

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

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Abstract – Early Badenian (Middle Miocene) Conidae specimens that were collected from three SW Romanian localities (Coșteiu de Sus, Lăpușiu de Sus, Nemeșești), and deposited in the collection of the Hungarian Natural History Museum, Budapest, are revisited. 41 species are described and figured. The material shows affinity with assemblages known from the Börzsöny Mts (Hungary), from the Vienna Basin, and from northern Italy. With 112 figures and 1 table.

Key words – Badenian, Central Paratethys, Conidae, Coșteiu de Sus, Lăpușiu de Sus, Middle Miocene, Nemeșești, Neogastropoda

INTRODUCTION

The aim of this paper is the revision of the Early Badenian *Conus* material that was collected from Coșteiu de Sus, Lăpușiu de Sus, and Nemeșești (SW Romania) in the late 19th and early 20th centuries, and is deposited in the collection of the Hungarian Natural History Museum, Budapest. Immensely rich fossil materials are known from the region, however, some fossil groups that were recorded in earlier publications require taxonomical revision. The present work can contribute to the documentation of the actual diversity of the family Conidae (see NAWROT *et al.* 2015).

Coșteiu de Sus (= Kosteĵ or Felsőkastély *in Hungarian*), Lăpușiu de Sus (= Felső-Lapugy) and Nemeșești (= Nemeș or Nemesest) are well-known Middle Miocene fossiliferous localities (Fig. 1). All three are located south from the Mureș River, in the small Neogene Făget Basin that represents an eastwards extension of the Pannonian Basin. The Early Badenian fauna of the region is typical of the Central Paratethys.

Tertiary deposits of Lăpușiu with microfossils were first described by NEUGEBOREN (1846, 1847). The great geological and palaeontological importance of the site was soon recognized, so numerous papers dealt with the rich fau-

na and especially with the mollusc assemblages. *Conus* materials were described by NEUGEBOREN (1853), STUR (1863), HAUER & STACHE (1863), HALAVÁTS (1876, 1881), HOERNES (1878), HOERNES & AUINGER (1879), BOETTGER (1887), and KOCH (1889, 1898). The detailed summary of the 19th century achievements was rendered by KOCH (1900). Molluscs of Nemeșești were first listed by NEUGEBOREN (1852), delineated by HÖRNES (1853), and briefly dealt with by LÓCZY (1882). The fauna of Coșteiu was described by NEUGEBOREN (1854), and later analysed by HOERNES & AUINGER (1879), BOETTGER (1897, 1902–1907), and ZILCH (1934). New researches concerning gastropod faunas from Coșteiu, Lăpugiu or Nemeșești were presented by NIȚULESCU (1931), MOISESCU (1955), DUȘA (1967, 1969), PAPP (1976), PETRESCU *et al.* (1990), PACAUD (2003), CAZE *et al.* (2010), TĂMAȘ *et al.* (2013), and POPA *et al.* (2015). A comprehensive evaluation of the Badenian Conidae assemblage of Lăpugiu was presented by CHIRA & VOIA (2001).

The taxonomy of the conoids has been widely discussed in the literature (see BOUCHET *et al.* 2011, KOHN 2014, HENDRICKS 2015). In this paper the genus level classification of Miocene species is based on works of TUCKER & TENORIO (2009) and LANDAU *et al.* (2013). Seven genera are applied for the studied material: *Kalloconus* da Motta, *Lautoconus* Monterosato, *Monteiroconus* da Motta, *Plagioconus* Tucker et Tenorio, *Pseudonoduloconus* Tucker et Tenorio, *Varioconus* da Motta, and *Conilithes* Swainson. For species level revision we used papers of

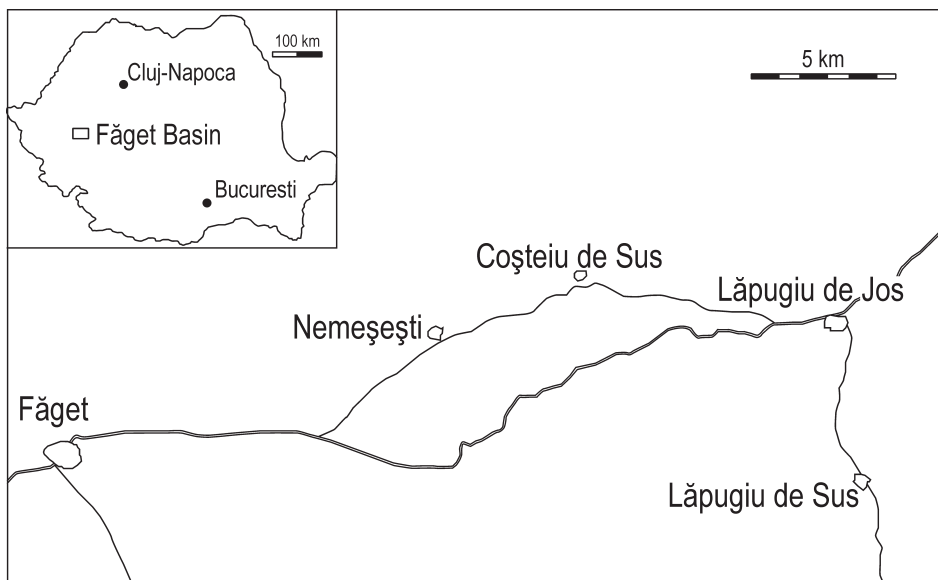


Fig. 1. The studied localities in SW Romania

HALL (1964), DAVOLI (1972, 2003), BAŁUK (1997, 2006), CHIRLI (1997), MUÑIZ (1999), VAESSEN (2010), LANDAU *et al.* (2013), KOVÁCS & VICIÁN (2014), and JANSSEN *et al.* (2014a, b). The following morphological features were taken into consideration: shell size, proportion and overall shape, characteristics of the spire and spiral whorls, types of the shoulder, sculptural features, colour pattern, and subsutural flexure.

SYSTEMATIC PALAEOONTOLOGY

As most taxa described here have been discussed in detail in the literature, only selected synonymies are cited which contain the types, the most important synonyms, and the latest papers. Only the Middle Miocene distributions of species are recorded in this paper (for detailed stratigraphic and geographic range see e.g. LANDAU *et al.* 2013 and KOVÁCS & VICIÁN 2014), the palaeogeographic scheme is based on that of LANDAU *et al.* (l. c.). The shell length (SL) is given in mm. All of the photos were taken by P. Balázs.

Superfamily Conoidea Fleming, 1822

Family Conidae Fleming, 1822

Genus *Kalloconus* da Motta, 1991

Kalloconus berghausi (Michelotti, 1847)

(Figs 2–3, 10–11)

1847 *Conus Berghausi* – MICHELOTTI, p. 342, pl. 13, fig. 9.

1879 *Conus (Dendroconus) Vaceki* nov. form. – HOERNES & AUINGER, p. 22.

1879 *Conus (Dendroconus) Voelauensis* nov. form. – HOERNES & AUINGER, p. 21, pl. 1, fig. 8, pl. 3, fig. 4.

2013 *Kalloconus berghausi* (Michelotti) – LANDAU *et al.*, p. 236, pl. 37, figs 6–8, pl. 42, fig. 1, pl. 81, fig. 1 (*cum syn.*).

Material – 60 specimens – Coşteiu: M 60.8923., 60.8935., 60.8954., 60.8960., 60.9872., 60.9874. (30 mm), 60.9878.A., 60.9911.; Lăpugiu: M 60.7443.A., 60.8289.A-C., 60.8316.A-B., 60.8321.A-E., 60.8334.A-C., 60.8335.A-I., 60.8337.A., 60.8338.A., 60.8339.A-D., 60.8345.R-T., 60.8347.A., 60.8348.A-B., 60.8361.A-B., 60.8427.A-B., 60.8919.A-D., 60.8956., 60.8968.A-C., 60.8969.A., 60.8971., 60.9852.A., 60.10134., 60.10135., 60.10203., 62.5998.

Description – SL: 18–77.5. Spire low, outline concave to convex. Spiral whorls smooth. Shoulder rounded. Body whorl broadly conical, outline convex, smooth with fine ridges at the base. Subsutural flexure asymmetrically curved. Colour pattern: spiral rows of small dots.

Remarks – The taxon was recently revised by LANDAU *et al.* (2013). By the help of colour pattern analysis, the previous wide species concepts (see e.g. HALL 1964, BAŁUK 1997) were rejected, as well as taxonomic validity of some species was verified again (see below).

Distribution – Middle Miocene: Atlantic (France), Paratethys (Austria, Bosnia, Bulgaria, Hungary, Moldavia, Poland, Romania, Serbia, Slovakia, Slovenia, Ukraine), Mediterranean (Italy, Turkey).

Kalloconus daciae (Hoernes et Auinger, 1879)
(Figs 4–5, 16–18)

1879 *Conus* (*Dendroconus*) *Daciae* nov. form. – HOERNES & AUINGER, p. 21, pl. 3, fig. 1.
2013 *Monteiroconus daciae* (Hoernes et Auinger) – LANDAU *et al.*, p. 242, pl. 38, fig. 7, pl. 39, fig. 1, pl. 41, fig. 11, pl. 42, fig. 5, pl. 78, fig. 8, pl. 81, fig. 6 (*cum syn.*).
2014 *Lithoconus planospira* (Erünał-Erentöz) – KOVÁCS & VICIÁN, p. 75, fig. 41 (*cum syn.*).

Material – 7 specimens – Coşteiu: M 60.10107., 60.10170.; Lăpugiu: M 60.8275., 60.8278.A., 60.8357.A-B., 62.6019.

Description – SL: 30–80. Spire low to flattened, apex pointed. Spiral whorls slightly concave, striate. Shoulder rounded. Body whorl conical, outline straight, smooth with fine ridges at the base. Subsutural flexure asymmetrically curved.

Remarks – The validity of the taxon was recently dealt with by LANDAU *et al.* (2013), as well as *Conus* (*Lithoconus*) *planospira* (Erünał-Erentöz, 1958) was regarded as a synonym of *K. daciae*. The species differs from *K. berghausi* in striate spiral whorls. Both *K. daciae* and *K. hungaricus* that were earlier interpreted as synonyms of *K. berghausi* by KOVÁCS & VICIÁN (2014) occurred in the Letkés assemblage (Börzsöny Mts, N Hungary).

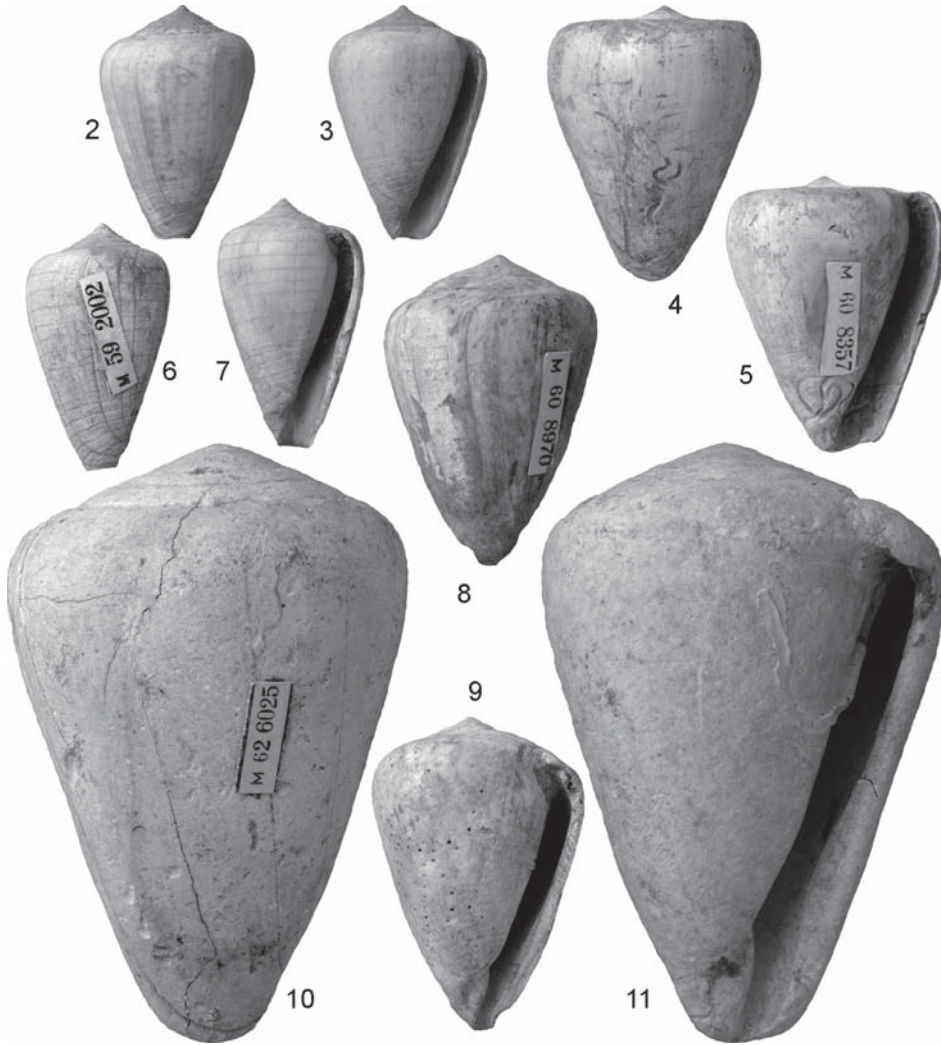
Distribution – Middle Miocene: Atlantic (France), North Sea (Belgium), Paratethys (Austria, Bulgaria, Czech Republic, Hungary, Romania, ?Slovakia), Mediterranean (Greece, Italy, Turkey).

