

Systematic descriptions

In the following descriptions the systematics developed by TOZER (1981) is used, with a few exceptions. The genera *Lardaroceras*, *Asseretoceras* and *Megaceratites*, introduced afterwards, are systematically arranged according to the opinion of their author BALINI (1992a, b). *Hyparpadites*, due to its fastigate venter, is here removed from Arpaditidae to Paraceratitinae. Moreover, following the opinion of MANFRIN et al. (2005), *Ticinites* is removed from Danubitidae to Bulogitinae, *Parasturia* is removed from Sturiidae to Ptychitidae and, following MONNET & BUCHER (2005), *Tropigymnites* is removed from Japonitidae to Gymnitidae.

The signs of open nomenclature were used according to BENGTON (1988), except regarding the uncertainty of the generic attributions; here the opinions of RICHTER (1943) and MATTHEWS (1973) were followed, i.e. question marks “?” after the name, instead of “aff.” in front of the name, were used. The signs attached to the synonymy lists were applied from RICHTER (1943, p. 40–42) and MATTHEWS (1973).

The majority of the material is deposited in the Department of Palaeontology and Geology of the Hungarian Natural History Museum (HNHM) under the inventory numbers prefixed by M., INV, or PAL, and in the palaeontological collection of the Mining and Geological Survey of Hungary (MGSH) under the inventory numbers prefixed by T. A few figured specimens are kept in the private collections of K. TAMÁS (Kővágóörs) and L. VARGA (Úny), without inventory numbers.

The author made comparative studies on ammonoid specimens deposited in several museums abroad; the names of the collections and their acronyms (used in the present monograph) are the following: Geologische Bundesanstalt, Wien (GBAW), Naturhistorisches Museum, Wien (NHMW), Bayerische Staatssammlung, München (BSM), Paläontologisches Institut und Museum, Universität Zürich (PIMUZ), Natural History Museum, London (NHML).

The dimensions of the measured ammonoid specimens (D = diameter, WH = whorl-height, WW = whorl-width, U = diameter of umbilicus) are given in millimetres (Figure 18).

Order Ceratitida HYATT, 1884

Superfamily Noritoidea KARPINSKY, 1889

Family Noritidae KARPINSKY, 1889

Genus *Norites* MOJSISOVICS, 1878

Type species: *Norites gondola* (MOJSISOVICS, 1869)

Norites gondola (MOJSISOVICS, 1869)

Plate I: 1–5.

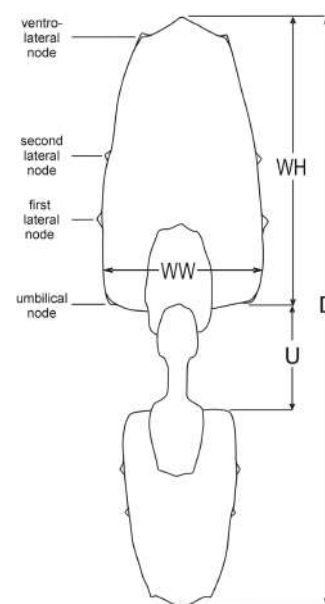


Figure 18. The axes of measurements (D = diameter, WH = whorl-height, WW = whorl-width, U = diameter of umbilicus), and the terminology of nodes, used in the present monograph

* 1869 *Ammonites Gondola* MOJS. nov. sp. — MOJSISOVICS, Cephalopoden-Fauna des alpinen Muschelkalkes, p. 584, pl. XV, fig. 3a–b.

- v 1900 [*Ceratites*] *cordevolicus* MOJS. — DIENER, Muschelkalk–Cephalopoden südl. Bakony, p. 25, pl. II, fig. 3.
 v 1901 *Norites gondola* MOJS. var. nov. — REIS, Fauna des Wettersteinkalkes I., p. 90, pl. IV, figs 24, 25.
 v 1903 *Norites Dieneri* ARTH. — ARTHABER, Neue Funden Muschelkalk des südl. Bakony, Revision, p. 26, pl. I, fig. 9.
 ? 1915 *Norites gondola* MOJS. — ARTHABER, Die Trias von Bithynien, p. 144, pl. XVII, fig. 3.
 v 1934 *Norites gondola* (MOJSISOVICS) — SPATH, Ammonoidea of the Trias, p. 281, fig. 98.
 v 1973 *Norites dieneri* ARTHABER, 1903 — RIEBER, Grenzbitumenzone, p. 71, pl. 17, figs 17, 18, 20.
 v 1989 *Norites dieneri* ARTHABER, 1903 ? — VÖRÖS & PÁLFY, Vászoly, p. 19.
 1996 *Norites dieneri* ARTHABER, 1903 — FANTINI SESTINI, Calcare di Esino 2, p. 216, pl. 1, fig. 10.
 v 1998 *Norites dieneri* ARTHABER, 1903 — VÖRÖS, Balaton-felvidék, p. 26, 35, 38, 42.
 v 2003 *Norites gondola* (MOJSISOVICS, 1869) — VÖRÖS, Pelsonian, p. 79, pl. A–I, figs 5–7, text-fig. A–9. (cum syn.)
 2008 *Norites gondola* (MOJSISOVICS 1869) — MONNET et al., Giudicarie, p. 69, text-figs 6, 7.

Material

15 specimens of various state of preservation, from Felsőörs (1), Vörösberény (1), Szentantalfa (1), Vászoly (4), Mentshely (6), Sóly (1) and Tótvázsony (1).

Measurements

	D	WH	WW	U
INV 2017.139.1.	34.8	~17.9	~10.1	~3.7
INV 2017.140.1.	33.4	17.5	?	~3.2
INV 2017.136.1.	28.1	13.8	7.5	~2.8
INV 2017.138.1.	~28.1	~13.1	?	~2.8
INV 2017.137.1.	26.3	14.1	7.6	~2.8

Description

The specimens are rather small for the genus. The coiling is very involute; the whorl-section is high and narrow trapezoidal. The umbilicus is narrow and deep. The umbilical wall is steep and forms a rather sharp shoulder with the flanks. The flanks are gently and evenly convex and meet the flat venter with a marked ventrolateral shoulder, carrying a definite, faint keel. The ornamentation is very weak.

The details of the suture were not studied; a weathered specimen (Plate I: 5) shows a ceratitic suture with at least five lateral lobes at 27 mm diameter.

Remarks

N. gondola is the type species of the genus *Norites*. Its middle Anisian (Pelsonian) occurrences and the relationships to other Pelsonian forms of *Norites* were discussed in detail by VÖRÖS (2003).

N. dieneri ARTHABER, 1903 was taken as an independent species by some authors, including VÖRÖS (1998) mainly on the basis of its larger size and its occurrence in the higher Anisian beds (Avisianum Subzone), in contrast to *N. gondola* which was recorded prevalently from the Pelsonian. However the new collections at the Balaton Highland revealed *N. gondola* in some transitional horizons (Camunum, Pseudohungaricum and Felsőeoersensis subzones). The extremely large size of ARTHABER's type specimen of *N. dieneri* is not considered enough to distinguish it as a separate species.

The specimen figured as *N. gondola* by ARTHABER (1915, l. c.) seems to be poorly preserved and its ventrolateral shoulder is rather rounded, without "keel"; therefore this item is included to the synonymy only with query.

Several specimens of *N. gondola* listed by SPATH (1934) were examined in the collection NHML (London) and most of them (C. 5458, C. 13896, C. 21037–9, C. 23063, C. 37191 and C. 37206) are here regarded as proper representatives of that species.

Distribution

N. gondola was described from the Anisian Schreyeralm Limestone of the Northern Calcareous Alps. It was found also in Anisian localities of the Northern Calcareous Alps, the Southern Alps and the Dinarides (Han Bulog Limestone). At the Balaton Highland it ranges from the Pelsonian Balatonicus Subzone to the Illyrian Avisianum Subzone.

Superfamily Ceratitoidea MOJSISOVICS, 1879

Family Ceratitidae MOJSISOVICS, 1879

Subfamily Beyrichitinae SPATH, 1934

Genus **Beyrichites** WAAGEN, 1895

Type species: *Beyrichites reuttensis* (BEYRICH, 1867)

Beyrichites cf. reuttensis (BEYRICH, 1867)

Plate I: 6.

* 1867 *Ammonites Reuttensis*. — BEYRICH, Über einige Cephalopoden, p. 113, pl. I, fig. 4a–c.v 1998 *Beyrichites cf. reuttensis* (BEYRICH, 1867) — VÖRÖS, Balaton-felvidék, p. 26, 59.v 2003 *Beyrichites cf. reuttensis* (BEYRICH, 1867) — VÖRÖS, Pelsonian, p. 95, pl. A–VII, fig. 10 (cum syn.).*Material*

Four fragmentary specimens from Szentantalfa.

Measurements

	D	WH	WW	U
INV 2017.141.1.	48.5	?	?	?

Description

The specimens are medium-sized for the genus. Compressed shells with rather involute coiling. The whorl-section is high oval. The umbilical shoulder is rounded. The flank is gently convex and passes gradually into the highly arched, narrow venter. The ornamentation is weak; it consists of widely spaced, sinuous to falcid ribs fading out near the venter. In the outer part of the flank, very weak secondary ribs are inserted between the primaries.

Suture lines were not seen.

Remarks

The middle Anisian (Pelsonian) occurrences of *B. reuttensis* and the relationships to other species of *Beyrichites* were discussed in detail by VÖRÖS (2003). The figures published by VENZO & PELOSIO (1968, l. c.) are regarded as the most perfect and reliable illustrations of *B. reuttensis*.

Distribution

B. reuttensis was described from the Anisian of the Southern Alps. It is also known from the Northern Calcareous Alps (Wetterstein Limestone), the Dinarides and the Caucasus. At the Balaton Highland it ranges from the Illyrian Binodosus Subzone to the Pseudohungaricum Subzone.

Genus **Lardaroceras** BALINI, 1992Type species: *Lardaroceras krystyni* BALINI, 1992*Lardaroceras krystyni* BALINI, 1992

Plate I: 9.

* 1992 *Lardaroceras krystyni* sp. n. — BALINI, *Lardaroceras*, p. 12, text-figs 4A, 5A–E, pl. 1, figs 1–5.1993 *Lardaroceras krystyni* BALINI, 1992 — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 64, pl. 3, fig. 1.v 1998 *Lardaroceras krystyni* BALINI, 1992 — VÖRÖS, Balaton-felvidék, p. 20, 22, 59 (partim), (non pl. I, fig. 7).v 2010 *Lardaroceras krystyni* BALINI, 1992 — VÖRÖS, North Hungary, p. 6, pl. I, figs 4, 5.*Material*

50 specimens of various state of preservation, from Felsőörs (4), Vörösberény (10), Szentantalfa (6), Szentkirályszabadja (2), Vászoly (23), Szentbékállá (4), and Iszkaszentgyörgy (1).

Measurements

	D	WH	WW	U
INV 2017.144.1.	59.1	26.9	?	?

Description

Small to large *Lardaroceras* with moderately involute, compressed conch. The whorl-section is high oval to subtrapezoidal. The umbilical wall and the umbilical margin are poorly seen. The flanks are gently convex, almost flat and meet the arched venter at a blunt ventrolateral margin. The venter bears a definite rounded keel separated from the ventrolateral

shoulders. The ornamentation consists of weak, mostly sinuous radial ribs and nodes. The prominent umbilical nodes elevate from the umbilical margin. There are no lateral nodes. The ventrolateral nodes (around 20 on a half whorl) are of medium strength; on the body chamber they appear as somewhat adorally elongated clavi.

Suture lines are not visible.

Remarks

This is the type species of the genus *Lardaroceras* and, according to the detailed description of BALINI (1992b, l. c.), it differs from the other species of that genus by the absence of lateral nodes. Previously this feature was not considered by the present author (VÖRÖS 1998, l. c.) and some forms with lateral row of nodes were wrongly attributed to *L. krystyni*. In the present monograph these forms are described as *L. barrandei* (MOJSISOVICS, 1882).

Distribution

L. krystyni was described from the Illyrian (Middle Triassic) of the Southern Alps (Lombardy). At the Balaton Highland it ranges from the Illyrian Camunum Subzone to the Felsőeoersensis Subzone.

Lardaroceras barrandei (MOJSISOVICS, 1882)

Plate I: 7, 8, 10, 11.

- v * 1882 *Ceratites Barrandei* E. v. MOJSISOVICS — MOJSISOVICS, Meditteranen Triasprovinz, p. 25, pl. XII, fig. 8.
- v 1989 *Parakellnerites* cf. *meriani* RIEBER, 1973 — VÖRÖS & PÁLFY, Vászoly, p. 19. (partim)
- v 1993 *Parakellnerites* sp., aff. *merianii* B — VÖRÖS, Reitzi Zone, p. 27, pl. I, figs 8, 9.
- v 1993 *Parakellnerites* sp., aff. *merianii* B — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 117, pl. 11, fig. 3.
- v 1998 *Lardaroceras krystyni* BALINI, 1992 — VÖRÖS, Balaton-felvidék, p. 20, 22, 59 (partim), pl. I, fig. 7.
- v 1998 *Lardaroceras* sp., aff. *krystyni* BALINI, 1992 — VÖRÖS, Balaton-felvidék, p. 22, 59 (partim), pl. I, fig. 8.
- v 2002 *Lardaroceras* sp. — VÖRÖS & PÁLFY, Köveskál, p. 55, pl. I, fig. 9.

Material

28 specimens of various state of preservation, from Felsőörs (8), Vörösberény (2), Szentantalfa (4), Szentkirályszabadja (1), Vászoly (9), Köveskál (1), Szentbékálla (2) and Vöröstó (1).

Measurements

	D	WH	WW	U
M.98.4	78.8	35.4	22.9	?
M.98.5	78.1	38.4	~21.1	~14.1
INV 2017.142.1.	38.1	19.1	?	~7.5
INV 2017.143.1.	36.8	18.5	?	~7.1

Description

Small to large *Lardaroceras* with moderately involute, compressed conch. The whorl-section is high oval to subtrapezoidal. The umbilical wall and the umbilical margin are poorly seen. The flanks are gently convex, almost flat and meet the arched venter at a blunt ventrolateral margin. The venter bears a definite rounded keel separated from the ventrolateral shoulders. The ornamentation consists of weak, mostly sinuous radial ribs and nodes. The prominent umbilical nodes elevate from the umbilical margin. The weak lateral nodes are somewhat nearer to the umbilical than to the ventrolateral margin and fade gradually on the body chamber; their number is around 12 on a half whorl. The ventrolateral nodes (20 to 22 on a half whorl) are strong, mostly pointed; on the body chamber they appear as somewhat projected clavi.

Suture lines are not visible.

Remarks

The holotype of *L. barrandei*, by monotypy, is deposited in the collection of the MGSZ (Budapest), under the inventory number T.123. This specimen was inspected in the collection of the MGSZ and the identification of our specimens from the Balaton Highland was confirmed.

This species, although properly defined and illustrated by MOJSISOVICS (1882), was almost forgotten; only AIRAGHI (1912, p. 13) gave a short description of a specimen from the Anisian of Tre Fontane (Monte San Giorgio). This record was not verified by later authors because AIRAGHI's material was lost during the war (see RIEBER 1973, p. 7). Previously, *L. barrandei* was overlooked by the present author (VÖRÖS 1993, 1998, l. c.) and was taken as a variant of *L. krystyni* BALINI, 1992.

However, it can easily be differentiated by its definite lateral row of nodes, missing in *L. krystyni*. The closely related *L. pseudohungaricum* BALINI, 1992 shows much coarser ornamentation both in the ribbing and in the nodosity.

Distribution

L. barrandei was described from the Balaton Highland, where its occurrence is now verified at numerous sites. Its record from the Southern Alps is ambiguous. At the Balaton Highland it ranges from the Illyrian Camunum Subzone to the Felsőeoersensis Subzone.

Lardaroceras pseudohungaricum BALINI, 1992

Plate I: 12; Plate II: 1–7; Figure 19.

- v 1882 *Ceratites hungaricus* E. v. MOJSISOVICS — MOJSISOVICS, *Mediterr. Triasprovinz*, p. 35 (partim), pl. XXX, fig. 19 (only).
- v 1989 *Parakellnerites cf. frauenfelderi* RIEBER, 1973 — VÖRÖS & PÁLFY, *Vászoly*, p. 19. (partim).
- v* 1992 *Lardaroceras pseudohungaricum* sp. n. — BALINI, *Lardaroceras*, p. 17, text-figs 4B–D, 6A–B, pl. 2, figs 1, 2, pl. 3, figs 1, 2.
- v 1993 *Lardaroceras aff. pseudohungaricum* BALINI, 1992 — BRACK & RIEBER, *Anisian/Ladinian boundary*, p. 468 (partim), pl. 5, figs 11, 12, 15 (non fig. 3).
- v 1993 *Parakellnerites* sp., aff. *hungaricus* A — VÖRÖS, *Reitzi Zone*, p. 27, pl. I, figs 6, 7.
- 1993 *Lardaroceras pseudohungaricum* BALINI, 1992 — GAETANI, (ed.), *Anisian/Ladinian boundary field workshop*, p. 64, pl. 3, fig. 2.
- v 1993 *Parakellnerites* sp., aff. *hungaricus* A — GAETANI (ed.), *Anisian/Ladinian boundary field workshop*, p. 117, pl. 11, figs 6, 7.
- v 1998 *Lardaroceras pseudohungaricum* BALINI, 1992 — VÖRÖS, *Balaton-felvidék*, p. 20, 59, pl. II, figs 1, 2.
- v 1998 *Lardaroceras* ? sp. aff. *pseudohungaricum* BALINI, 1992 — VÖRÖS, *Balaton-felvidék*, p. 22, 59.
- 1998 *Lardaroceras pseudohungaricum* BALINI, 1992 — PETEK, *Hrastenica*, p. 131 and 139, pl. 3, fig. 5.
- v 2010 *Lardaroceras pseudohungaricum* BALINI, 1992 – VÖRÖS, *North Hungary*, p. 5, pl. I, figs 1, 3.

Material

75 specimens of various state of preservation, from Felsőörs (35), Vörösberény (1), Szentantalfa (8), Vászoly (14), Mentshely (5), Köveskál (1), Szentbékállá (1), Szentkirályszabadja (2) and Iszkaszentgyörgy (8).

Measurements

	D	WH	WW	U
T.1666.	49.8	19.8	17.4	15.2
M.98.18	94.5	37.5	?	?
INV 2017.145.1.	90.7	?	?	?
M.98.168A	72.3	30.1	19.4	17.1
INV 2017.146.1.	64.4	27.2	17.6	~15.1
M.98.19	62.7	28.1	~17.1	~15.1
INV 2017.147.1.	56.5	37.5	17.7	~21.1
M 2001.26	49.7	22.4	?	17.1

Description

It is a large *Lardaroceras*, with moderately evolute coiling. The whorl-section is moderately compressed, high oval to subpentagonal. The umbilical margin is subrounded, steep. The flanks are slightly convex and form well marked ventrolateral shoulders with the gently arched venter. A rounded keel is present, well separated from the ventrolateral shoulders. The flanks are ornamented with strong ribs and nodes. The almost radial, slightly projected primary ribs run from the umbilical margin to the ventrolateral shoulder. Their number is 12 to 14 on a half-whorl of the body chamber. Instead of bifurcation, secondary ribs appear by insertion in the outer half of the flank. There are three rows of nodes. Each primary rib starts with strong, mostly sharp nodes at the umbilical margin, bears a prominent, pointed node at about the inner two-fifth of the flank and ends with strong, adorally projected node at the ventrolateral margin. There are similar, strong nodes on the ventrolateral ends of the secondary ribs. The number of the ventrolateral nodes is 15 to 18 on a half-whorl of the body chamber. The ornamentation is stronger on the body chamber than on the phragmocone.

Suture lines were not studied in detail; certain specimens showed four lateral saddles and a well denticulated first lateral lobe.

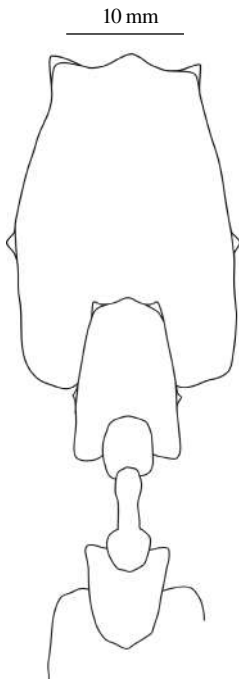


Figure 19. Cross section of *Lardaroceras pseudohungaricum* BALINI, 1992 (M.98.168), Vászoly, P-11a, Bed 5, Trinodosus Zone, Pseudohungaricum Subzone

Remarks

When introducing the species name *pseudohungaricum*, BALINI (1992b, p. 19) referred to the close similarity of his new species to “*Ceratites hungaricus*” MOJSISOVICS, 1882. He also stated that *L. pseudohungaricum* corresponded only partly to the specimens figured under the name *hungaricus* by MOJSISOVICS and that the four specimens figured by MOJSISOVICS (1882, pl. XXX, figs 17, 18, 19, 21) represented a heterogeneous series. The original specimens figured by MOJSISOVICS (housed in the collection MGSZ under the inventory numbers T.698., T.699., T.828. and T.1666.) were studied by the present author, and the morphological heterogeneity of the type series was confirmed. The largest specimen (T.828., pl. XXX, fig. 21 in MOJSISOVICS 1882) was designated by RIEBER (1973, p. 33) as the lectotype of the species *hungaricus* (now *Parakellnerites hungaricus*, see later in this monograph). Other two specimens (T.699., T.698., pl. XXX, figs 17 and 18 in MOJSISOVICS 1882) will be described as different, partly new species of *Parakellnerites* (later in this monograph). The fourth specimen (T.1666., pl. XXX, fig. 19 in MOJSISOVICS 1882) is here regarded as a proper representative of *L. pseudohungaricum*.

L. pseudohungaricum BALINI, 1992 differs from other species of *Lardaroceras* by its much coarser ornamentation, both in ribbing and in nodosity.

In some previous works (VÖRÖS & PÁLFY 1989, l. c., VÖRÖS 1993, l. c.), we tried to identify our specimens of *L. pseudohungaricum* with different species of *Parakellnerites*.

The specimens figured as *Lardaroceras* aff. *pseudohungaricum* by BRACK & RIEBER (1993, l. c.) were inspected at the collection PIMUZ, Zürich and, in the author's opinion, most of them may correspond to *L. pseudohungaricum*, except the specimen on pl. 5, fig. 3 of BRACK & RIEBER (1993), which seems to stand closer to *L. krystyni*.

Distribution

L. pseudohungaricum was recorded from late Anisian localities of the Southern Alps, the Julian Alps and the Rudabánya Mts (North Hungary). At the Balaton Highland its range is restricted to the Illyrian Pseudohungaricum and Felsőeoersensis Subzones.

Subfamily Paraceratitinae SILBERLING, 1962

Genus **Paraceratites** Hyatt, 1900

Type species: *Paraceratites elegans* (MOJSISOVICS, 1882)

Paraceratites trinodosus (MOJSISOVICS, 1882)

Plate II: 9–12; Plate III: 1–3; Figures 20, 21.

- v * 1882 *Ceratites trinodosus* E. v. MOJSISOVICS — MOJSISOVICS, *Mediterranen Triasprovinz*, p. 29 (partim), pl. VIII, figs 6, 9, pl. XXXVII, figs 6, 7. (non pl. VIII, figs 5, 7).
- non 1906 *Ceratites trinodosus* MOJS. — RENZ, *Argolis* (1), p. 385, unnumbered text-fig. on p. 386.
- ? 1907 *Ceratites trinodosus* v. MOJSISOVICS — DIENER, *Himalayan Muschelkalk*, p. 48, pl. III, fig. 5.
- non 1910 *Ceratites trinodosus* MOJSISOVICS — RENZ, *Argolis* (2), p. 19, pl. I, fig. 7.
- v non 1915 *Ceratites trinodosus* MOJS. Var. — ARTHABER, *Die Trias von Bithynien*, p. 123, pl. XII, fig. 3.
- v 1934 *Paraceratites trinodosus* (MOJSISOVICS) — SPATH, *Ammonoidea of the Trias*, p. 436 (partim), (non fig. 146).
- 1936 *Ceratites trinodosus* MOJS. — STEFANOFF, *Golo-Bärdo*, p. 156 (partim), pl. III, figs 3, 6, 9. (non pl. III, fig. 8).
- ? 1955 *Ceratites trinodosus* MOJS. — ŽLEBNÍK, *Peca*, p. 216, figs 1, 2.
- ? 1958 *Ceratites (Paraceratites) trinodosus* MOJSISOVICS — SACCHI VIALLI & VAI, *Fauna triassica bresciana*, p. 70, pl. IV, fig. 33.
- ? 1963 *Paraceratites trinodosus* (MOJSISOVICS) 1882 — ASSERETO, *Val Camonica*, p. 35, pl. II, figs 3, 4, text-fig. 10.
- non 1964 *Paraceratites* cf. *trinodosus* MOJSISOVICS — BANDO, *Japan*, p. 113, pl. 5, fig. 5, text-fig. 34/4.
- 1967 *Paraceratites trinodosus* (MOJSISOVICS, 1882) — CASATI & GNACCOLINI, *Alpi Orobie*, p. 135, pl. 10, fig. 8.
- 1968 *Paraceratites trinodosus* (MOJS.) — VENZO & PELOSIO, *Lenna in Val Brembana*, p. 100, pl. IX, figs 1–10, pl. X, figs 1, 2, pl. XII, fig. 1, 4.
- 1969 *Paraceratites trinodosus* (MOJSISOVICS) — GAETANI, *Giudicarie*, p. 484, pl. 37, figs 9, 10.
- 1980 *Paraceratites trinodosus* (MOJSISOVICS) — GU et al., *Tibet*, p. 347, pl. I, figs 9–11, text-fig. 4c.
- 1995 *Paraceratites trinodosus* (MOJSISOVICS, 1882) — MIETTO & MANFRIN, *Middle Triassic ammonoid*, p. 549, pl. II, figs 2, 3.
- 1993 *Paraceratites* aff. *trinodosus* (MOJSISOVICS, 1882) — GAETANI, (ed.), *Anisian/Ladinian boundary field workshop*, p. 64, pl. 1, fig. 5.
- v 1998 *Paraceratites trinodosus* (MOJSISOVICS, 1882) — VÖRÖS, *Balaton-felvidék*, p. 22, 59, pl. I, figs 4, 5.

Material

65 specimens of various state of preservation, from Felsőörs (16), Vörösberény (17), Szentantalfa (17), Köveskál (8), Monoszló (5), Barnag (2).

Measurements

	D	WH	WW	U
M.87.033	53.8	24.1	18.1	11.8
M.98.8	49.5	24.1	16.4	11.2
INV 2017.153.1.	46.1	20.5	16.1	11.3
INV 2017.152.1.	44.1	21.1	13.5	?
INV 2017.150.1.	37.8	17.8	?	8.1
INV 2017.151.1.	36.1	16.4	11.3	?
INV 2017.149.1.	25.1	11.1	10.5	?

Description

Medium to large *Paraceratites* with moderately involute, compressed conch. The whorl-section is high oval to subtrapezoidal. The umbilical wall is steep to overhanging; the umbilical margin is rather well marked. The flanks are gently convex and meet the arched venter at a blunt ventrolateral margin. The venter is gently roof-shaped but not fastigate. The ornamentation consists of rather strong, slightly prorsiradiate, almost straight ribs and nodes. The number of the ribs (eight on a half whorl) increases by irregular insertion of secondary ribs; bifurcation is rare. There are three rows of nodes. Each primary rib starts with strong nodes at the umbilical margin, bears a prominent node at about the inner two-fifth of the flank and ends with strong, adorally projected node at the ventrolateral margin. There are similar, strong nodes on the ventrolateral ends of the secondary ribs. The number of the ventrolateral nodes is 13 to 15 on a half-whorl of the body chamber. The ornamentation is somewhat stronger on the body chamber than on the phragmocone.

The suture line (Figure 21) is ceratitic with three simple lateral saddles; only the ventrolateral saddle shows a minute incision. The first lateral lobe is deeply denticulated.

Remarks

P. trinodosus was frequently recorded and profusely illustrated by numerous authors, nevertheless its exact morphological interpretation is still indefinite. Even the original description and illustrations given by MOJSISOVICS (1882) portrayed rather different forms under the name *trinodosus*. SPATH (1934, p. 436) designated a lectotype (specimen figured by MOJSISOVICS on pl. VIII, fig. 9), deposited in the BSM (München). This specimen (from Reutte, Nordtirol) slightly differs from the others figured by MOJSISOVICS by its almost rectiradiate ribbing. The other members of the type series, inspected by the present author in the collections GBAW (Wien) and the MGSB (Budapest), represent a wider range of variation. Only one specimen, figured by MOJSISOVICS (1882, pl. VIII, fig. 5), should be excluded by its fairly different ornamentation, and another (l. c. fig. 7) by its minute size. This wider concept or interpretation of *P. trinodosus* corresponds to and is supported by the copious illustration of this species by VENZO & PELOSIO (1968, l. c.).

P. trinodosus differs from *P. elegans* (MOJSISOVICS, 1882) by its more robust construction, by gently prorsiradiate ribbing and by the lateral nodes closer to the umbilicus; from *P. rothi* (MOJSISOVICS, 1882) by its arched venter and stronger ornamentation.

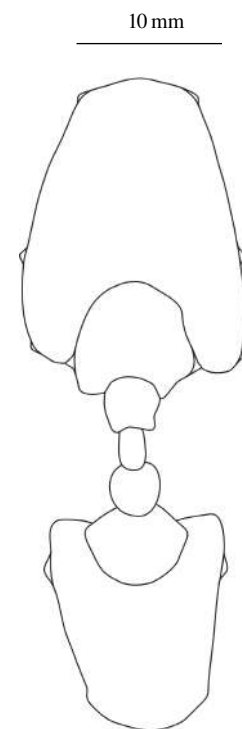


Figure 20. Cross section of *Paraceratites trinodosus* (MOJSISOVICS, 1882) (INV 2017.153.1.), Vörösberény, Bed 29, Trinodosus Zone, Trinodosus Subzone

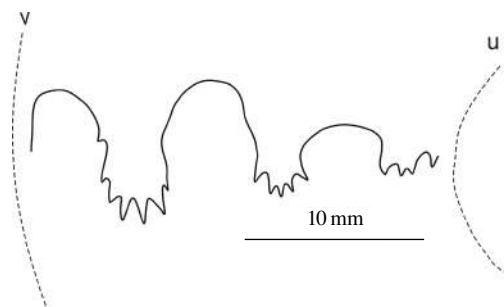


Figure 21. Suture line of *Paraceratites trinodosus* (MOJSISOVICS, 1882) (M.98.8), at 22 mm whorl-height, Vörösberény, Bed 29, Trinodosus Zone, Trinodosus Subzone; u: umbilical margin, v: ventrolateral margin

The specimens figured as *P. trinodosus* by RENZ (1906, l. c. and 1910, l. c.) probably belong to some other species showing quite different ornamentation, with weak nodes and sinuous, almost falcoid ribbing. More or less the same holds true for the poorly preserved specimen figured by BANDO (1964, l. c.).

ARTHABER's specimen of *P. trinodosus* from Turkey (ARTHABER, 1915, l. c.) may also be attributed to another species. According to the observations by the present author in the collections GBAW (Wien) this specimen has highly arched venter and its ornamentation, especially the nodes differ considerably from those of *P. trinodosus*.

STEFANOFF (1936, l. c.) figured four specimens of *P. trinodosus*. As far as the very poor photographs permit an evaluation, one of them (pl. II, fig. 8) surely does not belong here, because it has strongly projected ventrolateral nodes.

The specimen figured by GAETANI (ed.) (1993, l. c.) under the name *Paraceratites* aff. *trinodosus* from the Prezzo Limestone of Adanà (Giudicarie, Southern Alps) is here regarded as belonging to *P. trinodosus* in a broad sense.

Several specimens of *P. trinodosus*, listed by SPATH (1934) were examined in the collection NHML (London) and some of them (C. 14053, C. 14054, from Turkey) are here regarded as proper representatives of that species. Other specimens from Hallstatt (Northern Calcareous Alps) and Bosnia may tentatively be attributed to *P. trinodosus*. The North American specimen figured as *P. trinodosus* by SPATH (1934, fig. 146) was later included to *P. vogdesi* (SMITH, 1914) by SILBERLING & NICHOLS (1982) and the latter species was eventually ranged into their new genus *Brackites* by MONNET & BUCHER (2005).

