3., M.60.10576/1–3., M.64.395., M.68.512/2–3. (Lăpugiu de Sus), M.59.2251., M.60.6892., M.60.7143/1–2., M.60.7166., M.60.7190., M.60.10087. (Coşteiu de Sus), M.60.8077. (Nemeşeşti). Additional material from the N Pannonian Basin (Hungary) in the HNHM Collection: M.62.2955. (Mátraverebély), M.70.551. (Borsodbóta).

Remarks – The classification of the species is discussed in the literature. As the studied specimens possess multispiral protoconch and two weak columellar folds (clearly visible only on subadult shells, see Fig. 61) Beyrich's taxon is assigned herein to genus *Pseudolatirus*. The species is characterized by carinate spire whorls formed by two strong, abapical spiral cords. *Pseudolatirus rothi* is similar in size and morphology to *P. fornicatus* (Bellardi) (= *Fusus crispoides* Hoernes et Auinger) but the latter is distinguishable by more rounded whorls bearing weaker primary spiral cords. Probably the Paratethyan *Fusus crispus* and *F. crispoides* records in the literature represent *Pseudolatirus rothi*.

Gracilipurpura austriaca (Hoernes et Auinger) has paucispiral protoconch and its teleoconch whorls bear a much more elevated adapical spiral cord that forms a carinate periphery. It is worth noting that *G. austriaca* appears in the Badenian gastropod assemblage of Borsodbóta (N Pannonian Basin) (HNHM

M.70.552.), however, the illustrated specimen in Csepreghy-Meznerics (1969, pl. 5, figs 15–16) in fact represents *Pseudolatirus rothi*.

Distribution – Late Oligocene–Miocene. Chattian: North Sea Basin (Germany), Aquitanian: North Sea Basin (Denmark), Burdigalian–Langhian: North Sea Basin (Belgium, Denmark, and the Netherlands), Langhian–Tortonian:



Figs 57–60. *Pseudolatirus ligusticus* (Bellardi), apertural and abapertural views. – **Figs 57–58.** M.60.8033/1., SL 14.2. – **Figs 59–60.** M.60.7150/1., SL 14.2. – **Figs 61–65.** *Pseudolatirus rothi* (Beyrich). – **Fig. 61.** M.60.7143., apertural view, SL 12.7. – **Figs 62–63.** M.60.8056/2., apertural and abapertural views, SL 37.8. – **Figs 64–65.** M.60.8056/3., apertural and abapertural views, SL 30.6. Scale bars: 10 mm for Figs 57–60, 62–65; 5 mm for Fig. 61

North Sea Basin (Germany, the Netherlands), Badenian: Central Paratethys (Hungary, Romania).

Genus *Tarantinaea* Monterosato, 1917

Tarantinaea hoernesii (Seguenza, 1875)
(Figs 66–67)

1854 *Fasciolaria fimbriata* – Hörnes, p. 299, pl. 33, figs 5–7 (non Brocchi).
1875 *Fasciolaria hörnesii* – Seguenza, p. 280 (nom. nov. pro *Fasciolaria fimbriata* Brocchi in Hörnes 1854, p. 299, pl. 33, figs 5–7).
1890 *Fasciolaria fimbriata* – Hoernes & Auinger, p. 263 (non Brocchi).
1906 *Fasciolaria fimbriata* – Boettger, p. 48 (non Brocchi).
1960 *Fasciolaria* (*Pleuroploca*) *fimbriata* var. *hoernesi* Seguenza – Kojumdgieva, p. 187, pl. 45, figs 15, 17.
1966 *Fasciolaria* (*Pleuroploca*) *fimbriata* var. – Strausz, p. 353, pl. 29, fig. 2 (non Brocchi).
1972 *Fasciolaria* (*Pleuroploca*) *fimbriata variocarinata* – Csepreghy-Meznerics, p. 30, pl. 13, figs 15–16 *only* (non Sacco).
2013 *Tarantinaea hoernesii* (Seguenza) – Landau *et al*., p. 198, pl. 31, figs 2–3, pl. 67, fig. 7 (*cum syn.*).

Material – M.59.2228/1–11., M.60.8014/1–13., M.60.8016/1., M.60.8027/11., M.60.8263/3., M.60.8362/1–5., M.62.6125/1–3., M.62.6191/1–3., M.64.238., M.68.519/1–2. (Lăpugiu de Sus), M.59.2234/1–3., M.60.7132/1–3., M.60.7143/4., M.60.7149/1–3., M.60.7154/1–7., M.60.7161., M.60.7168/1–7., M.62.6192/1–2., M.68.8. (Coşteiu de Sus).

Remarks – Seguenza (1875)'s revision of Hörnes' „*fimbriata*" material was generally overlooked in the subsequent literature. The Mediterranean Pliocene *Tarantinaea fimbriata* (Brocchi) is distinguishable by paucispiral protoconch, higher and more stepped spire, and much weaker columellar folds.

Distribution – Middle–late Miocene. Badenian: Central Paratethys (Austria, Bulgaria, Czechia, Hungary, Poland, and Romania), Serravallian: Proto-Mediterranean Sea (Turkey), Tortonian: Proto-Mediterranean Sea (Italy).

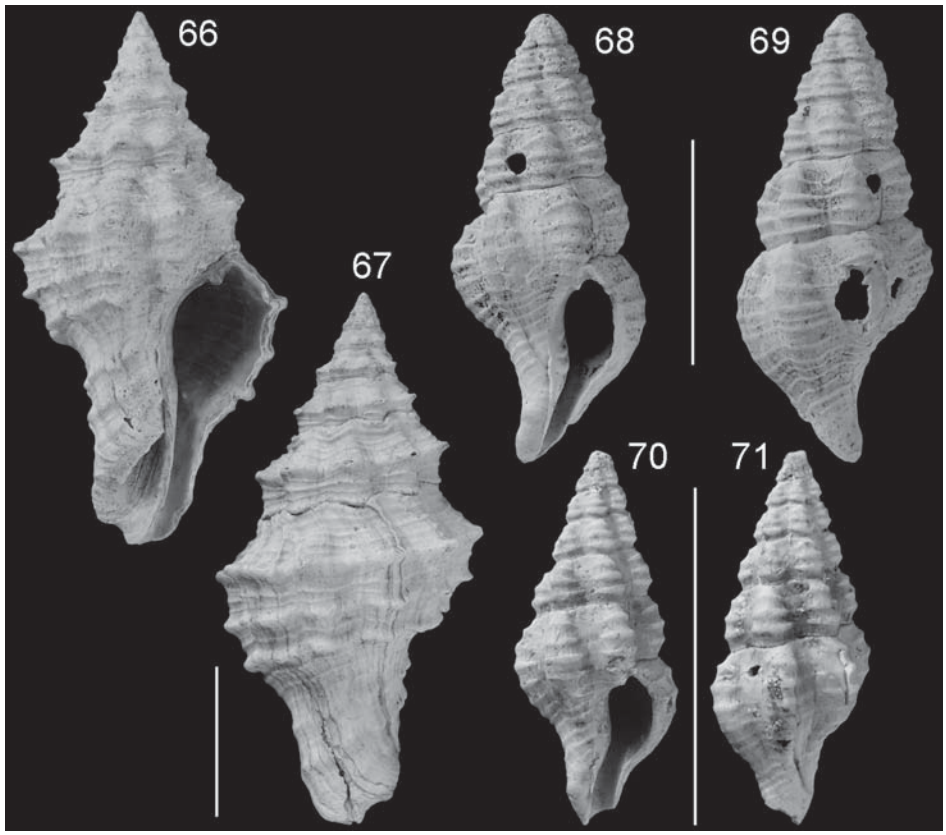
Genus *Turrilatirus* Vermeij et Snyder, 2006