Kalloconus fuscocingulatus (Hörnes, 1856)
(Figs 6–7)

1856 *Conus fusco-cingulatus* Bronn – HÖRNES, p. 21, pl. 1, fig. 5.
2014 *Dendroconus fuscocingulatus* (Bronn in Hörnes) – KOVÁCS & VICIÁN, p. 66, figs 43–46.

Material – 25 specimens – Coşteiu: M 60.9862.A-B., 60.10922.; Lăpugiu: M 59.2002., 60.7443.B., 60.7675.A., 60.8289.F-G., 60.8290.A-L., 60.8345.K-L., 60.8973.C., 60.10573., 60.10595.A.

Description – SL: 20–31.5. Spire of moderate height, outline concave. Spiral whorls smooth. Shoulder rounded. Body whorl ventricosely conical, outline



Figs 2–3. *Kolloconus berghausi* (Michelotti), M 60.9874., Coșteiu, SL: 30, abapertural and apertural views, (1×). – **Figs 4–5.** *Kolloconus daciae* (Hoernes et Auinger), M 60.8357.A., Lăpugiu, SL: 35, abapertural and apertural views, (1×). – **Figs 6–7.** *Kolloconus fuscocingulatus* (Hörnes), M 59.2002., Lăpugiu, SL: 31.5, abapertural and apertural views, (1×). – **Figs 8–9.** *Kolloconus hungaricus* (Hoernes et Auinger), M 60.8970., Lăpugiu, SL: 40, abapertural and apertural views, (1×). – **Figs 10–11.** *Kolloconus berghausi* (Michelotti), M 62.5998., Lăpugiu, SL: 77.5, abapertural and apertural views, (1×)

convex, smooth with dense spiral grooves at the anterior end. Subsutural flexure asymmetrically curved. Colour pattern: fine, widely spaced spiral lines.

Remarks – The species shows slight variability of the shell-width. It differs from *K. berghausi* in narrower body whorl, while from the similar *Varioconus steinabrunnensis* in narrower spire and in rounded shoulder.

Distribution – Middle Miocene: Paratethys (Austria, Bosnia, Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Serbia, Slovakia), Mediterranean (Greece, Italy, Turkey).

Kalloconus hungaricus (Hoernes et Auinger, 1879)

(Figs 8–9, 19)

1879 *Conus* (*Lithoconus*) *Hungaricus* nov. form. – HOERNES & AUINGER, p. 29, pl. 2, fig. 6, pl. 4, fig. 1.

2013 *Kalloconus hungaricus* (Hoernes et Auinger) – LANDAU *et al.*, p. 238, pl. 37, figs 9–10, pl. 38, fig. 1, pl. 41, fig. 8, pl. 42, fig. 2, pl. 81, fig. 2 (*cum syn.*).

Material – 8 specimens – Coşteiu: M 68.20.; Lăpugiu: M 60.8289.D-E., 60.8341., 60.8361.C., 60.8920., 60.8970., 60.10199.

Description – SL: 26–69. Spire flat to low, outline straight. Spiral whorls flat, striate. Shoulder rounded. Body whorl broadly and ventricosely conical, outline slightly convex, smooth with grooves at the base. Subsutural flexure asymmetrically curved, shallow.

Remarks – The validity of the species was recently treated in detail by LANDAU *et al.* (2013). *K. hungaricus* differs from *K. berghausi* in striate spiral whorls and in colour pattern.

Distribution – Middle Miocene: Paratethys (Austria, Hungary, Romania), Mediterranean (Turkey).

Kalloconus steindachneri (Hoernes et Auinger, 1879)

(Figs 12–15)

1879 *Conus* (*Dendroconus*) *Steindachneri* nov. form. (= *Hochstetteri* in text) – HOERNES & AUINGER, p. 24, pl. 3, fig. 3.

2014 *Dendroconus steindachneri* (Hoernes et Auinger) – KOVÁCS & VICIÁN, p. 67, figs 47–49 (*cum syn.*).

Material – 29 specimens – Coşteiu: M 60.8949., 60.9872., 60.9892., 60.10113., 68.18.; Lăpugiu: M 60.7675.B-D., 60.8278.B., 60.8335.J., 60.8336.A-G., 60.8338.E-F., 60.8932.A., 60.8947., 60.8969.B., 60.8973.A., 60.9852.B., 60.10117.A., 60.10150., 60.10200., 64.222.; Nemeşşti: M 60.8106.A.

Description – SL: 28–48. Spire of moderate height, outline straight. Spiral whorls smooth. Shoulder broad, rounded. Body whorl ventricosely conical, outline convex, smooth with grooves at the base. Subsutural flexure slightly curved, oblique.

Remarks – In this paper we follow the classification that was proposed by LANDAU *et al.* (2013) for the *berghausi*-group, so *Dendroconus steindachneri* is



Figs 12–15. *Kalloconus steindachneri* (Hoernes et Auinger): 12–13. M 60.8949., Coșteiu, SL: 45, abapertural and apertural views, (1×). 14–15. M 60.9892., Coșteiu, SL: 43, abapertural and apertural views, (1×). – **Figs 16–18.** *Kalloconus daciae* (Hoernes et Auinger), M 62.6019., Lăpușiu, SL: 80, apertural, apical and abapertural views, (1×)

placed within genus *Kalloconus* herein. The species shows moderate variability in width of the shoulder. It is closely allied to *K. berghausi* but differs in more elevated and straight spire.

Distribution – Middle Miocene: Paratethys (Austria, Bosnia, ?Croatia, Hungary, Romania, ?Slovenia).

Genus *Lautoconus* Monterosato, 1923

Lautoconus bitorosus (Fontannes, 1880)

(Figs 20–21)

1880 *Conus bitorosus* – FONTANNES, p. 146, pl. 8, fig. 12.

2013 *Lautoconus bitorosus* (Fontannes) – LANDAU *et al.*, p. 239, pl. 38, figs 2–4, pl. 41, fig. 9, pl. 42, fig. 3, pl. 81, fig. 3 (*cum syn.*).

Material – 65 specimens – Coșteiu: M 60.9872., 60.9877.; Lăpugiu: M 59.1858., 60.7675.E., 60.7720., 60.8276.C., 60.8277.A., 60.8289.I., 60.8294.C., 60.8299., 60.8301.A-D., 60.8303., 60.8309.A-B., 60.8313.F-G., 60.8316.C., 60.8318.A., 60.8321.F-J., 60.8337.B., 60.8338.B., 60.8339.F-I., 60.8343.A., 60.8345.I-J., 60.8353.A-J., 60.8360.A-C., 60.8361.D-I., 60.8932.B., 60.8969.C-D., 60.8973.B., 60.9852.C., 60.10132., 60.10184., 60.10311.A., 68.605.A-B.; Nemeșești: M 60.8106.B.

Description – SL: 17.4–60. Spire of low to moderate height, outline convex. Spiral whorls smooth. Shoulder subrounded. Body whorl ventricosely conical, outline convex, smooth with fine ridges at the base. Subsutural flexure asymmetrically curved, of moderate depth. Colour pattern: spiral rows of dashes.

Remarks – *M. bitorosus* varies moderately in height of the spire. It differs from *Kalloconus fuscocingulatus* in wider spire and in outline of the shoulder. The spire of *Varioconus steinabrunnensis* and of *V. vindobonensis* is more concave.

Distribution – Middle Miocene: Atlantic (France, Portugal, Spain), Paratethys (Austria, Hungary, Poland, Romania), Mediterranean (Italy, Tunisia, Turkey).

Lautoconus eschewegi (da Costa, 1866)

(Figs 22–25)

1866 *Conus Eschewegi* – DA COSTA, p. 29, pl. 9, figs 18–23.

2014 *Lautoconus belus* (d'Orbigny) – KOVÁCS & VICIÁN, p. 68, figs 4, 53–55.

2014 *Lautoconus eschewegi* (da Costa) – KOVÁCS & VICIÁN, p. 70, figs 7, 56–61 (*cum syn.*).

Material – 13 specimens – Lăpugiu: M 60.7675.F-G., 60.8316.G., 60.8337.G., 60.8339.E., P., 60.8345.M-Q., U-V.; Nemeșești: M 60.8118A.

Description – SL: 17–44. Spire narrow, low, outline convex to slightly concave. Spiral whorls smooth, convex. Shoulder rounded. Body whorl ventricosely

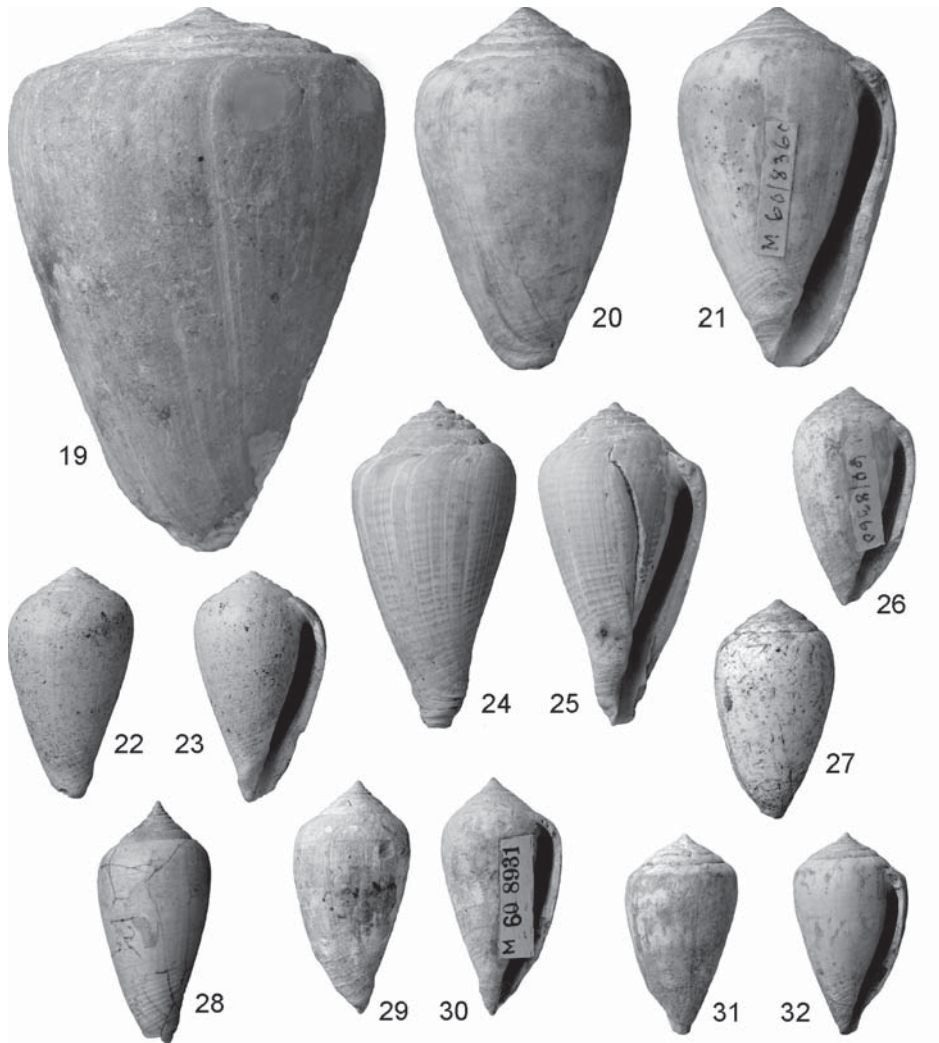


Fig. 19. *Kalloconus hungaricus* (Hoernes et Auinger), M 60.8341., Lăpugiu, SL: 70, abapertural view, (1×). – **Figs 20–21.** *Lautoconus bitorosus* (Fontannes), M 60.8360.A., Lăpugiu, SL: 47, abapertural and apertural views, (1×). – **Figs 22–25.** *Lautoconus eschewegi* (da Costa): **22–23.** M 60.7675.F., Lăpugiu, SL: 29, abapertural and apertural views, (1×). **24–25.** M 60.8118.A., Nemeșești, SL: 41.5, abapertural and apertural views, (1×). – **Figs 26–27.** *Lautoconus miovoeslauensis* (Sacco), M 60.8360.D., Lăpugiu, SL: 26, apertural and abapertural views, (1×). – **Figs 28–30.** *Lautoconus pyrula* (Brocchi): **28.** M 60.8948., Lăpugiu, SL: 31, abapertural view, (1×). **29–30.** M 60.8931., Lăpugiu, SL: 30, abapertural and apertural views, (1×). – **Figs 31–32.** *Lautoconus rotundus* (Hoernes et Auinger), M 60.8291.A., Lăpugiu, SL: 26, abapertural and apertural views, (1×)

conical, outline sigmoid, smooth with fine ridges at the base. Colour pattern consists of spiral rows of thin, widely spaced dashes. Subsutural flexure nearly diagonal.

Remarks – The species shows moderate variability in growth of the spire. *Varioconus clavatulus* differs in much higher spire, in weakly developed siphonal bend, and in asymmetrically curved subsutural flexure.