Distribution

P. trinodosus is widespread in the upper Anisian of the Northern Calcareous Alps, the Southern Alps, the Balkan Mountains and occurred in Tibet. The records from the Dinarides, Turkey and the Himalayas are doubtful. At the Balaton Highland its range is restricted to the Illyrian *Trinodosus* and *Camunum* Subzones.

Paraceratites cf. *elegans* (MOJSISOVICS, 1882)

Plate II: 8.

* 1882 *Ceratites elegans* E. v. MOJSISOVICS — MOJSISOVICS, *Mediterr. Triasprovinz*, p. 31, pl. IX, figs 5, 6, pl. XXVIII, fig. 9.

? 1904 *Ceratites* confr. *elegans* MOJSISOVICS 1882. — MARTELLI, *Boljevici*, p. 86, pl. V, fig. 3.

? 1936 *Ceratites* cfr. *elegans* MOJS. — STEFANOFF, *Golo-Bärdo*, p. 158, pl. IV, figs 7, 8.

? 1963 *Paraceratites* cf. *elegans* (MOJSISOVICS) 1882. — ASSERETO, *Val Camonica*, p. 35, pl. II, fig. 5.

1968 *Paraceratites elegans* (MOJS.) — VENZO & PELOSIO, *Lenna in Val Brembana*, p. 99, pl. VIII, figs 15–17.

1980 *Paraceratites elegans* (MOJSISOVICS) — GU et al., *Tibet*, p. 346, pl. I, figs 12, 13, text-fig. 4b.

1995 *Paraceratites elegans* (MOJSISOVICS, 1882) — MIETTO & MANFRIN, *Middle Triassic ammonoid*, p. 549, pl. II, fig. 1.

v 1998 *Paraceratites* cf. *elegans* (MOJSISOVICS, 1882) — VÖRÖS, *Balaton-felvidék*, p. 22, 59.

Material

16 specimens of various state of preservation, from Felsőörs (5), Vörösberény (5), Szentantalfa (4), Monoszló (2).

Measurements

	D	WH	WW	U
INV 2017.148.1.	33.3	15.5	?	8.2

Description

Medium sized *Paraceratites* with moderately involute, compressed conch. The whorl-section is high oval. The characters of the umbilical wall and the umbilical margin are poorly seen. The flanks are gently convex, almost flat and meet the highly arched venter at a blunt ventrolateral margin. The venter is roof-shaped but not fastigate. The ornamentation consists of rather strong, nearly straight ribs and nodes. The number of the primary ribs (seven on a half whorl) increases by irregular, sometimes double, insertion of secondary ribs; bifurcation is rare. There are three rows of nodes. Each primary rib starts with strong node at the umbilical margin, bears a prominent lateral node and ends with strong, adorally projected node at the ventrolateral margin. There are similar, strong nodes on the ventrolateral ends of the secondary ribs. The number of the ventrolateral nodes is 12 on a quarter of the phragmocone.

The suture line was not seen.

Remarks

P. elegans, the type species of the genus *Paraceratites*, differs from *P. trinodosus* by its more compressed conch, more elevated, subcarinate venter and nearly rectiradiate ribbing. The type specimens, deposited in Berlin, were not inspected by the present author, but the good figures given by MOJSISOVICS (1882, l. c.) and the fine illustrations published by VENZO & PELOSIO (1968, l. c.) offered a realistic morphological information on *P. elegans*.

The items by MARTELLI (1904, l. c.), STEFANOFF (1936, l. c.) and ASSERETO (1963, l. c.) are only tentatively included to the present synonymy because of the poor quality of the published photographs.

Distribution

P. elegans was described from Anisian of the Northern Calcareous Alps, the Southern Alps and Tibet; its records from the Dinarides and the Balkan Mountains are doubtful. At the Balaton Highland its range is restricted to the Illyrian Trinodosus, Camunum and Pseudohungaricum Subzones.

Paraceratites cf. *rothi* (MOJISOVICS, 1882)

Plate III: 4, 5.

v * 1882 *Ceratites rothi* E. v. MOJISOVICS — MOJISOVICS, *Mediterranen Triasprovinz*, p. 25, pl. IX, fig. 7.

1968 *Paraceratites rothi* (MOJS.) — VENZO & PELOSIO, *Lenna in Val Brembana*, p. 107, pl. XI, figs 9–19, pl. XII, fig. 3.

v 1998 *Paraceratites* cf. *rothi* (MOJISOVICS, 1882) — VÖRÖS, *Balaton-felvidék*, p. 20, 59.

Material

Two specimens of poor state of preservation from Felsőörs.

Measurements

	D	WH	WW	U
Holotype T.838.	47.3	20.5	16.7	11.2
INV 2017.154.1.	54.5	~19.5	?	?

Description

Medium sized with moderately evolute conch. The whorl-section is low subtrapezoidal. The umbilical wall and the umbilical margin are poorly seen. The flanks are almost flat and meet the venter at a marked ventrolateral margin. The venter is very low, almost tabulate. The ornamentation consists of ribs of various strength, and nodes. There are 10 to 12 ribs on a half whorl; secondary ribs and bifurcation are rare. The umbilical nodes are poorly seen. The lateral nodes lie near the middle of the lateral flank and are massive but rather low. The ventrolateral nodes (12 to 14 on a half whorl) are strong and somewhat adorally projected.

The suture line was not seen.

Remarks

The original specimen of *P. rothi* was investigated by the present author in the collection of the MGSZ (Budapest). It is a single specimen, kept under the inventory number T.838., and is re-figured here (Plate III: 5) as the holotype by monotypy. Both the specimen and the description and figure by MOJISOVICS (1882, l. c.) show the tabulate venter, crossed by fine, adorally arched growth lines. This is the most important morphological feature distinguishing *P. rothi* from other species of *Paraceratites*. The ample illustration given by VENZO & PELOSIO (1968, l. c.) endorse the independent specific status of *P. rothi*.

Distribution

P. rothi was described from the upper Anisian from Felsőörs (Hungary) and from the Southern Alps. At the Balaton Highland its range is restricted to the Illyrian Trinodosus Subzone.

Genus *Semiornites* ARTHABER, 1912

Type species: *Semiornites cordevolicus* (MOJISOVICS, 1882)

Semiornites cf. *cordevolicus* (MOJISOVICS, 1882)

Plate III: 7, 9.

v * 1882 *Ceratites cordevolicus* E. v. MOJISOVICS — MOJISOVICS, *Mediterranen Triasprovinz*, p. 26, pl. XII, figs 5–7.

1934 *Semiornites cordevolicus* (MOJISOVICS) — SPATH, *Ammonoidea of the Trias*, p. 455, figs 149, 150a.

? 1935 *Ceratites cordevolicus* MOJS. — BERNDT, *Ostbalkan*, p. 13, pl. I, fig. 3.

? 1963 *Semiornites cordevolicus* (MOJISOVICS) 1882 — ASSERETO, *Val Camonica*, p. 40, pl. III, fig 3.

- 1967 *Semiornites cordevolicus* (MOJISOVICS, 1882) — CASATI & GNACCOLINI, Alpi Orobie, p. 135, pl. 10, fig. 4.
 1968 *Semiornites cordevolicus* (MOJS.) — VENZO & PELOSIO, Lenna in Val Brembana, p. 110, pl. XII, figs 8–10, 12, 13.
 v 1998 *Semiornites* cf. *cordevolicus* (MOJISOVICS, 1882) — VÖRÖS, Balaton-felvidék, p. 22, 59.

Material

35 specimens of various state of preservation, from Vörösberény (22), Szentanatalfa (13).

Measurements

	D	WH	WW	U
INV 2017.156.1.	36.1	17.5	10.5	6.8
INV 2017.158.1.	23.5	~12.5	~5.1	~5.1

Description

Small *Semiornites* with involute, compressed conch. The whorl-section is high subtrapezoidal. The umbilical margin is well marked; the umbilical wall is gently inclined. The flanks are almost flat and meet the tabulate venter at a rather sharp ventrolateral margin. The ornamentation consists of weak, mostly sinuous radial rugae and growth lines. There are no umbilical and lateral nodes. The ventrolateral margin bears weak nodes (around 20 on a half whorl); on the body chamber they appear as adorally elongated clavi.

Suture lines are not visible.

Remarks

The original specimens of *cordevolicus*, figured by MOJISOVICS (1882, l. c.), were checked in the collections GBAW (Wien) and the MGSZ (Budapest, T.827.). The specimen, figured by MOJISOVICS (1882, pl. XII, fig. 5), was re-figured and designated as lectotype by SPATH (1934, l. c.). These figures and the splendid illustrations published by VENZO & PELOSIO (1968, l. c.) unanimously show that *S. cordevolicus* is the most weakly ornamented species of the genus *Semiornites*.

In a previous work (VÖRÖS 1998, p. 22, 59) a few specimens of this species were wrongly attributed to the more strongly ornamented *S. lennanus* (MOJISOVICS, 1882).

The record from the Balkan Mountains by BERNDT (1935, l. c.) is fairly doubtful because the published poor figure shows keel-like crest along the ventrolateral shoulder of the specimen which suggests that it may belong to the genus *Norites*.

Distribution

S. cordevolicus was repeatedly recorded from the Southern Alps.

At the Balaton Highland its range is restricted to the Illyrian Trinodosus and Camunum Subzones.

Semiornites cf. *aviticus* (MOJISOVICS, 1882)

Plate III: 6.

- v * 1882 *Ceratites aviticus* E. v. MOJISOVICS — MOJISOVICS, Mediterranen Triasprovinz, p. 24, pl. XII, figs 2–4.
 ? 1963 *Semiornites aviticus* (MOJISOVICS) 1882 — ASSERETO, Val Camonica, p. 37, pl. III, fig 1, text-figs 11, 12.
 ? 1967 *Semiornites aviticus* (MOJISOVICS, 1882) — CASATI & GNACCOLINI, Alpi Orobie, p. 135, pl. 10, figs 3, 9.
 1968 *Semiornites aviticus* (MOJS.) — VENZO & PELOSIO, Lenna in Val Brembana, p. 114, pl. XIII, figs 4, 10, 14–16.
 1993 *Semiornites aviticus* (MOJISOVICS, 1882) — GAETANI, (ed.), Anisian/Ladinian boundary field workshop, p. 64, pl. 1, fig. 4.
 v 1993 *Semiornites aviticus* — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 117, pl. 11, fig. 5.
 v 1993 *Semiornites aviticus* — VÖRÖS, Reitzi Zone, p. 27, pl. I, figs 3, 4.
 v 1998 *Semiornites* ? cf. *aviticus* (MOJISOVICS, 1882) — VÖRÖS, Balaton-felvidék, p. 20, 59.

Material

46 specimens of various state of preservation, from Felsőörs (17), Szentantalfa (27), Szentkirályszabadja (1), Dörgicse (1).

Measurements

	D	WH	WW	U
INV 2017.155.1.	82.5	39.5	23	19.7

Description

Large *Semiornites* with involute, compressed conch. The whorl-section is high oval to subtrapezoidal. The umbilical margin is well marked; the umbilical wall is gently inclined. The flanks are gently convex and meet the venter at a rather sharp ventrolateral margin. The venter is rather highly arched, roof-shaped but still not fastigate. The ornamentation consists of weak, mostly sinuous primary ribs and intercalated secondary riblets. The umbilical and lateral nodes are weak and fade out on the body chamber. The ventrolateral margin bears numerous weak nodes (around 20 on a half whorl) persisting also on the body chamber.

Suture lines are not visible.

Remarks

The original specimens of *aviticus*, figured by MOJSISOVICS (1882, l. c.), were checked in the collections of the MGSB, and the largest specimen (inventory number: T.697., figured by MOJSISOVICS 1882, pl. XII, fig. 4) is designated here as lectotype. On the basis of the comparisons, the identification of our specimens seems warranted.

S. aviticus differs from *S. cordevolicus* (MOJSISOVICS, 1882) by its somewhat stronger ornamentation and from other species of *Semiornites* by its roof-shaped, almost fastigate venter.

VENZO & PELOSIO (1968, l. c.) illustrated various specimens of *S. aviticus*; from among these, the largest one (l. c., pl. XIII, fig. 17) is the most similar to our specimens.

The items by ASSERETO (1963, l. c.) and CASATI & GNACCOLINI (1967, l. c.) are only tentatively included to the present synonymy because the figured specimens bear very strong ornamentation.

Distribution

S. aviticus was described from the Balaton Highland and from many localities of the Southern Alps. At the Balaton Highland it ranges from the Illyrian Binodosus Subzone to the Pseudohungaricum Subzone.

Semiornites ? cf. *falcifer* (HAUER, 1896)

Plate III: 8.

v* 1896 *Ceratites falcifer* n. sp. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 258, pl. VIII, figs 5, 6.

1904 *Ceratites falcifer* HAUER 1896 — MARTELLI, Boljevici, p. 84, pl. V, fig. 4.

non 1916 *Ceratites (Semiornites) falcifer* HAU. — ARTHABER, Trient, p. 257, pl. V, figs 3, 4.

? 1949 *Ceratites falcifer* HAU. — RIEDEL, Alpi meridionali, p. 5, pl. I, fig. 8.

1994 “*Ceratites*” aff. *falcifer* HAUER, 1896 — BALINI, Hydra, p. 359, pl. 2, fig. 3.

2003 “*Semiornites*” *falcifer* (HAUER, 1896) — MIETTO et al., Bagolino, p. 459, pl. 1, fig. 5, pl. 2, fig. 8.

Material

One poorly preserved, fragmentary specimen from Mencshely.

Measurements

	D	WH	WW	U
INV 2017.157.1.	34.5	25.4	?	?

Description

Small half-whorl showing involute, compressed conch. The whorl-section is high subtrapezoidal. The umbilical margin is well marked; the umbilical wall is gently inclined. The flanks are almost flat and meet the arched venter at a rather sharp ventrolateral margin. A low, rounded keel is present on the venter, well separated from the ventrolateral shoulders. The flanks are ornamented with moderately strong, prorsiradiate falcooid primary ribs (around eight on a quarter of the whorl) and a few intercalated secondary riblets. The umbilical nodes are rather prominent. Lateral nodes are absent. The ventrolateral margin bears well developed, adorally projected nodes (around 13 on a quarter of the whorl).

Suture lines are not visible.

Remarks

The original specimen of *falcifer*, figured by HAUER (1896, l. c.), was checked in the collections NHMW (Wien). Our specimen from the Balaton Highland fits rather well the figured monotype in the characters of the ornamentation. Only its venter seems to be narrower, but this may be due to the preservation (partial compaction) of our specimen.

The specimen figured by ARTHABER (1916, l. c.) as “*Ceratites (Semiornites) falcifer*” does not seem to belong to this species because it shows a definitely fastigate venter, less falcooid ribs, and much more robust ventrolateral nodes.

The item by RIEDEL (1949, l. c.) is only tentatively included to the present synonymy because, although the ornamentation is somewhat similar to *falcifer*, the accompanying *Bulogites* fauna suggests a Pelsonian age.

“*Ceratites* sp. ind. aff. *falcifer* HAUER”, figured by DIENER (1913, p. 53, pl. VII, fig. 1) is rather similar to HAUER’s original figure of *falcifer*, but on the basis of its cross section it seems to belong to the genus *Bulogites*.

SALOPEK (1913, p. 10, fig. 1) figured only a suture line, therefore this record of *falcifer* is also questionable.

MIETTO et al. (2003, l. c.) published only lateral views of a somewhat compressed forms attributed to *falcifer*; moreover, their specimens came from the upper part of the Reitzi Zone.

The generic position of the species “*Ceratites falcifer*” (HAUER, 1896) is queried. BALINI (1994, l. c.) maintained the wide uncertainty in the generic attribution, while using the name “*Ceratites*”. KUTASSY (1932, p. 473) used the name combination “*Ceratites (Semiornites) falcifer*”. SPATH (1934, p. 456) definitely put this species into the genus *Semiornites* and directly compared it to *S. aviticus* (MOJSISOVICS, 1882) and *S. cordevolicus* (MOJSISOVICS, 1882). MIETTO et al. (2003, l. c.) also used this generic attribution but used inverted commas for the generic name. In fact, the falcooid ribbing is more widespread among the Hungaritidae, whereas the venter of “*Ceratites*” *falcifer* points to relationship to Paraceratitinae. After considering the opinions of SPATH (1934, p. 456) and P. MIETTO (pers. comm.) the combination of names *Semiornites* ? *falcifer* is used here tentatively. It has to be mentioned that this species was regarded as member of the genus *Stoppaniceras* by RIEBER (1973, p. 36, 41); this is not accepted here, but further emphasizes the uncertainty around the proper generic attribution of the species *falcifer*.

Distribution

S. ? falcifer was described from the upper Anisian from the Dinarides, Island Hydra (Greece) and the Southern Alps. At the Balaton Highland it was found in the Illyrian Liepoldti Subzone.

Genus *Asseretoceras* BALINI, 1992

Type species: *Asseretoceras camunum* (ASSERETO, 1963)

Asseretoceras camunum (ASSERETO, 1963)

Plate III: 10–12; Plate IV: 1–4.

* 1963 *Bulogites camunus* n. sp. — ASSERETO, Val Camonica, p. 46, pl. IV, figs 4, 5, text-figs 15, 16.

v 1989 *Stoppaniceras* cf. *variabilis* RIEBER, 1973 — VÖRÖS & PÁLFY, Vászoly, p. 21, pl. I, figs 1, 2.

v 1992 *Asseretoceras camunum* (ASSERETO, 1963) — BALINI, New genera, p. 181, figs 2, 3.

v 1993 *Asseretoceras camunum* — VÖRÖS, Reitzi Zone, p. 28, pl. I, figs 1, 2.

1993 *Asseretoceras camunum* (ASSERETO, 1963) — GAETANI, (ed.), Anisian/Ladinian boundary field workshop, p. 64, pl. 2, figs 2, 3.

v 1993 *Asseretoceras camunum* — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 117, pl. 11, figs 1, 2.

1994 *Asseretoceras camunum* (ASSERETO, 1963) — BALINI, Hydra, p. 354, pl. 1, fig. 1.

v 1998 *Asseretoceras camunum* (ASSERETO, 1963) — VÖRÖS, Balaton-felvidék, p. 20, 59.

v 2010 *Asseretoceras camunum* (ASSERETO, 1963) — VÖRÖS, North Hungary, p. 8, pl. II, figs 1, 2.

v 2015 *Asseretoceras camunum* (ASSERETO, 1963) — VÖRÖS et al., New data, p. 319, pl. I, fig. 1.

Material

58 specimens of various state of preservation, from Felsőörs (14), Vörösbény (2), Szentantalfa (11), Vászoly (26), Mencshely (1), Vöröstó (1), Szentkirályszabadja (2), Iszkaszentgyörgy (1).

Measurements

	D	WH	WW	U
INV 2017.160.1.	~60.1	20.4	?	?
INV 2017.161.1.	57.5	18.5	?	?
INV 2017.159.1.	52.1	19.2	?	19.8
INV 2017.162.1.	52.1	17.1	?	?
M.89.52	28.5	12.4	8.3	8.2
M.89.187A	26.5	12.8	10.1	?
M.89.187B	24.7	9.5	8.2	?

Description

Medium-sized *Asseretoceras* with moderately involute conch. The whorl-section is somewhat trapezoidal, subquadrate. The umbilical wall and the umbilical margin are poorly observed, they seem to be subrounded. The flanks are gently convex. The ventrolateral margin is well-marked. The venter is evenly and moderately arched. The ornamentation consists of strong ribs bearing nodes. The ribs are slightly prorsiradiate and gently concave. The primary ribs run from the umbilical margin to the ventrolateral shoulder. Their number is 8 to 10 on a half-whorl of the body chamber. The secondary ribs are usually intercalated in the interspace of the primaries; bifurcation is rare. There are three rows of nodes on the flanks. The umbilical nodes are rather bulla-like on each primary ribs. The moderately strong lateral nodes appear irregularly on some primary ribs in the inner one-fourth of the flank. The ventrolateral nodes (14 to 18 on a half-whorl) uniformly appear both at the primary and on the secondary ribs. They are adorally projected and develop as spines on the body chamber.

Suture lines are not visible.

Remarks

A. camunum was introduced by ASSERETO (1963, l. c.) as a species of *Bulogites*, then it became the type species of *Asseretoceras* erected by BALINI (1992a). Subsequent illustrations by GAETANI (ed.) (1993, l. c.) and (BALINI 1994, l. c.) supported the identification of our specimens with *A. camunum*.

A few specimens from Vászoly (Balaton Highland) were erroneously identified as *Stoppaniceras* cf. *variabilis* RIEBER, 1973 by VÖRÖS & PÁLFY (1989, l. c.); in fact they represent *A. camunum*.

Distribution

A. camunum was described from the upper Anisian of the Southern Alps, Island Hydra (Greece) and the Rudabánya Mts (North Hungary). At the Balaton Highland its range is restricted to the Illyrian Camunum and Pseudohungaricum Subzones.

Genus *Megaceratites* BALINI, 1992

Type species: *Megaceratites fallax* BALINI, 1992

When erecting his new genus, BALINI (1992a, p. 183) based it exclusively to the type species *fallax* and excluded many, partly similar, ceratitid species. On the other hand, the present author (VÖRÖS, 1998, 2010a) had the opinion, that the close morphological similarity between the type species and “*Ceratites*” *subnodosus* MOJSISOVICS, 1882, and their almost coeval occurrence, justified the attribution of the latter species to *Megaceratites*. The morphological and stratigraphical ranges of *Megaceratites* were further expanded when DE ZANCHE et al (1995, p. 138) and MIETTO et al. (2003b, p. 454) tentatively attributed the higher Anisian species *friccensis* (ARTHABER, 1916) to *Megaceratites*. This broader interpretation of the genus *Megaceratites* is preferred here.

Megaceratites cf. *subnodosus* (MOJSISOVICS, 1882)

Plate IV: 5–8; Plate V: 1.

- v * 1882 *Ceratites subnodosus* E. v. MOJSISOVICS — MOJSISOVICS, Mediterranen Triasprovinz, p. 33, pl. X, figs 9–11.
- v ? 1882 *Ceratites* nov. f. ind. — MOJSISOVICS, Mediterr. Triasprovinz, p. 36, pl. XIII, fig. 2.
- v ? 1896 *Ceratites* cf. *subnodosus* MOJS. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 254, pl. VII, fig. 4.
- ? 1912 *Ceratites subnodosus* MOJS. — AIRAGHI, Besano, p. 19, pl. III, fig. 3. (no ventral view)
- 1914 *Ceratites subnodosus* MOJS. — HORN, Knollenkalkstufe, p. 18, pl. I, fig. 1.
- 1916 *Ceratites subnodosus* MOJS. — ARTHABER, Trient, p. 250, text-fig. 3a, pl. III, figs 1–4.
- v 1934 *Paraceratites subnodosus* (MOJSISOVICS). — SPATH, Ammonoidea of the Trias, p. 438 (partim).
- 1968 *Paraceratites subnodosus* (MOJS.) — VENZO & PELOSIO, Lenna in Val Brembana, p. 108, pl. XII, figs 6, 7.
- non 1980 *Paraceratites subnodosus* (MOJSISOVICS) — GU et al., Tibet, p. 347, pl. I, figs 17–19, text-fig. 4a.
- v 1989 *Paraceratites* ? *subnodosus* (MOJSISOVICS, 1882) — VÖRÖS & PÁLFY, Vászoly, p. 19, pl. I, fig. 3.
- v 1993 *Paraceratites* ? *subnodosus* — VÖRÖS, Reitzi Zone, p. 27, pl. I, fig. 5.
- v 1993 *Paraceratites* ? *subnodosus* — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 117, pl. 11, fig. 4.
- v 1998 *Megaceratites* ? cf. *subnodosus* (MOJSISOVICS, 1882) — VÖRÖS, Balaton-felvidék, p. 20, 59, pl. I, fig. 6.
- v 2010 *Megaceratites subnodosus* (MOJSISOVICS, 1882) — VÖRÖS, North Hungary, p. 8, pl. II, fig. 3.
- v 2015 *Megaceratites* ? *subnodosus* (MOJSISOVICS, 1882) — VÖRÖS et al., New data, p. 319, pl. I, fig. 2.

Material

77 specimens of various state of preservation, from Felsőörs (4), Vörösberény (42), Szentantalfa (14), Vászoly (5), Mencshely (2), Köveskál (5), Dörgicse (1), Paloznak (1), Szentbékállá (1), Barnag (2).

Measurements

	D	WH	WW	U
M.98.9	82.1	38.5	25.5	?
INV 2017.164.1.	82.1	31.5	25.8	29.5
INV 2017.163.1.	78.1	31.1	23.4	?
INV 2017.165.1.	67.5	27.1	?	?
M.89.168A	65.1	26.4	20.6	21

Description

Medium to large *Megaceratites*, with moderately evolute conch. The whorls are rather compressed, stout; the cross-section is subquadratic. The umbilical edge is subrounded. The flanks are flat to gently convex and form a well marked ventrolateral shoulder with the flat, gently arched venter. The flanks are ornamented with very strong ribs with irregularly developed nodes. The prosiradiate ribs (8 to 10) are somewhat projected on the body chamber. Secondary ribs irregularly inserted by intercalation at the inner half of the mid-flank. There are no umbilical nodes. The lateral nodes appear on the inner thirds of the primary ribs. The ventrolateral nodes are very prominent, clavus-like; they appear on both the primary and the secondary ribs. Their number is 12 to 14 on a half-whorl of the body chamber. The venter is usually flat, or slightly roof-shaped. The phragmocone and the inner whorls are much weakly ornamented than the body chamber and their venters are more arched.

Suture lines are poorly visible; definitely ceratitic.

Remarks

This species was previously placed into the genus *Paraceratites* by several authors. The stout whorls and the character of the ornamentation fit very well with those of *Megaceratites* erected recently by BALINI (1992b); this assignment is used in the present paper, despite that BALINI definitely did not include the species *subnodosus* into his new genus.

MOJSISOVICS (1882, l. c.) in the original description illustrated three specimens which well demonstrated the range of variation of *subnodosus*. The lectotype designated by SPATH (1934, l. c.), figured by MOJSISOVICS (1882) on pl. X, fig. 10, portrays a variant with rather regular and strong lateral nodes and low ventral keel on the phragmocone. The other two specimens (pl. X, figs 9, 11, in MOJSISOVICS 1882) have few or none lateral nodes and possess flat venter. Most of our specimens from the Balaton Highland correspond rather to these latter two types. The broader interpretation of *subnodosus* is supported also by the illustrations published by VENZO & PELOSIO (1968, l. c.).

The specimen described by MOJSISOVICS (1882, p. 36, pl. XIII, fig. 2) as “*Ceratites* nov. f. ind.” may tentatively be included to *subnodosus* as a very rarely ribbed, marginal variant.

The record by HAUER (1896, l. c.) is included into the synonym list only tentatively, because only the suture line was figured, and the specimen is very poorly preserved (as it was confirmed in the collection NHMW, Wien).

The specimen figured by GU et al. 1980, l. c.) from Tibet has fastigate venter and its ventrolateral nodes are weaker than the lateral ones, therefore it is definitely excluded from *M. subnodosus*.

Several specimens of *M. subnodosus*, listed by SPATH (1934.) were examined in the collection NHML (London) and two of them (C. 23073, C. 5423, from Albania and Hallstatt) are here regarded as proper representatives of this species. Other two specimens (C. 20485, C. 30981, from Bosnia and Montenegro) seem to stand closer to *M. ?friccensis* (ARTHABER).

Distribution

M. subnodosus was described from Anisian of the Northern Calcareous Alps, the Southern Alps, the Dinarides and the Rudabánya Mts (North Hungary). At the Balaton Highland its range is restricted to the Illyrian Trinodosus, Camunum and Pseudohungaricum Subzones.

Megaceratites ? cf. *friccensis* (ARTHABER, 1916)

Plate V: 2; Figure 22.

* 1916 *Ceratites friccensis* ARTH. — ARTHABER, Trient, p. 254, pl. IV, figs 2–4.

1995 “*Megaceratites*” *friccensis* (ARTHABER, 1916) — DE ZANCHE et al., Dolomites, p. 138, pl. II, fig. 8.

v 1998 *Megaceratites* ? *friccensis* (ARTHABER, 1916) — VÖRÖS, Balaton-felvidék, p. 42, 59, (partim) pl. IV, fig. 13 (only).

2003 “*Megaceratites*” *friccensis* (ARTHABER, 1916) — MIETTO et al., Bagolino, p. 454, pl. 2, figs 7, 9.

Material

15 specimens of various state of preservation, from Sóly.

Measurements

	D	WH	WW	U
M.98.87	94.5	41.1	35.1	?

Description

Large *Megaceratites*, with moderately evolute conch. The whorls are stout; the cross-section is subquadratic. The umbilical edge is poorly seen. The flanks are gently convex and pass gradually into the gently arched venter. The flanks are ornamented with robust ribs with strong nodes. The number of the nearly rectiradiate ribs is eight on the body chamber. A few secondary ribs irregularly appear by intercalation. There are no umbilical nodes. The lateral nodes develop on the inner thirds of the primary ribs. The ventrolateral nodes are exceptionally prominent; in some cases they appear as laterally oriented, long spines, gently curving ventrally. Their number is eight on a half-whorl of the body chamber. The phragmocone and the inner whorls are less strongly ornamented than the body chamber and higher oval in cross-section (Figure 22).

Suture lines are not seen.

Remarks

On the basis of the rather good figures of *friccensis* by ARTHABER (1916, l. c.), DE ZANCHE et al. 1995, l. c.) and MIETTO et al. (2003, l. c.), the identification of our specimens from the Balaton Highland seems to be warranted. The tentative attribution of the species *friccensis* to the genus *Megaceratites*, also suggested by DE ZANCHE et al. 1995, l. c.) and MIETTO et al. (2003, l. c.), is expressed here by the use of question mark. It has to be noted that *friccensis* was regarded as member of the genus *Stoppaniceras* by RIEBER (1973, p. 36, 41); this underscores the uncertainty around the proper generic attribution of this species.

In a previous work of the present author (VÖRÖS, 1998, pl. IV, figs 11, 12) a few ammonoids were figured as *M. ?friccensis*; now they are regarded as belonging to *Stoppaniceras* cf. *ellipticum* (HAUER, 1887).

Some specimens, listed by SPATH (1934, p. 439) under the name *Paraceratites subnodosus* (MOJISOVICS, 1882), were examined in the collection NHML (London) and two of them (C. 20485, C. 30981, from Bosnia and Montenegro) were thought to be standing close to *M. ?friccensis* (ARTHABER).

Distribution

M. friccensis was described from the upper Anisian Reitzi Zone of the Southern Alps. At the Balaton Highland its range is restricted to the Illyrian Avisianum Subzone.

Genus *Kellnerites* ARTHABER, 1912

Type species: *Kellnerites bosnensis* (HAUER, 1887)

The generic name *Kellnerites* was introduced by ARTHABER (1912, p. 342) as a subgenus of *Ceratites*, with the type species “*C.*” *bosnensis* HAUER, 1887. SALOPEK (1914) erected a new genus *Popinites* on the same type species; this was a junior objective synonym and was included to *Kellnerites* by the same author (SALOPEK 1936b, p. 176). In the first part of his catalogue SPATH (1934, p. 458) used the generic name *Popinites* but in the second part of the catalogue (SPATH 1951, p. 10) and in the “Treatise” (ARKELL et al. 1957, p. L152), the right use of the senior name *Kellnerites* was established. The generic name *Bosnites*, used for this taxon by FRECH & RENZ (1908) and RENZ (1913), was preoccupied by a noritid genus *Bosnites* HAUER, 1896.