Turrilatirus patruelis (Bellardi, 1884) new comb.
(Figs 68–71)

1890 *Fasciolaria moravica* nov. form. – Hoernes & Auinger, p. 266, pl. 31, fig. 9.
1906 *Lathyrus moravicus* (Hoernes et Auinger) – Boettger, p. 49.
1969 *Fasciolaria moravica* Hoernes et Auinger – Csepreghy-Meznerics, p. 90, pl. 5, figs 24, 26.
1981 *Latirus patruelis* Bellardi – Ferrero Mortara *et al*., p. 144, pl. 39, fig. 6.
1994 *Fasciolaria moravica* Hoernes et Auinger – Nikolov, p. 54, pl. 3, figs 5–7.
2006 *Latirus moravicus* (Hoernes et Auinger) – Bałuk, p. 211, pl. 14, fig. 6.

Material – M.59.2154/1–4., M.60.7165., M.60.9786., M.60.9788. (Coşteiu de Sus), M.60.8106/1–3. (Nemeşeşti).

Remarks – The close similarity between the Proto-Mediterranean *Latirus patruelis* Bellardi and the Central Paratethyan *Fasciolaria moravica* nov. form. was already underlined by Hoernes & Auinger (1890) and Sieber (1937). The protoconch of *patruelis* was not described by Bellardi; *moravica* has multispiral, conical protoconch of approx. three smooth, rounded whorls. I have studied photos of the syntype of *Latirus patruelis* (BS.017.03.063, Ferrero Mortara *et al.* 1981, pl. 39, fig. 6.) by the courtesy of Annalaura Pistarino (Museo di Geologia e Paleontologia della Università di Torino), and it seems that other morphological features of the two taxa are identical: conical spire, straight in outline, outer lip lirate within, columella with three horizontal folds,



Figs 66–67. *Tarantinaea hoernesii* (Seguenza), M.60.8014., apertural and abapertural views, SL 35.8. – **Figs 68–71.** *Turrilatirus patruelis* (Bellardi), apertural and abapertural views. – **Figs 68–69.** M.60.9788., SL 20. – **Figs 70–71.** M.59.2154., SL 11.2. Scale bars: 10 mm

short siphonal canal, sculpture of seven broad, rounded axial ribs arranged in line on teleoconch whorls, three strong primary spiral cords on early spire whorls. According to Hoernes & Auinger (1890) *moravica* differs only in its smaller size (*patruelis* SL 20 mm, *moravica* 14 mm). In fact, the *moravica* specimens recorded so far in the Paratethys do not exceed this size but the specimen shown on Figs 68–69 corresponds to Bellardi's type.

The supraspecific classification of the species has been discussed in the literature, namely it was recently mentioned as *Polygona* by Landau *et al.* (2019). As the morphology of *patruelis* agrees well with the diagnosis of *Turrilatirus* (Vermeij & Snyder 2006) the species is placed within this genus herein. The Pliocene–Recent *Turrilatirus turritus* (Gmelin), as well as the Recent *T. sanguifluus* (Reeve) and *T. nagasakiensis* (Smith) are all closely allied forms in morphology. *Turrilatirus* was recorded in the Pliocene central Mediterranean Sea (Italy, Tabanelli 2014). From stratigraphical point of view the early–middle Miocene *patruelis* is the earliest representative of the genus.

Distribution – Middle Miocene. Langhian: Proto-Mediterranean Sea (Italy), Badenian: Central Paratethys (Austria, Bulgaria, Czechia, Hungary, Poland, and Romania).

Family Melongenidae Gill, 1867
Genus *Melongena* Schumacher, 1817

Melongena cornuta (Agassiz, 1843)
(Figs 72–73)

1853 *Pyrula cornuta* Agassiz – Hörnes, p. 274, pl. 29, figs 1–3, pl. 30, figs 1–3.
1890 *Pyrula* (*Melongena*) *cornuta* Agassiz – Hoernes & Auinger, p. 247, pl. 28, figs 15–16.
2002 *Melongena cornuta* (Agassiz) – Harzhauser, p. 102, pl. 7, figs 1–3 (*cum syn.*).

Material – M.68.484. (Lăpugiu de Sus).

Remarks – The species was widespread in the Badenian Central Paratethys, and it is characterized by highly variable shell morphology. The specimen figured herein bears a concave subsutural slope, it is closely allied to the material of Nikolov (1994, pl. 5, figs 3–4) from the Badenian Lom Basin (South Carpathian Foredeep, NW Bulgaria).

Distribution – Early–middle Miocene. Aquitanian–Langhian: NE Atlantic (France), Langhian: Proto-Mediterranean Sea (Italy), Eggenburgian–Karpatian: Central Paratethys (Austria), Badenian: Central Paratethys (Austria, Bulgaria, Hungary, Poland, Romania, and Slovakia), Serravallian: Proto-Mediterranean Sea (Greece).

Family Pisaniidae Gray, 1857
Genus *Aplus* De Gregorio, 1885

Aplus exsculptus (Dujardin, 1837)
(Figs 74–75)

1853 *Murex plicatus* – Hörnes, pl. 25, figs 9–10 (non Brocchi).
1890 *Pollia exsculpta* Dujardin – Hoernes & Auinger, p. 241.
1906 *Pollia* (*Engina*) *exsculpta* (Dujardin) – Boettger, p. 32.
1966 *Cantharus* (*Pollia*) *exsculptus* (Dujardin) – Kókay, p. 58, pl. 8, fig. 10.
2013 *Anna exsculpta* (Dujardin) – Landau *et al*., p. 168, pl. 21, figs 10–11, pl. 64, fig. 8 (*cum syn.*).
2021 *Aplus exsculptus* (Dujardin) – Lozouet, pl. 41, fig. 10.

Material – M.60.10294., M.60.10331., M.64.414. (Lăpugiu de Sus), M.60.6947/1–5., M.60.6950/1–3., M.60.6999/1–10., M.60.7007., M.60.7016., M.60.10261. (Coşteiu de Sus).