Distribution – Middle Miocene: Atlantic (Isles of Azores, Portugal, Spain), Paratethys (Hungary, Romania), Mediterranean (Italy, Morocco, Turkey).

Lautoconus miovoeslauensis (Sacco, 1893)
(Figs 26–27)

1879 *Conus* (*Chelyconus*) *ventricosus* BRONN – HOERNES & AUINGER, pl. 6, figs 5–6 *only*.

1893 *Conus* (*Chelyconus*) *miovoeslauensis* – SACCO, p. 108.

2014 *Chelyconus miovoeslauensis* (Sacco) – KOVÁCS & VICIÁN, p. 60, figs 11–15 (*cum syn.*).

Material – 4 specimens – Lăpugiu: M 60.7443.C., 60.8313.H., 60.8360.D., 60.9032.E.

Description – SL: 22–30. Spire of moderate height, narrow, outline straight to slightly concave. Shoulder rounded. Body whorl ventricosely conical, outline convex, smooth with 4–5 widely spaced spiral grooves at the base. Colour pattern consists of two different types of spiral rows that regularly alternate: a row of small dots and a row of larger dots, visible under UV light. Subsutural flexure asymmetrically curved, of moderate depth.

Remarks – *L. miovoeslauensis* differs from the closely allied *L. bitorosus* in oval shell with rounded shoulder and narrower spire, and in colour pattern. In the genus level classification we underline the relationship between the two species. The species was abundant in the Letkés assemblage with two phenotypes (smooth or granulate shells) (KOVÁCS & VICIÁN 2014). From Lăpugiu only four specimens can be recorded, all bear smooth shell.

Distribution – Middle Miocene: Paratethys (Austria, Hungary, Romania).

Lautoconus pyrula (Brocchi, 1814)
(Figs 28–30)

1814 *Conus pyrula* – BROCCHI, p. 288, pl. 2, fig. 8.

1879 *Conus* (*Chelyconus*) *Sturi* nov. form. – HOERNES & AUINGER, p. 41, pl. 5, figs 9–10.

2014 *Lautoconus pyrula* (Brocchi) – KOVÁCS & VICIÁN, p. 71, figs 62–65 (*cum syn.*).

Material – 13 specimens – Coșteiu: M 59.1926.; Lăpugiu: M 59.1847., 60.8287.A-B., 60.8289.H., 60.8316.E-F., 60.8317.C., 60.8345.G-H., 60.8931., 60.8948., 60.10153.

Description – SL: 23–37. Spire of moderate height, outline sigmoid. Apex elevated, spiral whorls smooth. Shoulder rounded. Body whorl ventricosely conical, outline slightly sigmoid, smooth with fine incised grooves at the anterior end. Subsutural flexure slightly curved, nearly diagonal.

Distribution – Middle Miocene: Atlantic (Portugal, Spain), Paratethys (Austria, Bosnia, Czech Republic, Hungary, Romania, Serbia), Mediterranean (Greece, Italy, Turkey).

Lautoconus rotundus (Hoernes et Auinger, 1879)
(Figs 31–32)

1879 *Conus* (*Chelyconus*) *rotundus* nov. form. – HOERNES & AUINGER, p. 50, pl. 6, fig. 8.

2014 *Varioconus rotundus* (Hoernes et Auinger) – KOVÁCS & VICIÁN, p. 61, figs 16–19 (*cum syn.*).

Material – 5 specimens – Lăpugiu: M 59.2001., 60.8291.A-D.

Description – SL: 15–36. Spire moderately high, outline convex, apex projected. Spiral whorls convex, smooth, suture deep. Shoulder rounded to subangulate. Body whorl broadly and ventricosely conical, outline straight to slightly convex, smooth with fine spiral ridges at the anterior end. Subsutural flexure asymmetrically curved, shallow.

Remarks – The species is closely allied to *L. bitorosus* in morphology, so it is classified here within genus *Lautoconus*. *L. bitorosus* differs in shape of the body whorl and the shoulder. *L. rotundus* differs from *Varioconus conoponderosus* in lower and convex spire.

Distribution – Middle Miocene: Paratethys (Austria, Hungary, Poland, Romania).

Lautoconus ventricosus (Gmelin, 1791)
(Figs 33–34)

1791 *Conus ventricosus* – GMELIN, p. 3397.

2014 *Lautoconus ventricosus* (Gmelin) – KOVÁCS & VICIÁN, p. 73, figs 70–72 (*cum syn.*).

Material – 6 specimens – Lăpugiu: M 59.2004.B., 60.9852.D., 60.10152., 68.601., 68.603., 68.605.C.

Description – SL: 25–42. Spire of moderate height, outline straight. Spiral whorls smooth. Shoulder angulate. Body whorl ventricosely conical, outline slightly convex, smooth with fine ridges at the base. Subsutural flexure nearly diagonal.

Remarks – The species is characterized by high level of intraspecific variability.

Distribution – Recent *L. ventricosus* occurs in the Mediterranean Sea and in the Eastern Atlantic Ocean (Portugal to Senegal). Middle Miocene records: North Sea (Belgium), Paratethys (Austria, Hungary, Romania), Mediterranean (Italy).

Genus *Monteiroconus* da Motta, 1991

Monteiroconus mercati (Brocchi, 1814)
(Figs 35–36, 40–41)

1814 *Conus Mercati* – BROCCHI, p. 287, pl. 2, fig. 6.

2013 *Monteiroconus mercati* (Brocchi) – LANDAU *et al.*, p. 244, pl. 39, figs 2–4, pl. 41, fig. 12, pl. 42, fig. 6, pl. 81, figs 7–8 (*cum syn.*).

Material – 8 specimens – Coşteiu: M 60.9865.A-B., 68.23.; Lăpugiu: M 60.8293.C., 60.8360.J-K., 60.10149., 60.10198.

Description – SL: 50–60. Spire of low to moderate height, outline slightly gradate, straight to slightly concave. Spiral whorls smooth, sutural ramps flat to gently concave. Shoulder angulate. Body whorl conical, slightly elongate, outline convex, smooth with fine ridges at the base. Subsutural flexure asymmetrically curved, of moderate depth.

Remarks – The species shows moderate variability of growth of the spire. The specimen on Figs 40–41 bears gradate spire with subangular and smooth spiral whorls, it agrees with *M. mercati* var. *turricula* (Brocchi).

Distribution – Middle Miocene: Atlantic (France), Paratethys (Austria, Czech Republic, Hungary, Romania), Mediterranean (Turkey).

Monteiroconus mojsvari (Hoernes et Auinger, 1879)
(Figs 37–39)

1879 *Conus (Dendroconus) Mojsvari* nov. form. – HOERNES & AUINGER, p. 18, pl. 3, fig. 2.

1973 *Conus (Lithoconus) mercati miocaenicus* Sacco – NICORICI & SAGATOVICI, p. 175, pl. 27, fig. 1.

? 2001 *Conus (Lithoconus) mercatti* [sic] *miocenicus* Sacco – CHIRA & VOIA, pl. 2, fig. 3.

2013 *Monteiroconus mojsvari* (Hoernes et Auinger) – LANDAU *et al.*, p. 243 (*cum syn.*).

Material – 1 specimen – Lăpugiu: M 62.6027.

Description – SL: 88. Spire low, outline slightly concave. Spiral whorls canalliculate, striate. Shoulder subangular. Body whorl conical, outline straight, smooth with fine ridges at the base. Subsutural flexure asymmetrically curved.

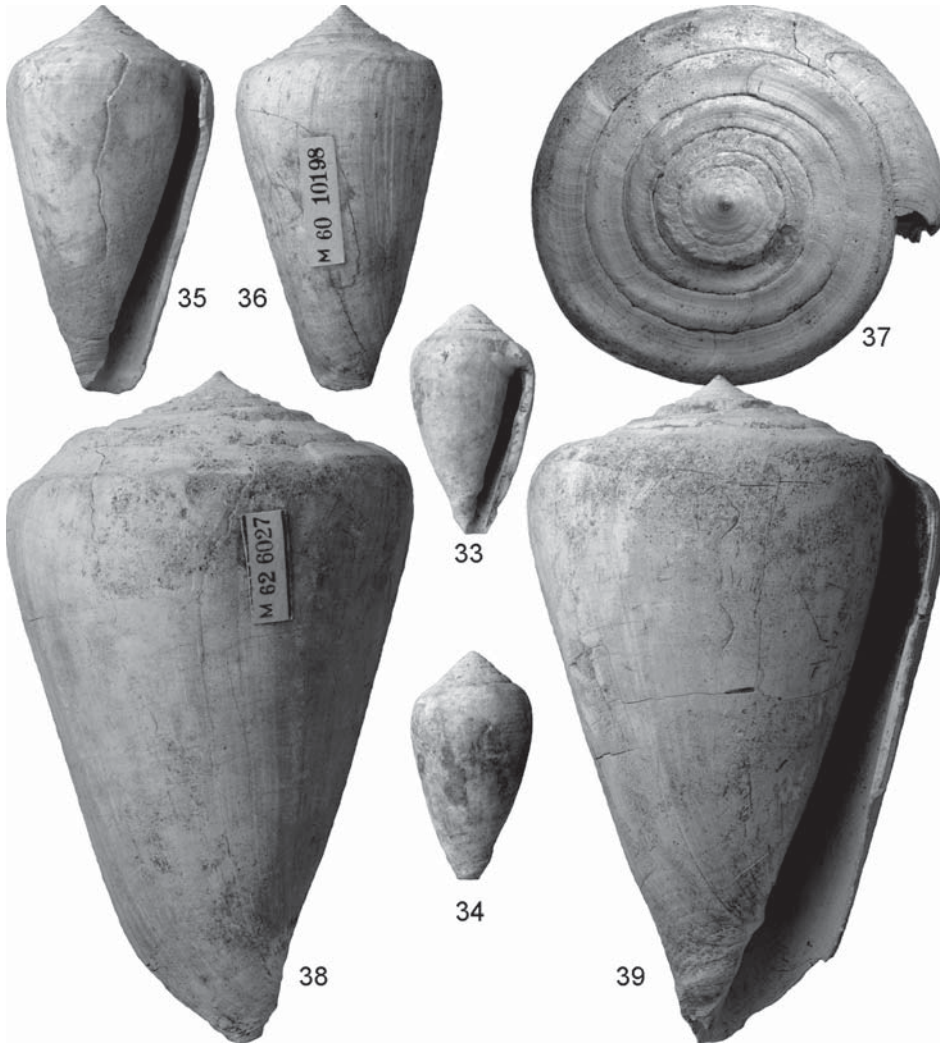
Remarks – The validity of the taxon was recently verified by LANDAU *et al.* (2013). *M. mercati* differs from *M. mojsvari* in gradate spire with smooth whorls.

Distribution – Middle Miocene: Paratethys (Austria, Hungary, Italy, Romania).

Monteiroconus tietzei (Hoernes et Auinger, 1879)
(Figs 42–43)

1879 *Conus* (*Lithoconus*) *Tietzei* nov. form. – HOERNES & AUINGER, p. 28, pl. 1, fig. 3.

2014 *Monteiroconus tietzei* (Hoernes et Auinger) – KOVÁCS & VICIÁN, p. 79, figs 92–96 (*cum syn.*).



Figs 33–34. *Lautoconus ventricosus* (Gmelin), M 60.10152., Lăpugiu, SL: 29, apertural and abapertural views, (1×). – **Figs 35–36.** *Monteiroconus mercati* (Brocchi), M 60.10198., Lăpugiu, SL: 50, apertural and abapertural views, (1×). – **Figs 37–39.** *Monteiroconus mojsvari* (Hoernes et Auinger), M 62.6027., Lăpugiu, SL: 88, apical, abapertural and apertural views, (1×)

Material – 12 specimens – Lăpugiu: M 60.8278.C., 60.8293.A., 60.8335.K., 60.8339.J., 60.8346.A., 60.8347.B., 60.8945., 60.8968.D., 60.8972., 60.9852.E., 60.10162.; Nemeșești: M 60.8107.

Description – SL: 23–38. Spire of low to moderate height, outline concave. Spiral whorls striate. Shoulder subangulate. Body whorl conical, outline straight to slightly convex, smooth with fine ridges at the base. Subsutural flexure asymmetrically curved.

Remarks – The species differs from *Kalloconus berghausi* in higher and concave spire, and in subangular shoulder. *M. mercati* differs in elevated spire and in elongate body whorl.

Distribution – Middle Miocene: Paratethys (Bosnia, Hungary, Romania).

Genus *Plagioconus* Tucker et Tenorio, 2009

Plagioconus elongatus (Borson, 1820)

(Figs 44–45)

1820 *Conus Elongatus* – BORSON, p. 198, pl. 1, fig. 4.

1856 *Conus Haueri* Partsch – HÖRNES, p. 34, pl. 4, fig. 4 only.

1972 *Conus elongatus* Borson – DAVOLI, p. 105, tab. 12, text-fig. 25, pl. 6, figs 18–20, 22–24.

2006 *Conus (Leptoconus) elongatus* Borson – БАЛУК, p. 216, pl. 16, fig. 8.

Material: 1 specimen – Coșteiu: M 60.7860.

Description – SL: 86.5. Spire of moderate height, outline slightly concave. Spiral whorls concave, smooth. Suture deep. Shoulder broad, rounded. Body whorl elongate, outline straight, smooth with fine grooves on the lower third. Subsutural flexure asymmetrically curved, deep.