The correct interpretation of the type species needs further discussion. In the first definition of *Kellnerites* ARTHABER (1912, p. 342) referred to the illustrations of both specimens figured as *bosnensis* by HAUER (1887, pl. VI, figs 1, 2). SPATH (1934, p. 458–459, fig. 151) made a restriction: he selected one (the larger) of HAUER’s specimens as lectotype and reproduced the figure pl. VI, fig. 1 of HAUER. The other figure by HAUER (1887, pl. VI, fig. 2) was taken as different and cited with question mark by SPATH (l. c.). This was followed in the “Treatise” (ARKELL et al. 1957) where the same figure of HAUER (1887) was reproduced as typical in the description of *Kellnerites*. The reason of this restriction might be that HAUER (1896, p. 255) erected a new species “*C.*” *halilucensis* for the smaller specimen what he figured previously as *bosnensis* (HAUER 1887, pl. VI, fig. 2). This restricted morphological interpretation of *Kellnerites*, typified by the specimen *K. bosnensis* figured by HAUER (1887, pl. VI, fig. 1) is used here.

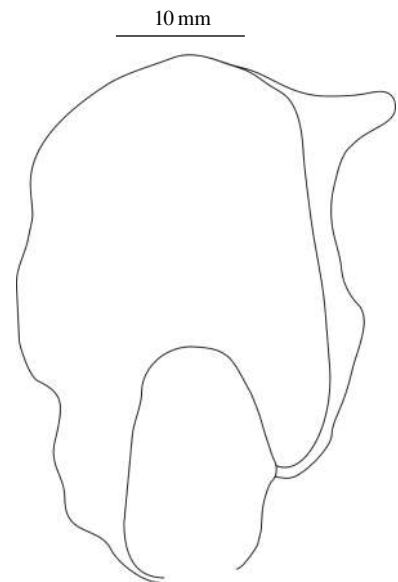


Figure 22. Cross section of *Megaceratites* ? cf. *friccensis* (ARTHABER, 1916) (M.98.87), Sóly, Bed 6, Reitzi Zone, Avisianum Subzone

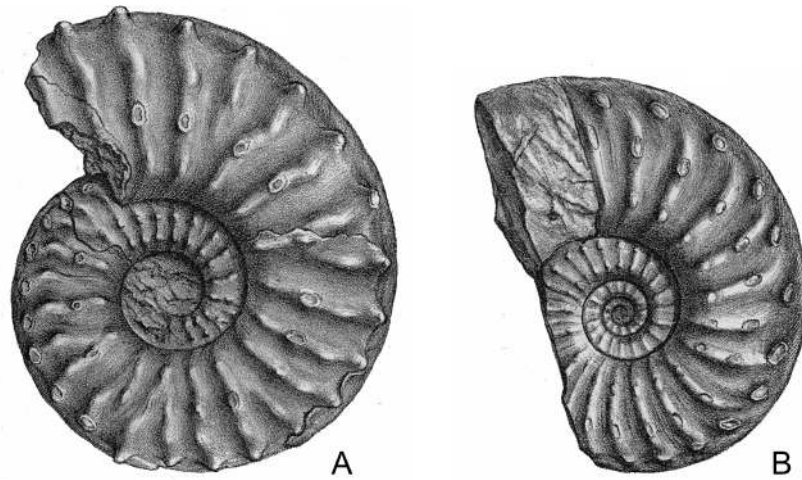


Figure 23. Comparison of two type specimens figured as “*Ceratites*” *bosnensis* by HAUER. A: the holotype of “*C.*” *bosnensis* from Han Bulog (Geologische Bundesanstalt, Wien, inv. no. 1887/01/33), described and figured by HAUER (1887, p. 24, pl. VI, Figure 1); B: the second “type” of “*bosnensis*” from Haliluci (Naturhistorisches Museum, Wien, inv. no.: NHMW 1998z0063/0037), designated by HAUER (1896, p. 254, pl. VII, figs. 13, 14), which is regarded as belonging to *Epikellnerites tamasi* n. sp. in the present monograph ($\times 0.8$)

The interpretation of the type species of *Kellnerites* became further confused when HAUER (1896, p. 254, pl. VII, figs 13, 14) described a specimen, attributed to “*C.*” *bosnensis* and categorically identified with the original type (HAUER 1887, pl. VI, fig. 1). However, this specimen (as confirmed by the present author in the collection NHMW, Wien) is very much different from the original type. It has definitely prorsiradiate, projected ribs, bearing four nodes, in contrast to the rectiradiate ribbing and three rows of nodes of the original type specimen (Figure 23). It is here regarded as a species of a different, new genus described later in this monograph.

After all, in a restricted interpretation, used in the present monograph, the genus *Kellnerites* comprises the following nominal species:

- Kellnerites bosnensis* (HAUER, 1887, p. 24, pl. VI, fig. 1)
- Kellnerites felsoeoersensis* (STÜRZENBAUM, 1875, p. 256, pl. V, fig. 1)
- Kellnerites bispinosus* (HAUER, 1896, p. 256, pl. VII, figs 5–9)
- ? *Kellnerites halilucensis* (HAUER, 1896, p. 255).

Their common diagnostic features are the rectiradiate ribbing and three rows of nodes.

Kellnerites bosnensis (HAUER, 1887)

Plate V: 3–5.

- v * 1887 *Ceratites Bosnensis* n. sp. — HAUER, Han Bulog, p. 24 (partim), pl. VI, fig. 1 (only) (non fig. 2 = halilucensis).
- v non 1896 *Ceratites Bosnensis* HAU. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 254, pl. VII, figs 13–14.
- non 1908 *Ceratites (Bosnites) bosnensis* HAUER. (FRECH) — FRECH & RENZ, Hydra, p. 455, pl. XVI, fig. 2.
- non 1913 *Ceratites (Bosnites) bosnensis* HAUER — RENZ, Griechenland, p. 571, text-fig. 9.
- ? 1914 *Popinites bosnensis* HAU. sp. — SALOPEK, Kunovac-vrela, p. 11 (partim), pl. III, fig. 2a. (only) (non pl. III, fig. 2b, c and pl. VII, fig. 1).
- v 1934 *Popinites bosnensis* (HAUER) — SPATH, Ammonoidea of the Trias, p. 459 (partim), figs 150c, 151.
- non 1964 *Kellnerites* cf. *bosnensis* HAUER — BANDO, Japan, p. 110, pl. 5, fig. 6, text-fig. 33/1.
- v 1993 *Kellnerites bosnensis* — VÖRÖS, Reitzi Zone, p. 27, pl. II, fig. 3.
- v 1993 *Kellnerites felsoeoersensis* — VÖRÖS, Reitzi Zone, p. 27, pl. II, figs 1, 2.
- v 1993 *Kellnerites bosnensis* — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 117, pl. 11, fig. 8.
- v 1993 *Kellnerites felsoeoersensis*. — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 117, pl. 11, fig. 9, pl. 12, fig. 1.
- v non 1993 *Kellnerites bosnensis* (HAUER, 1896) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 470 (partim), pl. 5, figs 10, 11.
- v ? 1993 *Kellnerites bosnensis* (HAUER, 1896) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 470 (partim), pl. 5, figs 7–9, 13, 14, (non pl. 5, figs 10, 11).
- v non 1993 *Kellnerites bosnensis* (HAUER, 1896) — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 65, pl. 4, figs 4, 5.
- v ? 1993 *Kellnerites bosnensis* (HAUER, 1896) — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 65 (partim), pl. 4, figs 6, 10, 11.
- v 1998 *Kellnerites felsoeoersensis* (STÜRZENBAUM, 1875) — VÖRÖS, Balaton-felvidék, p. 20, 59, (partim), pl. II, fig. 4 (only).

- v 1998 *Kellnerites* cf. *bosnensis* (HAUER, 1887) — VÖRÖS, Balaton-felvidék, p. 38, 59.
 non 1998 *Kellnerites* cf. *bosnensis* (HAUER, 1887) — PETEK, Hrastenica, p. 131, 138, pl. 3, figs 1–3.
 v non 2015 *Kellnerites* cf. *bosnensis* (HAUER, 1887) — VÖRÖS et al., New data, p. 319, pl. I, fig. 3.
 v non 2016 *Kellnerites bosnensis* (HAUER 1888) — TONGTHERM et al., Thailand, p. 162, figs 4j–l.

Material

11 specimens of various state of preservation, from Felsőörs (2), Vörösberény (1), Szentkirályszabadja (3), Vászoly (1), Mencshely (4).

Measurements

	D	WH	WW	U
M.98.6	89.5	38.1	23.1	25.5
INV 2017.167.1.	71.2	32.3	23.6	22.1
INV 2017.166.1.	49.1	22.3	13.5	?

Description

Medium to large *Kellnerites* with moderately involute conch. The whorl-section is high oval to subquadratic. The umbilical wall is subvertical. The flanks are gently convex and passes gradually to the highly arched venter bearing a distinct, rounded keel. The ventrolateral margin is marked by a row of prominent nodes. The flanks are ornamented with massive, rectiradiate, slightly projected primary ribs (10 on a half whorl) and nodes. Some primary ribs are thickened at the outer third of the flank in the form of low swellings but not true nodes. Rare intercalated secondary ribs appear irregularly at around mid-flank. There are three rows of nodes. The umbilical nodes are well-developed. The row of the high and pointed lateral nodes runs near the inner third of the flank. The very strong, spinose ventrolateral nodes (15 on a half whorl) appear at the ends of both the primary and the secondary ribs; they are elevated laterally and slightly curved ventrally.

Suture lines are not visible.

Remarks

K. bosnensis is the type species of the genus *Kellnerites*, yet its correct interpretation needs discussion. In the first definition of *bosnensis* HAUER (1887, pl. VI, figs 1, 2) illustrated two, somewhat different specimens. Later HAUER (1896, p. 255) introduced a new name “*Ceratites Halilucensis*” for the smaller specimen (figured in HAUER 1887, pl. VI, fig. 2). In the same monograph HAUER (1896, p. 254, pl. VII, figs 13, 14) described a specimen which he attributed to “*C.*” *bosnensis* and categorically identified with the original type, i. e. the larger specimen figured in HAUER (1887, pl. VI, fig. 1). However, these two specimens are very much different, as confirmed by the present author in the collections NHMW, and the GBAW, Wien, respectively (Figure 23). The original type of *bosnensis* (HAUER 1887, pl. VI, fig. 1), deposited in the GBAW (inventory number: 1887/01/33), has rectiradiate ribbing with three definite rows of nodes, whereas the second specimen of “*bosnensis*” (HAUER 1896, pl. VII, figs 13, 14), kept in the NHMW (inventory number: NHMW 1998z0063/0037), portrays prorsiradiate, projected ribs and four rows of nodes.

The present author regards the former specimen (HAUER 1887, pl. VI, fig. 1) as the typical *bosnensis*, and in doing this, shares the opinions of SPATH (1934, p. 458–459, fig. 151) who designated it as the lectotype, and (ARKELL et al. 1957, p. L152) who re-figured this specimen as the type of *Kellnerites bosnensis*.

On the other hand, the subsequently described specimen, with four rows of nodes (HAUER 1896, p. 254, pl. VII, figs 13, 14), was apparently regarded by many authors, e. g. FRECH & RENZ (1908, l. c.), RENZ (1913, l. c.), SALOPEK (1914, pl. III, fig. 2b, c; pl. VII, fig. 1), BANDO (1964, l. c.), BRACK & RIEBER (1993, l. c.) and PETEK (1998, l. c.) as the typical *Kellnerites bosnensis*. In the opinion of the present author, the subsequently described specimen of HAUER (1896), with four rows of nodes, and the majority of the above cited records belong to some probably different species of another, new genus, to be described later in this monograph.

Other species of *Kellnerites* can be well differentiated from *K. bosnensis*. In *K. felsoeoersensis* (STÜRZENBAUM, 1875) and *K. halilucensis* (HAUER, 1896) the lateral row of nodes is near the middle of the flank, while in *K. bosnensis* the lateral nodes are much closer to the umbilicus, in the inner third of the lateral side. *K. bispinosus* (HAUER, 1896) differs from *K. bosnensis* by its more evolute conch with stout whorls with low quadratic cross-section.

One of the specimens figured as “*Popinites bosnensis*” by SALOPEK (1914, pl. III, fig. 2a) may tentatively be regarded as *K. bosnensis*; the others (l. c., pl. III, fig. 2b, c and pl. VII, fig. 1) seem to be representatives of the above mentioned new genus.

The specimens listed by SPATH (1934) under the name *Popinites bosnensis*, were examined in the collection NHML (London) and two of them (C. 20328, C. 20482, from Volujak, Bosnia) are here regarded as proper representatives of that species. The figure (SPATH, l. c., fig. 151) is a reproduction of the original figure of the type specimen of “*Ceratites*” *bosnensis* by HAUER (1887, pl. VI, fig. 1).

In some previous work VÖRÖS (1993, l. c., 1998, l. c.) also in GAETANI (ed.) (1993, l. c.) wrongly attributed a few specimens of *K. bosnensis* to *K. felsoeoersensis* (STÜRZENBAUM, 1875). On the other hand, the specimen figured mistakenly as *K. bosnensis* by VÖRÖS et al. (2015, l. c.) should be attributed to *K. felsoeoersensis*, on the basis of its lateral nodes located at the middle of the flank.

The specimen figured by TONGTHERM et al. (2016, l. c.) was inspected personally in 2014 on loan from K. TONGTHERM; this tricarinate juvenile ammonite may belong rather to the genus *Halilucites*.

Distribution

K. bosnensis was described from the upper Anisian of the Dinarides and the Southern Alps. At the Balaton Highland it occurs in the Illyrian *Felsoeoersensis* Subzone and probably in the Liepoldti Subzone.

Kellnerites felsoeoersensis (STÜRZENBAUM, 1875)

Plate VI: 1–3; Figure 24

- v * 1875 *Ceratites Felső Örsensis* n. sp. — STÜRZENBAUM, *Ceratites Reitzi*-szint, p. 256, pl. V, fig. 1.
- v 1882 *Ceratites Felső-Örsensis* STÜRZENBAUM. — MOJISOVICS, *Mediter. Triasprovinz*, p. 36, pl. XIII, fig. 1.
- v 1896 *Ceratites fissicostatus* n. sp. — HAUER, *Cephalopoden aus der Trias von Bosnien*, II, p. 255, pl. VII, figs 1–3.
- v ? 1993 *Kellnerites bosnensis* (HAUER, 1896) — BRACK & RIEBER, *Anisian/Ladinian boundary*, p. 470 (partim), pl. 5, fig. 10 (only).
- v ? 1993 *Kellnerites fissicostatus* (HAUER, 1896) — BRACK & RIEBER, *Anisian/Ladinian boundary*, p. 470, pl. 7, figs 2, 3.
- v non 1993 *Kellnerites felsoeoersensis* — VÖRÖS, *Reitzi Zone*, p. 27, pl. II, figs 1, 2.
- v non 1993 *Kellnerites felsoeoersensis* — GAETANI (ed.), *Anisian/Ladinian boundary field workshop*, p. 117, pl. 11, fig. 9, pl. 12, fig. 1.
- v non 1998 *Kellnerites felsoeoersensis* (STÜRZENBAUM, 1875) — VÖRÖS, *Balaton-felvidék*, p. 20, 59, (partim), pl. II, fig. 4 (= *bosnensis*).
- v 1998 *Kellnerites felsoeoersensis* (STÜRZENBAUM, 1875) — VÖRÖS, *Balaton-felvidék*, p. 20, 59, (partim), pl. II, fig. 3 (only).
- v 2015 *Kellnerites cf. bosnensis* (HAUER, 1887) — VÖRÖS et al., *New data*, p. 319, pl. I, fig. 3.

Material

Two specimens of medium state of preservation, from Felsőörs (1), and Vászoly (1).

Measurements

	D	WH	WW	U
Holotype T.694.	74.8	26.6	24.2	25.1
M.98.11	85.1	35.3	26.1	28.4
INV 2017.169.1.	72.1	32.3	24.5	?

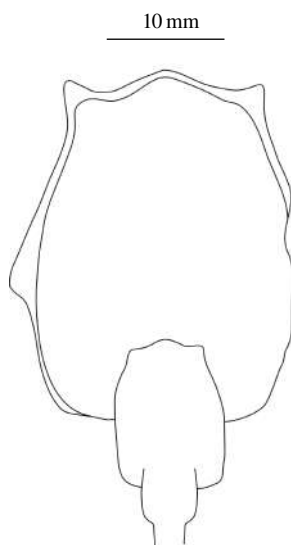


Figure 24. Cross section of *Kellnerites felsoeoersensis* (STÜRZENBAUM, 1875) (M.98.11), Szentkirályszabadja, loose, Reitzi Zone, *Felsoeoersensis* Subzone (?)

Description

Large *Kellnerites* with moderately involute conch. The whorl-section is high oval to subquadratic (Figure 24). The umbilical wall is subrounded. The flanks are gently convex and passes gradually to the arched venter bearing a very high, blunt keel. The ventrolateral margin is marked by a row of prominent nodes. The flanks are ornamented with very strong, rectiradiate, slightly projected primary ribs (10 on a half whorl) and nodes. Secondary ribs appear rarely and irregularly at around the mid-flank. There are three rows of nodes. The umbilical nodes are moderately developed. The row of the high and pointed lateral nodes runs near the middle of the flank. The strong, spinose ventrolateral nodes (12 to 14 on a half whorl) appear at the ends of both the primary and the secondary ribs; they are elevated ventrolaterally and gently curved ventrally.

Suture lines are poorly visible; ceratitic, with at least two lateral saddles.

Remarks

The holotype (by monotypy) of *K. felsoeoersensis*, is kept in the collection of the MGSZ under the inventory number T.694. It was inspected by the present author and re-figured here (Plate VI: 1). The original figure by STÜRZENBAUM (1875, l. c.) is very correct, whereas the figures portraying the same type specimen by MOJISOVICS (1882, l. c.) are somewhat exaggerated. Nevertheless the most important distinctive character of *K. felsoeoersensis*, i.e. the position of the lateral row of nodes at the mid-flank, is well demonstrated, and in this way the identification of our specimens is warranted.

Other species of *Kellnerites* can be well differentiated from *K. felsoeoersensis*. In *K. bosnensis* (HAUER, 1896) and *K. bispinosus* (HAUER, 1896) the lateral nodes are much closer to the umbilicus, in the inner third of the lateral side. Moreover, *K. bispinosus* (HAUER, 1896) differs from *K. felsoeoersensis* by its more evolute conch with stout whorls with low quadratic cross-section. *K. halilucensis* (HAUER, 1896) stands very close to *felsoeoersensis* by its radial ribbing and single lateral row of nodes at the mid-whorl; the only small difference is that its keel is apparently much weaker.

The type specimen of *K. fissicostatus* (HAUER, 1896, l. c.) was investigated in the collection NHMW (Wien), and in the opinion of the present author it should belong to *K. felsoeoersensis* by the strong similarity of its all morphological features. For the same reason, the rather worn specimen, figured as *K. fissicostatus* by BRACK & RIEBER (1993, l. c.) is here tentatively included to *K. felsoeoersensis*.

One of the specimens figured under the name *K. bosnensis* by BRACK & RIEBER (1993, pl. 5, fig. 10) has its lateral row of nodes at the mid-flank; it may belong to *K. felsoeoersensis* or to *K. halilucensis*.

In some previous work VÖRÖS (1993, l. c., GAETANI [ed.] 1993, l. c.) and partly in VÖRÖS (1998, l. c.) wrongly attributed a few specimens of *K. bosnensis* to *K. felsoeoersensis* (STÜRZENBAUM, 1875). On the other hand, the specimen figured mistakenly as *K. bosnensis* by VÖRÖS et al. (2015, l. c.) should be attributed to *K. felsoeoersensis*, on the basis of its lateral nodes located at the middle of the flank.

Distribution

K. felsoeoersensis is recorded from the upper Anisian of the Balaton Highland, the Dinarides and the Southern Alps. At the Balaton Highland its range is restricted to the Illyrian Felsoeoersensis Subzone.

Kellnerites cf. *bispinosus* (HAUER, 1896)

Plate V: 6.

v * 1896 *Ceratites bispinosus* n. sp. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 256, pl. VII, figs 5–9.

? 1914 *Popinites bispinosus* HAU. var *licanus*. — SALOPEK, Kunovac-vrela, p. 11, pl. III, fig. 1.

v 1993 *Kellnerites bispinosus* — VÖRÖS, Reitzi Zone, p. 27.

v 1998 *Kellnerites* cf. *bispinosus* (HAUER, 1896) — VÖRÖS, Balaton-felvidék, p. 20, 59.

v ? 2010 *Kellnerites* cf. *bispinosus* (HAUER, 1896) — VÖRÖS, North Hungary, p. 6, pl. I, fig. 6.

Material

One poorly preserved specimen from Felsőörs.

Measurements

	D	WH	WW	U
INV 2017.168.1.	34.1	14.8	15.4	?

Description

Small *Kellnerites* with rather evolute conch. The whorl-section is low trapezoidal, subquadratic; the width of the whorl exceeds the height. The umbilical wall is subrounded. The flanks are rather convex. The venter is arched and bears a low, indistinct, rounded keel. The ventrolateral margin is marked by a row of prominent nodes rising above the venter. The flanks are ornamented with massive, rectiradiate, slightly projected primary ribs and nodes. Rare intercalated secondary ribs appear irregularly at around the mid-flank. There are three rows of nodes. The umbilical nodes are well-developed. The row of the high and pointed lateral nodes runs near the inner third of the flank. The very strong, spinose ventrolateral nodes appear at the ends of both the primary and the secondary ribs.

Suture lines are not visible.

Remarks

The original specimens of *K. bispinosus* were checked by the present author in the collection NHMW (Wien) and they correspond properly to the figures given by HAUER (1896, l. c.). From among them, the specimen, figured on pl. VII, figs 7, 8, can be qualified as the holotype, since HAUER (l. c., p. 256) declared that he considered this specimen the “eigentliche Typus”. On the basis of its stout, quadratic whorl, blunt keel, and the lateral nodes near the inner third of the lateral part, the specimen from Felsőörs fits well the variation range of *K. bispinosus*.

Other species of the genus differ from *K. bispinosus* first of all by their more involute conch and higher ventral keel. Moreover, in *K. felsoeoersensis* (STÜRZENBAUM, 1875) and *K. halilucensis* (HAUER, 1896) the lateral nodes are around the mid-flank, while in *K. bispinosus* they are at the inner one-third of the flank.

The specimen figured by SALOPEK (1914, l. c.) as *Popinites bispinosus* HAU. var *licanus* probably does not belong here, because it has a very high keel and its ribbing is strongly projected.

VÖRÖS (2010a) tentatively attributed a specimen from North Hungary to *K. cf. bispinosus*. The ornamentation and the evolute conch of this poorly preserved specimen is similar to that species, on the other hand, it seems to have a rather high, blunt keel what contradicts to this attribution.

Distribution

K. bispinosus was described from the upper Anisian of the Dinarides and doubtfully from North Hungary. At the Balaton Highland its range is restricted to the Illyrian Felsőeersensis Subzone.

Genus *Epikellnerites* n. gen.

Type species: Epikellnerites angustecarinatus (HAUER, 1896).

Diagnosis: Small to large ceratitids with moderately involute conch. Whorl section subquadratic to high oval; umbilical margin subrounded to steep. Venter arched to fastigate; keel present. Prorsiradiate, projected ribs of various strength. Primaries and secondaries occasionally form fibulate ribbing. Four rows of nodes: umbilical nodes, two rows of lateral nodes at various parts of the flank, and projected clavi on the ventrolateral margin. Suture ceratitic, three lateral saddles, first lateral lobe deep with various degree of denticulation.

Derivatio nominis: *Epikellnerites* seems to appear stratigraphically above *Kellnerites* (epi- <greek> = above).

Nominal species belonging to Epikellnerites:

Epikellnerites angustecarinatus (HAUER, 1896, p. 256, pl. VII, figs 15–17)

Epikellnerites bagolinensis (BRACK & RIEBER, 1993, p. 470, pl. 6, figs 1, 2)

Epikellnerites tamasi n. sp.

Epikellnerites aff. *tamasi* n. sp.

Epikellnerites vaszolyensis n. sp.

Epikellnerites pseudochohnokyi n. sp.

Epikellnerites spinatus n. sp.

Discussion: *Epikellnerites*, from morphological point of view, stands between *Kellnerites* and *Reitziites*. It shares the general shape of the conch with *Kellnerites*, including the nearly fastigate venter with definite keel, but differs in having four lateral rows of nodes in contrast to the three rows of nodes in *Kellnerites*. On the other hand, the ornamentation of the flanks in *Epikellnerites*, especially in the species *E. vaszolyensis* and *E. pseudochohnokyi*, shows many similarities to that of *Reitziites*; however, the latter genus has flat or concave venter, in contrast to the arched and keeled venter of the *Epikellnerites* species. According to the sparse data, *Epikellnerites* occurs stratigraphically above *Kellnerites* and below *Reitziites* and this suggests that it may represent a phyletic connecting link between them.

Distribution: Late Anisian; Dinarides, Southern Alps, Balaton Highland, doubtfully Island Hydra (Greece). At the Balaton Highland *Epikellnerites* ranges from the Illyrian Liepoldti to Reitzi Subzones.

Epikellnerites angustecarinatus (HAUER, 1896)

Plate VI: 4–6; Plate VII: 1, 2; Figure 25.

v * 1896 *Ceratites angustecarinatus* n. sp. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 256, pl. VII, figs 15–17.

? 1908 *Ceratites (Bosnites) bosnensis* HAUER. (FRECH) — FRECH & RENZ, Hydra, p. 455, pl. XVI, fig. 2.

v 1990 “*Protrachyceras*” *reitzi* (BÖCKH) — KOVÁCS et al., Balaton Upland, p. 194, pl. 3, fig. 4.

v 1993 *Kellnerites angustecarinatus* — VÖRÖS, Reitzi Zone, p. 27, pl. II, fig. 4.

v ? 1993 *Kellnerites angustecarinatus* (HAUER, 1896) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 470, pl. 6, fig. 4.

v 1998 *Kellnerites angustecarinatus* (HAUER, 1896) — VÖRÖS, Balaton-felvidék, p. 38, 59.

Material

Nine specimens of various state of preservation, from Vörösberény (1), Vászoly (3) and Mencshely (5).

Measurements

	D	WH	WW	U
INV 2017.173.1.	74.8	31.2	21.2	22.5
INV 2017.171.1.	70.6	28.0	21.1	23.8
INV 2017.170.1.	68.2	27.1	18.1	21.5
INV 2017.172.1.	48.2	18.5	17.1	?
INV 2017.174.1.	36.5	15.1	13.1	12.2

Description

Large *Epikellnerites* with moderately involute conch. The whorl-section is high oval to subquadratic. The umbilical wall is subvertical. The flanks are gently convex and pass gradually to the highly arched venter bearing a distinct, blunt keel. The ventrolateral margin bears a row of prominent nodes. The flanks are ornamented with massive, slightly prorsiradiate, almost straight primary ribs (10 to 12 on a half whorl) and nodes. Rare intercalated secondary ribs appear irregularly in the inner third of the flank; bifurcation is rare. Both the primary and the secondary ribs weaken or almost fade out near the ventrolateral margin. There are four rows of nodes. The umbilical nodes are well-developed. The first row of the pointed lateral nodes runs near the inner quarter of the flank. The second row of the strong, sometimes spinose lateral nodes (16 to 18 in number) runs in the outer quarter of the flank; they appear at the end of the ribs, also on the secondaries. The ventrolateral nodes appear as a separate row of projected clavi on the ventrolateral margin; they are elevated above the ventral keel; they are less in number (14 on a half whorl) than the third lateral nodes.

Suture lines are poorly seen; ceratitic, with three entire lateral saddles and deeply denticulated first lateral lobe (Figure 25).

Remarks

The holotype (by monotypy) of *E. angustecarinatus* was inspected by the present author in the collection NHMW (Wien, inventory number: NHMW 1998z0063/0006) and it corresponds properly to the figures given by HAUER (1896, l. c.). On the basis of their morphology, especially the blunt keel, and the four rows of nodes, the identification of the specimens from the Balaton Highland with *E. angustecarinatus* was confirmed.

E. angustecarinatus is a valid and well-defined taxon; it is the type species of the genus *Epikellnerites*. It differs from the other species of the genus first of all by its coarser ornamentation, in terms of both the ribbing and the nodes. *E. bagolinensis* (BRACK & RIEBER, 1993) is more involute and its lateral nodes significantly prevail over the ribs. *E. tamasi* n. sp. has higher whorls with fastigate venter and its nodes prevail in strength over the ribs. In *E. vaszolyensis* n. sp. the ribbing prevails over the nodes which are differently located. In *E. spinatus* n. sp. the nodes are regularly pointed. *Epikellnerites pseudocholnoky* n. sp. has fine ribbing almost without nodes.

The specimen figured as "*Ceratites (Bosnites) bosnensis* HAUER" by FRECH & RENZ (1908, l. c.), probably belongs to *E. angustecarinatus* on the basis of its four rows of lateral nodes, although the figure shows definitely rectiradiate ribbing.

KOVÁCS et al. (1990, l. c.) illustrated a specimen from Vászoly as "*Protrachyceras*" *reitzei* (BÖCKH). This ammonite was kept in the private collection of the late I. SZABÓ and was transferred to the collection of the Hungarian Natural History Museum. According to the label, the locality was Vászoly, Shaft XVII, in contrast to the statement in KOVÁCS et al. (1990, l. c.) referring to Vászoly, Shaft XVIII. This specimen was so embedded in the rock matrix, that only its lateral part was seen. On the basis of the lateral ornamentation the authors (KOVÁCS et al. 1990, l. c.) misidentified this ammonite. Subsequent preparation of the specimen by the present author revealed the ventral side with definite keel and now it is identified as *E. angustecarinatus*.

The "*Kellnerites angustecarinatus*" specimen illustrated by BRACK & RIEBER (1993, l. c.) was checked in the collection PIMUZ, Zürich; the very poor preservation of the specimen does not permit to decide if the identification is correct or not.

Distribution

E. angustecarinatus was described from the upper Anisian of the Dinarides; its records from the Island Hydra (Greece) and the Southern Alps are doubtful. At the Balaton Highland it ranges from the Illyrian Liepoldti to Reitzei Subzones.

Epikellnerites tamasi n. sp.

Plate VII: 3, 4; Figures 26, 27.

v 1896 *Ceratites Bosnensis* HAU. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 254, pl. VII, figs 13–14.

? 1904 *Ceratites trinodosus* MOJISOVICS 1882 — MARTELLI, Boljevici, p. 80, pl. V, fig. 1.

? 1914 *Popinites bosnensis* HAU. sp. — SALOPEK, Kunovac-vrēla, p. 11 (partim), pl. III, figs 2b, c, pl. VII, fig. 1 (only), (non pl. III, fig. 2a).

v 1993 *Kellnerites bosnensis* (HAUER, 1896) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 470 (partim), pl. 5, figs 10, 11 (only).

v 1993 *Kellnerites bosnensis* (HAUER, 1896) — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 65, pl. 4, figs 4, 5 (only).

? 1994 "*Kellnerites*" sp. ind. — BALINI, Hydra, p. 356, pl. 1, fig. 2.

? 1998 *Kellnerites* cf. *bosnensis* (HAUER, 1887) — PETEK, Hrastenica, p. 131, 138 (partim), pl. 3, fig. 3 (only).

v 2015 N. gen. aff. *Kellnerites bagolinensis* BRACK & RIEBER, 1993 — VÖRÖS et al., New data, p. 319, pl. I, fig. 4.

Holotype: Hungarian Natural History Museum (Budapest), inventory number: PAL 2017.10.1.

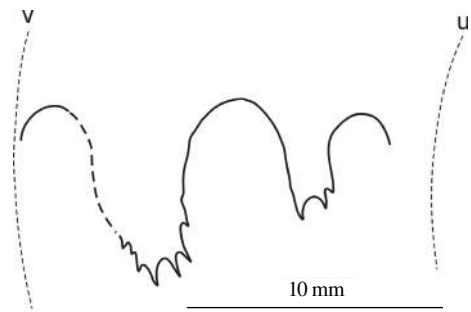


Figure 25. Suture line of *Epikellnerites angustecarinatus* (HAUER, 1896) (INV 2017.172.1.), at 16 mm whorl-height, Vászoly, loose, Reitzei Zone Liepoldti or Reitzei Subzone; u: umbilical margin, v: ventrolateral margin

Locus typicus: Szentbékálla, vineyards; grab sample

Stratum typicum: ochre-yellow, siliceous limestone (Vászoly Formation ?); upper Illyrian, Reitzi Zone, Liepoldti Subzone (?).