Remarks – The generic arrangement of the species was clarified by Landau *et al*. (2019: 182). *Aplus exsculptus* displays a wide geographical distribution in the European Miocene appearing in the NE Atlantic, the Proto-Mediterranean, and the Central Paratethyan realms.

Distribution – Middle–late Miocene. Langhian: NE Atlantic (France), Badenian: Central Paratethys (Austria, Bulgaria, Czechia, Hungary, Poland, Romania, and Ukraine), Serravallian: Proto-Mediterranean Sea (Turkey), Tortonian: Proto-Mediterranean Sea (Italy).

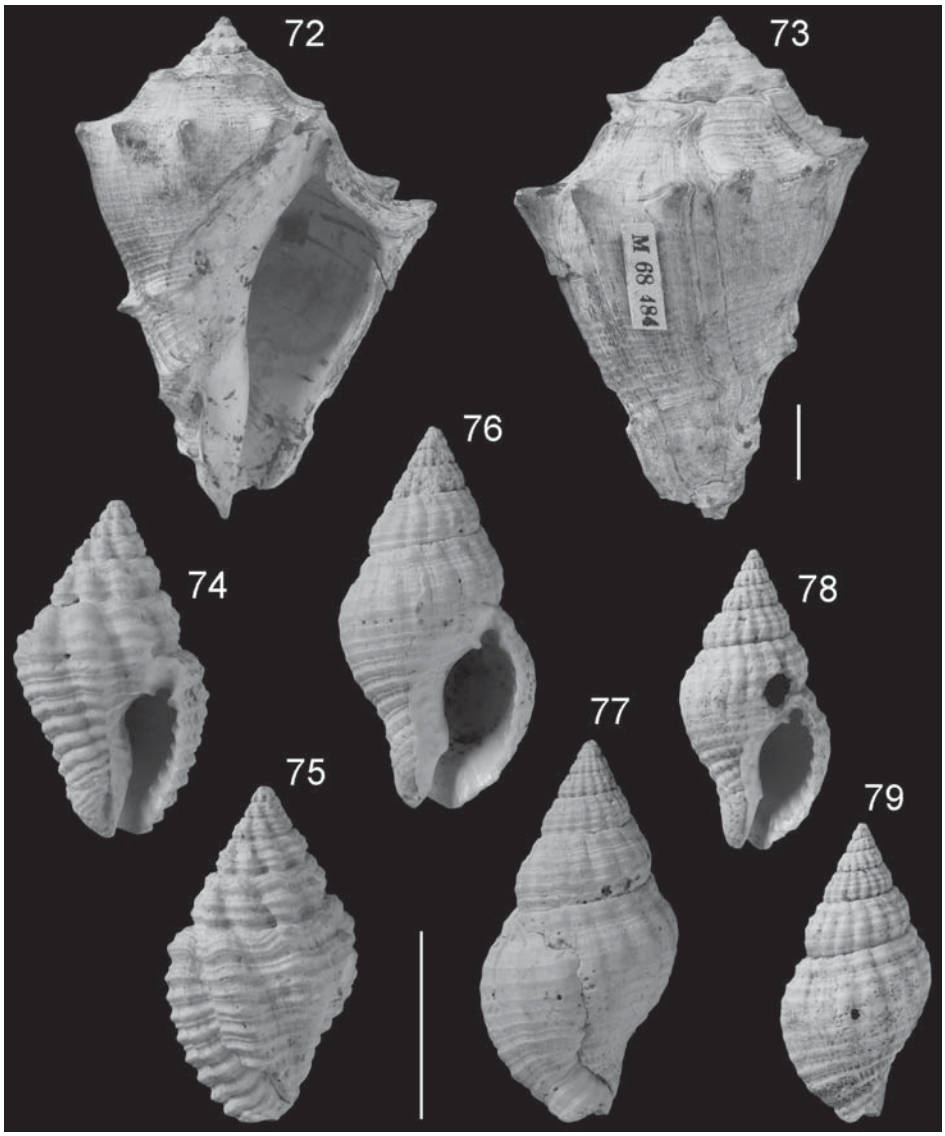
Aplus lapugyensis (Hoernes et Auinger, 1890)
(Figs 76–79)

1902 *Pollia lapugyensis* Hoernes et Auinger – Boettger, p. 34.
non 1954 *Cantharus* (*Pollia*) *lapugyensis* Hoernes et Auinger – Strausz, p. 26, pl. 4, figs 96 [= ? *Aplus exsculptus* (Dujardin, 1837)].
v non 1960 *Cantharus* (*Pollia*) *lapugyensis* (Hoernes et Auinger) – Báldi, p. 67, pl. 2, fig. 7 [= *Aplus subpusillus* (Hoernes et Auinger, 1890)].

Material – M.60.10287., M.60.10328., M.68.626. (Lăpugiu de Sus), M.59.6372/1–2., M.60.10506. (Coşteiu de Sus).

Remarks – The species was regarded as a junior synonym of *Aplus dorbigny* (Payraudeau, 1827) in the literature (Brunetti & Della Bella 2014), however, the latter is a Pleistocene–Recent species, and is distinguishable by a much stronger sculpture. The Pannonian Basin records of *Aplus lapugyensis* (Strausz 1954, Báldi 1960) are based on misidentifications. *Aplus lapugyensis* is endemic to the Făget Basin.

Distribution – Middle Miocene. Badenian: Central Paratethys (Romania).



Figs 72–73. *Melongena cornuta* (Agassiz), M.68.484., apertural and abapertural views, SL 67. – **Figs 74–75.** *Aplus exsculptus* (Dujardin), M.60.6947/1., apertural and abapertural views, SL 18.2. – **Figs 76–79.** *Aplus lapugyensis* (Hoernes et Auinger), apertural and abapertural views. – **Figs 76–77.** M.60.10328., SL 20.7. – **Figs 78–79.** M.60.10287., SL 16. Scale bars: 10 mm

Aplus transsylvanicus (Hoernes et Auinger, 1890) new comb.
(Figs 80–83)

1906 *Pollia multicostata* Bellardi var. *transsylvanica* Hoernes et Auinger – Boettger, p. 31.
1960 *Cantharus* (*Pollia*) *multicostatus* var. *transsylvanicus* (Hoernes et Auinger) – Kojumdgieva, p. 173, pl. 43, fig. 17.

Material – M.59.2000., M.60.10334/1–2. (Lăpugiu de Sus), M.59.1893., M.60.7005/1–9., M.60.10278. (Coşteiu de Sus).

Remarks – The morphology of the species is highly variable, the number of axial ribs on the last whorl varies between 9–12. The specimens illustrated herein agree with the type and Kojumdgieva's material in size but differ by bearing slightly broader axial ribs. The aperture of the similar *Aplus mariae* (Hoernes et Auinger) is much narrower, and its ribs are less in number than those of typical *A. transsylvanicus* specimens.

Distribution – Middle Miocene. Badenian: Central Paratethys (Bulgaria, Romania).