Remarks – *P. extensus* is a closely allied form, but differs in elevated, narrow, gradate spire with convex, angulate whorls.

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

Plagioconus extensus (Hörnes, 1856)

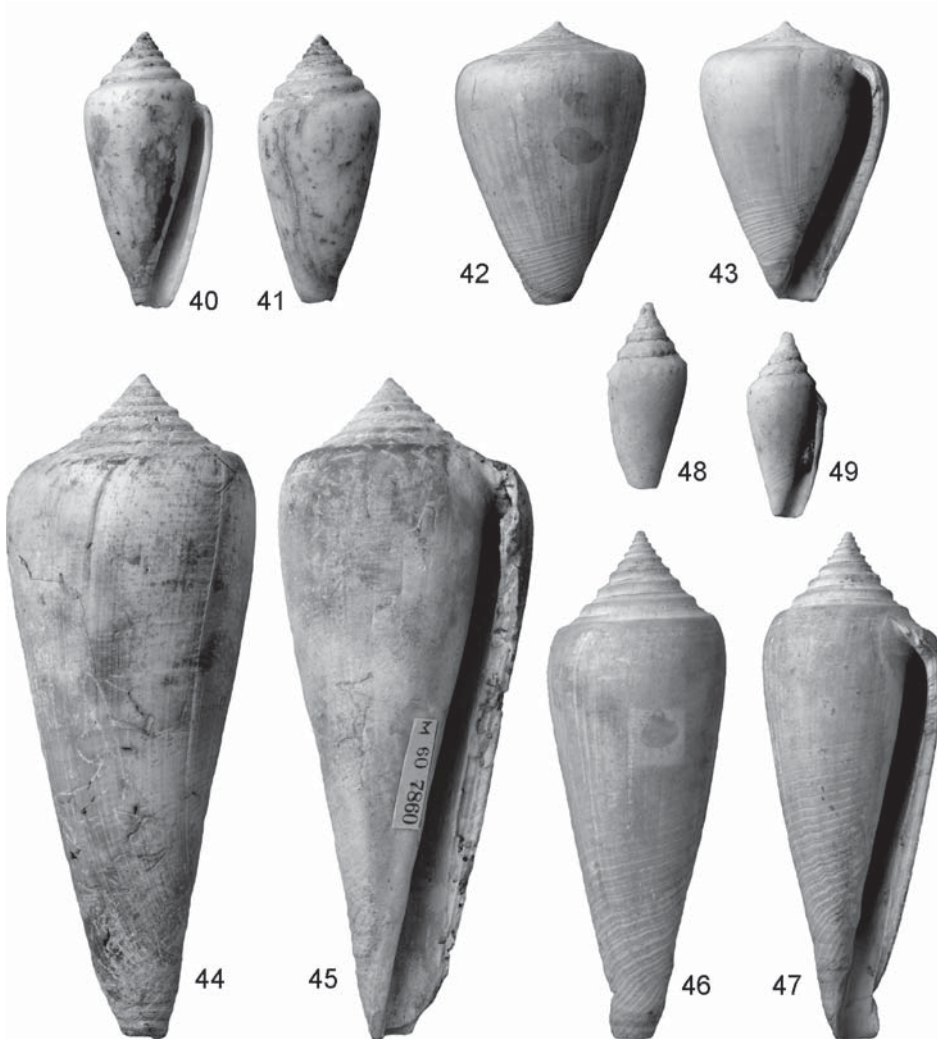
(Figs 46–47)

1856 *Conus extensus* Partsch – HÖRNES, p. 37, pl. 5, fig. 1.

non 2001 *Conus (Leptoconus) extensus* Partsch – CHIRA & VOIA, pl. 2, fig. 1. [= *P. marii* (Sacco)]

2014 *Plagioconus extensus* (Partsch in Hörnes) – KOVÁCS & VICIÁN, p. 79, figs 97–100 (*cum syn.*).

Material – 14 specimens – Coșteiu: M 60.9859., 60.9889., 68.15., 68.21.; Lăpugiu: M 60.8282.A., 60.8286.A-B., 60.8358.G., 60.8359.A-B., 60.8938., 60.10060., 68.594., Nemeșești: M 60.8135.



Figs 40–41. *Monteiroconus mercati* (Brocchi), M 60.9865.A., Coșteiu, SL: 34, apertural and abapertural views, (1×). – **Figs 42–43.** *Monteiroconus tietzei* (Hoernes et Auinger), M 60.8107., Nemeșești, SL: 36, abapertural and apertural views, (1×). – **Figs 44–45.** *Plagioconus elongatus* (Borson), M 60.7860., Coșteiu, SL: 86.5, abapertural and apertural views, (1×). – **Figs 46–47.** *Plagioconus extensus* (Hörnes), M 60.8135., Nemeșești, SL: 64, abapertural and apertural views, (1×). – **Figs 48–49.** *Pseudonoduloconus* cf. *subbigranosus* (Sacco), M 60.9873.B., Coșteiu, SL: 8, abapertural and apertural views, (3×)

Description – SL: 37–89. Spire high, outline straight, step-like. Subapical whorls finely tuberculate, late whorls striate. Shoulder rounded. Body whorl narrowly conical, outline straight, smooth with marked, widely spaced grooves on the lower half. Subsutural flexure asymmetrically curved and deep.

Remarks – *P. elongatus* differs in growth of the spire and in robust shape of the shoulder.

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

Plagioconus marii (Sacco, 1893)
(Figs 50–51)

1893 *Conus* (*Chelyconus*) *Marii* – SACCO, p. 62, pl. 6, fig. 1; varieties: *fusulopupoides*, *ovatopupoides*, *digitiformis*, *asparagispira*, *perfusulospira*, *clavatoidea*, *subconicospira*, *medioventrosa*, *subpileospira*, *ovatobrevis*, *pileospira*, *mamillatospira*: p. 62–64, pl. 6, figs 2, 4–8, 10–15.

2014 *Plagioconus marii* (Sacco) – KOVÁCS & VICIÁN, p. 81, figs 101–105, 108 (*cum syn.*).

Material – 1 specimen – Coșteiu: M 60.10096.

Description – SL: 66. Spire elevated, outline convex. Spiral whorls convex, smooth. Suture deep. Shoulder broad, rounded. Body whorl elongate, ventricose-ly conical, smooth with ridges at the base. Aperture narrow, straight. Subsutural flexure asymmetrically curved.

Remarks – The species shows high level of intraspecific variability. *P. puschi* differs in lower and narrower spire.

Distribution – Middle Miocene: Paratethys (Hungary, Romania), Mediterranean (Italy).

Plagioconus puschi (Michelotti, 1847)
(Figs 52–53)

1847 *Conus Puschi* – MICHELOTTI, p. 340, pl. 14, fig. 6.

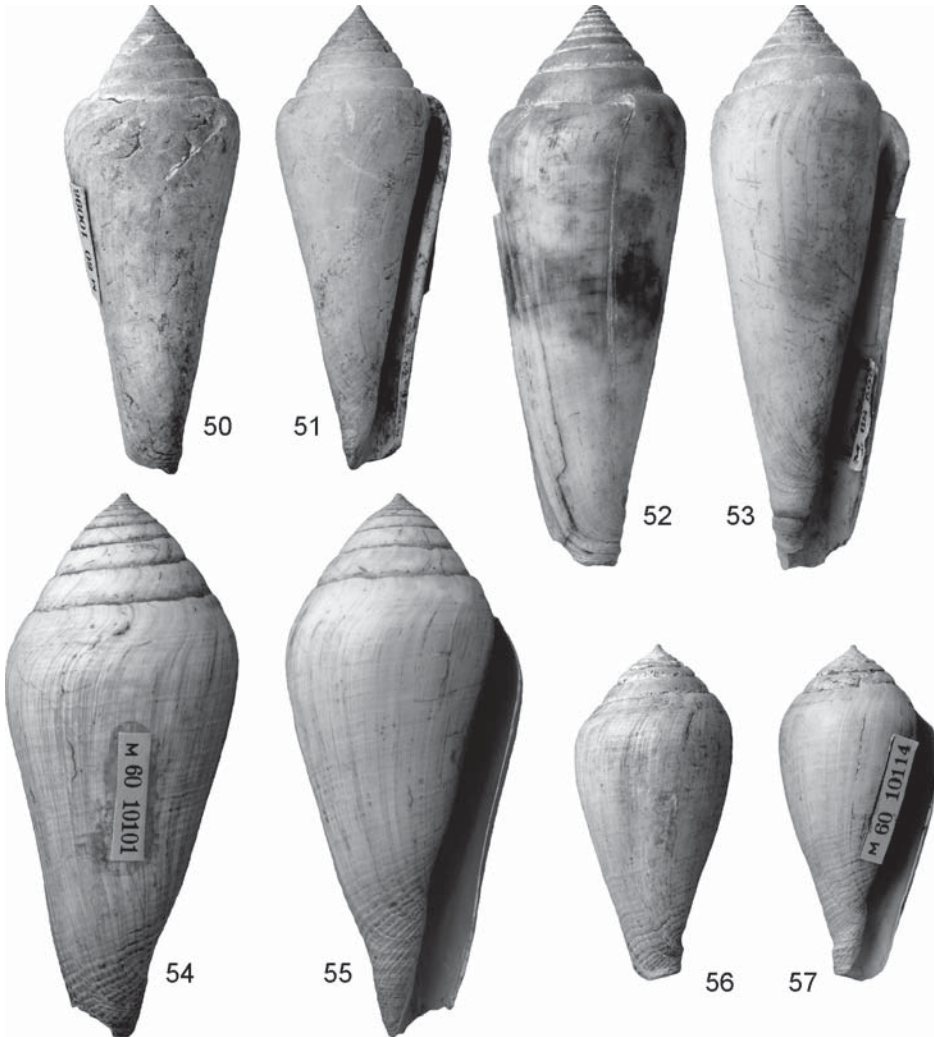
2013 *Plagioconus puschi* (Michelotti) – LANDAU *et al.*, p. 245, pl. 39, fig. 5, pl. 41, fig. 13, pl. 42, fig. 7, pl. 81, fig. 9 (*cum syn.*).

Material – 11 specimens – Coșteiu: M 60.9883., 60.9891., 60.9912.; Lăpu-giu: M 60.8293.B., 60.8358.H., 60.8359.C., 60.8367.A-B., 68.599.A., 68.604.; Nemeșești: M 60.8136.

Description – SL: 40–71. Spire conical, moderately high, outline straight. Spiral whorls convex. Shoulder rounded. Body whorl narrowly conical, outline straight, smooth with fine ridges on the lower third. Subsutural flexure diagonal.

Remarks – The species differs from the closely allied forms (*P. elongatus*, *P. extensus*, *P. marii*) in growth of the spire, and in subsutural flexure.

Distribution – Middle Miocene: Atlantic (France, Portugal), Paratethys (Austria, Bosnia, Bulgaria, Hungary, Romania, Serbia), Mediterranean (Greece, Turkey).



Figs 50–51. *Plagioconus marii* (Sacco), M 60.10096., Coșteiu, SL: 61, abapertural and apertural views, (1×). – **Figs 52–53.** *Plagioconus puschi* (Michelotti), M 68.599.A., Lăpugiu, SL: 73, abapertural and apertural views, (1×). – **Figs 54–55.** *Varioconus clavatulus* (Orbigny): 54–55. M 60.10101., Coșteiu, SL: 71, abapertural and apertural views, (1×). **56–57.** M 60.10114., Coșteiu, SL: 43, abapertural and apertural views, (1×)

Genus *Pseudonoduloconus* Tucker et Tenorio, 2009*Pseudonoduloconus* cf. *subbigranosus* (Sacco, 1893)
(Figs 48–49)

1893 *Stephanoconus subbigranosus* – SACCO, p. 120, pl. 11, fig. 24, varieties: *bispirata*, *subbicrenulata*, *ligusticofusulata*, *ligusticovulata*, *ligusticoconica*, *pliocoronaxoides*: p. 120–121, pl. 11, figs 25–30.

1999 *Conus* (*Stephanoconus*) *subbigranosus* (Sacco) – MUÑIZ, p. 86, fig. 10J-L.

Material – 1 specimen – Coșteiu: M 60.9873.B.

Description – SL: 8. Spire elevated, outline slightly concave. Spiral whorls convex, beaded. Shoulder rounded, beaded. Body whorl conical, outline straight, smooth with spiral ridges at the base.

Remarks – Our specimen bears only 5 spiral whorls, it is regarded as a juvenile form, so the use of open nomenclature seems reasonable. It differs from the type (refigured by FERRERO MORTARA *et al.* 1984, pl. 20, fig. 12) in slightly narrower and higher spire, it is closer to the morphotype *subbicrenulata* (SACCO 1893, pl. 11, fig. 26). The small-sized species differs from *C. antediluvianus* and *C. dujardini* in convex spiral whorls and rounded shoulder.

Distribution – Middle Miocene: Paratethys (Romania), Mediterranean (Italy).

Genus *Varioconus* da Motta, 1991*Varioconus clavatulus* (Orbigny, 1852)
(Figs 54–57)

1852 *Conus clavatulus* – ORBIGNY, p. 11.

2014 *Varioconus clavatulus* (Orbigny) – KOVÁCS & VICIÁN, p. 83, figs 109–110 (*cum syn.*).