Derivatio nominis: After the name of Károly TAMÁS who collected the holotype.

Diagnosis: Medium-sized, moderately involute *Epikellnerites* with high oval whorls and subrounded umbilical wall. Venter narrow, fastigate; keel sharp. Ribs prorsiradiate, projected. Four rows of prominent nodes. Lateral nodes at the inner and the outer third of the flank, respectively, forming spiral chains. Ventrolateral projected clavi separated from ribs. Suture ceratitic; lateral lobes shallow, denticulation dense.

Material

Two incomplete specimens from Vászoly (1) and Szentbékálla (1).

Measurements

	D	WH	WW	U
Holotype PAL 2017.10.1.	75.1	30.8	21.4	20.9
Paratype PAL 2017.11.1.	44.1	?	14.2	14.1

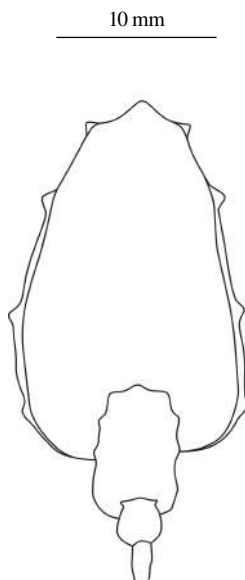


Figure 26. Cross section of *Epikellnerites tamasi* n. sp., Holotype, PAL 2017.10.1., Szentbékálla, loose, Reitzi Zone, Felsőeoersensis or Liepoldti Subzone (?)

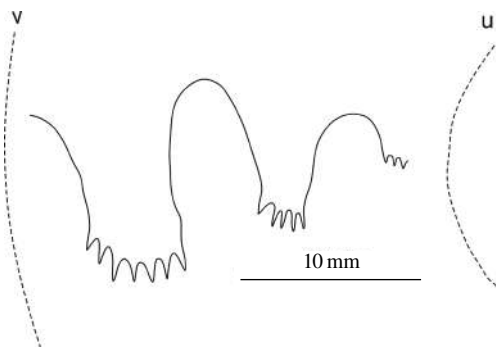


Figure 27. Suture line of *Epikellnerites tamasi* n. sp., Holotype, PAL 2017.10.1., at 23 mm whorl-height, Szentbékálla, loose, Reitzi Zone, Felsőeoersensis or Liepoldti Subzone (?), u: umbilical margin, v: ventrolateral margin

Description

Medium-sized *Epikellnerites* with moderately involute conch. The whorl-section is high oval. The umbilical wall is subrounded. The flanks are gently convex and pass gradually to the high and narrow, almost fastigate venter bearing a distinct, rather sharp keel. The ventrolateral margin bears a row of prominent nodes. The flanks are ornamented with prorsiradiate, partly sinuous, projected primary ribs (14 to 16 on a half whorl) and nodes. Rare intercalated secondary ribs appear irregularly near the umbilicus; bifurcation is rare. Both the primary and the secondary ribs weaken or almost fade out near the ventrolateral margin. The nodes are more prominent than the ribs. There are four rows of nodes. The umbilical nodes are well-developed. The first row of the lateral nodes runs near the inner third of the flank. The second row of the strong lateral nodes runs in the outer third of the flank; they seem to form a nearly continuous spiral chain on the phragmocone, while they became isolated on the body chamber. The ventrolateral nodes appear as separate rows of projected clavi on the ventrolateral margins; their number is around 16 on a half whorl.

Suture lines are ceratitic, with at least three, entire lateral saddles. The second lateral saddle is rather narrow and high. The lateral lobes have shallow depression with dense denticulation (Figure 27).

Remarks

This new species was established on a type specimen collected by K. TAMÁS at Szentbékálla, from the debris of siliceous limestone (probably Vászoly Formation, Reitzi Zone; see VÖRÖS et al. 2015). *E. tamasi* was described previously under different names. The oldest record of this taxon is due to HAUER (1896, pl. VII, figs 13, 14), who described a specimen with four rows of nodes and prorsiradiate, projected ribs, very similar to *E. tamasi*. HAUER (1896, l. c.) attributed this specimen to "*C.*" *bosnensis* HAUER, 1887 and categorically identified it with the original type of *bosnensis*, i. e. the larger specimen figured under this name in HAUER (1887, pl. VI, fig. 1). However, this must be qualified as a mistake, because these two specimens are very much different, as confirmed by the comparative studies of the present author in the collections of the NHMW, and the GBW, Wien, respectively (Figure 23). The original type specimen (HAUER 1887, pl. VI, fig. 1), having rectiradiate ribbing with three definite rows of nodes, was taken as the type of *Kellnerites bosnensis* by SPATH (1934, p. 458–459, fig. 151) and (ARKELL et al. 1957, p. L152).

The "second *bosnensis*" (HAUER 1896, pl. VII, figs 13, 14), with pro-

jected ribs and four rows of nodes, was apparently regarded by some authors, e. g. SALOPEK (1914, l. c.), BRACK & RIEBER (1993, l. c.), also in GAETANI (ed.) (1993, l. c.); specimen checked in the collection PIMUZ (Zürich) and PETEK (1998, l. c.) as the typical *Kellnerites bosnensis*. On the other hand, by the opinion of the present author, the subsequently described specimen of HAUER (1896, l. c.), with four rows of nodes, and the above cited records probably belong to *Epikellnerites tamasi* n. sp.

The specimens figured as “*Ceratites trinodosus* MOJSISOVICS” by MARTELLI (1904, l. c.) and as “*Kellnerites*” sp. ind. by BALINI (1994, l. c.) show apparent similarity to *E. tamasi*.

The type specimen of this new species was recently described and illustrated with the tentative open nomenclature as “N. gen. aff. *Kellnerites bagolinensis* BRACK & RIEBER, 1993” by VÖRÖS et al. (2015, l. c.).

A remarkable ammonoid, described and illustrated by MOJSISOVICS (1882, p. 36, pl. XXXIV, fig. 1) as “*Ceratites* nov. forma indet aff. *hungarico*”, is deposited in the collection of the MGSZ under the inventory number T.863. The specimen was collected by B. ZSIGMONDY in 1871 from Felsőörs, from the siliceous limestone of the Reitzi Zone (judging from the rock matrix, probably from around Bed 100, according to the present numbering; i. e.: probably from the Liepoldti Subzone). It shows many similarities to *E. tamasi* in whorl characters and ornamentation, with the difference that the lateral rows of nodes lay in the inner half of the flank. This large fragment of a body chamber (with a maximum diameter of 93.5 mm) is re-figured here (Plate VII: 5) and named as *Epikellnerites* aff. *tamasi*. It is not described in detail in this monograph because it is represented only with a single specimen in the collection of the MGSZ, and no further specimens were found in our recent collecting works.

Distribution

E. tamasi was recorded from the upper Anisian of the Dinarides, the Southern Alps and doubtfully from the Island Hydra (Greece). At the Balaton Highland it occurs probably in the Illyrian Liepoldti Subzone.

Epikellnerites vaszolyensis n. sp.

Plate VII: 6; Plate VIII: 1–8; Plate IX: 1, 2; Figures 28–30

v 1990 *Parakellnerites* sp. nov. 1. — KOVÁCS et al., Balaton Upland, p. 194, pl. 3, fig. 1.

v 1993 *Reitziites reitzi* — VÖRÖS, Reitzi Zone, p. 27 (partim), pl. III, fig. 3 (non figs 2, 4).

v 1993 *Reitziites reitzi* — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 117 (partim), pl. 12, fig. 5. (non figs 4, 6).

v 1998 *Hyparpadites* ? sp., aff. *liepoldti* (MOJSISOVICS, 1882) — VÖRÖS, Balaton-felvidék, p. 50, pl. II, fig. 6. (Erroneously named as “*Hyparpadites* sp. aff. *bagolinensis* BRACK & RIEBER” in the plate explanation.)

v 1998 *Hyparpadites* cf. *bagolinensis* (BRACK & RIEBER, 1993) — VÖRÖS, Balaton-felvidék, p. 50, pl. II, fig. 7.

v 1998 *Kellnerites* sp., aff. *angustecarinatus* (HAUER, 1896) — VÖRÖS, Balaton-felvidék, p. 38, 59, pl. III, fig. 1.

Holotype: Hungarian Natural History Museum (Budapest), inventory number: PAL 2017.12.1.

Locus typicus: Vászoly, Trench P–11/c.

Stratum typicum: Purplish-red to greenish-yellow limestone (Vászoly Formation); upper Illyrian, Reitzi Zone, Liepoldti or Reitzi Subzone.

Derivatio nominis: After the name of the type locality, Vászoly.

Diagnosis: Medium-sized, moderately involute *Epikellnerites* with high oval whorls and subrounded to steep umbilical wall. Venter fastigate; keel blunt. Ribs prorsiradiate, sinuous, projected. Primaries and secondaries weaken near the ventrolateral margin and tend to form fibulate ribbing. Ribbing prevails over nodosity. Four rows of nodes. Lateral nodes at the inner and the outer quarter of the flank, respectively. Ventrolateral projected clavi separated from ribs. Suture ceratitic; lateral lobes deep, denticulation strong.

Material

18 specimens of various state of preservation, from Vöröshéreny (1), Vászoly (6), Mencshely (8), Örvényes (2) and Szentbékállá (1).

Measurements

	D	WH	WW	U
Holotype PAL 2017.12.1.	72.1	30.1	29.3	22.1
Paratype PAL 2017.14.1.	77.7	34.2	19.7	22.1
Paratype PAL 2017.13.1.	71.1	30.1	20.3	?
Paratype PAL 2017.15.1.	70.8	31.6	21.9	18.3
Paratype M.98.14.	68.1	27.5	17.6	18.5
Paratype PAL 2017.18.1.	66.5	26.9	20.2	20.5

	D	WH	WW	U
Paratype M.98.74	49.5	20.1	13.5	?
Paratype M.87.006	47.1	~18.1	11.1	?
Paratype PAL 2017.17.1.	40.1	17.5	12.1	10.3
Paratype PAL 2017.19.1.	38.1	21.1	16.2	?
Paratype PAL 2017.16.1.	30.1	13.6	9.3	8.3

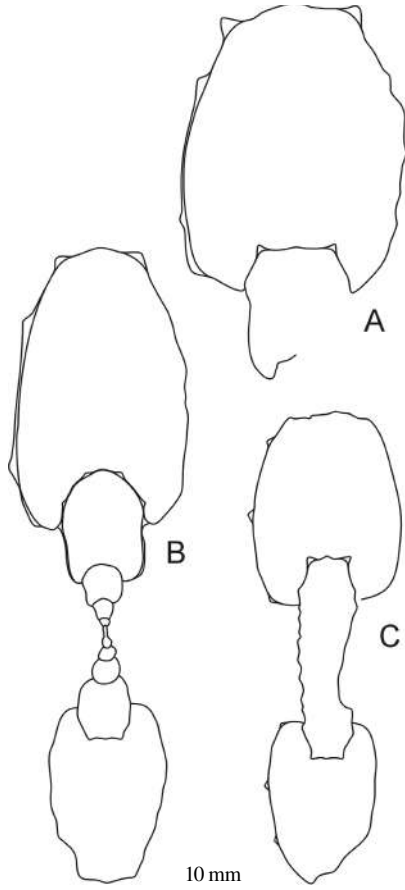


Figure 28. Cross sections of *Epikellnerites vaszolyensis* n. sp. A: Paratype, PAL 2017.47.1., Mencshely, loose, Reitzi Zone, Reitzi Subzone (?); B: Paratype, PAL 2017.13.1., Vászoly, P-11c, loose, Reitzi Zone, Reitzi Subzone (?); C: Paratype, M.98.74, Mencshely, loose, Reitzi Zone, Reitzi Subzone (?)

Description

Medium-sized *Epikellnerites* with moderately involute conch. The whorl-section is high oval. The umbilical wall is subrounded to steep. The flanks are gently convex and pass into the almost fastigate venter bearing a distinct, blunt keel. The ventrolateral margin is accentuated by a row of prominent nodes. The flanks are ornamented with slightly prorsiradiate, sinuous, projected primary ribs (12 to 14 on a half whorl) and nodes. Secondary ribs intercalate irregularly at around the inner fifth of the flank; bifurcation is rare. Both the primary and the secondary ribs weaken or almost fade out near the ventrolateral margin. The ribbing seems more prominent than the nodes. There are four rows of nodes. The umbilical nodes are well-developed. The first row of the medium strong lateral nodes runs near the inner quarter of the flank. The second row of the stronger lateral nodes runs in the outer quarter of the flank. The ventrolateral nodes form separate rows of projected clavi on the ventrolateral margins; their number is around 15 on a half whorl. The ribs became slightly convex between the two rows of the lateral nodes; some ribs seem to fuse near the ventrolateral clavi, in the form of a kind of fibulate ribbing. In some cases the ornamentation becomes stronger on the body chamber than on the phragmocone.

Suture lines are ceratitic, with at least three, entire lateral saddles. The lateral lobes are deep with strong denticulation (Figures 29, 30).

Remarks

E. vaszolyensis differs from other species of the genus by its lateral ornamentation, where the ribbing prevails over the nodes and the widely spaced two lateral rows of nodes lying in the inner and the outer quarter of the flank. *E. angustecarinatus* (HAUER, 1896) is more coarsely ornamented in all respects. *E. bagolinensis* (BRACK & RIEBER, 1993) is more involute and its lateral nodes, evenly distributed on the flanks, significantly prevail over the ribs. *E. tamasi* n. sp. has higher whorls with fastigate venter and its nodes prevail in strength over the ribs. In *E. spinatus* n. sp. the nodes are regularly pointed. *Epikellnerites pseudochohnokyi* n. sp. has fine ribbing almost without nodes.

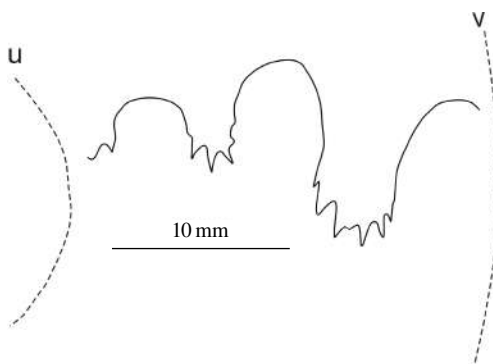


Figure 29. Suture line of *Epikellnerites vaszolyensis* n. sp., Paratype, PAL 2017.14.1., at 21 mm whorl-height, Vászoly, P11c, loose, Reitzi Zone, Liepoldti or Reitzi Subzone, u: umbilical margin, v: ventrolateral margin

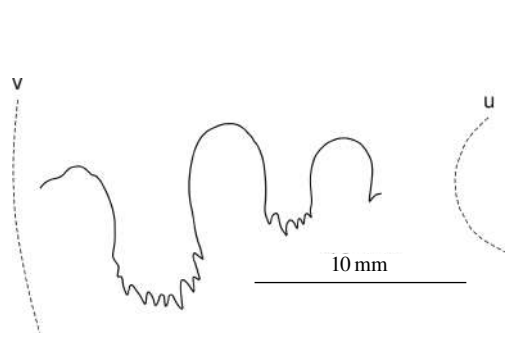


Figure 30. Suture line of *Epikellnerites vaszolyensis* n. sp., Paratype, M.87.006, at 15 mm whorl-height, Szentbékállá, loose, Reitzi Zone, Liepoldti or Reitzi Subzone, u: umbilical margin, v: ventrolateral margin

Many specimens of this new species were tentatively identified with completely different taxa by previous authors.

The specimen, illustrated by KOVÁCS et al. (1990, pl. 3, fig. 1) as a new species of *Parakellnerites*, is re-figured here (Plate VIII: 7); it represents an extremely finely ribbed variant of *Epikellnerites vaszolyensis*.

On the basis of ribbing characters, an ammonite were wrongly identified with *Reitziites reitzi* (BÖCKH) by the present author (VÖRÖS 1993, l. c., and in GAETANI 1993, l. c.). In fact this specimen, re-figured here (Plate IX: 2) bears a ventral keel and this, together with the characteristic ornamentation, render it to *E. vaszolyensis*.

Some other specimens of *E. vaszolyensis* from the Balaton Highland were also wrongly identified with different *Hyparpadites* species by the present author (VÖRÖS 1998, l. c.) misled by the curious nature and position of their lateral rows of nodes. These specimens are re-figured here (Plate VIII: 2, 5).

A little worn half-whorl, illustrated previously as *Kellnerites* sp., aff. *angustecarinatus* (HAUER, 1896) by VÖRÖS (1998, l. c.), is re-figured here (Plate VIII: 4) and on the basis of its partly fibulate ribbing, subordinate nodes and definite keel, now it is regarded as *E. vaszolyensis*, different from the much coarsely ornamented *E. angustecarinatus*.

Distribution

E. vaszolyensis was until now reported only from the Balaton Highland, where it ranges from the Illyrian Liepoldti Subzone to the Reitzi Subzone.

Epikellnerites pseudochohnokyi n. sp.

Plate IX: 3–5; Figures 31, 32

v 1993 *Reitziites chohnokyi* — VÖRÖS, Reitzi Zone, p. 27 (partim), pl. III, fig. 5 (non fig. 6).

v 1993 *Reitziites chohnokyi* — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 117 (partim), pl. 12, fig. 7. (non fig. 8).

Holotype: Hungarian Natural History Museum (Budapest), inventory number: PAL 2017.20.1.

Locus typicus: Mencshely I, Bed 9.

Stratum typicum: Red to greyish-yellow, clayey limestone (Vászoly Formation); upper Illyrian, Reitzi Zone, Reitzi Subzone.

Derivatio nominis: Reference to the apparent similarity to *Reitziites* morphotype *chohnokyi* (FRECH, 1903).

Diagnosis: Small, moderately involute *Epikellnerites* with high oval whorls and steep umbilical wall. Venter arched; keel blunt. Ribs prorsiradiate, sinuous, strongly projected. Primaries and secondaries weaken near the ventrolateral margin. Four rows of nodes. Nodosity subordinate to ribbing. Lateral nodes/swellings at the inner and the outer third of the flank, respectively. Ventrolateral projected clavi, separated from ribs. Suture ceratitic; lateral lobes deep, denticulation strong.

Material

10 specimens of various state of preservation, from Mencshely.

Measurements

	D	WH	WW	U
Holotype PAL 2017.20.1.	26.5	10.5	8.5	10.1
Paratype PAL 2017.21.1.	31.4	12.3	9.4	10.1
Paratype PAL 2017.22.1.	27.1	?	9.6	?

Description

Small *Epikellnerites* with moderately involute conch. The whorl-section is high oval. The umbilical wall is rather steep. The flanks are gently convex and pass into the narrow, arched venter bearing an indistinct, blunt keel. The ventrolateral margin is accentuated by a row of projected clavi. The flanks are ornamented with slightly prorsiradiate, sinuous, strongly projected primary ribs (14 to 16 on a half whorl) and weak nodes. Numerous secondary ribs intercalate irregularly at around the inner third of the flank; bifurcation is rare. Some primary and secondary ribs weaken or almost fade out near the ventrolateral margin. The secondary ribs occasionally fuse near the ventrolateral margin, in the form of a kind of fibulate ribbing. On the flanks the ribbing strongly prevails over the nodes which develop only as rather irregular swellings on the ribs. There are four rows of nodes. The umbilical nodes are regularly developed. The first row of the weak lateral nodes or swellings runs near the inner third of the flank. The second row of the somewhat stronger lateral nodes/swellings runs in the outer third of the flank. The ventrolateral nodes form separate rows of projected clavi on the ventrolateral margins; their number is around 16 to 18 on a half whorl.

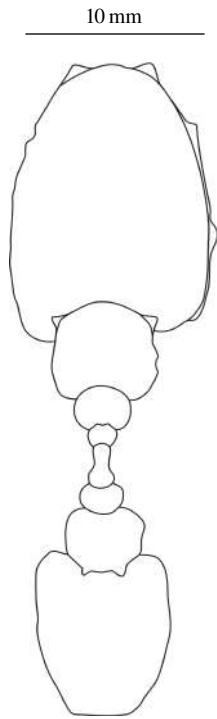


Figure 31. Cross section of *Epikellnerites pseudochnokyi* n. sp., Paratype, PAL 2017.48.1., Mentshely, loose, Reitzi Zone, Reitzi Subzone (?)

Suture lines are ceratitic, with at least three, entire lateral saddles. The lateral lobes are deep with rather strong denticulation (Figure 32).

Remarks

E. pseudochnokyi is extraordinarily similar to *Reitziites chalnokyi* (FRECH, 1903) which is described in the present monography as *R. reitzi* morphotype *chnokyi*. The details of the ornamentation fit almost perfectly, and even the suture lines do not show significant deviation. The diagnostic difference is in the ventral part. The venter of “morphotype *chnokyi*” is very narrow, slightly grooved and the ventrolateral clavi appear alternately, while in *E. pseudochnokyi* the venter is wider, arched or slightly keeled, and the ventrolateral clavi stand in opposite order.

The above demonstrated deceptive similarity misled the present author (VÖRÖS 1993, l. c., and in GAETANI 1993, l. c.) who figured a specimen of *E. pseudochnokyi* under the name *Reitziites chalnokyi*.

E. pseudochnokyi differs from other species of the genus *Epikellnerites* by its more compressed whorls and its lateral ornamentation: fine and dense ribbing with very weak nodes or rather swellings.

Distribution

E. pseudochnokyi is known only from the Balaton Highland, where its range is restricted to the Illyrian Reitzi Subzone.

Epikellnerites spinatus n. sp.

Plate IX: 6, 7; Figure 33

v 1993 *Reitziites reitzi* — VÖRÖS, Reitzi Zone, p. 27 (partim), pl. III, fig. 4 (non figs 2, 3).

Holotype: Hungarian Natural History Museum (Budapest), inventory numbers: PAL 2017.23.1.

Locus typicus: Mentshely I, Bed 9.

Stratum typicum: Red to greyish-yellow, clayey limestone (Vászoly Formation); upper Illyrian, Reitzi Zone, Reitzi Subzone.

Derivatio nominis: Reference to the extremely pointed nodes of this species.

Diagnosis: Small to medium-sized, moderately involute *Epikellnerites* with oval whorls and subrounded umbilical wall. Venter fastigate; keel blunt. Ribs prorsiradiate, slightly projected. Primaries and sparse secondaries weaken near the ventrolateral margin. Ribbing and nodosity equal in strength. Four rows of nodes. Pointed lateral nodes/spines at the inner and the outer third of the flank, respectively. Ventrolateral row of pointed nodes, separated from ribs. Suture ceratitic; first lateral lobe deep, finely denticulated.

Material

Two incomplete specimens from Mentshely.

Measurements

	D	WH	WW	U
Holotype PAL 2017.23.1.	52.1	19.1	15.8	16.5
Paratype PAL 2017.24.1	38.1	15.2	13.2	?

Description

Small to medium-sized *Epikellnerites* with moderately involute conch. The whorl-section is oval. The umbilical wall is

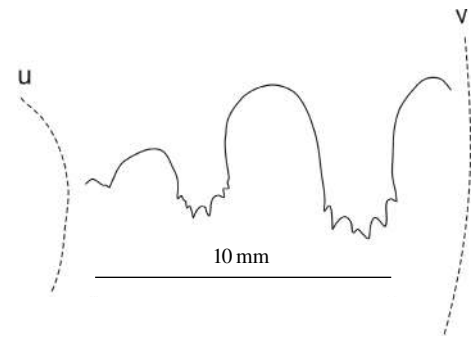


Figure 32. Suture line of *Epikellnerites pseudochnokyi* n. sp., Paratype, PAL 2017.48.1., at 13 mm whorl-height, Mentshely, loose, Reitzi Zone, Reitzi Subzone (?), u: umbilical margin, v: ventrolateral margin

subrounded. The flanks are moderately convex and pass into the almost fastigate venter bearing a definite blunt keel. The flanks are ornamented with prorsiradiate, slightly projected primary ribs (10 to 12 on a half whorl) and nodes. Secondary ribs intercalate irregularly at around the middle of the flank; bifurcation was not observed. The ribs weaken near the ventrolateral margin. The ribbing and the nodosity are equally prominent elements of the ornamentation. There are four rows of nodes. The umbilical nodes are regularly developed. The first row of the strong and pointed lateral nodes runs near the inner third of the flank. The second row of the pointed lateral nodes runs in the outer third of the flank. The ventrolateral nodes form separate rows of slightly projected tubercles on the ventrolateral margins; their number is around 14 on a half whorl. Most of the lateral and the ventrolateral nodes show a definite spinose character.

Suture lines are poorly seen; ceratitic, with rather deep and finely denticulated first lateral lobe.

Remarks

E. spinatus differs from other species of the genus *Epikellnerites* by its characteristic ornamentation, where the ribbing and the nodosity are equally prominent elements, and the spinose character of its nodes.

In a previous work (VÖRÖS 1993, l. c.) the here designated type specimen of *E. spinatus* was wrongly attributed to *Reitziites reitzi* (BÖCKH, 1872).

Distribution

E. spinatus is known only from the Balaton Highland, where its range is restricted to the Illyrian Reitzi Subzone.

Genus **Reitziites** BRACK & RIEBER, 1993

Type species: *Reitziites reitzi* (BÖCKH, 1872)

When they introduced the genus *Reitziites*, BRACK & RIEBER (1993, p. 471) gave a comprehensive and correct morphological definition. They also suggested that *Reitziites* is a descendant of *Kellnerites* and the ancestor of *Nevadites*. This opinion is accepted here with the complementing remark that *Epikellnerites* n. gen. is the possible link between *Kellnerites* and *Reitziites*; and that the direct descendant of *Reitziites* may be *Latemarites*.

Nominal species attributed to *Reitziites*:

Reitziites reitzi (BÖCKH, 1872, p. 147, pl. VII, fig. 3a, pl. VIII, figs 3b, 4, 5)

Ceratites perauritus DIENER, 1900 (p. 26, pl. II, fig. 1) = *Reitziites reitzi*

Trachyceras Chohnokyi FRECH, 1903 (p. 8, pl. II, fig. 5) = *Reitziites reitzi* morphotype *chohnokyi*

Reitziites ecarinatus (HAUER, 1896, p. 257, pl. VIII, figs 7–10)

Balatonites conspicuus DIENER, 1900 (p. 28, pl. II, fig. 5) = *Reitziites ecarinatus*

By the inclusion of the species *ecarinatus* (HAUER, 1896) to *Reitziites*, the scope of the genus became wider than the original definition of BRACK & RIEBER (1993). Further discussion at the species descriptions.

Reitziites reitzi (BÖCKH, 1872)

Plate XIX: 1–8; Plate XX: 1–6, 8; Plate XXI: 1–7; Plate XXII: 1–3; Figures 34–36

- v* 1872 *Ceratites Reitzi* n. sp. — BÖCKH, Bakony déli részének, p. 147, pl. VII, fig. 3a, pl. VIII, figs 3b, 4, 5.
- v 1873 *Ceratites Reitzi* n. sp. — BÖCKH, Südlichen Theiles des Bakony, p. 157, pl. VII, fig. 3a, pl. VIII, figs 3b, 4, 5.
- v 1875 *Ceratites Reitzi* BÖCKH — STÜRZENBAUM, Ceratites Reitzi-szint, p. 256, pl. V, fig. 2.
- v 1882 *Trachyceras Reitzi* (BOECKH) E. v. M. — MOJSISOVICS, Mediterr. Triasprovinz, p. 113, pl. VII, figs 2–5.
- v 1900 *Ceratites perauritus* nov. sp. — DIENER, Muschelkalk–Cephalopoden südl. Bakony, p. 26, pl. II, fig. 1.
- v 1903 *Trachyceras Reitzi* BÖCKH — FRECH, Neue Cephalopoden, p. 8, pl. II, fig. 6.
- ? 1936 *Kellnerites samoborensis* n. sp. — SALOPEK, Greguric-brijeg, p. 212, pl. I, fig. 1.
- 1964 *Protrachyceras reitzi* (BOECKH) — BANDO, Japan, p. 106, pl. 10, figs 1–5, text-figs 31, 32.
- v non 1986 Group of *Nevadites reitzi* (BÖCKH 1872) — BRACK & RIEBER, Lower Buchenstein beds, p. 200, pl. 2, fig. 2, pl. 4, fig. 4.
- v 1989 *Xenoprotrachyceras reitzi* (BÖCKH, 1872) — VÖRÖS & PÁLFY, Vászoly, p. 21., pl. III, fig. 5.
- v non 1990 “*Protrachyceras*” *reitzi* (BÖCKH) — KOVÁCS et al., Balaton Upland, p. 194, pl. 3, fig. 4.
- v 1993 *Reitziites reitzi* (BÖCKH, 1872) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 472 (partim), pl. 7, figs 1, 4, 5, pl. 8, figs 1, 2, 7–10, 12, pl. 11, figs 1, 2, text-figs 15s, 17e, f. (only).
- v 1993 *Reitziites reitzi* (BÖCKH, 1872) — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 65, pl. 15, figs 2–4, 7, 8.
- v 1993 *Reitziites reitzi* — VÖRÖS, Reitzi Zone, p. 27 (partim), pl. III, fig. 2 (non figs 3, 4).

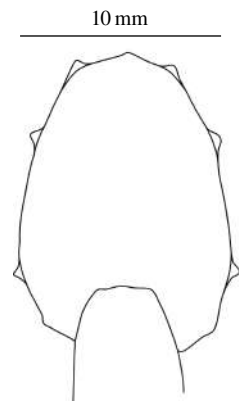


Figure 33. Cross section of *Epikellnerites spinatus* n. sp., Holotype, PAL 2017.23.1., Mentshely I, Bed 9, Reitzi Zone, Reitzi Subzone

- v 1993 *Reitziites reitzi* — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 117 (partim), pl. 12, figs 4, 6. (non fig. 5).
 ? 1995 *Reitziites reitzi* (BÖCKH, 1872) — MIETTO & MANFRIN, Middle Triassic ammonoid, p. 549, pl. II, fig. 7.
 ? 1995 *Reitziites reitzi* (BÖCKH, 1872) — DE ZANCHE et al., Dolomites, p. 152, pl. II, fig. 4.
 v 1998 *Reitziites reitzi* (BÖCKH, 1872) — VÖRÖS, Balaton-felvidék, p. 21, 31, 38, 59, pl. III, figs 2, 3.
 ? 2003 *Reitziites reitzi* (BÖCKH, 1872) — MIETTO et al., Bagolino, p. 451, pl. 1, figs 4, 12.
 v 2015 *Reitziites reitzi* (BÖCKH, 1872) — VÖRÖS et al., New data, p. 319, pl. I, fig. 5.

Material

63 specimens of various state of preservation, from Felsőörs (3), Szentkirályszabadja (2), Vászoly (20), Mencshely (36) and Sólly (2).