Genus *Janiopsis* Rovereto, 1889

Janiopsis angulosa (Brocchi, 1814)
(Figs 84–85)

1853 *Murex angulosus* Brocchi – Hörnes, p. 237, pl. 25, fig. 1.
1885 *Jania maxillosa* – Hoernes & Auinger, p. 230, pl. 27, figs 11–12 (non Bellardi et Michelotti).
1885 *Jania angulosa* Brocchi – Hoernes & Auinger, p. 231, pl. 27, figs 13–14.
1969 *Janiopsis angulosa* (Brocchi) – Csepreghy-Meznerics, p. 86, pl. 4, figs 7–8.
2016 *Janiopsis angulosa* (Brocchi) – Brunetti & Della Bella, p. 27, fig. 16/A–H (*cum syn.*).

Material – M.59.1895., M.59.1947., M.60.7953. (Lăpugiu de Sus), M.60.6996/4. (Coşteiu de Sus).

Remarks – The specimens in the studied collection agree well with the holotype of *Janiopsis angulosa* (refigured by Brunetti & Della Bella 2016, fig. 16/A–B). The early Miocene *Janiopsis maxillosa* (Bellardi et Michelotti, 1840) differs from *J. angulosa* by a broader shell sculptured with denser and finer spiral cords (see Brunetti & Della Bella 2016, fig. 17/A–C). This species was recorded by Hoernes & Auinger (1885) from Lăpugiu de Sus but the illustrated specimens are much closer in morphology to *Janiopsis angulosa*.

Distribution – Middle Miocene–early Pliocene. Badenian: Central Paratethys (Austria, Bulgaria, Hungary, and Romania). Tortonian–Zanclean: Proto-Mediterranean Sea (Italy).

Janiopsis labrosa (Bellardi et Michelotti, 1840)
(Figs 86–89)

1872 *Jania labrosa* (Bonelli) – Bellardi, p. 150, pl. 11, fig. 7 *only*.
non 1853 *Murex labrosus* Michelotti – Hörnes, p. 242, pl. 25, fig. 3 (= *Jania* ? *reussi* Hoernes et Auinger, 1885).
1960 *Janiopsis labrosa* var. *orientalis* n. var. – Kojumdgieva, p. 175, pl. 44, figs 3–4.
1981 *Jania labrosa* (Bellardi et Michelotti) – Ferrero Mortara *et al*., p. 43, pl. 4, fig. 8.

Material – M.59.6372/1–2., M.60.6996/1–3., M.60.7153/1–2., M.60.10506. (Coşteiu de Sus).

Remarks – The species is a new record in the Făget Basin gastropod assemblage. *Janiopsis reussi* (Hoernes et Auinger) differs from *J. labrosa* by possessing a more elongated shell with longer siphonal canal (see Hörnes 1853, pl. 25, fig. 3). The holotype of *Janiopsis labrosa* var. *orientalis* described by Kojumdgieva (1960) from the Badenian South Carpathian Foredeep (NW Bulgaria) is identical in size and morphology with the W Romanian specimens figured here. It differs from the Italian shells by being slightly more elongated; however, this difference seems only an intraspecific variety.

Distribution – Middle Miocene. Langhian: Proto-Mediterranean Sea (Italy), Badenian: Central Paratethys (Bulgaria, Romania).

Genus *Pisania* Bivona-Bernardi, 1832

Pisania transsylvanica (Hoernes et Auinger, 1884)
(Figs 90–93)

1903 *Hilda transylvanica* (sic!) Hoernes et Auinger – Cossmann, p. 106, pl. 5, figs 4–5.
1960 *Colubraria* (*Hilda*) *transsylvanica* Hoernes et Auinger – Kojumdgieva, p. 139, pl. 38, fig. 7.

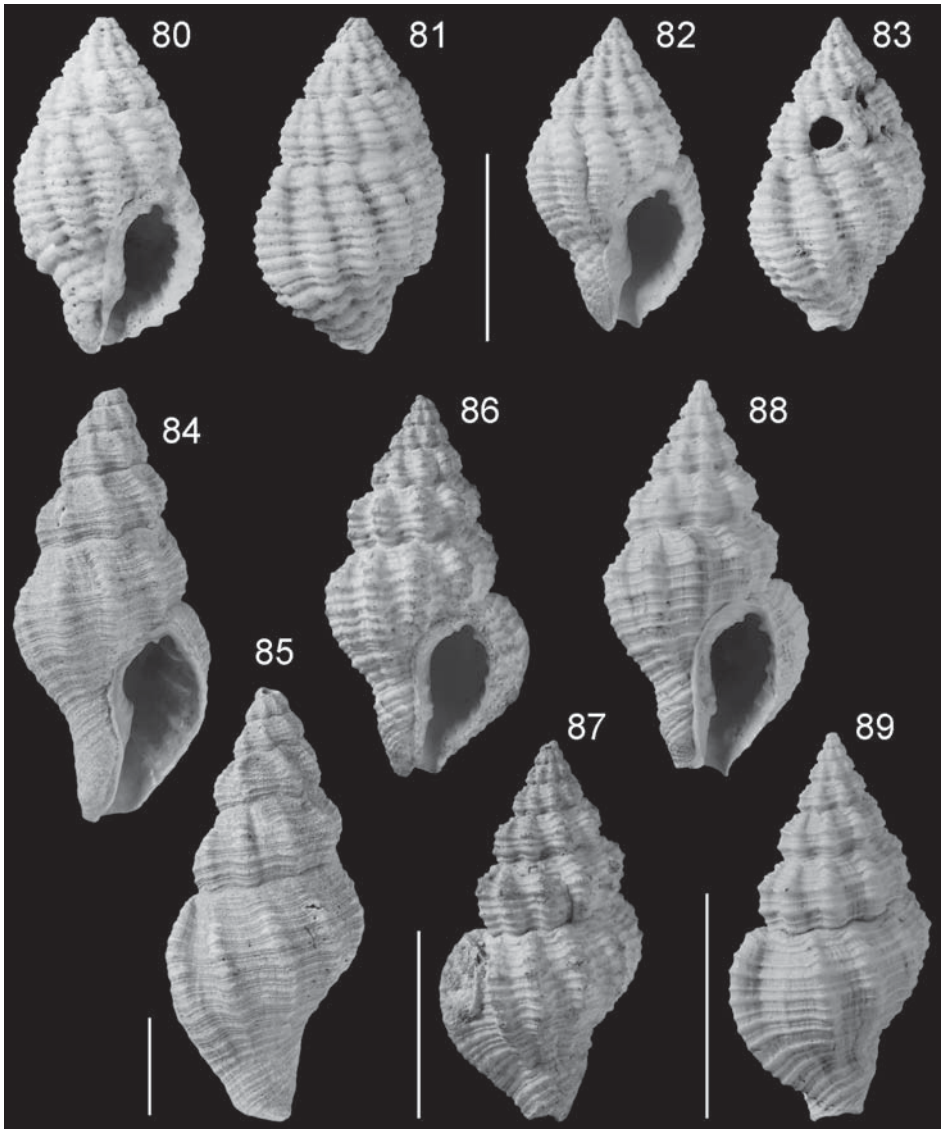
Material – M.59.1996., M.60.8547/1–2., M.60.10079., M.60.10334/1–2., M.68.611. (Lăpugiu de Sus).