Material – 3 specimens – Coșteiu: M 60.10101., 60.10114.; Nemeșești: M 60.8118.B.

Description – SL: 43–71. Spire of moderate height, outline convex. Spiral whorls high, slightly convex, smooth. Suture deep. Shoulder rounded. Body whorl sigmoid, smooth with fine ridges at the base. Subsutural flexure asymmetrically curved, of moderate depth.

Remarks – *V. noe* differs in striate spiral whorls and in narrower body whorl.

Distribution – Middle Miocene: North Sea (Belgium, the Netherlands), Paratethys (Hungary, Romania), Mediterranean (Turkey).

Varioconus conoponderosus (Sacco, 1893)

(Figs 58–59)

1893 *Conus* (*Chelyconus*) *conoponderosus* – SACCO, p. 75, pl. 7, fig. 22, varieties: *conicissima*, *subpupoidea*: p. 75–76, pl. 7, figs 23–24.

2014 *Varioconus conoponderosus* (Sacco) – KOVÁCS & VICIÁN, p. 83, figs 111–115 (*cum syn.*).

Material – 9 specimens – Coșteiu: M 60.8952.; Lăpugiu: M 60.8290.M., 60.8311., 60.8312.A., 60.8337.C., 60.8338.C-D., 60.8930., 68.598.

Description – SL: 31–44. Spire of low to moderate height, outline slightly convex. Spiral whorls smooth. Shoulder rounded to subangulate. Body whorl conical, outline straight to slightly convex, smooth with pronounced growth lines, and with fine grooves at the base. Subsutural flexure asymmetrically curved.

Remarks – The species is characterized by intraspecific variability (DAVOLI 1972). *V. ponderosus* differs in more elevated spire.

Distribution – Middle Miocene: Paratethys (?Austria, Hungary, Romania), Mediterranean (?Italy, Turkey).

Varioconus montisclavus (Sacco, 1893)

(Figs 60–63)

1893 *Chelyconus Montisclavus* – SACCO, p. 68, pl. 6, fig. 38, varieties: *cappucinorum*, *pagodaeformis*, *inflatulospira*, *mamillatocrassa*, *angulatocrassa*, *humilispirata*, *magnomamillata*, *mamillospira*: p. 68–69, pl. 6, figs 39–46.

1964 *Conus montisclavus* (Sacco) – HALL, p. 149, pl. 26, figs 1–3, 5–6 (*cum syn.*).

Material – 7 specimens – Coșteiu: M 60.9861.A-B., 60.9863.C.; Lăpugiu: M 60.8289.K., 60.8301.D., 68.599.C.; Nemeșești: M 60.8106.C.

Description – SL: 25–37. Spire low, outline convex, apex projected. Spiral whorls finely striate. Shoulder rounded. Body whorl conical, outline slightly sigmoid, smooth with fine ridges at the base. Subsutural flexure asymmetrically curved, shallow. Colour pattern of specimen M 68.599.C.: dense spiral rows of dashes.

Remarks – The species shows moderate variability of growth of the spire. Specimen M 68.599.C. matches *V. montisclavus mamillospira* (SACCO 1893, pl. 6, fig. 46), while specimen M 60.8301.D. is close to *Chelyconus ponderosulcatus mamillatoides* Sacco (refigured by FERRERO MORTARA *et al.* 1984, pl. 19, fig. 8) that was considered as *montisclavus* by HALL (1964). This is the first record of the taxon from the Central Paratethys.

Distribution – Middle Miocene: Paratethys (Romania), Mediterranean (Italy).

Varioconus mucronatolaevis (Sacco, 1893)

(Figs 64–65)

1893 *Conus* (*Chelyconus*) *mucronatolaevis* – SACCO, p. 66, pl. 6, fig. 26, varieties: *fusoelegans*, *long-ovuloides*, *laevispira*, *taurobiconica*, *glandispira*, *globospira*, *permamillata*, *conicangulata*: p. 66–67, pl. 6, figs 27–34.

2014 *Varioconus mucronatolaevis* (Sacco) – KOVÁCS & VICIÁN, p. 85, figs 121–124 (*cum syn.*).

Materials – 4 specimens – Lăpugiu: M 60.8282.C-D., 68.599.C., 68.602.

Description – SL: 28–30. Spire of moderate height, outline convex, apex projected. Spiral whorls smooth to finely striate. Shoulder rounded. Body whorl ventricosely conical, outline straight, smooth with fine ridges at the base. Subsutural flexure asymmetrically curved.

Remarks – The species is characterized by intraspecific variability with moderate variety of development of the spire. It differs from *Plagioconus marii* in lower and wider spire.

Distribution – Middle Miocene: Paratethys (Bulgaria, Hungary, Romania), Mediterranean (Italy).

Varioconus noe (Brocchi, 1814)

(Figs 66–68)

1814 *Conus noe* – BROCCHI, p. 293, pl. 3, fig. 3.

1879 *Conus* (*Chelyconus*) *Transylvanicus* nov. form. – HOERNES & AUINGER, p. 41, pl. 1, fig. 14.

1997 *Conus* (*Chelyconus*) *noe* Brocchi – CHIRLI, p. 5, pl. 1, fig. 10 (*cum syn.*).

non 2001 *Conus* (*Chelyconus*) *noe* Brocchi – CHIRA & VOIA, pl. 3, fig. 2. [= *Varioconus clavatulus* (Orbigny, 1852)]

Material – 2 specimens – Lăpugiu: M 60.8358.E., 60.10156.

Description – SL: 51–60. Spire of moderate height, outline slightly convex. Spiral whorls high, slightly convex to concave, striate. Shoulder somewhat subangulate. Body whorl narrowly conical, smooth with fine ridges at the base. Subsutural flexure asymmetrically curved, of moderate depth. Colour pattern: dense spiral rows of dashes.

Remarks – *V. clavatulus* differs in smooth spiral whorls and in broader body whorl.

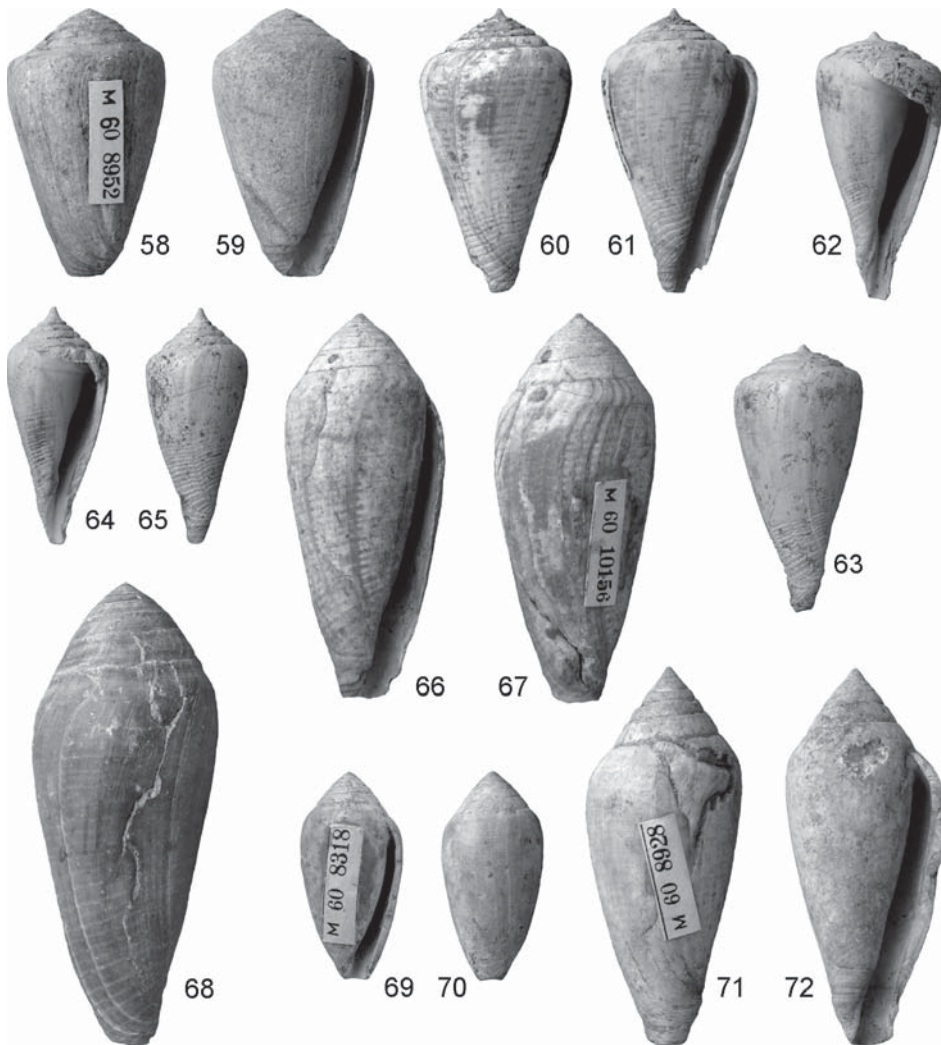
Distribution – Middle Miocene: Paratethys (Romania).

Varioconus olivaeformis (Hoernes et Auinger, 1879)

(Figs 69–70)

1879 *Conus* (*Chelyconus*) *olivaeformis* nov. form. – HOERNES & AUINGER, p. 52, pl. 1, fig. 23.

2014 *Varioconus olivaeformis* (Hoernes et Auinger) – KOVÁCS & VICIÁN, p. 85, figs 125–130.



Figs 58–59. *Varioconus conoponderosus* (Sacco), M 60.8952., Coșteiu, SL: 34, abapertural and apertural views, (1×). – **Figs 60–63.** *Varioconus montisclavus* (Sacco): **60–61.** M 68.599.C., Lăpugiu, SL: 37, abapertural and apertural views, (1×). **62–63.** M 60.8301.D., Lăpugiu, SL: 35, apertural and abapertural views, (1×). – **Figs 64–65.** *Varioconus mucronatolaevus* (Sacco), M 60.8282.C., Lăpugiu, SL: 30, apertural and abapertural views, (1×). – **Figs 66–68.** *Varioconus noe* (Brocchi): **66–67.** M 60.10156., Lăpugiu, SL: 50, apertural and abapertural views, (1×). **68.** M 60.8358.E., Lăpugiu, SL: 60, abapertural view, (1×). – **Figs 69–70.** *Varioconus olivaeformis* (Hoernes et Auinger), M 60.8318.B., Lăpugiu, SL: 27, apertural and abapertural views, (1×). – **Figs 71–72.** *Varioconus pelagicus* (Brocchi), M 60.8928., Lăpugiu, SL: 49, abapertural and apertural views, (1×)

Material – 12 specimens – Coșteiu: M 60.9884.; Lăpugiu: M 60.8297.A-B., 60.8318.B-G., 60.10553.A-C.

Description – SL: 10–27. Spire moderately high, outline straight to slightly convex. Spiral whorls slightly convex, smooth. Shoulder rounded. Body whorl slightly elongate, narrowly ovate, outline convex, smooth with 4 spiral grooves at the base. Anterior notch slightly developed. Subsutural flexure asymmetrically curved.

Remarks – The species was abundant in the Letkés assemblage (KOVÁCS & VICIÁN 2014). It differs from *V. ponderosus* in size and in narrower shell.

Distribution – Middle Miocene: Paratethys (Bosnia, ?Czech Republic, Hungary, Romania).

Varioconus pelagicus (Brocchi, 1814)
(Figs 71–74)

1814 *Conus pelagicus* – BROCCHI, p. 289, pl. 2, fig. 9.

1879 *Conus (Chelyconus) Lapugyensis* nov. form. – HOERNES & AUINGER, p. 42, pl. 1, fig. 9, pl. 5, fig. 8.

1879 *Conus (Chelyconus) Mariae* nov. form. – HOERNES & AUINGER, p. 49, pl. 6, fig. 7.

2013 *Varioconus pelagicus* (Brocchi) – LANDAU *et al.*, p. 247, pl. 39, figs 6–7, pl. 41, fig. 14, pl. 42, fig. 8, pl. 82, figs 1–2 (*cum syn.*).

Material – 8 specimens – Coșteiu: M 68.17.; Lăpugiu: M 60.8281.A., 60.8296., 60.8314.A., 60.8928., 60.8939., 60.10182., 60.10201.

Description – SL: 22.5–64.5. Spire of moderate height, outline slightly convex to straight. Spiral whorls smooth to striate. Shoulder rounded. Body whorl conical, outline sigmoid, ornamented with fine spiral ridges on the lower half. Well-developed siphonal fasciole. Subsutural flexure nearly diagonal.

Remarks – The species shows variability of growth of the spire, and of length and width of the body whorl.

Distribution – Middle Miocene: Atlantic (France), Paratethys (Austria, Bulgaria, Croatia, Hungary, Romania, Ukraine), Mediterranean (Greece, Turkey).

Varioconus ponderosus (Brocchi, 1814)
(Figs 75–76)

1814 *Conus ponderosus* – BROCCHI, p. 293, pl. 3, fig. 1.

2014 *Varioconus ponderosus* (Brocchi) – KOVÁCS & VICIÁN, p. 87, figs 138–142 (*cum syn.*).