Measurements

	D	WH	WW	U
Lectotype T.696.	79.8	26.9	?	31.5
T.3212.	90.6	29.9	?	?
T.3103.	52.6	18.5	?	21.2
T 2017.10.1.	101.5	36.1	26.4	?
T 2017.9.1.	92.9	34.5	22.1	?
T 2017.11.1.	73.6	28.3	20.8	23.2
INV 2017.212.1.	94.8	38.4	28.6	?
INV 2017.207.1.	90.1	39.5	27.4	?
M.98.21	82.1	42.1	?	?
INV 2017.215.1.	80.4	34.4	21.2	22.2
INV 2017.216.1.	76.2	~23.0	?	~25.0
INV 2017.213.1.	73.5	27	20	28.8
INV 2017.210.1.	64.5	24.8	?	26.5
INV 2017.208.1.	63.2	27.1	19.8	?
M.98.15	58.8	23.2	19.5	22.8
M 2001.27	54.1	21.1	?	19.5
INV 2017.209.1.	48.8	26.5	21.5	?
INV 2017.206.1.	42.5	19.1	16.5	?
M.89.108	41.5	14.4	11.1	?
INV 2017.205.1.	40.1	13.5	?	16.3
INV 2017.214.1.	39.6	13.7	13.1	14.0
INV 2017.204.1.	25.1	13.8	12.5	?
M.89.110	15.4	5.1	6.1	6.2
INV 2017.211.1.	14.5	?	5.9	?
L. Varga collection, Úny	76.5	30.3	?	27.5
L. Varga collection, Úny	42.8	14.8	?	14.3

Description

Medium to large *Reitziites* with moderately evolute conch. The whorl-section is oval. The umbilical wall is subrounded to steep. The flanks are gently convex and pass gradually into the flat or gently sulcate venter. The ventrolateral margin is accentuated by a row of prominent spines. The flanks are ornamented with nearly prorsiradiate, sinuous, projected primary ribs (14 to 18 on a half whorl) and nodes. Secondary ribs intercalate irregularly at around the inner third of the flank or even nearer to the umbilicus; bifurcation is rare and occurs only near the umbilicus. In many cases the primary and the secondary ribs fuse as approaching the ventrolateral margin and form of a kind of fibulate ribbing. Farther close to the ventrolateral

margin, both the primary and the secondary ribs weaken or almost fade out. On the flanks, the ribbing always prevails over the nodes; in some cases lateral nodosity seems to be absent (e.g. Plate XIX: 1, 7). Usually there are four rows of nodes. The umbilical nodes are regularly developed. The first row of the lateral nodes runs near the inner quarter of the flank; in most cases these nodes are only swellings on the ribs, but occasionally they tend to form spines (e.g. Plate XIX: 5). The second row of the very strong lateral nodes or spines runs in the outer quarter of the flank, at the fibulate meeting point or the end of the ribs. The ventrolateral nodes are in fact very high, almost vertical spines (around 16 on a half whorl); they form separate, usually alternating rows. These hollow spines, as a rule, break away, but if preserved, they show peculiar shape reminding pricked-up dog's ears; they neatly bend out from the vertical position and their lateral sides are somewhat excavated (e.g. Plate XIX: 5, and good illustration by STÜRZENBAUM 1875, pl. V, fig. 2). There is an almost smooth, narrow belt between the rows of the third lateral nodes and ventrolateral spines; this belt, and the narrow, flat venter is rarely crossed by weak growth lines. The style and strength of ornamentation change considerably during growth. In some cases the ornamentation becomes stronger on the body chamber than on the phragmocone (e.g. Plate XX: 5; Plate XXI: 7; Plate XXII: 1), or vice versa (e.g. Plate XX: 1; Plate XXI: 4).

Suture lines are ceratitic, with three, entire lateral saddles. The first lateral lobe is deep and wide, with strong denticulation; the second lateral lobe is much reduced in all respects (Figures 35, 36).

Remarks

R. reitzi is one of the first described and emblematical ammonoid species of the late Illyrian; for a long time, though mainly by Hungarian experts, it was regarded as the index fossil marking the base of the Ladinian (MOJSISOVICS 1882, SZABÓ et al. 1980, VÖRÖS et al. 2003b). In fact, it would have been an excellent guide fossil as well, because of its almost unmistakable morphology, quite unique among Triassic ammonoids.

From the point of view of lateral ornamentation, *R. reitzi* has some similarity to certain species of *Epikellnerites*, especially to *E. vaszolyensis* n. sp. but strongly differs by the flat or concave venter with vertical, very high ventrolateral spines in contrast to the fastigate venter and lower ventrolateral clavi of *E. vaszolyensis*.

Within the genus, *R. ecarinatus* (HAUER, 1896) differs from *R. reitzi* by its more evolute conch, broader, subhexagonal whorl-section and coarser ornamentation, dominated by nodes.

The lectotype (BÖCKH 1872, pl. VII, fig. 3a and pl. VIII, fig. 3b), designated by BRACK & RIEBER (1993, p. 472), is kept in the collection of the MGSB under the inventory number T.696. The lectotype is refigured here (Plate XIX: 1a, 1b) to show that the lateral views of this specimen given by BÖCKH (1872) and later by MOJSISOVICS (1882, pl. VII, fig. 2) are correct. On the other hand, the ventral views given by the cited authors are too much artistic and imaginative, because the other side of the specimen is embedded to host rock and the other row of the ventrolateral spines is hardly seen.

R. reitzi has a rather wide range of variation, therefore some species, described earlier under different names may be

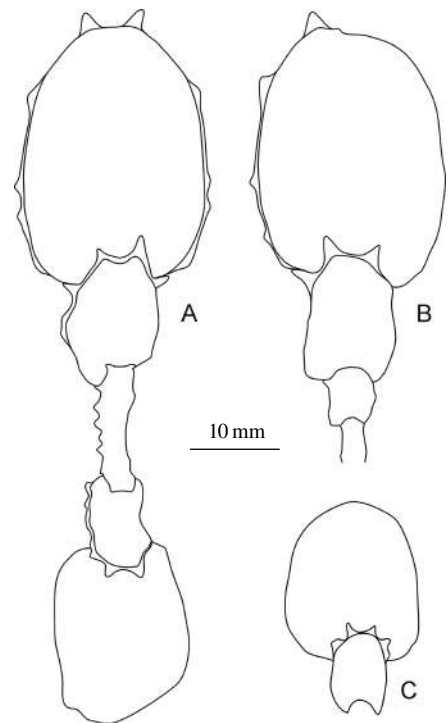


Figure 34. Cross sections of *Reitziites reitzi* (BÖCKH, 1872), A: INV 2017.213.1., Vászoly, P-17, loose, Reitzi Zone, Reitzi Subzone; B: T 2017.9.1., Vászoly, P-11c, loose, Reitzi Zone, Reitzi Subzone; C: INV 2017.208.1., Mecsely II, loose, Reitzi Zone, Reitzi Subzone (?)

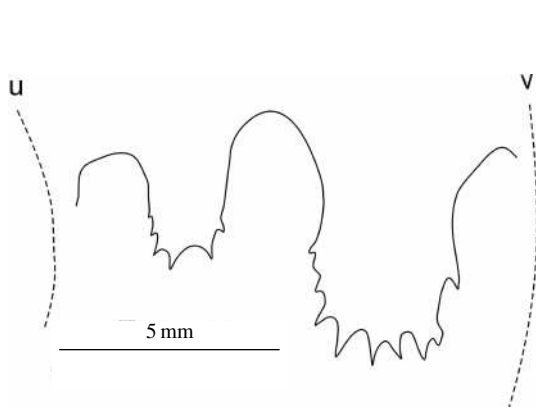


Figure 35. Suture line of *Reitziites reitzi* (BÖCKH, 1872), INV 2017.205.1., at 12 mm whorl-height, Felsőörs, loose, near Bed 108, Reitzi Zone, Reitzi Subzone, u: umbilical margin, v: ventrolateral margin

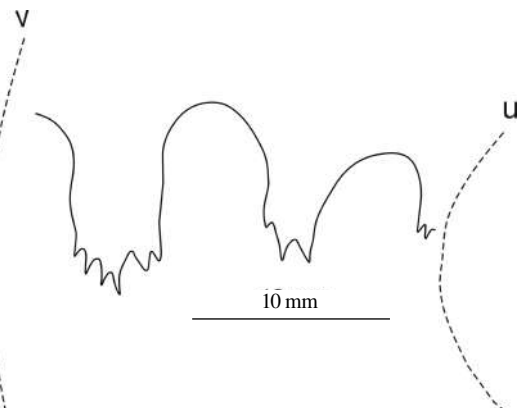


Figure 36. Suture line of *Reitziites reitzi* (BÖCKH, 1872), INV 2017.215.1., at 21 mm whorl-height, Vászoly, P-11c, loose, Reitzi Zone, Reitzi Subzone, u: umbilical margin, v: ventrolateral margin

regarded as synonyms, (“*Ceratites perauritus*” DIENER 1900, l. c.), or included here as morphotypes of *R. reitzi* (“*Trachyceras Cholnokyi*” FRECH, 1903, p. 8, pl. II, fig. 5). The specimens of *cholnokyi* are connected by continuous morphological transitions with the typical *reitzi*. This relationship is illustrated here on Plate XXII; the specimens of “typical” *cholnokyi* differ from *reitzi* mainly by their narrower venter. In spite of this connection, the morphotype *cholnokyi* (within the species *R. reitzi*) is described separately in the present monograph.

The specimen figured as “*Kellnerites samoborensis* n. sp.” by SALOPEK (1936a, l. c.) shows lateral ornamentation very similar to *R. reitzi* and, as it is written in the German version of the paper (SALOPEK 1936b, p. 176), the venter bears neither keel, nor sulcus. Therefore this record is taken tentatively into the present synonymy.

BRACK & RIEBER (1986, l. c.) described a few specimens as belonging to the “group of *Nevadites reitzi*”, but later the same authors (BRACK & RIEBER 1993), synonymised these with their new species *Nevadites avenonensis* BRACK & RIEBER, 1993.

KOVÁCS et al. 1990, l. c.) figured a specimen under the name “*Protrachyceras*“ *reitzi* (BÖCKH). The lateral ornamentation showed some similarity to *R. reitzi*, but the specimen was so embedded to the host rock that the ventral side was not seen. The careful preparation by the present author revealed the keeled venter; consequently the specimen was identified as *Epikellnerites angustecarinatus* (HAUER, 1896).

BRACK & RIEBER (1993) collected a series of specimens of *R. reitzi* from Bagolino, which were examined by the present author in the collection PIMUZ, Zürich. Most of them were considered typical representatives of this species. The specimens figured on pl. 7, figs 6, 7; pl. 8, figs 3–6, 13, 14 and pl. 11, fig. 3, were seen as standing close to *R. reitzi* morphotype *cholnokyi*, which, in fact, belongs to the species *reitzi* in wider sense. The single specimen which does not fit *R. reitzi* was figured by BRACK & RIEBER (1993, pl. 8, fig. 11) and, by its coarse ribbing and nodes, probably belongs to *R. ecarinatus* (HAUER, 1896).

Some of the specimens illustrated previously by the present author as *R. reitzi*, turned out to be representatives of different species of *Epikellnerites*; e.g. *E. vaszolyensis* (VÖRÖS 1993, pl. III, fig. 3; and also in GAETANI 1993, pl. 12, fig. 5), and *E. spinatus* (VÖRÖS 1993, pl. III, fig. 4.).

The specimens figured as *R. reitzi* by MIETTO & MANFRIN (1995), DE ZANCHE et al. 1995), and MIETTO et al. (2003) are rather poorly preserved and do not show the ventral part. On the basis of their lateral ornamentation they may belong to *R. reitzi*.

Distribution

R. reitzi was described from the upper Anisian of the Balaton Highland, the Southern Alps, Japan and probably from the Dinarides. At the Balaton Highland its range is restricted to the Illyrian Reitzi Subzone.

Reitziites reitzi (BÖCKH, 1872) morphotype *cholnokyi* Plate XXII: 4–7; Figure 37.

- v * 1903 *Trachyceras Cholnokyi* n. sp. (*Protrachyceras*) — FRECH, Neue Cephalopoden, p. 8, pl. II, fig. 5.
- 1913 *Protrachyceras Cholnokyi* FRECH — RENZ, Griechenland, p. 547, text-fig. 2.
- v 1989 *Xenoprotrachyceras cholnokyi* (FRECH, 1903) — VÖRÖS & PÁLFY, Vászoly, p. 21., pl. III, figs 3, 4.
- v 1993 *Reitziites reitzi* (BÖCKH, 1872) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 472 (partim), pl. 7, figs 6, 7, pl. 8, figs 3–6, 13, 14, pl. 11, fig. 3, text-fig. 15r (only).
- v 1993 *Reitziites cholnokyi* — VÖRÖS, Reitzi Zone, p. 27 (partim), pl. III, fig. 6 (only), (non fig. 5).
- v 1993 *Reitziites reitzi* — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 117 (partim), pl. 12, fig. 8 (only), (non fig. 7).
- v 1998 *Reitziites cholnokyi* (FRECH, 1903) — VÖRÖS, Balaton-felvidék, p. 31, 38, 59.
- v 2015 *Reitziites cholnokyi* (FRECH, 1903) — VÖRÖS et al., New data, p. 319, pl. I, fig. 6.

Material

28 specimens of various state of preservation, from Vászoly (6) and Mencshely (22).

Measurements

	D	WH	WW	U
M.89.129A	58.1	24.4	15	20.1
INV 2017.217.1.	52.4	21.1	13.4	13.3
INV 2017.218.1.	42.7	16.1	11.7	14.3
M.89.129B	28.3	11.8	7.8	8.2

Description

Small to medium-sized *Reitziites* with moderately involute conch. The whorl-section is high oval. The umbilical wall is subrounded to steep. The flanks are gently convex and pass into the narrow, tabulate venter. The ventrolateral margin is

accentuated by a row of projected clavi. The flanks are ornamented with slightly prorsiradiate, sinuous, strongly projected primary ribs (18 to 20 on a half whorl) and indistinct nodes. Numerous secondary ribs intercalate irregularly near the umbilicus or at around the inner third of the flank; bifurcation is rare. Some of the primary and the secondary ribs weaken near the ventrolateral margin. The secondary ribs occasionally fuse with the primaries near the ventrolateral margin, in the form of a kind of fibulate ribbing. On the flanks the ribbing strongly prevails over the nodes which develop only as rather irregular swellings on the ribs. There are four rows of nodes. The umbilical nodes are regularly developed. The first row of the weak lateral nodes runs near the inner third of the flank. The second row of the somewhat weaker lateral nodes or swellings runs in the outer third of the flank. The ventrolateral nodes form separate rows of projected clavi on the ventrolateral margins; their number is around 14 to 16 on a half whorl. The venter is narrow and the two rows of closely set ventrolateral clavi are in alternating position.

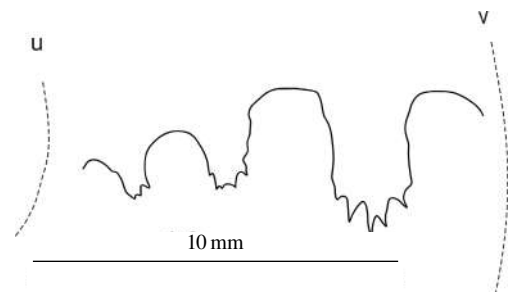


Figure 37. Suture line of *Reitziites reitzi* (BÖCKH, 1872) morphotype *cholnokyi*, INV 2017.296.1., at 12 mm whorl-height, Mencshely, loose, Reitzi Zone, Reitzi Subzone (?), u: umbilical margin, v: ventrolateral margin

Suture lines are ceratitic, with at least three, entire lateral saddles. The first lateral lobe is deep with strong denticulation; the second and third lateral lobes are gradually reduced both in depth and in denticulation (Figure 37).

Remarks

This taxon, described originally as *Trachyceras Cholnokyi* by FRECH (1903, l. c.) was regarded for a long time (from RENZ 1913, l. c. to VÖRÖS et al. 2015, l. c.) as a valid, distinct species. BRACK & RIEBER (1993, l. c., p. 473) synonymised *R. cholnokyi* with the morphologically close *R. reitzi* (BÖCKH, 1872).

The detailed studies made on a large material in the course of the preparation of the present monograph convinced the author that, from morphological point of view, the typical *cholnokyi* is connected by continuous transitions with the typical *reitzi*. This relationship is illustrated here on Plate XXII: 1–3; these specimens of *R. reitzi* are very close to the typical *cholnokyi* and differ mainly by their wider venter. Nevertheless, it was felt reasonable to distinguish and describe this group of peculiar ammonoids as a morphotype *cholnokyi* within the species *R. reitzi*.

Some of the specimens figured as *R. reitzi* by BRACK & RIEBER (1993, pl. 7, figs 6, 7, pl. 8, figs 3–6, 13, 14, pl. 11, fig. 3), morphologically correspond to the morphotype *cholnokyi*.

The species *Epikellnerites pseudocholnokyi* introduced in the present monograph, is very similar to *R. reitzi* morphotype *cholnokyi* in its lateral ornamentation and differs only by its wider and arched venter. This deceptive similarity led the present author (VÖRÖS 1993, l. c. and in GAETANI 1993, l. c.) to the wrong identification of a part of the respective specimens.

Distribution

This morphotype was recorded in the upper Anisian of the southern Alps and Greece. At the Balaton Highland its range is restricted to the Illyrian Reitzi and Avisianum Subzones.

Reitziites ecarinatus (HAUER, 1896)

Plate XX: 7; Plate XXIII: 1–11; Figure 38.

- v * 1896 *Ceratites ecarinatus* n. sp. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 257, pl. VIII, figs 7–10.
- v 1900 *Balatonites conspicuus* nov. sp. — DIENER, Muschelkalk–Cephalopoden südl. Bakony, p. 28, pl. II, fig. 5.
- v 1900 *Protrachyceras* sp. ind. — DIENER, Muschelkalk–Cephalopoden südl. Bakony, p. 31, pl. II, fig. 2.
- v 1903 *Ceratites conspicuus* DIEN. sp. — ARTHABER, Neue Funden Muschelkalk des südl. Bakony, Revision, p. 22, pl. I, figs 5, 6.
- v 1903 *Ceratites ecarinatus* HAUER — ARTHABER, Neue Funden Muschelkalk des südl. Bakony, Revision, p. 23, pl. I, fig. 4.
- v ? 1973 *Protrachyceras* cf. *conspicuus* (DIENER, 1900) — RIEBER, Grenzbitumenzone, p. 69, pl. 16, fig. 7.
- v 1989 *Nevadites* cf. *ecarinatus* (HAUER, 1896) — VÖRÖS & PÁLFY, Vászoly, p. 21., pl. III, fig. 1.
- v 1993 *Reitziites reitzi* (BÖCKH, 1872) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 472 (partim), pl. 8, fig. 11 (only).
- v ? 1993 *Kellnerites* cf. *ecarinatus* (HAUER, 1896) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 470, pl. 6, figs 5, 6.
- v 1993 *Reitziites ecarinatus* — VÖRÖS, Reitzi Zone, p. 27, pl. III, fig. 7.
- v 1993 *Reitziites ecarinatus* — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 117, pl. 12, fig. 9.
- ? 1995 “*Kellnerites*” *ecarinatus* (HAUER, 1896) — DE ZANCHE et al., Dolomites, p. 152, pl. II, fig. 3.
- v 1998 *Nevadites* ? *symmetricus* (SALOMON, 1895) — VÖRÖS, Balaton-felvidék, p. 31, 60.
- v 1998 *Nevadites* cf. *ecarinatus* (HAUER, 1896) — VÖRÖS, Balaton-felvidék, p. 50, pl. VI, fig. 16.

Material

70 specimens of various state of preservation, from Felsőörs (1), Szentkirályszabadja (3), Vászoly (5), Mencshely (41), Sólly (16), Szentbékállá (1), Hajmáskér (2) and Öskü (1).

Measurements

	D	WH	WW	U
M.87.009	55.9	22.5	18.2	22.2
INV 2017.224.1.	40.2	15.8	?	11.2
INV 2017.226.1.	41.1	15.3	13.1	?
INV 2017.227.1.	40.0	15.0	15.0	?
INV 2017.225.1.	36.1	12.8	14.1	16.2
INV 2017.220.1.	33.8	12.8	11.1	13.1
M.98.218	32.8	17.1	15.0	?
INV 2017.222.1.	29.5	10.8	12.8	11.5
INV 2017.223.1.	29.2	9.8	11.1	12.2
INV 2017.228.1.	20.8	7.1	8.2	8.7
INV 2017.221.1.	24.4	9.8	9.4	8.4

Description

Small to medium-sized *Reitziites*, with moderately evolute conch. The whorls are compressed, stout; the cross-section is oval to subhexagonal. The umbilical edge is subrounded. The flanks are strongly convex and pass gradually into the flat to gently sulcate venter. The flanks are ornamented with very strong ribs and nodes. The widely spaced ribs are retriradiate to slightly prorsiradiate; their number is 8 to 10 on a half whorl. Very rarely, secondary ribs are irregularly inserted by intercalation. There are four rows of nodes. The umbilical nodes appear only as swellings of the ribs. The first row of lateral nodes develops on the inner thirds of the primary ribs; these nodes occasionally appear as spines. The second row of lateral nodes emerges at the outer quarter of the ribs; some of the ribs terminate at these very prominent tubercles. The ventrolateral nodes are the most prominent; they form more or less separate, usually alternating rows of spines. Some of the strong ribs reach the ventrolateral spines, others weaken between the third row of lateral nodes and the ventrolateral spines. Some spines stand alone, without connection to any ribs, in the interspaces of spine-bearing ribs. The very high, almost vertical ventrolateral spines (10 to 12 on a half whorl) are hollow spines; if preserved, they show peculiar pointed ear shape (e.g. Plate XXIII: 2), reminding the spines of *R. reitzi*.

Suture lines are poorly visible; ceratitic, with two or three lateral saddles.

Remarks

HAUER (1896, l. c.) described and figured two specimens of *ecarinatus*. These were inspected by the present author in the collection NHMW (Wien); from among them the larger one, figured by HAUER (1896, pl. VIII, figs 9, 10; inventory number: NHMW 1998z0063/0017), is designated here as lectotype. The identification of our specimens from the Balaton Highland with the typical *R. ecarinatus* is ascertained.

R. ecarinatus differs from other species of *Reitziites* first of all by its evolute conch with stout, almost hexagonal whorls, and by the widely spaced, very strong ribs and nodes. The copious material recently collected from diverse localities of the Balaton Highland allowed us to somewhat broaden the morphological range of variation of this species.

As a marginal member of the genus, *R. ecarinatus* bears striking resemblance to some *Nevadites* species introduced by BRACK & RIEBER (1993), as revealed by the comparative studies of the present author in the collection PIMUZ, Zürich. Especially, the holotype of *N. secedensis* BRACK & RIEBER (1993, pl. 11, fig. 8; PIMUZ 7116) can well be compared to our specimen of *R. ecarinatus* figured here (Plate XXIII: 1). Similarly, the smaller specimens of *N. secedensis* and *N. avenonensis* BRACK & RIEBER, 1993, figured by BRACK & RIEBER (1993, pl. 11, figs 4, 5 and figs 9, 10, respectively) are remarkably similar in all respects to our smaller specimens of *R. ecarinatus* from the Balaton Highland. In spite of the high degree of apparent similarity, the two groups of forms remain separate stratigraphically, because *R. ecarina-*

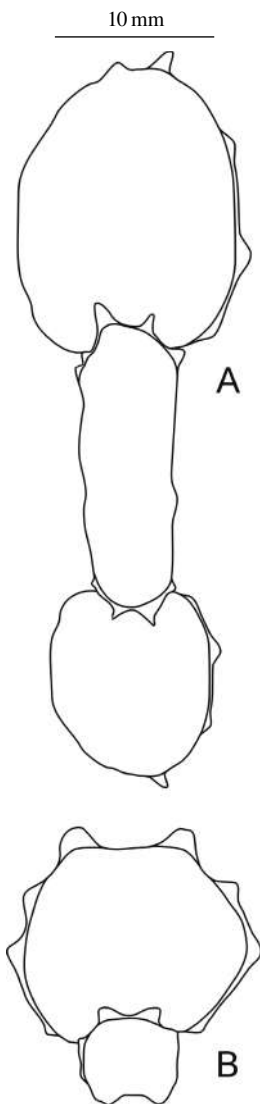


Figure 38. Cross sections of *Reitziites ecarinatus* (HAUER, 1896), A: INV 2017.226.1., Mencshely I, Bed 9, Reitzi Zone, Reitzi Subzone; B: INV 2017.297.1., Mencshely, loose, Reitzi Zone, Reitzi Subzone (?)

tus is restricted to the upper part of the Reitzi Zone, whereas *N. secedensis* and *N. avenonensis* are known only from the higher Secedensis Zone.

The type specimen of “*Balatonites conspicuus* nov. sp.”, described and figured by DIENER (1900, l. c.) was examined in the collection of the MGSB, where it is kept under the inventory number T.1641. It is surely not a *Balatonites*, because, instead of a nodose keel, it has a concave venter. This poorly preserved ammonite from Hajmáskér is rather deformed, crushed laterally, as it is also shown in the cross section figure by DIENER (1900, pl. II, fig. 5d). Considering the effect of compression, on the basis of the lateral ornamentation, the attribution of the specimen to *R. ecarinatus* is justified. The similarity is especially striking to our specimen from Szentbékállá, figured here on Plate XXIII: 1.

Another fragmentary specimen from Hajmáskér, described by DIENER (1900, l. c.) as “*Protrachyceras* sp. ind.”, and deposited in the collection of the MGSB, under the inventory number T.1266., is regarded here as a typical representative of *R. ecarinatus*.

Both above mentioned items by DIENER were revised and attributed to “*Ceratites conspicuus* DIEN. sp.” by ARTHABER (1903, p. 22); in the sense of the present interpretation, they belong to *R. ecarinatus*.

In the same work, ARTHABER (1903, p. 23, pl. I, fig. 4) described and figured a small ammonite from Hajmáskér as *Ceratites ecarinatus* HAUER. The examination of this specimen (inventory number T.1254.) in the collection of the MGSB endorsed the identification of ARTHABER.

The specimen figured as *Protrachyceras* cf. *conspicuus* by RIEBER (1973, l. c.) is listed with query in the synonymy, because it may belong to some species of *Nevadites* of higher stratigraphical position. According to H. RIEBER (pers. comm.) this specimen was collected near Besano, where only the higher part of the Grenzbitumenzone was exposed, corresponding to the Beds 80 to 120 interval in Monte San Giorgio (Secedensis Zone).

From among the many specimens figured as *R. reitzi* by BRACK & RIEBER (1993), only one (l. c., pl. 8, fig. 11) does not seem to belong to that species but should be regarded as a *R. ecarinatus* by its widely spaced, coarse ribs and strong nodes.

The specimen figured as “*Kellnerites*” *ecarinatus* by DE ZANCHE et al. 1995, l. c.) is a poorly preserved, compressed form; its venter is not seen at all. Therefore it is only tentatively included to the present synonymy.

In a previous work (VÖRÖS 1998, l. c.) the taxon *Nevadites* ? *symmetricus* (SALOMON, 1895) was itemised from Vászoly (Balaton Highland). This single specimen was the same as figured by VÖRÖS & PÁLFY (1989, pl. III, fig. 1) under the name “*Nevadites* cf. *ecarinatus*”. Here it is regarded as a juvenile specimen of *R. ecarinatus* and re-figured on Plate XX: 7. The type specimen of “*Trachyceras symmetricus*” SALOMON, 1895 was checked in the BSM (München) and it turned to be different from *R. ecarinatus*, and appeared as belonging to *Nevadites*.

The specimen figured under the name *Nevadites* cf. *ecarinatus* by VÖRÖS (1998, l. c.) is re-figured here on Plate XXIII: 1, as *R. ecarinatus*. In this case, just as in the previous item, the explanation of the mistake in the generic attribution can be given by the above discussed deceptive similarity between some forms of *Nevadites* and *R. ecarinatus*.

Distribution

R. ecarinatus was described from the upper Anisian of the Dinarides and the Southern Alps. At the Balaton Highland its range is restricted to the Illyrian Reitzi and Avisianum Subzones.

Genus *Latemarites* BRACK & RIEBER, 1993

Type species: *Latemarites latemarensis* BRACK & RIEBER, 1993, now regarded as a junior synonym of *Latemarites bavaricus* (REIS, 1901).

When the genus *Latemarites* was introduced by BRACK & RIEBER (1993, p. 475), the name-bearing species *Latemarites latemarensis* n. sp. was designated as the type species. *L. latemarensis* was correctly described and illustrated by plentiful material and was demonstrated as a widely variable species (BRACK & RIEBER 1993, p. 478).

MANFRIN et al. (2005, p. 496, figs 11/1–15) pointed out that *L. latemarensis* was the junior synonym of *Latemarites bavaricus* (REIS, 1901), and they convincingly proved the morphological identity of the two species by comparative studies of the type specimens of REIS, kept in the BSM (München).

The approval of this subjective synonymy logically would mean that the type species, *L. latemarensis* should be substituted by the senior synonym *L. bavaricus*. However, according to the Article 67.1.2. of the ICZN (1999, p. 57): “The name of a type species remains unchanged even when it is a junior synonym or homonym, or a suppressed name.” Moreover, we may accept the “Recommendation 67B.” of the ICZN, and apply it to our case:

The designated type species of *Latemarites*: *Latemarites latemarensis* BRACK & RIEBER, 1993 is currently synonymised with *Latemarites bavaricus* (REIS, 1901), but the latter is not the type species of *Latemarites* and should not be cited as such. If mention of the type species is required it should be made in some such manner as “Type species *Latemarites latemarensis* BRACK & RIEBER, 1993, a junior synonym of *Latemarites bavaricus* (REIS, 1901)” or “Type species *Latemarites latemarensis* BRACK & RIEBER, 1993, now regarded as a synonym of *Latemarites bavaricus* (REIS, 1901)”.

Consequently, we regard *Latemarites latemarensis* BRACK & RIEBER, 1993 as the type species of the genus, but we shall use the senior synonym, *Latemarites bavaricus* (REIS, 1901) in the following systematic descriptions.

In accordance with the opinion of MANFRIN et al. (2005, p. 496) *Latemarites* is regarded as a descendant of *Reitziites*.

Latemarites bavaricus (REIS, 1901)
Plate XXIII: 12–18; Plate XXIV: 1–9.

- v * 1901 *Ceratites bavaricus* nov. spec. — REIS, Fauna des Wettersteinkalkes I., p. 78, pl. II, figs 19–23, pl. VII, figs 4, 5.
v 1907 *Ceratites bavaricus* REIS — REIS, Fauna des Wettersteinkalkes II., p. 131, Text-figs 4, 5.
v 1993 *Latemarites latemarensis* n. sp. — BRACK & RIEBER, Anisian/Ladinian boundary, p. 478, pl. 10, figs 1–24, text-figs 15i, 17b.
v 1998 *Latemarites latemarensis* BRACK & RIEBER, 1993 — VÖRÖS, Balaton-felvidék, p. 29, 38, 42, 59, pl. VI, figs 6–15.
v 1998 *Latemarites conspicuus* (DIENER, 1900) — VÖRÖS, Balaton-felvidék, p. 42, 59, pl. VI, figs 2–5.
v 2002 *Latemarites latemarensis* BRACK & RIEBER — VÖRÖS, Paleoenvironmental distribution, p. 486, pl. 1, figs 8–17.
2005 *Latemarites bavaricus* (REIS, 1900) — MANFRIN et al., Latemar, p. 496, figs 11/1–15.
v 2015 *Latemarites latemarensis* BRACK & RIEBER, 1993 — VÖRÖS et al., New data, p. 319, pl. I, fig. 7.

Material

68 specimens of various state of preservation, from Felsőörs (3), Szentkirályszabadja (6), Vászoly (1), Mencshely (5), Sóly (51), Vörösberény (1) and Hajmáskér (1).

Measurements

	D	WH	WW	U
M.98.33	61.1	20.1	14.8	25.4
M.98.81	43.5	15.2	10.8	20.1
M.89.135	41.5	15.8	?	19.5
M.98.57	40.0	14.8	10.8	15.8
M.98.80	38.1	14.8	12.1	12.8
M.98.66	38.0	16.8	12.4	?
M.98.84	33.4	12.2	9.8	13.1
INV 2017.229.1.	29.1	10.6	9.2	10.5
M.98.29	28.1	9.1	?	11.3
INV 2017.232.1.	28.1	?	5.4	?
M.98.86	26.1	8.5	7.1	11.7
M 2001.28	25.5	9.8	8.1	8.5
M.98.70	23.1	8.5	6.2	8.6
INV 2017.231.1.	22.5	6.8	5.5	?
INV 2017.230.1.	16.1	5.6	4.3	6.9
K. Tamás collection, Kővágóörs	65.1	24.8	?	24.1

Description

Small to medium-sized *Latemarites* with moderately evolute conch. The whorl-section is high oval. The umbilical wall is subrounded to steep. The flanks are gently convex and pass gradually to the tabulate venter. The ventrolateral margin is accentuated by a row of prominent spines. The flanks are ornamented with slightly prorsiradiate, straight to sinuous, projected primary ribs (around 12 on a half whorl) and nodes. Secondary ribs intercalate irregularly at around the inner third of the flank or even nearer to the umbilicus; bifurcation is rare. On the inner half of the flanks and in the specimens of less than 30 mm diameter, the ribbing prevails over the nodes. Usually there are four rows of nodes. The umbilical nodes are only swellings on the ribs. The first row of the lateral nodes runs near the inner quarter of the flank; in most cases these nodes are weak or only of medium strength. The second row of the very strong lateral nodes or spines runs in the outer quarter of the flank; the ribs usually terminate or weaken at these nodes. The ventrolateral nodes are rather high spines (18 to 24 on a half whorl); they form separate, usually opposite rows. These spines, as a rule, break away, but if preserved, they are elevated ventrolaterally and gently curved ventrally.