Remarks – The generic arrangement of the species was clarified by Landau *et al*. (2019: 184). The NE Atlantic Burdigalian *Pisania sacyi* (Cossmann et Peyrot, 1924) is a similar form with well-developed spiral sculpture but is distinguishable by a more slender shell with much higher spire. *Pisania transsylvanica* is endemic to the Central Paratethys.

Distribution – Middle Miocene. Badenian: Central Paratethys (Bulgaria, Romania).

Unassigned Buccinoidea
Genus *Euthriofusus* Cossmann, 1901

Remarks – *Euthriofusus* was traditionally placed within the Fasciolariidae. It was removed from this family by Snyder (2003), and was assigned to the



Figs 80–83. *Aplus transsylvanicus* (Hoernes et Auinger), apertural and abapertural views. – **Figs 80–81.** M.60.7005/1., SL 18.3. – **Figs 82–83.** M.60.10278., SL 16.7. – **Figs 84–85.** *Janiopsis angulosa* (Brocchi), M.60.7953., apertural and abapertural views, SL 44.3. – **Figs 86–89.** *Janiopsis labrosa* (Bellardi et Michelotti), apertural and abapertural views. – **Figs 86–87.** M.60.10506., SL 20.5. – **Figs 88–89.** M.60.6996., SL 17.3. Scale bars: 10 mm

Buccinidae by Lozouet *et al.* (2001) and Landau *et al.* (2013). The arrangement of the taxon, however, needs further research.

Euthriofusus burdigalensis (Basterot, 1825)
(Figs 94–95)

1853 *Fusus burdigalensis* Basterot – Hörnes, p. 296, pl. 32, figs 13–14.
1890 *Fasciolaria* (*Tudicla*) *burdigalensis* Basterot – Hoernes & Auinger, p. 264.
1897 *Tudicla burdigalensis* Basterot – Boettger, p. 59.
1964 *Euthriofusus burdigalensis* (Basterot) – Răileanu & Negulescu, pl. 14, fig. 1.
2002 *Euthriofusus burdigalensis* (Defrance) – Harzhauser, p. 101, pl. 8, fig. 2 (*cum syn.*).

Material – M.60.8016/2–3., M.60.8034/1–2., M.60.8080. (Lăpugiu de Sus), M.60.7164/1–9., M.60.7170. (Coşteiu de Sus).

Remarks – *Euthriofusus burdigalensis* is widely distributed in the early Badenian Central Paratethys. The species is characterized by moderate morphological variability.

Distribution – Late Oligocene–middle Miocene. Chattian–Langhian: NE Atlantic (France), Egerian: Hungarian Paleogene Basin (Hungary), Eggenburgian–Badenian: Central Paratethys (Austria, Hungary, Romania, and Slovakia), Langhian: Proto-Mediterranean Sea (Italy), Badenian: Central Paratethys (Bosnia, Bulgaria, and Slovenia).

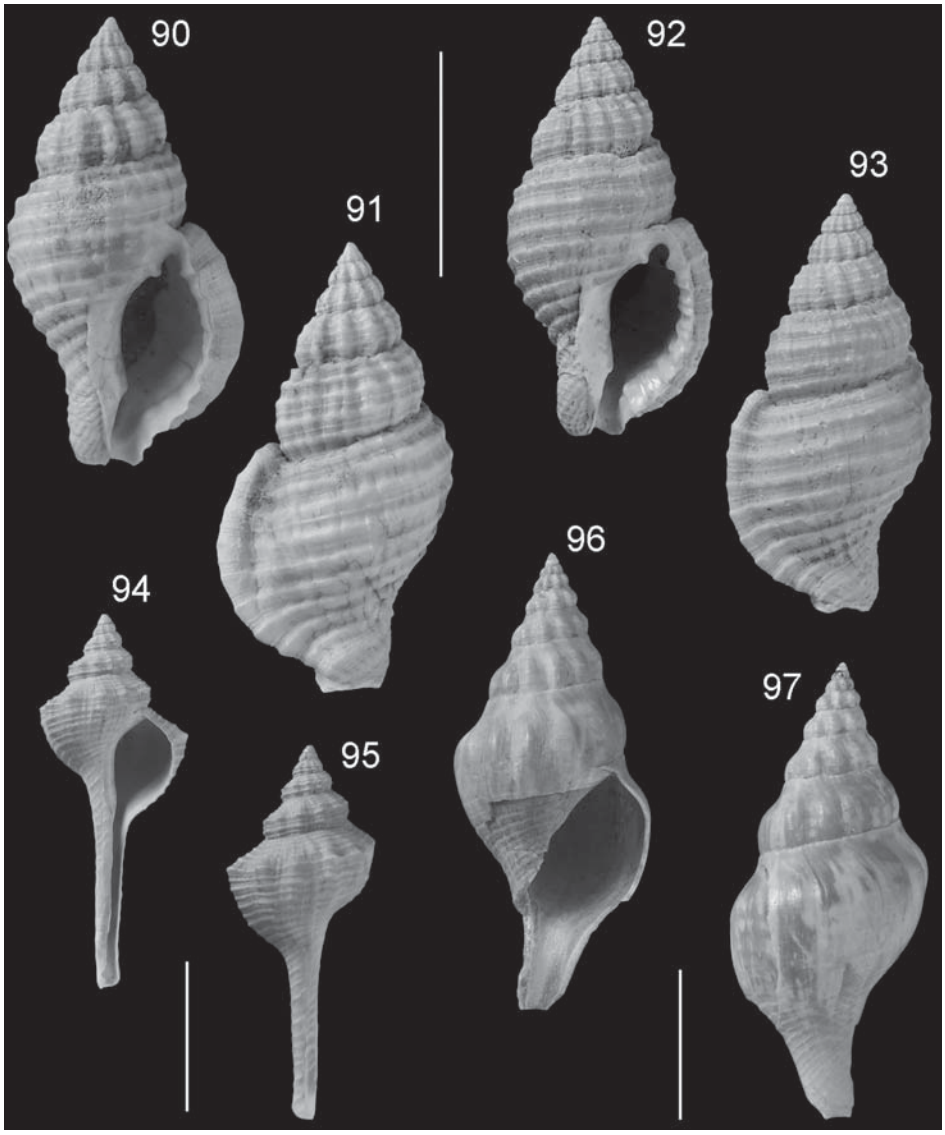
Euthriofusus virgineus (Grateloup, 1833)
(Figs 96–97)

1853 *Fusus virgineus* Grateloup – Hörnes, p. 286, pl. 31, figs 10–12.
1890 *Fusus virgineus* Grateloup – Hoernes & Auinger, p. 254, pl. 36, figs 1–7.
1966 *Fusus hoessi* – Strausz, pl. 26, figs 17–18 (non Hoernes et Auinger).
non 1970 *Euthriofusus virgineus* sensu Hörnes – Báldi & Kókay, fig. 6 [= ? *Angustifusus hoessi* (Hoernes et Auinger, 1890)].
1995 *Euthriofusus virgineus* (Grateloup) – Bałuk, p. 246, pl. 35, figs 1–5 (*cum syn.*).
2014 *Euthriofusus virgineus* (Grateloup) – Mikuž & Šoster, p. 58, pl. 2, fig. 3.