Material – 39 specimens – Coșteiu: M 60.9863.B., 60.9871., 60.9874., 60.9876., 60.9880., 60.9898.A., 60.10104.; Lăpugiu: M 59.2521., 59.2004.A., 60.8282.B., 60.8288.A-E., 60.8292.A-F., 60.8294.A-B., 60.8304., 60.8306.A.,

60.8312.B-C., 60.8316.D., 60.8317.B., 60.8339.K-L., 60.8358.H., 60.9032.A-C., 60.9852.F-G., 64.241., 68.600.A.

Description – SL: 32–75. Spire of moderate height, outline straight. Whorls flat to convex, smooth. Shoulder subangulate to rounded. Body whorl conical, slightly convex, smooth with fine ridges at the anterior end. Aperture wide, somewhat flaring. Subsutural flexure asymmetrically curved.

Remarks – The species shows high level of intraspecific variability (HALL 1964, DAVOLI 1972).

Distribution – Middle Miocene: Atlantic (France), Paratethys (Austria, Bosnia, Czech Republic, Hungary, Moldavia, Poland, Romania, Serbia, Slovakia, Ukraine), Mediterranean (Greece, Turkey).

Varioconus praelongus (Hoernes et Auinger, 1879)
(Figs 77–78)

1879 *Conus* (*Chelyconus*) *praelongus* nov. form. – HOERNES & AUINGER, p. 45, pl. 1, fig. 16.

1893 *Chelyconus praelongus* Hoernes et Auinger – SACCO, p. 65.

1960 *Conus* (*Chelyconus*) *praelongus* Hoernes et Auinger – KOJUMDGIEVA, p. 213, pl. 50, fig. 7.

? 1966 *Conus* (*Chelyconus*) *praelongus fusiformis* Halaváts – STRAUSZ, p. 461, text-fig. 208.

1967 *Conus* (*Chelyconus*) *praelongus* Hoernes et Auinger – DUŞA, p. 57, pl. 2, fig. 9.

non 1985 *Conus* (*Chelyconus*) *praelongus* Hoernes et Auinger – ATANACKOVIĆ, p. 178, pl. 39, figs 16–17 [= *Varioconus olivaeformis* (Hoernes et Auinger)]

Material: 3 specimens – Coşteiu: M 60.9863.A.; Lăpuşiu: M 60.8314.B., 60.8358.F.

Description – SL: 22–30. Spire moderately high, outline slightly convex. Subapical whorls tuberculate, spiral whorls convex, striate. Shoulder rounded subangular. Body whorl conical, outline somewhat convex, smooth or ornamented with fine spiral ridges. Subsutural flexure asymmetrically curved, shallow.

Remarks – The type was described from Lăpuşiu. *V. pelagicus* is a closely allied form, but differs in shell size and proportion, and in siphonal fasciole. The species shows variability of ornamentation. The shell of the type is wholly striate, but the striation of other specimens is weaker or absent. Based on new collecting works, the taxon can be recorded from Letkés. The specimen figured by ATANACKOVIĆ (1985) from Bosnia represents *V. olivaeformis* that differs from *V. praelongus* in lower spire and in ovate body whorl.

Distribution – Middle Miocene: Paratethys (Austria, Bulgaria, ?Poland, Romania).

Varioconus pseudoponderosus (Glibert, 1952)
(Figs 79–80)

- 1952 *Conus (Chelyconus) pseudoponderosus* Dollfus et Dautzenberg mss., nov. sp. – GLIBERT, p. 376, pl. 13, fig. 4.
 1966 *Conus (Chelyconus) pseudoponderosus* Dollfus et Dautzenberg (in Glibert) – STRAUZ, p. 463, pl. 68, figs 6–7.
 1973 *Conus (Chelyconus) pseudoponderosus* Glibert – BOHN-HAVAS, p. 1122, pl. 7, fig. 4, pl. 9, fig. 12.
 2010 *Conus pseudoponderosus* Glibert – VAESSEN, p. 12, figs 10/C, 15–17, 18/B.

Material – 2 specimens – Coșteiu: M 60.9878.B.; Lăpugiu: M 60.8958.

Description – SL: 47–48.5. Spire moderately high, outline straight. Spiral whorls convex, smooth, suture deep. Shoulder rounded. Body whorl conical, outline straight, smooth with fine spiral ridges at the base. Subsutural flexure asymmetrically curved, of moderate depth.

Remarks – This rare species was regarded as a synonym of *V. ponderosus* by HALL (1964) and by KOVÁCS & VICIÁN (2014). However, the morphological features allow acceptance of the validity, so here we follow the recent classification of VAESSEN (2010). *V. pseudoponderosus* differs from both *V. clavatulus* and *V. ponderosus* in lower spire with straight outline and in broader shell. The species is probable a transitional form between *V. ponderosus* and *V. conoponderosus*.

Distribution – Middle Miocene: Atlantic (France), Paratethys (Hungary, Romania).

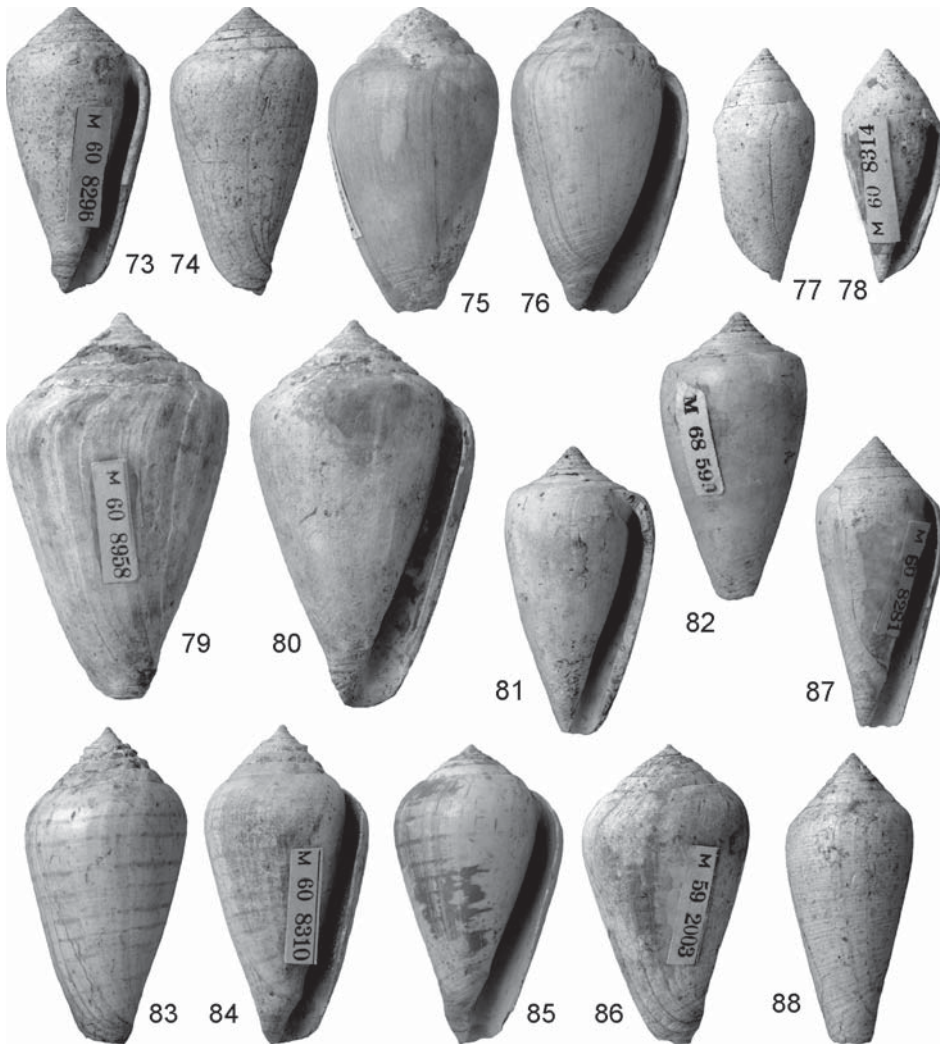
Varioconus steinabrunnensis (Sacco, 1893)
(Figs 81–82)

- 1893 *Conus (Chelyconus) steinabrunnensis* – SACCO, p. 75.
 2014 *Chelyconus steinabrunnensis* Sacco – KOVÁCS & VICIÁN, p. 61, figs 22–27 (*cum syn.*).

Material – 21 specimens – Coșteiu: M 60.9854.A-B.; Lăpugiu: M 60.8282.B., 60.8284., 60.8289.J., 60.8290.N., 60.8294.D., 60.8337.D-F., 60.8343.B-D., 60.8969.E-F., 60.10117.B., 60.10311.B., 64.392.B., 68.595.L-M., 68.599.B.

Description – SL: 15.5–47. Spire low, outline concave. Whorls smooth, ramps flat. Shoulder angulate. Body whorl conical, outline convex, smooth with fine grooves at the base. Subsutural flexure asymmetrically curved.

Remarks – As genus *Chelyconus* was not accepted for fossil conoids by TUCKER & TENORIO (2009) and LANDAU *et al.* (2013), we place *steinabrunnensis* within genus *Varioconus* herein. The species differs from *Kalloconus fuscocingulatus* in angulate shoulder, from *V. vindobonensis* in lower spire, and from *V. karamanensis* (Erüal-Erentöz) in striate spire.



Figs 73–74. *Varioconus pelagicus* (Brocchi), M 60.8296., Lăpugiu, SL: 37, apertural and abapertural views, (1×). – **Figs 75–76.** *Varioconus ponderosus* (Brocchi), M 59.2521., Lăpugiu, SL: 39, abapertural and apertural views, (1×). – **Figs 77–78.** *Varioconus praelongus* (Hoernes et Auinger), M 60.8314.B., Lăpugiu, SL: 30, abapertural and apertural views, (1×). – **Figs 79–80.** *Varioconus pseudoponderosus* (Glibert), M 60.8958., Lăpugiu, SL: 49, abapertural and apertural views, (1×). – **Figs 81–82.** *Varioconus steinabrunnensis* (Sacco), M 68.599.B., Lăpugiu, SL: 37, apertural and abapertural views, (1×). – **Figs 83–86.** *Varioconus subraristriatus* (da Costa): **83–84.** M 60.8310., Lăpugiu, SL: 41, abapertural and apertural views, (1×). **85–86.** M 59.2003., Lăpugiu, SL: 39, apertural and abapertural views, (1×). – **Figs 87–88.** *Varioconus suessi* (Hoernes et Auinger), M 60.8281.B., Lăpugiu, SL: 38, apertural and abapertural views, (1×)

Distribution – Middle Miocene: Paratethys (Austria, Bosnia, Bulgaria, Hungary, Poland, Romania).

Varioconus subraristriatus (da Costa, 1866)
(Figs 83–86)

- 1866 *Conus subraristriatus* Costa – DA COSTA, p. 15, pl. 4, figs 2, 7 *only*.
 1966 *Conus (Cleobula) subraristriatus* – STRAUZ, p. 465, pl. 71, figs 3–5.
 1973 *Conus (Dendroconus) subraristriatus* Costa – BOHN-HAVAS, p. 1070, pl. 7, figs 1–2, pl. 9, fig. 11.
 2013 *Varioconus subraristriatus* (Pereira da Costa) – LANDAU *et al.*, p. 250, pl. 40, figs 7–8, pl. 41, fig. 17, pl. 42, fig. 11.
 2014 *Varioconus enzesfeldensis* (Hoernes et Auinger) – KOVÁCS & VICIÁN, p. 84, figs 3, 116–120 (*cum syn.*).

Material – 15 specimens – Coşteiu: M 60.9872., 60.10179., 68.19.; Lăpugiu: M 59.1840., 59.2003., 60.7676., 60.8310., 60.8335.L., 60.8336.H., 60.8337.M-N., 60.8345.A-D.

Description – SL: 28–44. Spire of moderate height, outline slightly convex, apex projected. Spiral whorls slightly convex, smooth. Shoulder rounded. Body whorl broadly ovate, smooth with fine grooves at the base. Subsutural flexure nearly diagonal. Colour pattern: widely spaced spiral rows of brownish dashes.

Remarks – *V. enzesfeldensis* (Hoernes et Auinger) was regarded as a synonym of *V. subraristriatus* by LANDAU *et al.* (2013). The species shows moderate variability in the height of the spire.

Distribution – Middle Miocene: Paratethys (Austria, Bosnia, Hungary, Romania), Mediterranean (Greece, Turkey).

Varioconus suessi (Hoernes et Auinger, 1879)
(Figs 87–88)

- 1879 *Conus (Chelyconus) Suessi* nov. form. – HOERNES & AUINGER, p. 43, pl. 1, figs 1, 15, pl. 6, figs 1–2 *only*.
 1960 *Conus (Chelyconus) suessi* Hoernes et Auinger – KOJUMDGIEVA, p. 212, pl. 49, fig. 8.
 1966 *Conus (Chelyconus) suessi* Hoernes et Auinger – STRAUZ, p. 459, pl. 69, fig. 6.
 1976 *Conus (Chelyconus) suessi* Hoernes et Auinger – PAPP, p. 136, pl. 35, figs 16–17, pl. 36, figs 6–7.

Material – 12 specimens – Coşteiu: M 60.10105.; Lăpugiu: M 60.8281.B-C., 60.8292.G-H., 60.8307., 60.8358.A-D., 60.8360.E., 60.10148.