The style and strength of ornamentation may change considerably during growth. In some cases the ornamentation becomes stronger on the body chamber than on the phragmocone (e.g. Plate XXIII: 18), or vice versa (e.g. Plate XXIV: 4).

Suture lines are poorly seen: ceratitic, with three lateral saddles and a deeply denticulated first lateral lobe (Plate XXIV: 3).

Remarks

The lectotype of *L. bavaricus*, figured by REIS (1901, pl. II, fig. 19) was designated by MANFRIN et al. (2005, p. 496) on the basis of direct investigations of those authors in the BSM (München). They re-figured the lectotype and a few other para-lectotype specimens from the collection of REIS (MANFRIN et al. 2005, figs 11/8–10, 14, 15). Finally they concluded that *L. bavaricus* is conspecific with its junior synonym *L. latemarensis* BRACK & RIEBER, 1993.

The present author had the possibility to check the original specimens of REIS (1901, 1907) in München and, previously, the originals of *L. latemarensis* in the PIMUZ, Zürich, as well. It can be stated definitely, that the latter material is far more numerous and diverse, and it is better illustrated than that of REIS, considering even the illustrations by MANFRIN et al. (2005). Moreover, the present author has some doubt if *L. bavaricus* and *L. latemarensis* are really conspecific, because the few specimens of *L. bavaricus* in the REIS collection from the Wetterstein Mts are all simply ribbed, without definite nodes, whereas strongly nodose specimens prevail in the *L. latemarensis* populations from the Southern Alps (see illustrations in BRACK & RIEBER, 1993, pl. 10, figs 1–24 and in MANFRIN et al. 2005, figs 11/1–7). At the same time, it is demonstrated that simple ribbing is also frequent in the South Alpine populations of *L. latemarensis*. After all, the present author accepted the opinion of MANFRIN et al. (2005) and the *Latemarites* specimens from the Balaton Highland are described here under the name *L. bavaricus*.

The species name *bavaricus* is cited by MANFRIN et al. (2005) with the date of 1900. REIS' work, appeared in the thirtieth volume of *Geognostische Jahreshefte*, München, for the year 1900, but the volume was published in 1901. Therefore the proper date of the authorship is 1901.

In a previous work VÖRÖS (1998, l. c., pl. VI, figs 2–5) some specimens were wrongly identified as “*Latemarites conspicuus* (DIENER, 1900)”. Now these are included to the wide variation range of *L. bavaricus*.

Distribution

L. bavaricus was described from the upper Anisian of the Northern Calcareous Alps and the Southern Alps. At the Balaton Highland its range is restricted to the Illyrian Reitzi and Avisianum Subzones.

Genus *Detoniceras* MANFRIN & MIETTO, 1991

Type species: *Detoniceras rex* MANFRIN & MIETTO, 1991

Detoniceras ? sp.

Plate XXIV: 10.

v 1998 *Detoniceras* ? sp. — VÖRÖS, Balaton-felvidék, p. 42.

Material

One fragment from Sóly.

Measurements

	D	WH	WW	U
M.98.233	16.5	8.8	8.1	?

Description

Small fragment of a *Detoniceras*. The conch seems rather evolute; the whorl section is high oval. The umbilical wall is rounded. The flanks are gently convex; the venter is deeply sulcate. The flanks are ornamented with coarse ribs and strong nodes. No umbilical nodes are seen. Two lateral rows of nodes at the inner and outer third of the flank. The elevated ventrolateral nodes or spines stand opposite arrangement along the deep ventral groove.

Remarks

On the basis of its rather deep and sharp ventral groove, our specimen seems most similar to *Detoniceras? dezanchei* MANFRIN & MIETTO, 1991 which species was only tentatively assigned to the genus *Detoniceras* in a subsequent work by MANFRIN et al. (2005, p. 498).

Most of the species of the genus *Detoniceras* occur in the Ladinian, but *Detoniceras? dezanchei* was recorded also in the upper Anisian Secedensis Zone.

Distribution

The specimen from the Balaton Highland was collected from the late Illyrian Avisianum Subzone.

Genus **Hyparpadites** SPATH, 1951Type species: *Hyparpadites liepoldti* (MOJSISOVICS, 1882)

The generic name *Hyparpadites* was introduced by SPATH (1951, p. 57) based on the species “*Arpadites (Ceratitis) Liepoldti*” described and figured by MOJSISOVICS (1882, p. 53, pl. VIII, fig. 1, pl. IX, fig. 9). SPATH (l. c.) and subsequently the “Treatise” (ARKELL et al. 1957, p. L162) regarded *Hyparpadites* as a fore-runner of the typical *Arpadites*, and included it to the family Arpaditidae. However this attribution, based on the false morphological interpretation of the type species, was essentially wrong.

Even MOJSISOVICS (1882, p. 53), in the original description of *liepoldti*, used the generic name “*Ceratitis*” in parentheses and compared this species to “*Ceratitis elegans* MOJSISOVICS, 1882, both in general shape and in the ceratitic suture. Besides the presence of a second lateral row of nodes, the chief diagnostic character was the bicarinate venter. The apparently bicarinate venter led MOJSISOVICS (l. c.) SPATH (l. c.) and ARKELL et al. (l. c.) to misplace *liepoldti* (and consequently *Hyparpadites*) to the Arpaditidae, instead of the Ceratitidae. It has to be mentioned that HAUG (1894, p. 401) recognized the mistake, and stated that *liepoldti* is a true ceratitid (“est un véritable *Ceratitis*...”).

The apparent contradiction in the proper systematic position of *Hyparpadites* was recognized by the late T. TOZER in the course of the preparation of the planned “new Treatise” and he asked the present author (letter in 1994) to check the figured type specimen of *H. liepoldti* kept in the collection of the Geological Institute of Hungary (now Mining and Geological Survey of Hungary). Careful examination of the specimen revealed that it has nothing to do with the Arpaditidae, because the apparent “ventral furrow” (as seen on the specimen) is a little oblique, two centimetres long scratch, made probably by a chisel during preparation. The ventral view given by MOJSISOVICS (1882, pl. VIII, fig. 1) is highly exaggerated and misleading. Continuous ventral furrow can not be seen on the specimen, only in the innermost part, next to the body chamber, where it is an artefact. Everywhere else, only the fastigate, carinate venter can be seen.

It is worth mentioning also that MOJSISOVICS (1882, p. 53) shortly described another specimen of *liepoldti*, a whorl-fragment with keel on its venter.

In conclusion, the genus *Hyparpadites* must be removed from the family Arpaditidae and included to Ceratitidae. Its basic characters are the compressed, involute conch, fastigate venter, and flanks ornamented with weak ribs and four definite rows of nodes.

The genus *Hyparpadites* comprises the following nominal species:

Hyparpadites liepoldti (MOJSISOVICS, 1882, p. 53, pl. VIII, fig. 1, pl. IX, fig. 9)

Hyparpadites aff. *liepoldti* (MOJSISOVICS, 1882)

Hyparpadites szaboi n. sp.

In some previous works (VÖRÖS 1998, VÖRÖS et al. 2009) the present author suggested to include also *Kellnerites bagolinensis* BRACK & RIEBER, 1993 to *Hyparpadites*. In this monograph this species is regarded as belonging to the new genus *Epikellnerites*.

Hyparpadites liepoldti (MOJSISOVICS, 1882)

Plate IX: 8–10; Plate X: 1–6; Plate XI: 1, 2; Figures 39–41

v * 1882 *Arpadites (Ceratitis) Liepoldti* E. v. MOJSISOVICS — MOJSISOVICS, *Mediterranen Triasprovinz*, p. 53, pl. VIII, fig. 1, pl. IX, fig. 9.

v 1993 *Hyparpadites liepoldti* — VÖRÖS, *Reitzi Zone*, p. 27, pl. II, fig. 5.

v 1993 *Hyparpadites liepoldti* — GAETANI (ed.), *Anisian/Ladinian boundary field workshop*, p. 117, pl. 12, fig. 3.

v 1993 *Hyparpadites* sp., aff. *liepoldti* — VÖRÖS, *Reitzi Zone*, p. 31, pl. III, fig. 1.

v 1993 *Hyparpadites* sp. aff. *liepoldti* — GAETANI (ed.), *Anisian/Ladinian boundary field workshop*, p. 117, pl. 12, fig. 2.

v 1993 *Kellnerites bagolinensis* n. sp. — BRACK & RIEBER, *Anisian/Ladinian boundary*, p. 470 (partim), specimen PIMUZ 7064 only (not figured).

v 1998 *Hyparpadites* sp., aff. *liepoldti* (MOJSISOVICS, 1882) — VÖRÖS, *Balaton-felvidék*, p. 21, pl. II, fig. 5.

Material

38 specimens of various state of preservation, from Felsőörs (3), Szentkirályszabadja (21), Vászoly (5), Mencshely (3) and Sólly (6).

Measurements

	D	WH	WW	U
Lectotype T.689.	58.5	29.2	?	11.2
M.98.22	89.8	40.1	?	23.1
INV 2017.178.1.	88.4	42.1	17.8	15.1

	D	WH	WW	U
INV 2017.176.1.	>65	?	?	19.0
INV 2017.177.1.	62.5	29.5	16.1	14.4
INV 2017.175.1.	53.5	26.1	15.4	11.8
INV 2017.180.1.	53.1	25.2	14.5	12.1
INV 2017.179.1.	38.1	20.9	?	?
L. Varga collection, Úny	89.0	31.8	21.2	20.8
K. Tamás collection, Kővágóörs	65.1		?	13.1
K. Tamás collection, Kővágóörs	56.1	14.1	?	11.1

Description

Medium to large-sized *Hyparpadites* with compressed, involute conch. The whorl-section is high oval. The umbilical margin is steep to subvertical. The flanks are very gently convex and meet at a well-marked ventrolateral shoulder with the fastigate venter bearing a high keel. The flanks are ornamented with weak to moderately strong ribs and nodes. The almost radial, slightly projected and partly sinuous primary ribs are usually stronger in the inner half of the flank. Their number is 12 to 14 on a half-whorl. Bifurcation and insertion of secondary ribs occur irregularly. There are four rows of nodes. Each primary rib starts with well-developed nodes at the umbilical margin. The first row of lateral nodes is near the umbilical margin, in the inner quarter of the flank. The second row of lateral nodes runs at around the mid-flank. The ventrolateral margin bears prominent, pointed, somewhat projected nodes; their number is 26 to 30 on a half-whorl.

Suture lines are ceratitic, showing at least three lateral saddles with very weak denticles on the lower part of their sides. The lateral lobes are deep and wide, with rather strong denticulation (Figures 40, 41).

Remarks

The lectotype of “*Arpadites* (*Ceratites*) *Liepoldti* MOJŠISOVICS, 1882”, was examined by the present author in the collection of the MGSZ (inventory number: T.689.) and is re-figured here (Plate IX: 8). It was ascertained that this specimen does not belong to the Arpaditidae, because it is very involute and fastigate, and the ventral furrow, emphasized by MOJŠISOVICS (1882, l. c.), is an artefact. It is a somewhat oblique, short scratch, made probably by a chisel during preparation. The ventral view portrayed by MOJŠISOVICS (1882, pl. VIII, fig. 1) is highly exaggerated and misleading, because the specimen is, in fact, fastigate, throughout. MOJŠISOVICS (1882, l. c.) himself was somewhat hesitant as far as the generic attribution of *liepoldti*, because he used the generic name “*Ceratites*” in parentheses and compared this species to “*Ceratites*” *elegans* MOJŠISOVICS, 1882, both in general shape and in the ceratitic suture. Moreover, he mentioned another specimen of *liepoldti*, a whorl-fragment with keel on its venter. Consequently, the attribution of the species

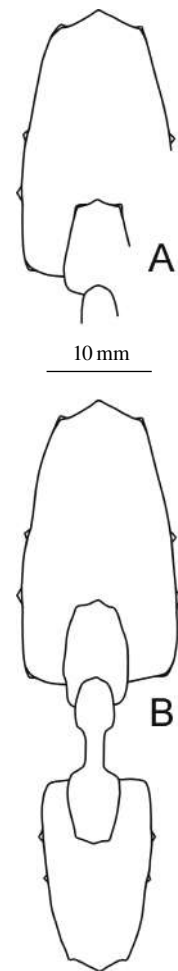


Figure 39. Cross sections of *Hyparpadites liepoldti* (MOJŠISOVICS, 1882), A: INV 2017.290.1., Szentkirályszabadja, Bed 14, Reitzi Zone, Felsőoersensis or Liepoldti Subzone; B: INV 2017.291.1., Szentkirályszabadja, Bed 16, Reitzi Zone, Felsőoersensis or Liepoldti Subzone

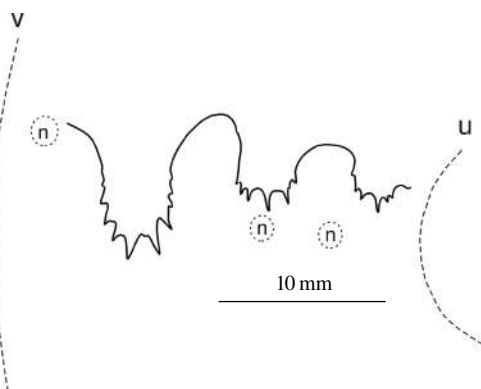


Figure 40. Suture line of *Hyparpadites liepoldti* (MOJŠISOVICS, 1882), (Lectotype, T.689.), at 24 mm whorl-height, Felsőörs, loose, Reitzi Zone, Liepoldti Subzone (?), u: umbilical margin, v: ventrolateral margin, n: position of nodes

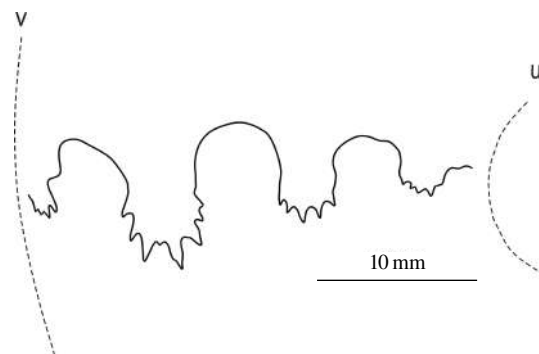


Figure 41. Suture line of *Hyparpadites liepoldti* (MOJŠISOVICS, 1882), INV 2017.176.1., at 27 mm whorl-height, Vászoly, P-XVIII, loose, Reitzi Zone, Liepoldti Subzone (?), u: umbilical margin, v: ventrolateral margin

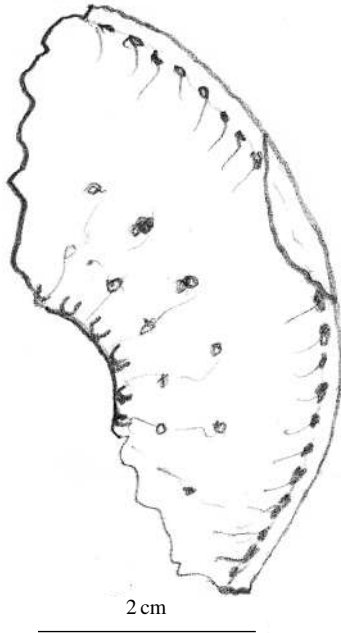


Figure 42. Hand-drawing from a specimen of *Hyarpadites liepoldti* (MOJSISOVICS, 1882), kept in the Paläontologisches Institut und Museum, Universität Zürich (inv. no.: PIMUZ 7064) under the name *Kellnerites bagolinensis* BRACK & RIEBER (1993)

liepoldti to the genus *Hyarpadites* SPATH, 1951 is justified. As it is written above, in the discussion of the genus, *Hyarpadites* should be removed from the Arpaditidae to the Ceratitidae.

STÜRZENBAUM (1875, p. 258), under the name “*Ceratites Böckhi* ROTH”, described a well-preserved specimen with four rows of nodes, bearing a weak row of nodes between the umbilical and the lateral nodes; this corresponds well to the diagnostic feature of *H. liepoldti*. This is very probably the same specimen what was figured as the type of *H. liepoldti* by MOJSISOVICS (1882, l. c.) because, according to the museum’s label, the type specimen was collected by J. STÜRZENBAUM in 1874.

BRACK & RIEBER (1993, p. 471, in the description of *Kellnerites bagolinensis* n. sp.) mentioned a specimen (inventory number: PIMUZ 7064) where even the spiral of the outer lateral nodes was situated in the inner half of the whorl height. This fragmentary specimen was not figured in their paper, but the present author (in 1998, Zürich, by courtesy of H. RIEBER) had the possibility to see and make a drawing (Figure 42) from that specimen which is here regarded as a typical representative of *H. liepoldti*.

In a few previous publications (VÖRÖS 1993, 1998) this species was described with open nomenclature as *Hyarpadites* sp., aff. *liepoldti*.

The specimen, illustrated here on Plate X: 6 (Sóly, Avisianum Subzone), was at first believed to be close to *P. arthaber* (DIENER, 1899), but the two lateral rows of nodes in the inner half of the flank proves that it belongs to *H. liepoldti*, in spite of its high stratigraphical occurrence.

Distribution

H. liepoldti is known from the upper Anisian of the Southern Alps and the Balaton Highland, where it ranges from the Illyrian Felsőeoersensis to the Liepoldti (and probably to the Avisianum) Subzones.

Hyarpadites aff. *liepoldti* (MOJSISOVICS, 1882)

Plate X: 7.

v 1989 *Hungarites* cf. *boeckhi* (HAUER, 1896) — VÖRÖS & PÁLFY, Vászoly, p. 19, pl. I, fig. 5.

Material

Six specimens of various state of preservation, from Vászoly.

Measurements

	D	WH	WW	U
M.89.136	67.1	30.1	12.7	12.8

Description

Large *Hyarpadites* with strongly compressed, involute conch. The whorl-section is very high oval. The umbilical margin is poorly seen; subrounded to steep. The flanks are nearly flat and meet at a well-marked ventrolateral shoulder with the highly fastigate venter bearing a keel. The flanks are ornamented with numerous weak ribs and indistinct nodes. The almost rectiradiate, slightly projected and partly sinuous ribs of equal strength usually run through the flank. Their number is around 15 on a half-whorl. Bifurcation and insertion of secondary ribs occur irregularly. Each primary rib starts with well-developed nodes at the umbilical margin. The indistinct lateral nodes, or rather swellings, are seated on the ribs; they seem to form at least two spiral rows. The ventrolateral margin bears distinct, somewhat projected nodes; their number is around 30 on a half-whorl.

Suture lines are not seen.

Remarks

This species is represented by poorly preserved specimens in our material, but on the basis of the general shape, ornamentation and especially the characters of the venter, its attribution to *Hyarpadites* seems to be assured. On the other hand, it is only tentatively allied to *H. liepoldti*.

In our previous work (VÖRÖS & PÁLFY 1989) the specimen figured here (Plate X: 7) was wrongly attributed to

“*Hungarites cf. boeckhi* (HAUER, 1896)”. As SPATH (1951, p. 10) pointed out, the species name *Ceratites Boeckhi*, given by HAUER (1896, p. 264) was preoccupied by the valid name introduced by ROTH (1871, p. 213) as emended by MOJSISOVIC (1882, p. 37). Therefore SPATH (l. c.) proposed the new name *Hungarites discus* SPATH, 1951 for HAUER’s species. However this species, according to the observations by the present author in the collection NHMW, (Wien), has no lateral and ventrolateral nodes and its fine ribs run up to the high keel. Consequently our previous identification was erroneous also from morphological point of view.

Distribution

At the Balaton Highland the range of *H. aff. liepoldti* is restricted to the Illyrian Liepoldti Subzone.

Hyparpadites szaboi n. sp.

Plate XI: 3, 4, 6; Figure 43.

v 1990 *Parakellnerites* sp. nov. 2. — KOVÁCS et al., Balaton Upland, p. 194, pl. 3, fig. 2.

v ? 1993 *Kellnerites bagolinensis* n. sp. — BRACK & RIEBER, Anisian/Ladinian boundary, p. 470 (partim), pl. 6, figs 3, 9 (only) (non pl. 6, figs 1, 2, text-fig. 15o, 16e).

Holotype: Hungarian Natural History Museum (Budapest), inventory numbers: PAL 2017.25.1.

Locus typicus: Vászoly, Shaft P–XVII, loose.

Stratum typicum: Dark-red to yellow limestone (Vászoly Formation); upper Illyrian, Reitzi Zone, Liepoldti Subzone (?).

Derivatio nominis: After the name of Imre SZABÓ, who collected the type specimens.

Diagnosis: Small to medium-sized, moderately involute *Hyparpadites* with high oval whorls and steep umbilical wall. Venter fastigate; keel moderately high. Ribs slightly prorsiradiate, projected. Primaries and secondaries of uniform strength through the flank. Four rows of nodes. Pointed lateral nodes at the inner and the outer third of the flank, respectively. Ventrolateral row of prominent nodes, at the ends of ribs. Suture ceratitic; first lateral lobe very deep, strongly denticulated; third lateral lobe flat with weak denticles.

Material

Seven specimens of various state of preservation, from Szentkirályszabadja (2), Vászoly (4) and Mencshely (1).

Measurements

	D	WH	WW	U
Holotype PAL 2017.25.1.	59	28.3	17.5	12
Paratype PAL 2017.26.1.	37.8	17	12	10
Paratype PAL 2017.27.1.	32.1	~15.1	?	?

Description

Small to medium-sized *Hyparpadites* with compressed, rather involute conch. The whorl-section is high oval. The umbilical margin is steep. The flanks are very gently convex and meet at a well-developed ventrolateral shoulder with the fastigate venter bearing a moderately high keel. The flanks are ornamented with rather weak ribs and nodes. The slightly prorsiradiate and projected primary ribs are of equal strength through the flank. Their number is around 12 on a half-whorl. Bifurcation and insertion of secondary ribs occur irregularly. There are four rows of nodes. Each primary rib starts with well-developed nodes at the umbilical margin. The first row of lateral nodes is in the inner third of the flank. The second row of lateral nodes runs at around the outer third of the flank. The ventrolateral margin is marked by prominent, somewhat projected nodes developing at the ends of the ribs; their number is 18 to 24 on a half-whorl. The ornamentation seems to become coarser on the body chamber than on the phragmocone.

Suture lines are ceratitic, showing at least three, entire lateral saddles. The first lateral lobe is extremely deep, with rather strong denticulation; the third lateral lobe shows flat bottom with weak denticles (Figure 43).

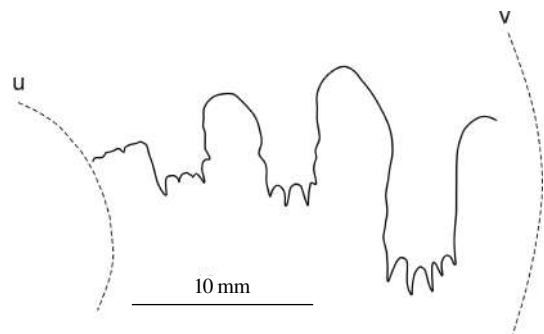


Figure 43. Suture line of *Hyparpadites szaboi* n. sp., Holotype, PAL 2017.25.1., at 27 mm whorl-height, Vászoly, P–XVII, loose, Reitzi Zone, Liepoldti Subzone (?), u: umbilical margin, v: ventrolateral margin

Remarks

H. szaboi stands very close to *H. liepoldti*; it differs from the type species first of all by the position of the lateral rows of nodes. In *H. szaboi* they are at the inner and outer third of the flank, whereas in *H. liepoldti* both rows are close to the umbilicus, in the inner half of the flank. In addition, *H. szaboi* has a lower keel and its suture is different.

The type specimen of *H. szaboi* was illustrated previously by KOVÁCS et al. (1990, pl. 3, fig. 2.) under the name *Parakellnerites* sp. nov. 2.

The author had the opportunity to study the specimens labelled as “*Kellnerites bagolinensis*” in the PIMUZ, Zürich, described by BRACK & RIEBER (1993, p. 470, pl. 6, figs 1–3, 9). The type series is believed heterogeneous: only the holotype (l. c., pl. 6, figs 1, 2) may be considered the true *bagolinensis* (included to *Epikellnerites* n. gen. in the present monograph). Other two specimens (l. c., pl. 6, figs 3, 9) show prorsiradiate, partly sinuous ribbing and less distinct nodosity; features definitely different from the typical *bagolinensis* and very similar to *H. szaboi*. They are listed with question mark in the present synonymy. A further specimen (inventory number: PIMUZ 7064), labelled also as *bagolinensis* by BRACK & RIEBER, is in fact a typical *H. liepoldti*, discussed and figured above (Figure 42).

Distribution

H. szaboi is known only from the Balaton Highland, where it ranges from the Illyrian Felsőeoersensis Subzone to the Liepoldti Subzone.

Genus **Parakellnerites** RIEBER, 1973

Type species: *Parakellnerites frauenfelderi* RIEBER, 1973

Parakellnerites frauenfelderi RIEBER, 1973

Plate XI: 5, 7–12; Figures 44, 45.

v * 1973 *Parakellnerites frauenfelderi frauenfelderi* ssp. n. — RIEBER, Grenzbitumenzone, p. 20, pl. 1, figs 1–13, Text-figs 6a–g.

v 1998 “*Stoppaniceras*” ex gr. *ellipticum* (HAUER, 1887) — VÖRÖS, Balaton-felvidék, p. 35, 38 (partim).

Material

14 specimens of various state of preservation, from Szentkirályszabadja (6), Vászoly (3) and Mencshely (5).

Measurements

	D	WH	WW	U
T 2017.2.1.	68.4	32.2	20.2	17.1
T 2017.1.1.	21.6	9.2	7.8	7.1
INV 2017.181.1.	44.5	17.8	14.4	13.1
INV 2017.183.1.	38.1	19.1	14.5	?
INV 2017.184.1.	35.5	13.5	9.7	?
INV 2017.185.1.	~29.8	?	?	?
INV 2017.182.1.	27.8	11.2	9.5	8.5

Description

Small to medium-sized *Parakellnerites* with moderately involute, compressed conch. The whorl-section is high oval to subtrapezoidal. The umbilical wall is subrounded to oblique. The flanks are gently convex and meet the arched venter at a blunt ventrolateral margin. The venter is roof-shaped with a definite keel. The ornamentation consists of rather strong, slightly prorsiradiate, almost straight ribs and nodes. The number of the ribs (8 to 12 on a half whorl) increases by insertion of secondary ribs at around the half of the flank; bifurcation is rare. There are three rows of nodes. Each primary rib starts with strong nodes at the umbilical margin, bears a prominent node at about the inner two-fifth of the flank and ends with a strong, adorally projected node at the ventrolateral margin. There are similar, strong nodes on the ventrolateral ends of the secondary ribs. The number of the ventrolateral nodes is 16 to 18 on a half-whorl. The ornamentation is somewhat coarser and shows more widely spaced ribs on the body chamber than on the phragmocone.

The suture line (Figure 45) is ceratitic with three narrow and high lateral saddles with minute incision at their base. The first lateral lobe is very deep and strongly denticulated; the second and third lateral lobes are gradually reduced in all respects.

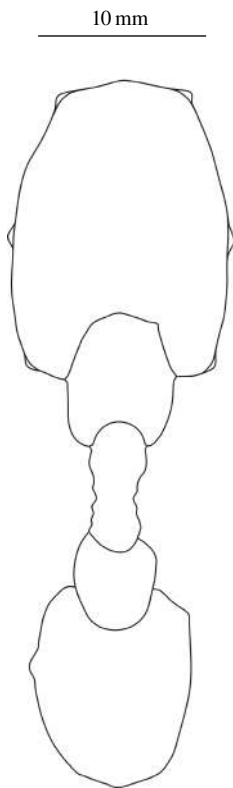


Figure 44. Cross section of *Parakellnerites frauenfelderi* RIEBER, 1973, INV 2017.292.1., Szentkirályszabadja, Bed 14, Reitzi Zone, Felsőeoersensis or Liepoldti Subzone

Remarks

When introduced the genus *Parakellnerites*, RIEBER (1973, p. 17) designated *P. frauenfelderi* as the type species and the nominate subspecies *P. frauenfelderi frauenfelderi* as the type subspecies. From among the five subspecies of *P. frauenfelderi*, introduced by RIEBER (1973), *P. f. frauenfelderi* was based on the holotype of the species. The holotype was checked by the present author in the collection PIMUZ, Zürich, and it was confirmed that the respective specimens from the Balaton Highland show the greatest similarity to this subspecies of *P. frauenfelderi*.

P. frauenfelderi seems to be different from other species of *Parakellnerites* by its rather coarse ornamentation both in ribbing and in nodosity, somewhat reminding the ornamentation of *Paraceratites*. From this point of view, *Parakellnerites meriani* RIEBER, 1973 is similar, but it has narrower and definitely carinate whorls. Moreover, in typical cases, the umbilical wall of *P. frauenfelderi* is oblique.

In a previous work (VÖRÖS 1998, l. c.) some specimens, which are now regarded as *P. frauenfelderi*, were cited tentatively under the name “*Stoppaniceras*” ex gr. *ellipticum* (HAUER, 1887).

Distribution

P. frauenfelderi was described from the Southern Alps, from the lower part of the “Grenzbitumenzone”, corresponding to the Avisianum Subzone. At the Balaton Highland it ranges from the Illyrian Liepoldti Subzone to the Avisianum Subzone.

Parakellnerites boeckhi (ROTH, 1871)

Plate XII: 1–6; Plate XIII: 1–3; Figures 46–48.

- v * 1871 “*Ceratites Böckhi*” n. sp. — ROTH, Forráshegy, p. 213.
- v 1874 *Ceratites Böckhi* ROTH — BÖCKH, Südlichen Theiles des Bakony II, p. 175, pl. IV, fig. 13.
- v 1882 *Ceratites Boeckhi* ROTH — MOJSISOVICS, Mediterr. Triasprovinz, p. 37, pl. IX, fig. 8.
- v ? 1986 “*Ceratites*” *Böckhi* ROTH 1871 — BRACK & RIEBER, Lower Buchenstein beds, p. 203, pl. 4, fig. 5.
- v 1989 *Parakellnerites* cf. *boeckhi* (ROTH, 1871) — VÖRÖS & PÁLFY, Vászoly, p. 21.
- ? 1995 *Parakellnerites boeckhi* (ROTH, 1871) — DE ZANCHE et al., Dolomites, p. 146, pl. III, fig. 6.
- v 1998 *Parakellnerites boeckhi* (ROTH, 1871) — VÖRÖS, Balaton-felvidék, p. 20, 59, pl. III, fig. 4, pl. V, fig. 4.
- v 2002 *Parakellnerites boeckhi* (ROTH) — VÖRÖS, Paleoenvironmental distribution, p. 486, pl. 1, fig. 5

Material

22 specimens of various state of preservation, from Felsőörs (3), Szentkirályszabadja (1), Vászoly (7) Mencshely (3), Sóly (6) and Balatoncsicsó (2).