Material – M.60.7814/1–2., M.60.8012/1–2. (Lăpugiu de Sus).

Remarks – The species is characterized by moderate morphological variability of the shape of the whorls (rounded to subangulate) and the strength of the axial ribs on the last whorl. The specimen figured by Báldi & Kókay (1970, fig. 6) differs from *Euthriofusus virgineus* by possessing a constricted last whorl, it probably represents *Angustifusus hoessi* (Hoernes et Auinger).

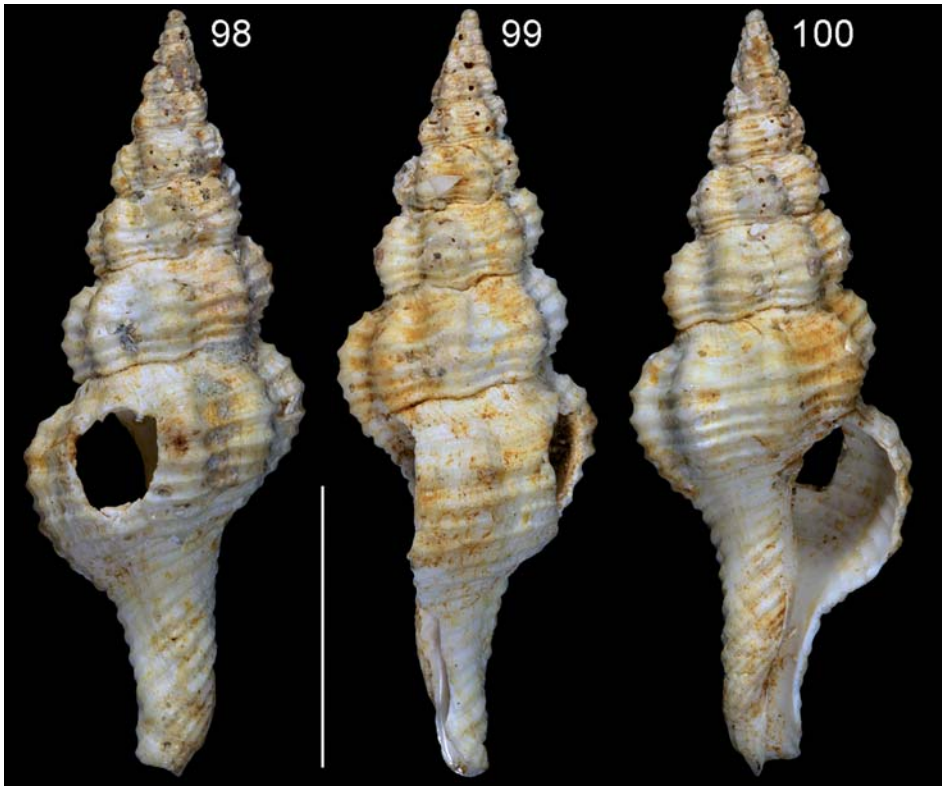
Distribution – Middle–late Miocene. Badenian: Central Paratethys (Austria, Bulgaria, Czechia, Hungary, Poland, Romania, and Slovenia), Tortonian: NE Atlantic (France).



Figs 90–93. *Pisania transsylvanica* (Hoernes et Auinger), apertural and abapertural views. – **Figs 90–91.** M.60.10079., SL 20. – **Figs 92–93.** M.60.8547/1., SL 18.5. – **Figs 94–95.** *Euthriofusus burdigalensis* (Basterot), M.60.7170., apertural and abapertural views, SL 25. – **Figs 96–97.** *Euthriofusus virgineus* (Grateloup), M.60.8012/1., apertural and abapertural views, SL 30.5. Scale bars: 10 mm

ADDITIONAL NOTE

Revising the Badenian Fasciolariidae assemblages in the palaeontological collection of the HNHM it became obvious that the holotype of *Aptyxis palatina* (Strausz, 1954) [= *Fusus* (*Streptochetus*) *clavatus palatinus* nov. var. – Strausz 1954, pp. 31, 109, pl. 4, fig. 100] is not available in public collections of Hungary. Therefore a neotype is designated herein: INV.55.78.1, Bakony Natural History Museum (Zirc) of the Hungarian Natural History Museum (Figs 98–100). The specimen came from the type locality (Várpalota, Szabó-bánya), and it is slightly smaller (SL 27 mm) than the type (SL approx. 30 mm). *Aptyxis palatina* is known from the Karpatian–Badenian deposits of Várpalota (Central Paratethys, Pannonian Basin, Hungary) (Kókay 1967) and from the Serravallian Karaman Basin (Proto-Mediterranean Sea, Turkey) (Landau *et al*. 2013).



Figs 98–100. *Aptyxis palatina* (Strausz), neotype, INV.55.78.1., Bakony Natural History Museum, abapertural, lateral and apertural views, SL 27, Photo: L. Katona. Scale bar: 10 mm

*

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REFERENCES

Báldi T. 1960: Tortonische Molluskenfauna von „Badener Tegelfazies" aus Szokolya, Nordungarn. – *Annales historico-naturales Musei nationalis hungarici* **52**: 51–99.

Báldi T. & Kókay J. 1970: Die Tuffitfauna von Kismaros und das Alter des Börzsönyer Andesitvulkanismus. – *Földtani Közlöny* **100**: 274–284. (in Hungarian with German abstract)

Bałuk W. 1995: Middle Miocene (Badenian) gastropods from Korytnica, Poland; Part II. – *Acta Geologica Polonica* **45**(3–4): 153–255.

Bałuk W. 2006: Middle Miocene (Badenian) gastropods from Korytnica, Poland; Part V Addenda et Corrigenda ad Prosobranchia. – *Acta Geologica Polonica* **56**(2): 177–220.

Bellardi L. 1872: I Molluschi dei Terreni terziari del Piemonte e della Liguria I. – *Memorie della Reale Accademia delle Scienze di Torino*. ser. 2, **27**: 1–264.

Bellardi L. 1884: I Molluschi dei Terreni terziari del Piemonte e della Liguria IV. – *Memorie della Reale Accademia delle Scienze di Torino*. ser. 2, **37**: 1–62.