Description – SL: 28–85. Spire of moderate height, outline straight. Spiral whorls flat, smooth. Shoulder rounded. Body whorl conical, outline straight to slightly convex, ornamented with fine spiral ridges. Subsutural flexure asymmetrically curved, shallow.

Remarks – The taxon was considered as a junior synonym of *V. pelagicus* by KOVÁCS & VICIÁN (2014). After the analysis of the Făget Basin materials, however, we recognize the validity of the species. *V. pelagicus* differs in sigmoid body whorl with well-developed siphonal fasciole, and in nearly diagonal subsutural flexure.

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

Varioconus taurinensis (Bellardi et Michelotti, 1840)

(Figs 89–90)

1840 *Conus Striatulus* Brocchi var. *Taurinensis* – BELLARDI & MICHELOTTI, p. 62, pl. 7, figs 12–13.

2013 *Varioconus taurinensis* (Bellardi et Michelotti) – LANDAU *et al.*, p. 251, pl. 41, figs 4–6, 19, pl. 42, fig. 13, pl. 82, figs 6–7.

2014 *Varioconus taurinensis* (Bellardi et Michelotti) – KOVÁCS & VICIÁN, p. 88, figs 143–148.

Material – 1 specimen – Lăpugiu: M 60.8339.O.

Description – SL: 15.5. Spire irregular, variable, mamillate to high. The ultimate spiral whorl is higher than the preceding whorls, convex to step-like. Shoulder sloping. Body whorl conical, outline convex, smooth with fine ridges at the base. Subsutural flexure nearly diagonal.

Remarks – The species was relatively abundant in the Letkés assemblage (KOVÁCS & VICIÁN 2014).

Distribution – Middle Miocene: Paratethys (Hungary, Romania), Mediterranean (Albania, Turkey).

Varioconus taurorectus (Sacco, 1893)

(Figs 91–92)

1893 *Chelyconus taurorectus* – SACCO, p. 67, pl. 6, fig. 35, variety: *proappenninica*: p. 68, pl. 6, fig. 37.

1964 *Conus taurorectus* (Sacco) – HALL, p. 161, pl. 20, figs 8, 13.

Material – 1 specimen – Lăpugiu: M 60.8355.

Description – SL: 55. Spire of moderate height, outline straight. Spiral whorls slightly convex, smooth, suture deep. Shoulder broad, rounded. Body whorl broadly conical, with prominent growth lines. Aperture somewhat flaring at the base. Subsutural flexure asymmetrically curved, deep.

Remarks – The specimen slightly differs from the type (refigured by FERREIRO MORTARA *et al.* 1984, pl. 18, fig. 4) in narrower base. The species is probably a morphotype of *V. conoponderosus*.

Distribution – Middle Miocene: Paratethys (Romania).

Varioconus vindobonensis (Hörnes, 1856)

(Figs 93–94)

1879 *Conus* (*Chelyconus*) *vindobonensis* Partsch – HOERNES & AUINGER, p. 48.non 2001 *Conus* (*Chelyconus*) *vindobonensis* Partsch in Hörnes – CHIRA & VOIA, pl. 2, fig. 5. [= ?*Varioconus ponderosus* (Brocchi)]2014 *Chelyconus vindobonensis* (Partsch in Hörnes) – KOVÁCS & VICIÁN, p. 62, figs 28–29 (*cum syn.*).

Material – 21 specimens – Coşteiu: M 68.16.; Lăpugiu: M 60.8277.B-D., 60.8297.F., 60.8301.E., 60.8306.B., 60.8313.A-E., 60.8317.D-F., 60.8345.E-F., 60.8346.B., 60.8353.K-M., 60.8941.B.

Description – SL: 13–38. Spire of moderate height, outline concave. Protoconch multispiral, projected. Spiral whorls convex, smooth. Shoulder angulate. Body whorl conical, outline convex, smooth with fine grooves at the base. Subsutural flexure asymmetrically curved.

Remarks – *V. steinabrunnensis* is a similar form but differs in more elongate body whorl and in lower spire with flat whorls.

Distribution – Middle Miocene: Paratethys (Austria, Czech Republic, Hungary, Moldavia, Poland, Romania, Serbia), Mediterranean (Turkey).

Genus *Conilithes* Swainson, 1840*Conilithes antediluvianus* (Bruguière, 1792)

(Figs 95–96)

1792 *Conus antediluvianus* – BRUGUIÈRE, p. 637, pl. 347, fig. 6.1879 *Conus* (*Leptoconus*) *Berwerthi* nov. form. – HOERNES & AUINGER, p. 35, pl. 5, figs 11–12.2014a *Conilithes antediluvianus* (Bruguière) – JANSSEN *et al.*, p. 73–90.

Material – 7 specimens – Coşteiu: M 60.8924.A-C., 60.9873.A., 60.9876.; Lăpugiu: M 60.8285., 60.8922.

Description – SL: 6–46. Spire high, outline straight, step-like. Sutural ramps concave, smooth. Shoulder carinate, finely tuberculate. Body whorl conical, outline straight, smooth with fine spiral grooves at the anterior end. Subsutural flexure asymmetrically curved.

Remarks – A comprehensive revision of the taxon was recently provided by JANSSEN *et al.* (2014a, b).

Distribution – Middle Miocene: Atlantic (Portugal), North Sea (Belgium, Denmark, Germany, the Netherlands), Paratethys (Austria, Bosnia, Bulgaria, Czech Republic, Hungary, Poland, Romania), Mediterranean (Albania, Greece, Italy, Morocco, Turkey).

Conilithes brocchii (Bronn, 1828)
(Figs 97–98)

1828 *Conus Brocchii* – BRONN, p. 740.

2014 *Conilithes brocchii* (Bronn) – KOVÁCS & VICIÁN, p. 89, figs 150–151 (*cum syn.*).

Material – 9 specimens – Coșteiu: M 60.9870., 60.9882.; Lăpușiu: M 60.8276.A-B., 60.8317.A., 60.8319.A-B., 60.8933., 60.10595.B.

Description – SL: 14–16. Spire of low to moderate height, conical, outline concave. Whorls finely striate with raised edge. Weakly beaded apical whorls. Shoulder angulate. Body whorl elongate conical, outline straight. Subsutural flexure asymmetrically curved, of moderate depth.

Remarks – *C. striatulus* is a similar form but differs in flat and smooth spiral whorls.

Distribution – Middle Miocene: Paratethys (Austria, Hungary, Romania), Mediterranean (Greece, Italy).

Conilithes canaliculatus (Brocchi, 1814)
(Figs 99–104)

1814 *Conus canaliculatus* – BROCCHI, p. 636, pl. 15, fig. 28.

1879 *Conus (Leptoconus) Brezinae* nov. form. – HOERNES & AUINGER, p. 36.

? 1887 *Conus (Chelyconus) szeptophorus* n. sp. – BOETTGER, p. 7, pl. 2, figs 6–8.

2013 *Conilithes dujardini* (Deshayes) – LANDAU *et al.*, p. 252, pl. 41, figs 1–3, 18, pl. 42, fig. 12, pl. 82, fig. 5.

2014 *Conilithes canaliculatus* (Brocchi) – KOVÁCS & VICIÁN, p. 91, figs 152–156 (*cum syn.*).

Material – 56 specimens – Coșteiu: M 60.8966., 60.9866., 60.9887.A-D., 60.9890.A-C.; Lăpușiu: M 60.6335., 60.8276.D-I., 60.8297.C-E., 60.8305. (17 spp.), 60.8319.F-I., 60.8323.A-H., 60.8335.M., 60.8941.A., 60.8967., 60.10075.A-B., 68.596.A., 68.606.A-B.

Description – SL: 6–37. Shell biconical, spire elevated, outline straight. Spiral whorls high, angular, dropped, smooth or striate, weakly tuberculate near the apex. Sutural ramps steep, slightly concave. Shoulder angulate, sloping. Body whorl smooth with incised grooves at the anterior end. Aperture straight, narrow. Subsutural flexure symmetrically curved.

Remarks – Taxonomical problems of the species was recently treated by KOVÁCS & VICIÁN (2014). *C. dujardini* differs markedly in morphology (see below).

Distribution – Middle Miocene: Paratethys (Austria, Bosnia, Bulgaria, Czech Republic, Hungary, Poland, Romania, Serbia, Slovakia, Slovenia, Ukraine), Mediterranean (Greece, Italy, Turkey).

Conilithes dujardini (Deshayes, 1845)
(Figs 105–108)

1845 *Conus Dujardini* – DESHAYES, p. 158.

2014 *Conilithes dujardini* (Deshayes) – KOVÁCS & VICIÁN, p. 92, figs 157–159 (*cum syn.*).

Material – 220 specimens – Coșteiu: M 60.7540., 60.8934., 60.8940.A-G., 60.9864., 60.9866., 60.9868. (22 spp.), 60.9873.C-I., 60.9875., 60.9885.A-E., 60.9887. (22 spp.), 60.9889., 60.9898.A-C., 60.10070.A-B., 60.10276.A-D.; Lăpugiu: M 60.7739.A-F., 60.8276. (39 spp.), 60.8308.A-C., 60.8319.J-S., 60.8323.I-J., 60.8340. (49 spp.), 60.8919.E-F., 60.8921.A-G., 60.8925., 60.8936., 68.595.A-K., 68.600.B., 68.596.B-C., 68.607.A-B.; Nemeșești: M 60.8108.A-E., 60.8118.

Description – SL: 5–38. Spire high, outline straight to concave. Apical whorls tuberculate. Spiral whorls smooth to finely striate. Shoulder angulate in early whorls, carinate in the last whorl. Body whorl conical, outline concave, either smooth with spiral grooves from the base up to the mid-height or fully ornamented with fine grooves. Subsutural flexure asymmetrically curved, deep. Colour pattern: spiral rows of small dots.

Remarks – Taxonomical problems of the species was recently discussed by KOVÁCS & VICIÁN (2014). The identity of *C. dujardini* and *C. exaltatus* (Eichwald) requires further research. In the Făget Basin assemblages the proportion of fully ornamented specimens is lower than in the Letkés material. The ornamentation shows fine gradation from smooth to fully ornamented body whorl in the material described here. *C. canaliculatus* differs in shell proportion, growth of the spire, in less raised and inclined spiral whorls, non carinate shoulder, and in colour pattern (see CAZE *et al.* 2010, fig. 5/N, LANDAU *et al.* 2013, pl. 82, fig. 5, and PAGANELLI 2014, pl. 5, fig. 3).

Distribution – Middle Miocene: Atlantic (France, Portugal), North Sea (Belgium, Denmark, Germany, the Netherlands), Paratethys (Austria, Bosnia, Bulgaria, Croatia, Czech Republic, Hungary, Moldavia, Poland, Romania, Serbia, Slovakia, Slovenia, Ukraine), Mediterranean (Greece, Italy, Libya, Turkey).

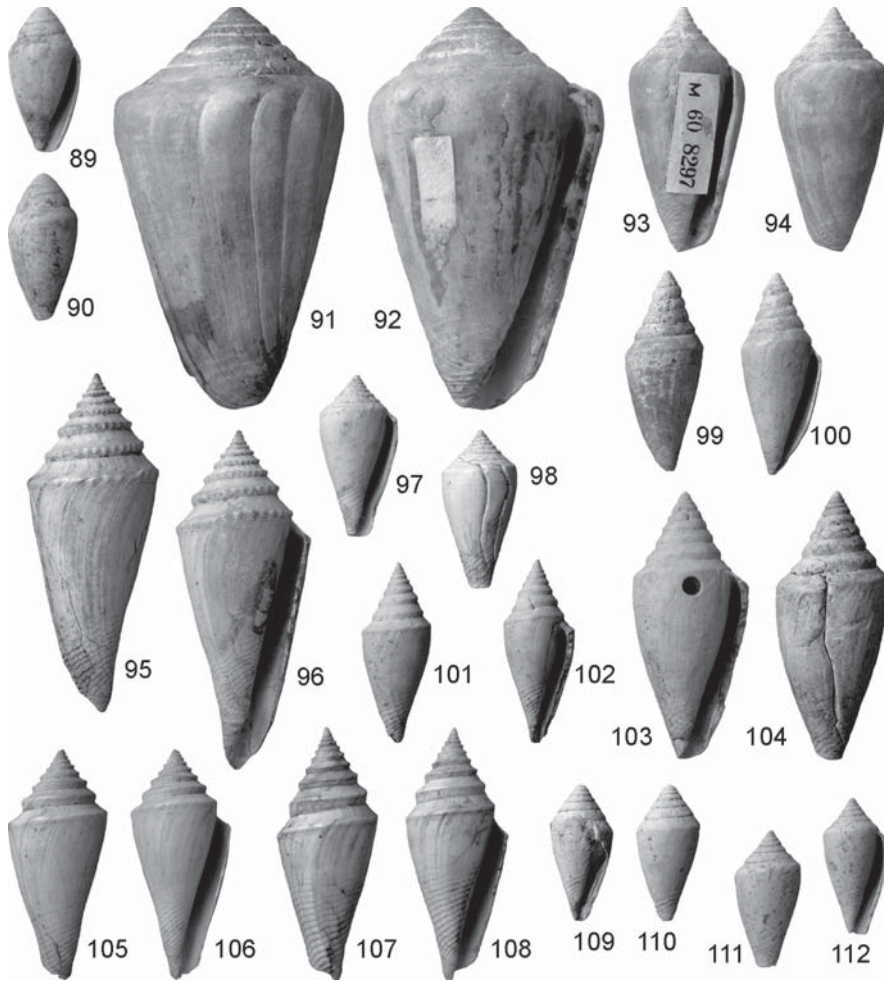
Conilithes granularis (Borson, 1820)
(Figs 109–110)

1820 *Conus Granularis* – BORSON, p. 196, pl. 1, fig. 3.