Measurements

	D	WH	WW	U
Holotype T.681.	57.7	23.8	?	11.9
T 2017.4.1.	90.2	42.7	26.6	18.1
T 2017.5.1.	88.2	40.6	25.4	18.8
T 2017.6.1.	83.5	40.5	21.8	18.9
T 2017.3.1.	79.9	40.1	22.9	15.7

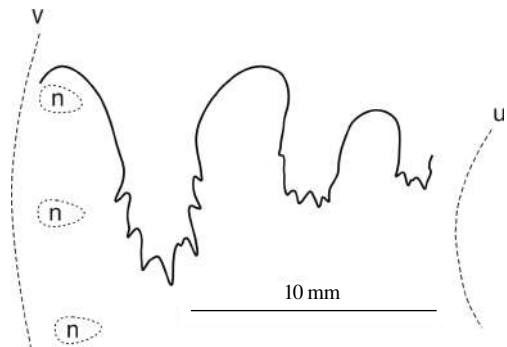


Figure 45. Suture line of *Parakellnerites frauenfelderi* RIEBER, 1973, INV 2017.183.1., at 17 mm whorl-height, Mencshely I, Bed 9, Reitzi Zone, Reitzi Subzone, u: umbilical margin, v: ventrolateral margin, n: position of nodes

	D	WH	WW	U
M.98.28	77.1	35.8	21.7	14.1
INV 2017.186.1.	70.8	31.1	18.8	11.8
M.98.31A	43.4	19.6	~10.1	11.6
M.98.31B	38.5	18.5	?	9.3

Description

Medium to large-sized *Parakellnerites* with moderately involute, compressed conch. The whorl-section is high oval. The umbilical wall is subrounded to vertical. The flanks are gently convex and meet the arched venter at a blunt ventrolateral margin. The venter is roof-shaped with a rather high keel. The ornamentation consists of rather strong, prorsiradiate, slightly sinuous ribs and nodes. The ribs are stronger and prorsiradiate in the inner half of the whorl, then become weaker and nearly rectiradiate towards the venter. The number of the ribs (8 to 10 on a half whorl) increases by insertion of secondary ribs at around the outer third of the flank; vague bifurcations appear also. There are three rows of nodes. Each primary rib starts with strong and projected nodes at the umbilical margin, bears a prominent node at about the inner third of the flank and ends with a strong, adorally projected, pointed node at the ventrolateral margin. There are similar, strong nodes on the ventrolateral ends of the secondary ribs. The number of the ventrolateral nodes is 18 to 20 on a half-whorl. The ornamentation becomes weaker on the body chamber.

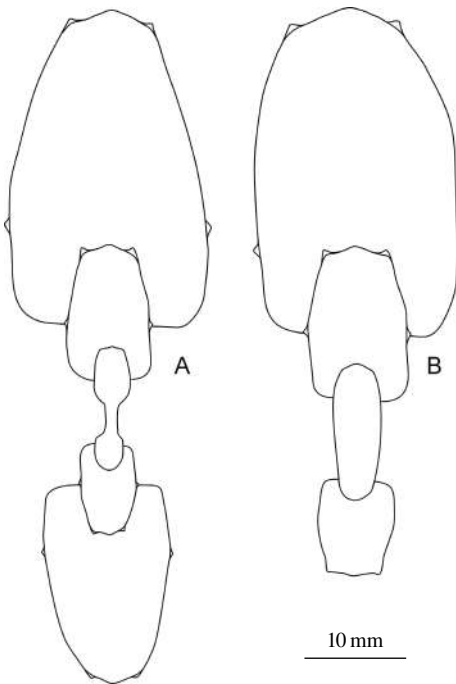


Figure 46. Cross sections of *Parakellnerites boeckhi* (ROTH, 1871), A: T 2017.6.1., Vászoly, P-11c, loose, Reitzi Zone, Reitzi Subzone (?); B: INV 2017.293.1., Mentshely I, Bed 8 (?), Reitzi Zone, Reitzi Subzone (?)

The suture line of the holotype (Figure 47) is ceratitic, tending to be sub-ammonitic, with four rather high lateral saddles with incisions at their sides. The first lateral lobe is very deep and strongly denticulated; the second and third lateral lobes are gradually reduced in all respects. Another specimen (Figure 48) shows a typical ceratitic (penultimate) suture with three entire lateral saddles; the first lateral lobe is deeply denticulated, the third lateral lobe is noticeably bifid.

The suture line of the holotype (Figure 47) is ceratitic, tending to be sub-ammonitic, with four rather high lateral saddles with incisions at their sides. The first lateral lobe is very deep and strongly denticulated; the second and third lateral lobes are gradually reduced in all respects. Another specimen (Figure 48) shows a typical ceratitic (penultimate) suture with three entire lateral saddles; the first lateral lobe is deeply denticulated, the third lateral lobe is noticeably bifid.

Remarks

ROTH (1871, l. c.) gave a proper description of *P. boeckhi*, regrettably only in Hungarian, notwithstanding, species name remained available. After BÖCKH (1874, l. c.) who gave a rather artistic but misleading figure; the first, more or less correct illustration of *P. boeckhi* was given by MOJISOVICS (1882, pl. IX, fig. 8.). The species was based on a single specimen, now kept in the collection of the MGSZ (inventory number: T.689.) which is the holotype by monotypy and re-figured here (Plate XII: 1).

The copious new material from the Balaton Highland helps to portray a

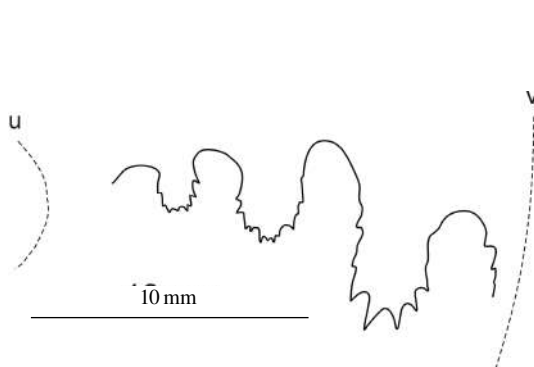


Figure 47. Suture line of *Parakellnerites boeckhi* (ROTH, 1871), (Holotype, T.681.), at 18 mm whorl-height, Felsőörs, loose, Reitzi Zone, Reitzi Subzone (?), u: umbilical margin, v: ventrolateral margin

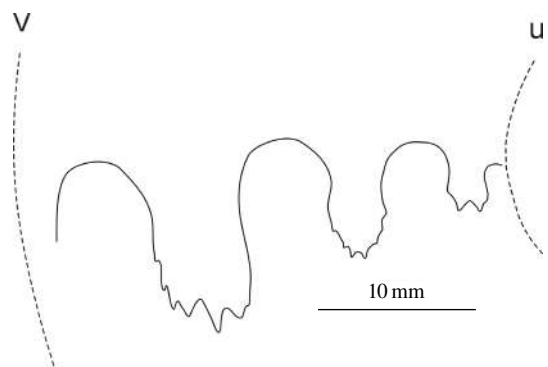


Figure 48. Suture line of *Parakellnerites boeckhi* (ROTH, 1871), INV 2017.293.1., at 29 mm whorl-height, Mentshely I, Bed 8 (?), Reitzi Zone, Reitzi Subzone (?), u: umbilical margin, v: ventrolateral margin

reliable picture of the species. *P. boeckhi* differs from other species of *Parakellnerites* by its characteristic lateral ornamentation, with initially prorsiradiate ribs turning rectiradiate in the outer half of the flank.

The specimen figured as “*Ceratites*” *Böckhi* ROTH 1871 by BRACK & RIEBER (1986, pl. 4, fig. 5.) was checked in the collection PIMUZ, Zürich; this rather incomplete specimen seems to belong here. DE ZANCHE et al. 1995, pl. III, fig. 6.) figured a very similar specimen under the name *P. boeckhi*; it is also a probable representative of this species.

Distribution

P. boeckhi was described, besides the Balaton Highland, from the upper Anisian of the Southern Alps. At the Balaton Highland it ranges from the Illyrian Liepoldti Subzone to the Avisianum Subzone.

Parakellnerites hungaricus (MOJSISOVICS, 1882)

Plate XIV: 5–8; Plate XV: 1; Figure 49.

v 1882 *Ceratites hungaricus* E. v. MOJSISOVICS — MOJSISOVICS, *Mediterr. Triasprovinz*, p. 35 (partim), pl. XXX, fig. 21 (only).

? 1912 *Ceratites hungaricus* MOJS. — AIRAGHI, *Besano*, p. 21, pl. III, fig. 4.

v 1993 *Parakellnerites ? hungaricus* — VÖRÖS, *Reitzi Zone*, p. 25 (partim), pl. VI, fig. 1. (non fig. 2).

v 1993 *Parakellnerites ? hungaricus* — GAETANI (ed.), *Anisian/Ladinian boundary field workshop*, p. 118 (partim), pl. 13, fig. 9 (non fig. 10).

v 1998 *Parakellnerites* sp., aff. *hungaricus* (MOJSISOVICS, 1880) — VÖRÖS, *Balaton-felvidék*, p. 20, 29, 59.

Material

Four specimens of various state of preservation, from Felsőörs (2), Vászoly (1) and MENCHSELY (1).

Measurements

	D	WH	WW	U
Lectotype T.828.	71.1	25.1	?	21.9
INV 2017.289.1.	67.8	30.7	18.7	16.5
M.89.75	57.6	23.6	?	19.1
INV 2017.288.1.	32.3	14.1	9.2	?
INV 2017.287.1.	30.1	14.5	10.6	7.8

Description

Small to medium-sized *Parakellnerites* with moderately involute, compressed conch. The whorl-section is high oval. The umbilical wall is subrounded to vertical. The flanks are gently convex and meet the venter at a distinct ventrolateral margin. The venter is fastigate. The ornamentation consists of nearly rectiradiate, somewhat projected ribs and nodes. The number of the ribs (around 10 on a half whorl) increases by insertion of secondary ribs at around the middle of the flank; bifurcations were not observed. The ribs become wider and lower towards the venter. There are three rows of nodes. Each primary rib starts with strong nodes at the umbilical margin, bears a prominent, mostly pointed node at about the inner third of the flank and ends with a strong, somewhat projected node at the ventrolateral margin. There are similar, strong nodes on the ventrolateral ends of the secondary ribs. The number of the ventrolateral nodes is 16 to 20 on a half-whorl. The ornamentation tends to be coarser on the body chamber.

The suture line (Figure 49) is ceratitic, with entire lateral saddles; The first lateral lobe is very deep and strongly denticulated; the second and third lateral lobes are gradually reduced in all respects.

Remarks

The name and concept of the species “*Ceratites hungaricus*” MOJSISOVICS, 1882 posed a complex nomenclatorial and taxonomic problem. It was recognised that the four specimens figured under the name *hungaricus* by MOJSISOVICS (1882, pl. XXX, figs 17, 18, 19, 21) represented a heterogeneous series (RIEBER 1973, BALINI 1992b). The original specimens figured by MOJSISOVICS (housed in the collection of the MGSH under the inventory numbers T.698., T.699., T.828. and T.1666.) were studied by the present author, and the morphological heterogeneity of the type series was confirmed. The largest and most complete specimen (T.828., pl. XXX, fig. 21 in MOJSISOVICS 1882)

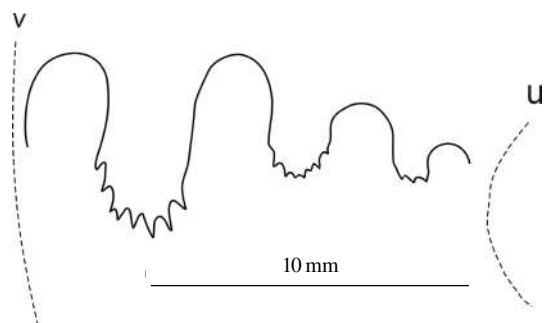


Figure 49. Suture line of *Parakellnerites hungaricus* (MOJSISOVICS, 1882), INV 2017.188.1., at 14 mm whorl-height, Felsőörs, Bed 111/F, Reitzi Zone, Avisianum Subzone, u: umbilical margin, v: ventrolateral margin

was designated by RIEBER (1973, p. 33, in the discussion of *P. meriani*) as the lectotype of the species *hungaricus* (now *Parakellnerites hungaricus*). Other two specimens (T.699., T.698., pl. XXX, figs 17 and 18, respectively, in MOJSISOVICS 1882) will be described as two other, partly new, species of *Parakellnerites* (later in this monograph). The fourth specimen (T.1666., pl. XXX, fig. 19 in MOJSISOVICS 1882) belongs to the genus *Lardaroceras* and is regarded as a proper representative of *L. pseudohungaricum* BALINI, 1992.

The specimen, figured as “*Ceratites hungaricus*” by AIRAGHI (1912, l. c.) may tentatively attributed to this species, although its ornamentation is much coarser.

In previous works (VÖRÖS 1993, 1998, l. c.) the species *P. hungaricus* was interpreted in a wider sense, including some forms which are now, in the present monograph, attributed to *P. stuerzenbaumi* n. sp.

The species name *hungaricus* appeared first in MOJSISOVICS (1880, p. 699), but only in faunal list therefore it remained *nomen nudum* until MOJSISOVICS (1882) gave the valid description.

Distribution

Up to now, *P. hungaricus* was recorded only from the Balaton Highland, where it occurs in the Illyrian Reitzi and Avisianum Subzones and probably in the Crassus Subzone.

Parakellnerites stuerzenbaumi n. sp.

Plate XIII: 4–6; Plate XIV: 1–4

v * 1882 *Ceratites hungaricus* E. v. MOJSISOVICS — MOJSISOVICS, Mediterr. Triasprovinz, p. 35 (partim), pl. XXX, figs 17 (only).

? 1963 *Semiornites hungaricus* (MOJSISOVICS) 1882 — ASSERETO, Val Camonica, p. 41, pl. II, figs 6, 7.

v 1989 *Parakellnerites* cf. *meriani* RIEBER, 1973 — VÖRÖS & PÁLFY, Vászoly, p. 19, pl. II, fig. 3.

v 1989 *Parakellnerites* cf. *hungaricus* (MOJSISOVICS, 1882) — VÖRÖS & PÁLFY, Vászoly, p. 21.

v 1993 *Parakellnerites* ? *hungaricus* — VÖRÖS, Reitzi Zone, p. 25, pl. VI, fig. 2. (non fig. 1).

v 1993 *Parakellnerites* ? *hungaricus* — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 118, pl. 13, fig. 10.

v 1998 *Parakellnerites hungaricus* (MOJSISOVICS, 1880) — VÖRÖS, Balaton-felvidék, p. 20, 31, 42, 59.

Holotype: Hungarian Natural History Museum (Budapest), inventory number: PAL 2017.30.1.

Locus typicus: Vászoly, Trench P–14, loose.

Stratum typicum: Yellow limestone (Vászoly Formation); upper Illyrian, Secedensis Zone, Crassus Subzone.

Derivatio nominis: After the name of József STÜRZENBAUM, renowned Hungarian geologist of the 19th century, who collected one of the paratypes.

Diagnosis: Medium to large, rather involute *Parakellnerites* with high oval whorls and nearly flat umbilical wall. Venter narrow, sharply fastigate. Ribs indistinct, rectiradiate. Three rows of prominent nodes. Distinct, pointed lateral nodes at the middle of the flank, forming spiral chain. Ventrolateral nodes pointed. Suture ceratitic; four lateral saddles, first lateral lobe deep.

Material

30 specimens of various state of preservation, from Felsőörs (14), Szentkirályszabadja (1), Vászoly (3), Mencshely (10), Sóly (1) and Balatoncsicsó (1).

Measurements

	D	WH	WW	U
Holotype PAL 2017.30.1.	96.9	42.5	22.4	20.3
Paratype T.699.	59.3	31.6	16.5	?
Paratype M.89.83	62.8	31.7	16.5	11.6
Paratype M.89.86	93.5	39.3	?	~18.3
Paratype PAL 2017.29.1.	~75.8	38.1	18.2	?
Paratype PAL 2017.31.1.	75.4	29.8	?	?
Paratype PAL 2017.28.1.	~70.1	40.4	20.8	?

Description

Medium to large *Parakellnerites* with rather involute, compressed conch. The whorl-section is high oval. The umbilical wall is oblique to vertical. The flanks are gently convex, almost flat and meet the venter at a distinct ventrolateral margin.

The venter is sharply fastigate. The ornamentation consists of very weak, indistinct, rectiradiate, ribs and nodes. The ribs are better visible in the inner half of the whorl, then usually fade out towards the venter. The number of the ribs (around 10 on a half whorl) seems to increase by vague insertion of secondary ribs. There are three rows of nodes. Each primary rib starts with weak nodes at the umbilical margin and ends with a strong, pointed node at the ventrolateral margin. There are similar, strong nodes (around 20 on a half-whorl) on the ventrolateral ends of the secondary ribs. The fastigate venter shows fine, projected growth rugae approaching diagonally to the keel from both sides. The lateral row of prominent, pointed nodes runs at about middle of the flank and does not seem to be strictly connected to the ribs. Their number varies between 8 to 12 on a half whorl.

The suture line is poorly seen; ceratitic, with four lateral saddles and a deep, denticulated first lateral lobe.

Remarks

One of the paratypes of *P. stuerzenbaumi* was included to the description of “*Ceratites hungaricus*” by MOJŠISOVICS (1882, l. c.). This specimen is kept in the collection of the MGSZ under the inventory number T.699. and is re-figured here (Plate XIII: 4). The original specimens, figured by MOJŠISOVICS as “*Ceratites hungaricus*”, were studied by the present author, and the morphological heterogeneity of the type series was confirmed. The largest and most complete specimen (T.828., pl. XXX, fig. 21 in MOJŠISOVICS 1882) was previously designated by RIEBER (1973, p. 33) as the lectotype of the species *P. hungaricus*. One specimen (T.1666., pl. XXX, fig. 19 in MOJŠISOVICS 1882) belongs to *Lardaroceras* and is regarded here as a proper representative of *L. pseudohungaricum* BALINI, 1992. Other two specimens, figured by MOJŠISOVICS (1882) represent two other species of *Parakellnerites*, and one of these (T.699., pl. XXX, figs 17 in MOJŠISOVICS 1882) is here selected as one of the paratypes of *P. stuerzenbaumi*.

P. stuerzenbaumi differs from other species of *Parakellnerites* first of all by its very weak, almost invisible ribbing and the distinct row of pointed lateral nodes at the mid-flank.

The specimens figured as “*Semiornites hungaricus*” from Contrada Gobbia by ASSERETO (1963, l. c.) belong probably to *P. stuerzenbaumi*; as it can be judged from the rather poor photographs, they are especially similar to our variants with smaller number of lateral nodes (e.g. Plate XIII: 5 and Plate XIV: 3).

In our earlier work (VÖRÖS & PÁLFY 1989, p. 19, pl. II, fig. 3) one specimen of *P. stuerzenbaumi* was wrongly identified as *Parakellnerites cf. meriani*.

In some other previous papers (VÖRÖS & PÁLFY 1989, p. 21, VÖRÖS 1993, 1998, l. c.) the species *P. hungaricus* was interpreted in a wider sense, including some forms which are now, in the present monograph, attributed to *P. stuerzenbaumi* n. sp.

Distribution

P. stuerzenbaumi was described from the upper Anisian of the Balaton Highland and probably the Southern Alps. At the Balaton Highland it ranges from the Illyrian Reitzzi Subzone to the Crassus Subzone.

Parakellnerites aff. *hungaricus* (MOJŠISOVICS, 1882)

Plate XV: 2–4

v 1882 *Ceratites hungaricus* E. v. MOJŠISOVICS — MOJŠISOVICS, Mediterr. Triasprovinz, p. 35 (partim), pl. XXX, fig. 18 (only).

v 1998 *Parakellnerites ? hungaricus* (MOJŠISOVICS, 1880) — VÖRÖS, Balaton-felvidék, p. 38.

Material

Four specimens of various state of preservation, from Felsőörs (1) and Mencišhely (3).

Measurements

	D	WH	WW	U
T.698.	66.1	26.9	?	?
INV 2017.191.1.	~76.1	~27.5	?	21.5
INV 2017.190.1.	53.8	25.1	13.1	10.9

Description

Small to medium-sized *Parakellnerites* with rather involute, compressed conch. The whorl-section is high oval. The umbilical wall is oblique to vertical. The flanks are gently convex and meet the venter at a distinct ventrolateral margin. The venter is fastigate with a definite keel. The ornamentation consists of nearly rectiradiate, somewhat projected ribs of various strength, and nodes. The number of the ribs (8 to 10 on a half whorl) increases by insertion of secondary ribs at around the

middle of the flank; bifurcations were not observed. There are three rows of nodes. Each primary rib starts with very strong nodes at the umbilical margin, bears a prominent, mostly pointed node at about the middle of the flank and ends with an extremely strong, pointed and projected node at the ventrolateral margin. There are similar, strong nodes on the ventrolateral ends of the secondary ribs. The number of the ventrolateral nodes is around 16 on a half-whorl. The ornamentation tends to be coarser on the body chamber.

The suture line is poorly seen; ceratitic to subammonitic, with partially denticulated first lateral saddle and very deep first lateral lobe.

Remarks

One specimen of this taxon was included into the description of “*Ceratites hungaricus*” by MOJSISOVICS (1882, l. c., pl. XXX, fig. 18). This specimen is kept in the collection of the MGSZ under the inventory number T.698. and is re-figured here (Plate XV: 2). This specimen, together with the newly collected ones from the Balaton Highland, belongs to a distinct morphological group standing between *P. hungaricus* (MOJSISOVICS, 1882) and *P. stuerzenbaumi* n. sp. The position of the lateral row of nodes at the mid-flank reminds the latter species, whereas the style of ribbing is akin to *P. hungaricus*, therefore the name *P. aff. hungaricus* is applied to it in the present monograph. It is different from the related species of *Parakellnerites* by the very strong, pointed and widely spaced ventrolateral nodes.

In a previous paper of the present author (VÖRÖS 1998) the species *P. hungaricus* was interpreted in a wider sense, including some forms which are here attributed to *P. aff. hungaricus*.

Distribution

Up to now this taxon is known only from the Balaton Highland, where it occurs in the Illyrian Avisianum Subzone.

Parakellnerites cf. rothpletzi (SALOMON, 1895)

Plate XV: 5–8; Figures 50, 51.

- v * 1895 *Balatonites rothpletzi* nov. sp. — SALOMON, Marmolata, p. 199, pl. VI, fig. 12.
 1921 *Hungarites Waageni* MOJSISOVICS sensu lato — BUBNOFF, Forno, p. 456 (partim), pl. XII, fig. 7 (only).
 v ? 1973 *Parakellnerites* ? sp. indet. b — RIEBER, Grenzbitumenzone, p. 34, pl. 5, figs 9, 10, Text-fig. 10d.
 v 1993 *Parakellnerites rothpletzi* (SALOMON, 1895) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 466, pl. 4, figs 1–17, text-fig. 15h.
 v 1993 *Parakellnerites rothpletzi* (SALOMON, 1895) — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 66, pl. 6, fig. 10.
 v 1998 *Parakellnerites rothpletzi* (SALOMON, 1895) — VÖRÖS, Balaton-felvidék, p. 37, 50.
 v non 1998 *Parakellnerites rothpletzi* (SALOMON, 1895) — VÖRÖS, Balaton-felvidék, p. 42, pl. V, figs 1–3.
 2005 *Parakellnerites rothpletzi* (SALOMON, 1895) — MANFRIN et al., Latemar, p. 495, figs 9/29–34.

Material

32 specimens of various state of preservation, from Felsőörs (1), Szentkirályszabadja (5), Mencshely (4), Sóly (20), Litér (1) and Balatoncsicsó (1).

Measurements

	D	WH	WW	U
INV 2017.195.1.	66.5	~32.5	16.1	?
INV 2017.193.1.	~63.1	~29.0	15.1	~11.0
INV 2017.194.1.	44.8	22.2	12.1	8.2
INV 2017.192.1.	~37.1	19.3	9.2	?

Description

Small to medium-sized *Parakellnerites* with rather involute, compressed conch. The whorl-section is high oval. The umbilical wall is oblique to vertical. The flanks are gently convex, almost flat and meet the venter at a distinct ventrolateral margin. The venter is fastigate. The ornamentation consists of very weak, prorsiradiate and projected ribs and weak nodes. The number of the ribs (12 to 14 on a half whorl) seems to increase by vague insertion of secondary ribs. There are three rows of nodes. Each primary rib starts with a definite node at the umbilical margin, bears indistinct node or swelling at the inner third of the flank, and ends with a rather strong, projected node at the ventrolateral margin. There are similar, strong nodes on the ventrolateral ends of the secondary ribs. The number of ventrolateral nodes varies between 20 and 30 on a half-whorl, altogether. The projected part of the ventrolateral nodes runs up to the fastigate ven-

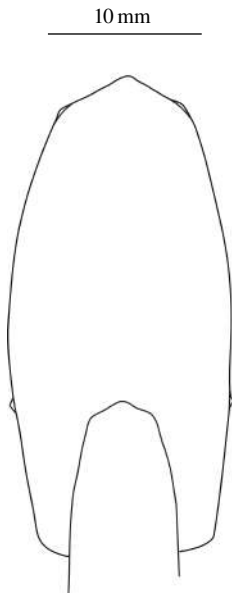


Figure 50. Cross section of *Parakellnerites* cf. *rothpletzi* (SALOMON, 1895), INV 2017.195.1., Mencshely I, Bed 3, Reitzi Zone, Avisianum Subzone

ter in the form of fine, diagonal growth rugae. This description of the ornamentation fits only to the phragmocone; on the body chamber the ornamentation gradually fades out, except the projected ventrolateral nodes.

The suture line (Figure 51) is ceratitic, tending to be subammonitic, with three rather high lateral saddles with incisions at their sides. The first lateral lobe is very deep and strongly denticulated; the second and third lateral lobes are gradually reduced in all respects. On another, larger specimen (Plate XV: 7) a more typical ceratitic (penultimate) suture is partially seen, with four entire lateral saddles; from among these the third is very wide.

Remarks

The original specimen of *P. rothpletzi*, designated here as lectotype, was inspected by the present author in the BSM (München); the figure given by SALOMON (1895, pl. VI, fig. 12.) corresponds almost perfectly to the type specimen. A plaster cast of the lectotype is figured here (Figure 52). It shows a fastigate venter with projected nodes, the weak ornamentation of the flanks, diagnostically fading out on the body chamber. The latter feature is especially decisive in distinguishing *P. rothpletzi* from other species of *Parakellnerites*. On the basis of the above mentioned fundamental characters, the identification of our moderately preserved specimens from the Balaton Highland seems to be ascertained.

BUBNOFF (1921, pl. XII, fig. 6, 7) figured two specimens under the name “*Hungarites Waageni*”. One of these (l. c. pl. XII, fig. 7) seems rather close to *P. rothpletzi* [in the explanation to plate XII (p. 620) this specimen was named “*Hungarites Waageni* MOJS. var. form. *rothpletzi* SALOMON”]. The other specimen (l. c. pl. XII, fig. 6) does not belong to *rothpletzi* and appears to be very similar to *Parakellnerites variegostatus* (REIS, 1901).

The specimens figured as “*Parakellnerites* ? sp. indet. b” by RIEBER (1973, l. c.) are probably belong to *P. rothpletzi*; one of the specimens figured by RIEBER (1973, pl. 5, fig. 10) is especially similar to one of ours shown here on Plate XV: 8.

BRACK & RIEBER (1993, l. c., and also in GAETANI 1993, l. c.) described and illustrated numerous specimens of *P. rothpletzi*. This copious material, collected from one locality at the Latemar Mountain, portrays the range of variation of the species. They were inspected by the present author in the collection PIMUZ, Zürich, and the homogeneity of the assemblage was ascertained. Yet, it is remarkable, that the majority of the Latemar specimens has much stronger ornamentation, even on the body chamber, than the lectotype of *P. rothpletzi* figured by SALOMON (1895).

In a previous work of the present author (VÖRÖS 1998, l. c.) the species *P. rothpletzi* was interpreted in a wider sense, including some forms (VÖRÖS 1998, pl. V, figs 1, 2) which are here attributed to *P. loczyi* (ARTHABER, 1903).

Distribution

P. rothpletzi was described from the upper Anisian of the Southern Alps and the Balaton Highland, where it ranges from the Illyrian Liepoldti Subzone to the Avisianum Subzone.

Parakellnerites aff. *rothpletzi* (SALOMON, 1895)

Plate XV: 9

v 1993 *Parakellnerites* aff. *rothpletzi* (SALOMON, 1895) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 467, pl. 4, fig. 18.

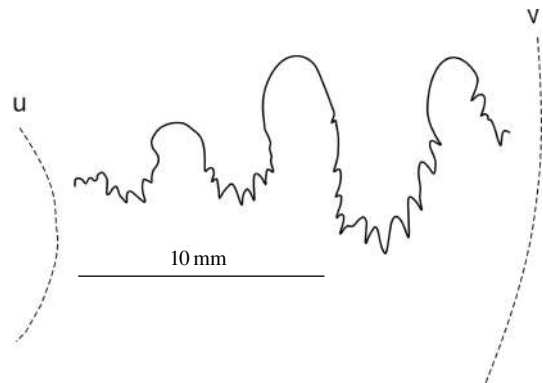


Figure 51. Suture line of *Parakellnerites* cf. *rothpletzi* (SALOMON, 1895), INV 2017.192.1., at 18 mm whorl-height, Felsöör, Bed 111/F, Reitzi Zone, Avisianum Subzone, u: umbilical margin, v: ventrolateral margin

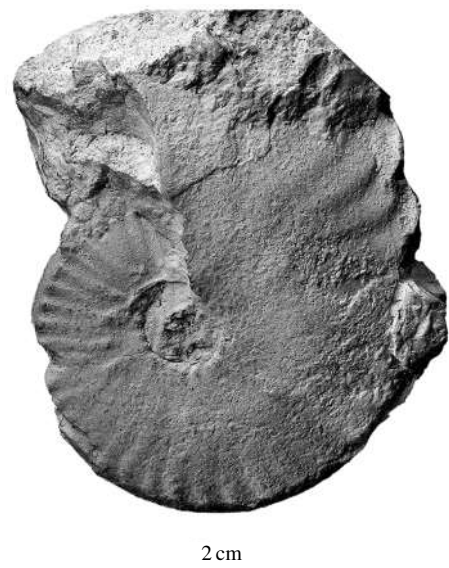


Figure 52. *Parakellnerites rothpletzi* (SALOMON, 1895), cast of the lectotype kept in the Bayerische Staatssammlung, München, figured by SALOMON (1895, pl. VI, Figure 12). By courtesy of Dr. A. NÜTZEL (München)

Material

One specimen from Vászoly.

Measurements

	D	WH	WW	U
T 2017.7.1.	60.3	28.3	15.9	18.1

Description

Medium-sized *Parakellnerites* with compressed, moderately involute conch. The whorl-section is high oval. The umbilical margin is steep to overhanging. The flanks are gently convex and meet at a well marked ventrolateral shoulder with the fastigate venter. The flanks are ornamented with moderately strong ribs and nodes. The slightly prorsiradiate, partly projected and sinuous primary ribs are usually stronger in the inner half of the flank. Their number is around 10 on a half-whorl. Bifurcation and insertion of secondary ribs occur irregularly. There are three rows of nodes. Each primary rib starts with well-developed nodes at the umbilical margin, bears a lateral node or swelling at the inner third of the flank and terminates with a projected, clavus-like node at the ventrolateral margin. The number of the ventrolateral nodes is around 18 on a half-whorl.

Suture lines are poorly seen, ceratitic.

Remarks

The single specimen from Vászoly has no proper counterpart in our material. It can only be compared to the specimen described and figured as *Parakellnerites* aff. *rothpletzi* by BRACK & RIEBER (1993, l. c.). This specimen from Seceda was checked by the present author in the collection PIMUZ, Zürich, and on the basis of the apparent similarity, the above mentioned name with open nomenclature was applied to our specimen from the Balaton Highland.

It has to be emphasised that the ornamentation of the specimens of this taxon is much stronger than that of *P. rothpletzi* (SALOMON, 1895).

Distribution

This taxon was described from the upper Anisian of the Southern Alps. At the Balaton Highland it was found in the Illyrian Crassus Subzone.

Parakellnerites loczyi (ARTHABER, 1903)

Plate XVI: 1–9

- v * 1903 *Ceratites Lóczyi* ARTH. — ARTHABER, Neue Funden Muschelkalk des südl. Bakony, Revision, p. 21, pl. I, figs 7, 8.
- v 1990 *Parakellnerites* sp. nov. 3. aff. *frauenfelderi* RIEBER — KOVÁCS et al., Balaton Upland, p. 194, pl. 3, fig. 3.
- v 1998 *Parakellnerites rothpletzi* (SALOMON, 1895) — VÖRÖS, Balaton-felvidék, p. 42, pl. V, figs 1–3.
- v 1998 *Parakellnerites loczyi* (ARTHABER, 1903) — VÖRÖS, Balaton-felvidék, p. 42, pl. V, figs 5–7.
- v 2002 *Parakellnerites loczyi* (ARTHABER) — VÖRÖS, Paleoenvironmental distribution, p. 486, pl. 1, fig. 6.
- v 2002 *Parakellnerites rothpletzi* (SALOMON) — VÖRÖS, Paleoenvironmental distribution, p. 486, pl. 1, fig. 7.