Boettger O. 1897–1907: Zur Kenntnis der Fauna der mittelmiocänen Schichten von Kostej im Krassó-Szörényer Komitat. – *Verhandlungen und Mitteilungen des siebenbürgischen Vereins für Naturwissenschaften zu Hermannstadt* 1897: **46**(1896): 49–66; 1902: **51**(1901): 1–200; 1906: **54**(1904): 1–99; 1907: **55**(1905): 101–244.

Brunetti M. & Della Bella G. 2014: La famiglia Buccinidae Rafinesque, 1815 nel Plio-Pleistocene italiano: i generi *Aplus* De Gregorio, 1884, *Engina* Gray, 1839 e *Gemophos* Olsson & Harbinson, 1953 (Gastropoda). – *Bollettino Malacologico* **50**: 1–22.

Brunetti M. M. & Della Bella G. 2016: Revisioni di alcuni generi della famiglia Buccinidae Rafinesque, 1815 nel Plio-Pleistocene del Bacino Mediterraneo, con descrizione di tre nuove specie. – *Bollettino Malacologico* **52**: 3–37.

Cadée M. C. & Janssen A. W. 1994: A taxonomic revision of NW European Oligocene and Miocene Fasciolariidae traditionally included in the genus *Streptochetus* (Mollusca, Gastropoda). – *Contributions to Tertiary and Quaternary Geology* **31**(2–4): 31–107.

Caze B., Saint Martin J.-P., Merle D. & Saint Martin S. 2010: Interet des motifs colores residuels des coquilles de mollusques pour la valorisation des sites paleontologiques et des collections: l'exemple du Badenien de Roumanie. – In: Saint Martin J.-P., Saint Martin S., Oaie G., Seghedi A. & Grigorescu D. (Coord.): *Le patrimoine paleontologique*. GeoEcoMar, Bucarest, pp. 27–38.

Cossmann M. 1903: *Essais de paléoconchologie comparée. 5.* – Paris, The author & de Rudeval, 215 pp.

Csepreghy-Meznerics I. 1954: A keletcserháti helvéti és tortónai fauna. (Helvetische und Tortonische fauna aus dem Östlichen Cserhátgebirge.) – *Jahrbuch der Ungarischen Geologischen Anstalt* **41**(4): 1–129, (130–185).

Csepreghy-Meznerics I. 1956: Die Molluskenfauna von Szob und Letkés. – *Jahrbuch der Ungarischen Geologischen Anstalt* **45**(2): 363–477.

Csepreghy-Meznerics I. 1969: Nouvelles Gastropodes et Lamellibranches pour la faune hongroise des gisements tortoniens-inférieurs de la Montagne de Bükk. – *Annales historico-naturales Musei nationalis hungarici, Pars Mineralogica et Palaeontologica* **61**: 63–127.

Csepreghy-Meznerics I. 1972: La faune Tortonienne-Inférieure des gisements tufiques de la Montagne de Bükk: Gastéropodes II. – *Egri Múzeum Évkönyve* **8**(1971–1972): 26–46.

Ferrero Mortara E., Montefameglio L., Pavia G. & Tampieri R. 1981: *Catalogo dei tipi e degli esemplari figurati della collezione Bellardi e Sacco. Parte I.* – Cataloghi VI, Museo Regionale di Scienze Naturali, Torino, 327 pp.

Grateloup J. P. S. de 1840–1847: *Conchyliologie fossile des terrains tertiaires du Bassin de l'Adour (environs de Dax),* 1. *Univalves. Atlas.* pls. 1–45 (1840); i-xx, 12 pp.; pls. 46–48 (1846). All plates published 1845, except plates 2, 4, 11 (1847). – Lafargue, Bordeaux.

Harzhauser M. 2002: Marine und brachyhaline Gastropoden aus dem Karpatium des Korneuburger Beckens und der Kreuzstettner Bucht (Osterreich, Untermiozan). – *Beiträge zur Paläontologie* **27**: 61–159.

Harzhauser M., Landau B. M., Mandic O., Kroh A., Kuttelwascher K., Grunert P., Schneider S. & Danninger W. 2014: Gastropods of an Ottnangian (Early Miocene) rocky shore in the North Alpine Foreland Basin (Allerding, Austria). – *Jahrbuch der Geologischen Bundesanstalt* **154**(1–4): 83–113.

Hoernes R. & Auinger M. 1879–1891: Die Gasteropoden der Meeres-Ablagerungen der ersten und zweiten Miocänen Mediterran-Stufe in der Österreichisch–Ungarischen Monarchie. – *Abhandlungen der k. k. geologischen Reichsanstalt* **12**: 1–382, 50 pls. Published in parts: pp. 1–52, pls 1–6 (1879), pp. 53–112, pls 7–12 (1880), pp. 113–153, pls 13–16 (1882), pp. 154–192, pls 17–22 (1884), pp. 193–232, pls 23–28 (1885), pp. 233–282, pls 29–36 (1890), pp. 283–330, pls 37–42 (1891), pp. 331–382, pls 43–50 (1891).

Hörnes M. 1851–1870: Die fossilen Mollusken des Tertiär-Beckens von Wien. – *Abhandlungen der k. k. geologischen Reichsanstalt* **3–4**: pp. 1–42, pls 1–5 (1851), pp. 43–208, pls 6–20 (1852), pp. 209–296, pls 21–32 (1853), pp. 297–382, pls 33–40 (1854), pp. 383–460, pls 41–45 (1855), pp. 461–736, pls 46–52 (1856) (3); pp. 1–479, pls 1–85 (1870) (4).

Kantor Y. I., Fedosov A. E., Kosyan A. R., Puillandre N., Sorokin P. A., Kano Y., Clark R. & Bouchet P. 2021: Molecular phylogeny and revised classification of the Buccinoidea (Neogastropoda). – *Zoological Journal of the Linnean Society*, 1–69. https://doi.org/10.1093/zoolinnean/zlab031

Kojumdgieva E. 1960: Le Tortonien du type viennois. – In: Kojumdgieva E. & Strachimirov B.: *Les fossiles de Bulgarie, VII, Tortonien,* Academie des Sciences de Bulgarie, Sofia, 246 pp.

Kókay J. 1966: Geologische und paläontologische Untersuchung des Braunkohlengebietes von Herend – Márkó (Bakony-Gebirge, Ungarn). – *Geologica Hungarica, Series Palaeontologica* **36**: 1–147.

Kókay J. 1967: Stratigraphie des Oberhelvets ("Karpatien") von Várpalota (Ungarn). – *Palaeontographia Italica* **63** (n. ser. 33): 75–111.

Kovács Z. 2018: New records of the genus *Euthria* (Mollusca, Buccinidae) in the Miocene Paratethys. – *Földtani Közlöny* **148**(2): 179–182. https://doi.org/10.23928/foldt.kozl.2018.148.2.179

Kovács Z. 2019: Muricidae (Neogastropoda) assemblages from the Middle Miocene of the Făget Basin (Romania) in the collection of the Hungarian Natural History Museum, Budapest. – *Fragmenta Palaeontologica Hungarica* **35**(2018): 111–142. https://doi.org/10.17111/FragmPalHung.2018.35.111

Kovács Z. & Balázs P. 2016: Conidae (Neogastropoda) assemblage from the Middle Miocene of the Făget Basin (Romania) in the collection of the Hungarian Natural History Museum, Budapest. – *Fragmenta Palaeontologica Hungarica* **32**(2015): 11–48.