1879 *Conus (Stephanoconus) Stachei* nov. form. – HOERNES & AUINGER, p. 16, pl. 6, figs 14–16.

1902 *Conus (Stephanoconus) wagneri* n. sp. – BOETTGER, p. 7.

2014 *Conilithes granularis* (Borson) – KOVÁCS & VICIÁN, p. 93, fig. 160 (*cum syn.*).



Figs 89–90. *Varioconus taurinensis* (Bellardi et Michelotti), M 60.8339.O., Lăpugiu, SL: 15.5, apertural and abapertural views, (1.25 \times). – **Figs 91–92.** *Varioconus taurorectus* (Sacco), M 60.8355., Lăpugiu, SL: 55, abapertural and apertural views, (1 \times). – **Figs 93–94.** *Varioconus vindobonensis* (Hörnes), M 60.8297.F., Lăpugiu, SL: 33, apertural and abapertural views, (1 \times). – **Figs 95–96.** *Conilithes antidiluvianus* (Bruguière), M 60.9876., Coșteiu, SL: 46, abapertural and apertural views, (1 \times). – **Figs 97–98.** *Conilithes brocchii* (Bronn), M 60.8276.A., Lăpugiu, SL: 17, abapertural and apertural views, (1.25 \times). – **Figs 99–104.** *Conilithes canaliculatus* (Brocchi): **99–100.** M 60.8323.A., Lăpugiu, SL: 26.5, abapertural and apertural views, (1 \times). **101–102.** M 60.8323.B., Lăpugiu, SL: 24, abapertural and apertural views, (1 \times). **103–104.** M 60.9890.A., Coșteiu, SL: 36, apertural and abapertural views, (1 \times). – **Figs 105–108.** *Conilithes dujardini* (Deshayes): **105–106.** M 60.9868.B., Coșteiu, SL: 31, abapertural and apertural views, (1 \times). **107–108.** M 60.9868.A., Coșteiu, SL: 34, abapertural and apertural views, (1 \times). – **Figs 109–110.** *Conilithes granularis* (Borson), M 60.9863.D., Coșteiu, SL: 12, abapertural and apertural views, (1.5 \times). – **Figs 111–112.** *Conilithes striatulus* (Brocchi), M 608305.A., Lăpugiu, SL: 12.5, abapertural and apertural views, (1.5 \times)

Material – 221 specimens – Coșteiu: M 60.8926. (39 spp.), 60.9853.A-B., 60.9855.A-D., 60.9860.A-B., 60.9862.C., 60.9863.D-E., 60.9866. (153 spp.), 60.9867.A-B., 60.9869., 60.9870., 60.9875., 60.9881.A-E., 60.9886., 60.10276.E-I.; Lăpugiu: M 60.10553.D., 68.595.N.

Description – SL: 4–12.5. Shell biconical, spire high, outline straight, whorls ornamented with two fine grooves in the middle. Shoulder angular. Body whorl conical, outline straight to sigmoid, smooth with spiral ridges at the base or entirely covered with regularly spaced, fine spiral ridges. Subsutural flexure symmetrically curved, of moderate depth.

Remarks – The species is characterised by two phenotypically different forms with granulate or striate body whorl. As size and morphology of “*Stephanoconus*” *wagneri* Boettger agree well with that of *C. granularis*, it is considered here as a junior synonym.

Distribution – Middle Miocene: Paratethys (Austria, Bosnia, Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia, Ukraine), Mediterranean (Italy).

Conilithes striatulus (Brocchi, 1814)
(Figs 111–112)

1814 *Conus striatulus* – BROCCHI, p. 294, pl. 3, fig. 4.

2003 *Conus striatulus* Brocchi – DAVOLI, p. 453, pl. 1, figs 2, 5, pl. 2, fig. 14.

Material – 5 specimens – Lăpugiu: M 60.8305.A-B., 60.8319.C-E.

Description – SL: 12–15. Spire of moderate height, conical, outline straight. Whorls smooth with slightly raised edge. Shoulder angulate. Body whorl conical, outline straight, smooth with spiral ridges at the base. Subsutural flexure asymmetrically curved.

Remarks – *C. brocchii* differs in striate spiral whorls. Based on new collecting works the occurrence of the species can be recorded from Letkés.

Distribution – Middle Miocene: Paratethys (Hungary, Romania).

CONCLUSION

Based on taxonomical revision, 41 conoid species are described here from three Early Badenian localities of the Făget Basin in Romania. Some of them (e.g. *L. eschewegi*, *V. montisclavus* or *V. taurorectus*) are new records from the region. From Lăpugiu, 37 species are represented by 579 specimens with dominance of *C. dujardini* (136 spp.), *L. bitorosus* (62), *K. berghausi* (52), and *C. canaliculatus* (47). From Coșteiu, 30 species are represented by 372 specimens with dominance of *C. granularis* (219) and *C. dujardini* (78). This difference can be explained by diverse origins of the museum collection (collecting works, donations, acquisi-

tion), as sediments of the same age are very similar at both localities. The small material from Nemeșești contains only 14 specimens that represent 9 species.

A few taxa that were recorded from Lăpugiu in earlier papers are absent from this museum collection, consequently the synthesis of the Conidae fauna of the region requires more research. To understand the actual diversity of this material, the comprehensive taxonomic revision of the Central Paratethyan Conidae is also inevitable. Some species assigned by HOERNES & AUINGER (1879) or SACCO (1893) were revised by HALL (1964) and by LANDAU *et al.* (2013), a few taxa are revised here, but others obviously need reinterpretation. Until further works we do not take account of records of e.g. “*Conus*” *neumayri* Hoernes et Auinger, “*Conus*” *karrereri* Hoernes et Auinger, “*Conus*” *schroeckingeri* Hoernes et Auinger recorded by KOCH (1900), and “*Stephanoconus*” *subnocturnus* (Orbigny) recorded by CHIRA & VOIA (2001) from the region.

On the other hand, the fauna list of Lăpugiu is completed here with four other taxa. *Conus subcoronatus* was described from this locality by BOETTGER (1887). The species was cited in subsequent papers (e.g. KOCH 1900), but it was never found again. Boettger’s collection is stored in Frankfurt, and we could study the photos of the holotype by courtesy of Dr. Ronald Janssen (Senckenberg Forschungsinstitut). The morphology of *subcoronatus* is close to *Pseudonoduloconus gastaldii* (Michelotti) in nodulose spiral whorls and shoulder, however, it differs by convex, not canaliculate spiral whorls. Based on these features, the validity of the species is recognized in this paper, and classified within genus *Pseudonoduloconus* Tucker et Tenorio.

Furthermore, taking notice of questionable synonymies, occurrences of three other taxa at Lăpugiu are accepted here from the records of CHIRA & VOIA (2001): *Kalloconus betulinoides* (Lamarck), *Monteiroconus antiquus* (Lamarck), and *Varioconus raristriatus* (Bellardi et Michelotti). These species and *P. subcoronatus* are indicated by * in Table 1.

From the Central Paratethys, the rich material presented here can be compared with that of the Börzsöny Mts (N Hungary). The Conidae fauna from Szob and Letkés also shows high diversity with 45 species (CSEPREGHY-MEZNERICS 1956, STRAUSS 1966, KOVÁCS & VICIÁN 2014). The assemblages of the two regions differ in the proportions of taxa. The dominant taxa at the Letkés section were *L. bitorosus*, *C. canaliculatus*, *V. miovoeslauenensis*, and *K. berghausi*, while in the Făget Basin *C. granularis*, *C. dujardini*, *L. bitorosus*, and *K. berghausi* prevail in the fauna. Altogether 51 Conidae species occur in the two regions, the proportion of shared taxa is 78.4%. Both assemblages are of mixed composition, they are related to the Conidae faunas known from the Vienna Basin and Northern Italy. According to HARZHAUSER & PILLER (2007) a clear Mediterranean character became dominant in the Central Paratethys in the early Middle Miocene. Our

Table 1. Conidae species from the Făget Basin (SW Romania) and from the Börzsöny Mts (N Hungary). * indicates taxa that are absent from the collection of the Hungarian Natural History Museum, Budapest, but known from the papers of BOETTGER (1887) and CHIRA & VOIA (2001).

** indicates new, unpublished Conidae records from Letkés (Börzsöny Mts)

species	Făget Basin	Börzsöny Mts
<i>aldrovandi</i> , <i>Monteiroconus</i> (Brocchi)	—	○
<i>anguliferus</i> , <i>Monteiroconus</i> cf. (Peyrot)	—	○
<i>antidiluvianus</i> , <i>Conilithes</i> (Bruguière)	○	○
<i>antiquus</i> , <i>Monteiroconus</i> (Lamarck)	*	○
<i>berghausi</i> , <i>Kalloconus</i> (Michelotti)	○	○
<i>betulinoides</i> , <i>Kalloconus</i> (Lamarck)	*	○
<i>bitorosus</i> , <i>Lautoconus</i> (Fontannes)	○	○
<i>brocchii</i> , <i>Conilithes</i> (Bronn)	○	○
<i>canaliculatus</i> , <i>Conilithes</i> (Brocchi)	○	○
<i>clavatulus</i> , <i>Varioconus</i> (d'Orbigny)	○	○
<i>conoponderosus</i> , <i>Varioconus</i> (Sacco)	○	○
<i>daciae</i> , <i>Kalloconus</i> (Hoernes et Auinger)	○	○
<i>dertogibbus</i> , <i>Varioconus</i> (Sacco)	—	○
<i>dujardini</i> , <i>Conilithes</i> (Deshayes)	○	○
<i>elongatus</i> , <i>Plagioconus</i> (Borson)	○	○
<i>eschewegi</i> , <i>Lautoconus</i> (da Costa)	○	○
<i>extensus</i> , <i>Plagioconus</i> (Partsch in Hörnes)	○	○
<i>fuscocingulatus</i> , <i>Kalloconus</i> (Bronn in Hörnes)	○	○
<i>granularis</i> , <i>Conilithes</i> (Borson)	○	○
<i>hirmetzli</i> , <i>Leptoconus</i> Kovács et Vicián	—	○
<i>hungaricus</i> , <i>Kalloconus</i> (Hoernes et Auinger)	○	○
<i>marii</i> , <i>Plagioconus</i> (Sacco)	○	○
<i>mercati</i> , <i>Monteiroconus</i> (Brocchi)	○	○
<i>miovoeslauensis</i> , <i>Lautoconus</i> (Sacco)	○	○
<i>mojsvari</i> , <i>Monteiroconus</i> (Hoernes et Auinger)	○	○
<i>montisclavus</i> , <i>Varioconus</i> (Sacco)	○	—
<i>mucronatolaevus</i> , <i>Varioconus</i> (Sacco)	○	○
<i>noe</i> , <i>Varioconus</i> (Brocchi)	○	—
<i>oboesus</i> , <i>Varioconus</i> (Michelotti)	—	**
<i>olivaeformis</i> , <i>Varioconus</i> (Hoernes et Auinger)	○	○
<i>parvicaudatus</i> , <i>Monteiroconus</i> (Sacco)	—	○
<i>pelagicus</i> , <i>Varioconus</i> (Brocchi)	○	○
<i>ponderosus</i> , <i>Varioconus</i> (Brocchi)	○	○
<i>praelongus</i> , <i>Varioconus</i> (Hoernes et Auinger)	○	**
<i>pseudoponderosus</i> , <i>Varioconus</i> (Glibert)	○	○
<i>puschi</i> , <i>Plagioconus</i> (Michelotti)	○	○
<i>pyrula</i> , <i>Lautoconus</i> (Brocchi)	○	○
<i>raristriatus</i> , <i>Varioconus</i> (Bellardi et Michelotti)	*	○
<i>rotundus</i> , <i>Lautoconus</i> (Hoernes et Auinger)	○	○
<i>steinabrunnensis</i> , <i>Varioconus</i> (Sacco)	○	○
<i>steindachneri</i> , <i>Kalloconus</i> (Hoernes et Auinger)	○	○
<i>striatulus</i> , <i>Conilithes</i> (Brocchi)	○	**
<i>subbigranosus</i> , <i>Pseudonoduloconus</i> cf. (Sacco)	○	—
<i>subraristriatus</i> , <i>Varioconus</i> (da Costa)	○	○
<i>subcoronatus</i> , <i>Pseudonoduloconus</i> (Böttger)	*	—
<i>suessi</i> , <i>Varioconus</i> (Hoernes et Auinger)	○	○
<i>taurinensis</i> , <i>Varioconus</i> (Bellardi et Michelotti)	○	○
<i>taurorectus</i> , <i>Varioconus</i> (Sacco)	○	—
<i>tietzei</i> , <i>Monteiroconus</i> (Hoernes et Auinger)	○	○
<i>ventricosus</i> , <i>Lautoconus</i> (Gmelin)	○	○
<i>vindobonensis</i> , <i>Varioconus</i> (Partsch in Hörnes)	○	○

achievements also prove a close relationship between the Central Paratethyan and the Mediterranean domains during the Langhian.

*

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