Landau B. M., Harzhauser M., İslamoğlu Y. & Silva C. M. 2013: Systematics and palaeobiogeography of the gastropods of the middle Miocene (Serravallian) Karaman Basin, Turkey. – *Cainozoic Research* **11–13**: 584 pp.

Landau B. M., Ceulemans L. & Van Dingenen F. 2019: The upper Miocene gastropods of northwestern France, 4. Neogastropoda. – *Cainozoic Research* **19**(2): 135–215.

Lozouet P. 2021: Buccinoidea (Mollusca, Gastropoda, Neogastropoda) de l'Oligocène supérieur (Chattien) du bassin de l'Adour (Sud-Ouest de la France). – *Cossmanniana* **22**: 2–129.

Lozouet P., Lesport J.-F. & Renard P. 2001: Révision des Gastropoda (Mollusca) du Stratotype de l'Aquitanien (Miocène inf.): site de Saucats "Lariey", Gironde, France. – *Cossmannia*, Hors-série **3**, 190 pp.

Michelotti G. 1847: Description des fossiles des terrains Miocenes de l'Italie septentrionale. – *Natuurkundige Verhandelingen van de Bataafsche Hollandsche Maatschappij der Wetenschappen te Haarlem* **3**(2): 1–408.

Mikuž V. & Šoster A. 2014: Several rare Miocene gastropods from surroundings of Šentjernej in Krka Basin, Slovenia. – *Folia Biologica et Geologica* **55**(1): 51–72. (in Slovenian with English abstract)

Nelli B. 1903: Fossili miocenici del Macigno di Porretta. – *Bollettino della Società Geologica Italiana* **22**(2): 181–250.

Nikolov P. I. 1994: Some molluscs from the Badenian (Middle Miocene) west of Pleven (Central Northern Bulgaria). II. Gastropoda: order Neogastropoda. – *Geologica Balcanica* **24**(4): 45–70.

Pavnotescu V., Iliescu O. & Radu A. 1972: Tortonian fauna from the Balta Sărată (Caraş–Severin district). – *Dări de seamă ale şedinţelor* **59**, 4. Stratigrafie, 127–133. (in Romanian with English abstract)

Peyrot A. 1928: Conchologie neogenique de l'Aquitaine. – *Actes de la Société Linnéenne de Bordeaux* **79** (Supplément): 1–263.

Popa M. V., Duma A. & Săplăcan A. 2015: Badenian gastropods from the collections of the Mureş County Museum. – *Analele Stiintificeale Universitatii "Al. I. Cuza" din Iasi Seria Geologie* **60**(2) (2014): 5–30.

Răileanu G. & Negulescu V. 1964: Comparative study of the Burdigalian fauna from the Transylvanian Basin and Petroşeni Basin. – *Anuarul Comitetului Geologic* **34**(1): 159–193. (in Romanian with English abstract)

Seguenza G. 1875: Studii stratigrafici sulla Formazione pliocenica dell'Italia Meridionale (*partim*). – *Bollettino del R. Comitato Geologico d'Italia* **9–10**: 275–283.

Sieber R. 1937: Die Fasciolariidae des niederösterreichischen Miozäns. – *Archive für Molluskenkunde* **69**: 138–160.

Snyder M. A. 2003: Catalogue of the marine gastropod family Fasciolariidae. – *Academy of Natural Sciences of Philadelphia, Special Publication* **21**: 431 pp.

Snyder M. A., Vermeij G. J. & Lyons W. G. 2012: The genera and biogeography of Fasciolariinae (Gastropoda, Neogastropoda, Fasciolariidae). – *Basteria* **76**(1–3): 31–70.

Stahlschmidt P. & Fraussen K. 2012: *Crassibougia*, a new genus for *Fusus clausicaudatus* Hinds, 1844, from South Africa, with description of a new species (Gastropoda: Fasciolariidae). – *Miscellania Malacologica* **5**(5): 85–93.

Stancu I. & Andreescu E. 1968: La faune tortonienne de la région Rugi–Delineşti (Bassin de Caransebeş). – *Studii şi cercetări de geologie, geofizică, geografie, Ser. geologie* **13**(2): 455–471. (in Romanian with French abstract)

Stancu J., Gheorgian M. D. & Popescu A. 1971: Stratigraphical studies of the Miocene from the northern slope of the Danube between the Dubova and Pojejena areas (South Carpathians). – *Dări de seamă ale şedinţelor* **57**(1969–1970), 4. Stratigrafie, 119–133. (in Romanian)

Strausz L. 1954: Várpalotai felső-mediterrán csigák. (Les gastropodes du Méditerranéen supérieur (Tortonien) de Várpalota.) – *Geologica Hungarica, Series Palaeontologica* **25**: 1–84, (87–130).

Strausz L. 1966: *Die miozän-mediterranen Gastropoden Ungarns*. – Akadémiai Kiadó, Budapest, 692 pp.

Symeonidis N. 1966: Das Neogen von Ostkreta. – *Annales Géologiques des Pays Helléniques* **16**: 249–314.

Tabanelli C. 2014: La famiglia Fasciolariidae (Mollusca, Gastropoda, Neogastropoda) nella serie marina plio-pleistocenica della Romagna occidentale. – *Quaderno di Studi e Notizie di Storia Naturale della Romagna* **39**: 1–55.

Vermeij G. J. & Snyder M. A. 2006: Shell characters and taxonomy of *Latirus* and related fasciolariid groups. – *Journal of Molluscan Studies* **72**: 413–424.

Vermeij G. J. & Snyder M. A. 2018: Proposed genus-level classification of large species of Fusininae (Gastropoda, Fasciolariidae). – *Basteria* **82**(4–6): 57–82.

Vicián Z., Krock H. & Kovács Z. 2017: New gastropod records from the Cenozoic of Hungary. – *Földtani Közlöny* **147**(3): 265–282. https://doi.org/10.23928/foldt.kozl.2017.147.3.265

Watters T. 2009: A revision of the western Atlantic Ocean genera *Anna*, *Antillophos*, *Bailya*, *Caducifer*, *Monostiolum*, and *Parviphos*, with description of a new genus, *Dianthiphos*, and notes on *Engina* and *Hesperisternia* (Gastropoda: Buccinidae: Pisaniinae) and *Cumia* (Colubrariidae). – *The Nautilus* **123**(4): 225–275.

Zilch A. 1934: Zur Fauna des Mittel-Miocäns von Kostej (Banat); Typus Bestimmung und Tafeln zu O. Boettger's Bearbeitungen. – *Senckenbergiana* **16**(1): 193–302.