Material

13 specimens of various state of preservation, from Szentkirályszabadja (4), Vászoly (1) and Sóly (8).

Measurements

	D	WH	WW	U
Lectotype T.1259.	47.5	21.2	?	13.1
INV 2017.196.1.	69.5	31.5	17.4	14
M.98.46	56.8	27.1	13.7	12.1
M.98.42	53.1	23.5	13.1	13.1
M.98.43A	52.8	23.6	11.8	13.8
INV 2017.197.1.	51.1	23.1	14.3	11.4
M.98.88	41.1	17.2	10.1	10.8

	D	WH	WW	U
M.98.48	39.5	16.1	~9.5	~11.0
M.98.47A	28.7	11.3	~7.5	9.4

Description

Small to medium-sized *Parakellnerites* with moderately involute, strongly compressed conch. The whorl-section is very high oval. The umbilical wall is subrounded to slightly overhanging. The flanks are very gently convex and meet the venter at a definite ventrolateral margin. The venter bears a definite keel on the phragmocone and on the smaller specimens then becomes simply fastigate on the body chamber. The ornamentation consists of slightly prorsiradiate, straight ribs and nodes. The number of the ribs (8 to 10 on a half whorl) increases by irregular insertion of secondary ribs, sometimes near the umbilicus; bifurcation was not observed. The ribs are rather strong near the umbilicus and characteristically expand towards the venter, i.e. they become gradually lower and wider. Each primary rib starts with a definite node at the umbilical margin. At the ventrolateral margin the low and expanded ribs (both the primaries and the secondaries) end with strong, longitudinal clavi which, in some cases, coalesce to almost continuous chains. At the flanks, the strength of the ribbing and the nodosity increase during growth. The inner whorls of the phragmocone are ornamented only by weak ribs; nodes are usually absent. Nodes gradually appear on the phragmocone and become stronger on the body chamber; they are situated at the inner third of the flank.

The suture line is not well known; ceratitic with at least three lateral saddles and a deeply denticulated first lateral lobe, as shown by one of our specimens (Plate XVI: 9) and by the figure drawn from the lectotype by ARTHABER (1903, pl. 1, fig. 8c).

Remarks

This species was regarded as belonging to the genus *Parakellnerites* also by RIEBER (1973, p. 18). The type specimens of ARTHABER (1903, pl. I, figs 7, 8), from Hajmáskér, are kept in the collection of the MGSZ under the inventory numbers T.1259. (lectotype) and T.1647 (paralectotype). The first of them, figured as “*Ceratites Lóczyi*” by ARTHABER (1903, l. c., pl. I, fig. 8), is here designated as the lectotype, and re-figured on Plate XVI: 1. The newly collected specimens from the Balaton Highland correspond properly to the type specimens but portray a somewhat wider morphological range. The most particular features of *P. loczyi*, distinguishing it from other *Parakellnerites* species, are the straight ribs expanding and lowering towards the venter and the absence of nodes in the earlier growth stages.

KOVÁCS et al. (1990, pl. 3, fig. 3) illustrated a specimen from Vászoly as “*Parakellnerites* sp. nov. 3. aff. *frauenfelderi* RIEBER”. This ammonite was kept in the private collection of the late I. SZABÓ and was transferred to the collection of the Hungarian Natural History Museum and re-figured here (Plate XVI: 2) as *P. loczyi*.

Some specimens of *P. loczyi* were wrongly attributed to *P. rothpletzi* in a previous publication by the present author (VÖRÖS 1998, pl. V, figs 1–3).

Distribution

P. loczyi was up to now recorded only from the Balaton Highland, where it ranges from the Illyrian Liepoldti Subzone to the Avisianum Subzone.

Parakellnerites cf. *zoniansis* BRACK & RIEBER, 1993

Plate XVI: 10.

v 1993 *Parakellnerites zoniansis* n. sp. — BRACK & RIEBER, Anisian/Ladinian boundary, p. 465, pl. 3, figs 1–10, text-figs 15d–g, 16d.

Material

One specimen from Vászoly.

Measurements

	D	WH	WW	U
T 2017.8.1.	85.7	36.5	20.8	18.2

Description

Large *Parakellnerites* with moderately involute, compressed conch. The whorl-section is high oval. The umbilical wall is subrounded to vertical. The flanks are gently convex and meet the arched venter at a definite ventrolateral margin. The

venter is roof-shaped with a rather high keel. The ornamentation consists of rather weak, prorsiradiate, slightly straight ribs and nodes. The ribs are rather strong in the inner third of the flank, then weaken, but become stronger again towards the venter. The number of the ribs (about 8 on a half whorl) increases by insertion of secondary ribs at around the middle of the flank. There are three rows of nodes. Each primary rib starts with strong nodes at the umbilical margin, bears a weak node at about the middle of the flank and ends with a strong, somewhat projected and pointed node at the ventrolateral margin. There are similar, strong nodes on the ventrolateral ends of the secondary ribs. The number of the ventrolateral nodes is around 20 on a half-whorl. The row of the weak lateral nodes seems to disappear on the body chamber. Fine, projected growth rugae, approaching diagonally to the keel, are seen on the fastigate venter.

The suture lines were not seen.

Remarks

The original specimens of *P. zoniaensis*, described by BRACK & RIEBER (1993), were examined by the present author in the collection PIMUZ, Zürich, and thus the identification of the specimen from the Balaton Highland seems approved. It shares many features of the ornamentation with the larger specimens of the Punta di Zonia assemblage, first of all the fading of the ribs on the mid-flank, and the character of the venter.

BRACK & RIEBER (1993, p. 466) properly discussed the differences between *P. zoniaensis* and two closely related species: *P. hungaricus* (MOJSISOVICIS, 1882) and *P. rothpletzi* (SALOMON, 1895). A further, even more similar species, *P. stuerzenbaumi* n. sp., differs from *P. zoniaensis* by its almost completely smooth umbilical margin and by the almost total absence of lateral ribbing.

Distribution

P. zoniaensis was described from the upper Anisian of the Southern Alps. At the Balaton Highland it was found in the Illyrian Crassus Subzone.

Genus *Parahungarites* n. gen.

Type species: *Parahungarites arthaberi* (DIENER, 1899).

Diagnosis: Small to medium-sized ceratitids with rather involute conch. Whorl section high oval; umbilical margin vertical to overhanging. Venter fastigate; keel present. Rectiradiate, sinuous, projected ribs. Irregularly inserted secondaries. Typically only ventrolateral nodes; umbilical nodes may be present. Projected ventrolateral clavi are oriented diagonally but may coalesce along the ventrolateral margin. Suture ceratitic, tending to subammonitic; three lateral saddles, first lateral lobe deep with strong denticulation.

Derivatio nominis: Combined from the generic names *Parakellnerites* and *Hungarites*, indicating that the new genus morphologically stands between the two.

Nominal species belonging to *Parahungarites*:

Parahungarites arthaberi (DIENER, 1899, p. 9, pl. I, figs 1–3)

Parahungarites solyensis n. sp.

Discussion: This new genus, as its name implies, morphologically stands between the genera *Parakellnerites* and *Hungarites* (s. l.), and is believed to form a phyletic link between them. The type species, *P. arthaberi* was attributed for a long time to the genus *Hungarites*, and in fact, the fastigate/keeled venter, and the very weak lateral ornamentation supported this idea. Later, BRACK & RIEBER (1993, p. 465) pointed out that the presence of the definite ventrolateral row of nodes excludes *arthaberi* from *Hungarites* and they included this species to *Parakellnerites*. It is true that *Parahungarites arthaberi* and *solyensis* share many features of *Parakellnerites* but the absence of the lateral (and in most cases also the umbilical) nodosity opposes this attribution. On the other hand, transitional forms can be found among the *Parakellnerites* species as well. For example, *P. rothpletzi* (SALOMON, 1895) may be regarded as some kind of “connecting link”, because, in typical cases, it shows the gradual diminishing of the umbilical and lateral nodosity, reaching the stage of only faint ribbing on the body chamber. BRACK & RIEBER (1993, p. 461) also recognized that *Parakellnerites* “is no monophyletic unit” and that “The morphological gap between several representatives of *Parakellnerites* sensu lato and *Hungarites* is very small.” At the same time they called the attention to the heterogeneity of *Hungarites* and the family Hungaritidae, which can not be regarded as phylogenetic units. TOZER (1981, p. 93) included several strongly nodose genera (e.g. *Iberites* HYATT, 1900, *Gevanites* PARNES, 1975) to Hungaritidae, what also points to the heterogeneity of the family. Even earlier SPATH (1951, p. 9, 10) declared that *Hungarites* “must be polyphyletic” and represents “an assemblage of Ceratitid offshoots...”, and that “The separation of Hungaritidae from the Ceratitidae will thus always be more or less arbitrary.” SPATH (l. c.) also stated that the “Ladinian genotype of *Hungarites*, i.e. *H. mojsisovicsi* ROTH, is an endform” and “could not have given rise to a form like *H. yatesi* Hyatt & Smith, which was smooth already in the earliest Anisian. [Regrettably, this observation was not taken into account in the “Treatise” (ARKELL et al. 1957, p. L156) and the description of *Hungarites* was illustrated by a drawing of *H. yatesi*, maintaining the uncertainty.] Our hungaritid material from the Balaton Highland supports the ideas cited above, and

suggests that *Parakellnerites* (s. l.) and *Hungarites* (s. l.) are connected with transitional forms. Therefore, in the opinion of the present author, the hungaritids, at least the late Anisian hungaritids, would be better removed from the Hungaritidae and inserted to the Paraceratitidae, close to *Parakellnerites*. However, this kind of rearrangement of the systematic order is beyond the scope of this monograph.

Distribution: Late Anisian; Southern Alps, Dinarides, Balaton Highland. At the Balaton Highland *Parahungarites* ranges from the Illyrian Reitzi to Crassus Subzones.

Parahungarites arthaberi (DIENER, 1899)

Plate XVII: 1–10; Figures 53–56.

- v * 1899 *Hungarites Arthaberi* nov. sp. — DIENER, Cephalopodensuiten südl. Bakony, p. 9, pl. I, figs 1–3.
- v 1993 *Parakellnerites arthaberi* (DIENER, 1899) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 465, pl. 2, figs 10, 11, pl. 12, figs 7, 10, text-fig. 16f.
- v 1993 *Parakellnerites arthaberi* (DIENER, 1899) — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 65, pl. 6, fig. 10.
- v 1993 *Hungarites arthaberi* — VÖRÖS, Reitzi Zone, p. 27, pl. IV, fig. 3.
- v 1993 *Hungarites arthaberi* — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 117, pl. 12, fig. 10.
- v 1998 *Hungarites ? arthaberi* DIENER, 1899 — VÖRÖS, Balaton-felvidék, p. 21, 38, 42, 50, pl. III, figs 5–7, pl. IV, figs 1, 2.

Material

209 specimens of various state of preservation, from Felsőörs (3), Szentkirályszabadja (4), Vászoly (1), Mencshely (102), Sóly (85), Balatoncsicsó (10), Hajmáskér (2) and Öskü (2).

Measurements

	D	WH	WW	U
Lectotype T.310.	57.8	29.2	15.9	7.9
INV 2017.200.1.	77.1	?	18.8	?
INV 2017.203.1.	75.2	35.1	19.4	~10.5
M.87.021	73.4	31.4	18.2	12.1
M.98.227	54.7	25.6	~15.5	8.7
M.98.146	53.5	27.2	13.6	8.1
INV 2017.201.1.	52.5	28.4	13.6	8.7
M.98.68	51.1	25.4	12.1	6.4
INV 2017.198.1.	50.1	24.1	15.1	7.1
M.98.69	46.8	23.5	12.8	5.7
M.98.223A	42.1	?	~10.0	?
INV 2017.199.1.	41.1	19.6	?	7.2
M.98.147	38.1	19.5	11.1	6.8
INV 2017.202.1.	36.5	17.8	10.4	6.8

Description

Small to medium-sized *Parahungarites* with very involute, compressed conch. The whorl-section is high oval. The umbilical wall is vertical to slightly overhanging. The flanks are gently convex, almost flat and meet the venter at a blunt ventrolateral margin. The venter is fastigate, occasionally keeled. The ornamentation consists of weak, rectiradiate and sinuous ribs and weak nodes. The number of the ribs (around 10 on a half whorl) increases by inserted secondary ribs; the place of insertion varies from the periumbilical region to the outer third of the flank. Both the primaries and the secondaries are strongly projected near the ventrolateral margin. There are no umbilical and lateral nodes. The ventrolateral nodes have the form of strongly projected clavi, developed as diagonally oriented swellings on the ends of the primary and secondary ribs. The number of ventrolateral clavi varies between 20 and 24 on a half-whorl. In some cases, the ornamentation of the body chamber becomes weaker and the ribs develop into irregularly spaced, sinuous growth rugae.

The suture line (Figures 54–56) is ceratitic, tending to be subammonitic, with three high lateral saddles with occasional incisions at their sides. The first lateral lobe is very deep and strongly denticulated; the second (and the indistinct third) lateral lobe are reduced

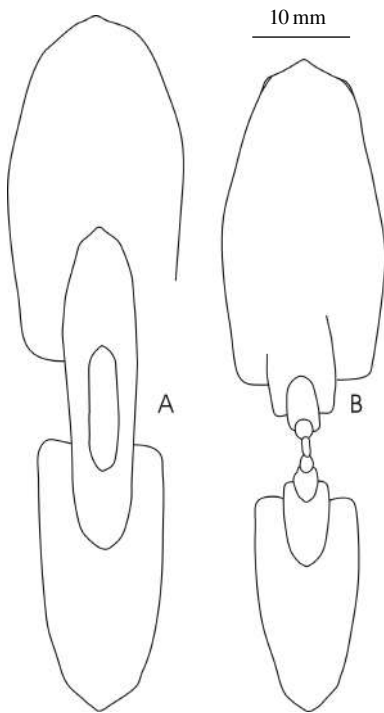


Figure 53. Cross sections of *Parahungarites arthaberi* (Diener, 1899), A: M.87.021, Balatoncsicsó, St. Balázs church ruins, loose, Reitzi Zone, Avisianum Subzone (?); B: INV 2017.294.1., Mencshely II, Bed 4, Reitzi Zone, Avisianum Subzone

ponds properly to *Parahungarites arthaberi*. The other items (BRACK & RIEBER 1993, pl. 2, figs 10, 11, pl.12, fig. 7) do not show the characteristic sinuous ribbing but, considering the wide variation range of this species, they may also belong here.

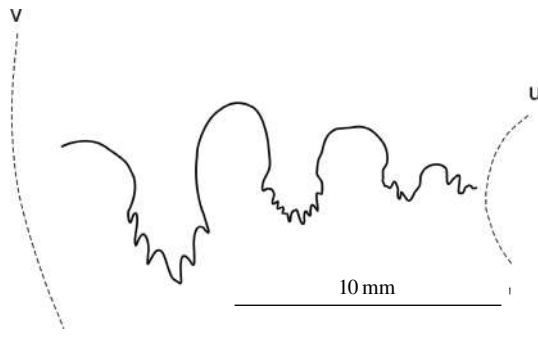


Figure 55. Suture line of *Parahungarites arthaberi* (DIENER, 1899), M.98.227, at 18 mm whorl-height, Sóly, Bed 8, Reitzi Zone, Avisianum Subzone, u: umbilical margin, v: ventrolateral margin

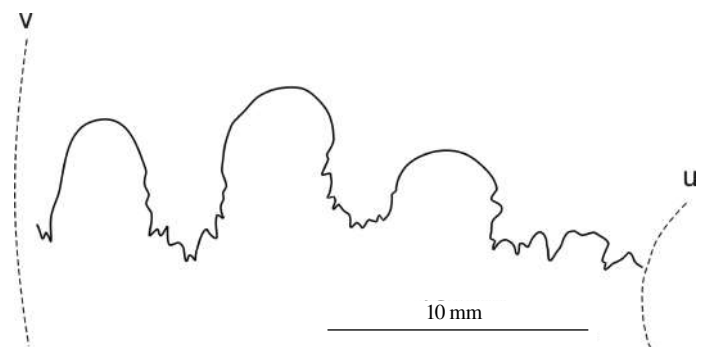


Figure 56. Suture line of *Parahungarites arthaberi* (DIENER, 1899), INV 2017.295.1., at 23 mm whorl-height, Mencshely I, Bed 5, Reitzi Zone, Avisianum Subzone, u: umbilical margin, v: ventrolateral margin

in all respects. Vague suspensive lobes are seen near the umbilical margin.

Remarks

P. arthaberi is the far most common ceratitid ammonoid found at the Balaton Highland. The original type series figured by DIENER (1899, pl. I, figs 1–3), housed in the collection of the MGSB were examined by the present author. The specimen, figured by DIENER (l. c.) on pl. I, fig. 1 (inventory number T.310.) is here designated as the lectotype of *P. arthaberi*, and the specimen figured only for its suture line by DIENER (l. c., pl. I, fig. 3; inventory number T.314.) stands close to the lectotype and is considered the paralectotype. On the other hand, the smallest specimen, figured by DIENER on pl. I, fig. 2 (inventory number T.311.) should be excluded from *P. arthaberi* and attributed to the genus *Parakellnerites* (perhaps to *P. rothpletzi*) because it has three definite rows of nodes.

P. arthaberi has typically neither umbilical, nor lateral nodes and its venter is simply fastigate without definite keel. *solyensis* n. sp. differs from *P. arthaberi* by the presence of strong nodes at the umbilical margin.

The specimens figured as “*Parakellnerites arthaberi*” by BRACK & RIEBER (1993, and also in GAETANI 1993) were checked by the present author in the collection PIMUZ, Zürich. One of them (BRACK & RIEBER 1993, pl. 12, fig. 10) corresponds properly to *Parahungarites arthaberi*. The other items (BRACK & RIEBER 1993, pl. 2, figs 10, 11, pl.12, fig. 7) do not show the characteristic sinuous ribbing but, considering the wide variation range of this species, they may also belong here.

Distribution

P. arthaberi was described from the upper Anisian of the Balaton Highland and the Southern Alps. According to the new data, at the Balaton Highland it ranges from the Illyrian Reitzi Subzone to the Crassus Subzone.

Parahungarites solyensis n. sp.

Plate XVIII: 5–9; Figure 57.

v 1896 *Ceratites lenis* n. sp. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 252 (partim), pl. VI, figs 3, 4 (only). (non figs 1, 2, 7 and 5, 6).

v 1993 *Hungarites lenis* (HAUER, 1896) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 463 (partim), pl. 2, figs 6, 7 (only).

v 1993 *Hungarites lenis* (HAUER, 1896) — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 64 (partim), pl. 4, figs 1, 2 (only).

v 1998 *Hungarites* ? sp., aff. *arthaberi* DIENER, 1899 — VÖRÖS, Balaton-felvidék, p. 42, pl. IV, fig. 3.

Holotype: Hungarian Natural History Museum (Budapest), inventory number: M.98.53.

Locus typicus: Sóly, Őr Hill, Bed 9.

Stratum typicum: Yellow to pink limestone (Vászoly Formation); upper Illyrian, Reitzi Zone, Avisianum Subzone.

Derivatio nominis: After the name of the village Sóly, near to the type locality.

Diagnosis: Small to medium-sized, rather involute *Parahungarites* with high oval whorls and vertical to overhanging umbilical wall. Venter fastigate; keel blunt. Ribs rectiradiate, sinuous, projected. Two rows of nodes. Umbilical nodes prominent. Lateral nodes absent. Ventrolateral projected clavi, tending to coalesce. Suture ceratitic; first lateral lobe deep, expanding, denticulation strong.

Material

10 specimens of various state of preservation, from Vászoly (1) and Sóly (9).

Measurements

	D	WH	WW	U
Holotype M.98.53.	65.3	30.1	14.8	11.7
Paratype M.98.208A	53.1	24.4	13.5	11.3
Paratype M.98.208B	46.5	21.5	11.1	9.3
Paratype M.98.212A	35.8	16.6	8.3	8.7
Paratype PAL 2017.32.1.	32.0	13.0	7.0	10.0

Description

Small to medium-sized *Parahungarites* with rather involute, compressed conch. The whorl-section is high oval. The umbilical wall is vertical to slightly overhanging. The flanks are gently convex, almost flat and meet the venter at a blunt ventrolateral margin. The venter is fastigate, with a blunt keel. The ornamentation consists of weak, rectiradiate and sinuous ribs and weak nodes. The number of the ribs (around 10 on a half whorl) increases by secondary ribs inserted mostly at the middle of the flank. Both the primaries and the secondaries are projected near the ventrolateral margin. The umbilical nodes are well-developed. There are no lateral nodes. The rather weak ventrolateral nodes have the form of projected clavi, developed on the ends of the primary and secondary ribs. The ventrolateral clavi tend to coalesce into an almost continuous rim which endows the venter with tricarinate appearance. In most cases, the ornamentation of the body chamber becomes weaker and the umbilical nodes seem to vanish.

The suture line (Figure 57) is ceratitic, tending to be subammonitic, with three lateral saddles with occasional incisions at their sides. The strongly denticulated first lateral lobe is very deep and expands posteriorly; the second (and the indistinct third) lateral lobe is reduced, the third lobe seems to be bifid.

Remarks

The absence of lateral nodes refer this new species to the genus *Parahungarites*. It differs from *P. arthaberi* (DIENER, 1899) by having umbilical nodes (at least on the phragmocone) and by the less prominent and less projected nature of the ventrolateral clavi.

In the present author's opinion some forms previously figured under the name "*Ceratites lenis*" by HAUER (1896, l. c.) and "*Hungarites lenis*" by BRACK & RIEBER (1993, and also in GAETANI 1993) belong to *P. solyensis* n. sp.

The type material of "*Ceratites lenis*" HAUER, 1896 was examined by the present author in the collections NHMW (Wien). The three specimens figured under the name "*lenis*" seem to represent three different taxa. The largest specimen (figured by HAUER 1896, on pl. VI, figs 1, 2 and 7 for the suture line; inventory number: NHMW 1998z0063/0007) should keep the name "*lenis*"; it was designated as the lectotype of *lenis* by SPATH (1934, p. 457, under the name "*Semiornites lenis*"). One of the other specimens (figured by HAUER 1896, on pl. VI, figs 5, 6) portrays quite different ornamentation, with definite umbilical nodes (which are almost absent in the lectotype) and bears a slightly arched venter,

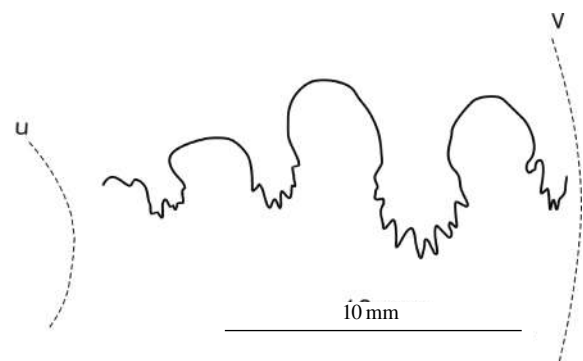


Figure 57. Suture line of *Parahungarites solyensis* n. sp., Paratype, M.98.208B, at 17 mm whorl-height, Sóly, Bed 6, Reitzi Zone, Avisianum Subzone, u: umbilical margin, v: ventrolateral margin

without any keel. The third specimen (figured by HAUER 1896, on pl. VI, figs 3, 4) differs from both the latter and the lectotype. The character of the umbilical and ventrolateral nodes, the absence of lateral nodes, and the roughly tricarinate venter, all fit well to the respective features of *P. solyensis*.

BRACK & RIEBER (1993) apparently interpreted rather widely the species "*Hungarites lenis*". Their figured specimens were examined by the present author in the collection PIMUZ, Zürich. The smaller of the two specimens (BRACK & RIEBER 1993, pl. 2, figs 6, 7; re-figured in GAETANI 1993, pl. 4, figs 1, 2) corresponds properly to the specimen figured by HAUER 1896, on pl. VI, figs 3, 4, consequently it is here regarded as belonging to *P. solyensis*.

In the previous work of the present author (VÖRÖS 1998, l. c.) a specimen (now the holotype of *P. solyensis*) was figured as *Hungarites* ? sp., aff. *arthaberi*.

Distribution

P. solyensis is known from the upper Anisian of the Dinarides and the Southern Alps. At the Balaton Highland its range is restricted to the Illyrian Avisianum Subzone.

Genus *Halilucites* DIENER, 1905

Type species: *Halilucites rusticus* (HAUER, 1896)

Halilucites rusticus (HAUER, 1896)

Plate XXIV: 13, 14; Plate XXV: 1; Figure 58.

v * 1896 *Ceratites* (*Hungarites*) *rusticus* n. sp. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 259, pl. IX, figs 1–4.

? 1913 *Ceratites* (*Halilucites*) aff. *rusticus* v. HAUER spec. — TOULA, Westbosnien, p. 655, pl. XXIII, fig. 7.

1995 *Halilucites rusticus* (HAUER, 1896) — DE ZANCHE et al., Dolomites, p. 148, pl. III, fig. 4.

v 1998 *Halilucites rusticus* (HAUER, 1896) — VÖRÖS, Balaton-felvidék, p. 31, pl. VII, fig. 2.

v 2002 *Halilucites rusticus* (HAUER) — VÖRÖS, Paleoenvironmental distribution, p. 488, pl. 2, fig. 1.

2003 *Halilucites rusticus* (HAUER, 1896) — MIETTO et al., Bagolino, p. 459, pl. 1, fig. 14, pl. 2, fig. 6.

2005 *Halilucites rusticus* (HAUER, 1896) — MANFRIN et al., Latemar, p. 496, figs 11/16, 17, 19, 20.

? 2007 *Halilucites rusticus* (HAUER, 1896) — BRACK et al., Growth and drowning, p. 334, fig. 5/10.

Material

Two specimens from Felsőörs (1) and Vászoly (1).

Measurements

	D	WH	WW	U
M.98.63	110.1	38.1	29.5	43.1
INV 2017.235.1.	39.1	17.4	13.8	?

Description

Medium to large *Halilucites* with rather evolute conch. The whorl-section is subquadrate. The umbilical wall seem to be sub-rounded to vertical. The flanks are gently convex. The ventrolateral margin is well-marked, carinate. The venter is tricarinate, with a prominent, high keel. The ornamentation consists of coarse ribs bearing indistinct nodes. The ribs are nearly rectiradiate and definitely projected. The primary ribs run from the umbilical margin to the ventrolateral shoulder. Their number is 10 to 12 on a half-whorl of the body chamber. The secondary ribs are usually intercalated in the interspace of the primaries in the inner third of the flank; bifurcation also occurs at around the mid-flank. There are three rows of nodes. The umbilical nodes are well-developed on each primary ribs. The moderately strong lateral nodes appear rarely and irregularly on some primary ribs at the points of bifurcations. The ventrolateral nodes (18 to 20 on a half-whorl) uniformly appear both at the primary and on the secondary ribs. They are adorally projected and develop into fine, projected growth rugae approaching diagonally to the ventrolateral carinae.

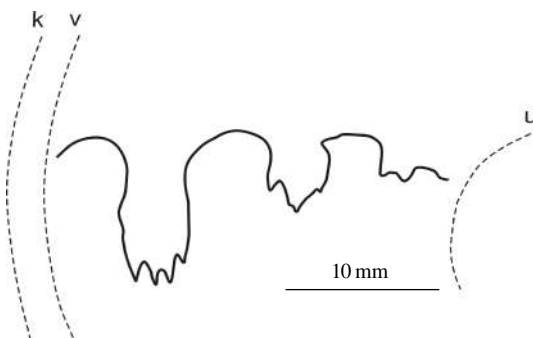


Figure 58. Suture line of *Halilucites rusticus* (HAUER, 1896), M.98.63, at 31 mm whorl-height, Vászoly, P-11a, Bed 16/A, Secedensis Zone, Crassus Subzone, u: umbilical margin, v: ventrolateral margin, k: top of the keel

The suture line is poorly preserved (Figure 58), very simple ceratitic, with at least three lateral saddles; the first lateral lobe is very deep and coarsely denticulated, the other lobes are much reduced.

Remarks

This is the type species of the genus *Halilucites*. The original specimens of *rusticus*, figured by HAUER (1896, l. c.), were examined in the collection NHMW (Wien), and the better preserved specimen (inventory number: NHMW 1998z0063/0029; figured by HAUER 1896, pl. IX, figs 1, 2) is designated here as lectotype. On the basis of the comparisons, the identification of our specimens seems warranted.

H. rusticus is rather easy to identify, nevertheless some items of the above synonymy are queried. The specimen figured as “*Ceratites (Halilucites) aff. rusticus*” by TOULA (1913, l. c.) may belong here though its lateral nodes are at the one-third of the flank and the crucial ventral view is not shown.

BRACK et al. (2007) figured some *Halilucites* specimens from the Dolomites; one of these (l. c., fig. 5/10), named as *H. rusticus*, probably represent *H. arietitiformis* (HAUER, 1896), on the basis of its strongly projected, simple ribs.

Distribution

H. rusticus was described from the upper Anisian of the Dinarides and the Southern Alps. At the Balaton Highland it was found in the Illyrian Crassus Subzone.

Halilucites cf. *arietitiformis* (HAUER, 1896)

Plate XXIV: 12.

- v * 1896 *Ceratites (Hungarites) arietitiformis* n. sp. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 260, pl. X, figs 1–3.
- v ? 1896 *Ceratites (Hungarites) planilateratus* HAU. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 261, pl. XI, figs 1–3.
- 1903 *Hungarites arietitiformis* HAUER — FRECH, Neue Cephalopoden, p. 13, pl. III, fig. 1.
- ? 1906 *Hungarites arietitiformis* HAUER — RENZ, Argolis (1), p. 388, unnumbered text-fig. on p. 386.
- ? 1910 *Hungarites arietitiformis* HAUER (*Judicarites*) — RENZ, Argolis, p. 34, text-fig. 3.
- v ? 1986 *Halilucites* cf. *arietitiformis* (HAUER 1896) — BRACK & RIEBER, Lower Buchenstein beds, p. 204, pl. 2, figs 5, 6.
- v 1993 *Halilucites arietitiformis* — VÖRÖS, Reitzi Zone, p. 25, pl. VI, fig. 4.
- v 1993 *Halilucites arietitiformis* — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 118, pl. 13, fig. 6.
- v 2002 *Halilucites* cf. *arietitiformis* (HAUER) — VÖRÖS, Paleoenvironmental distribution, p. 488, pl. 2, fig. 2.

Material

One incomplete specimen from Felsőörs.

Measurements

	D	WH	WW	U
INV 2017.234.1.	46.9	17.1	11.7	?

Description

Small, incomplete half whorl of a *Halilucites*. The whorl-section is high subquadrate. The umbilical wall seem to be sub-rounded. The flanks are gently convex. The ventrolateral margin is well-marked, carinate. The venter is tricarinate, with a prominent, high keel. The ornamentation consists of coarse ribs without distinct lateral nodes. The ribs are prorsiradiate, projected, nearly falcooid. The primary ribs run from the umbilical margin to the ventrolateral shoulder. Their number is around 12 on a half-whorl (partly on the body chamber). Secondary ribs were not observed. The ventrolateral nodes (around 12 on a half-whorl) appear as swellings on the primary ribs. They are adorally projected and diagonally coalesce with the ventral carinae.

The suture line is poorly seen (Plate XXIV: 12); ceratitic, with three lateral saddles and a deep first lateral lobe of simple dentition.

Remarks

The original specimen of *H. arietitiformis*, figured by HAUER (1896, pl. X, figs 1–3), was examined in the collection NHMW (Wien). The type is much larger than the specimen from the Balaton Highland, but the essential features, first of all the characteristic style of ribbing, are shared and the identification of our specimen seems warranted.

H. arietitiformis (HAUER, 1896) differs from *H. rusticus* by its simple, not bifurcating, much more projected, almost falcooid ribbing and narrower whorls. *H. obliquus* (HAUER, 1896) is more finely ribbed and has definite periumbilical nodes.

The comparisons made in HAUER’s type material of *Halilucites* species, in the NHMW (Wien), led to the conclusion that some of those species would be better to unite because their morphological differences are very subtle. For example, the species *planilateratus* HAUER, 1896, according to the opinion of the present author, may be tentatively attributed to *H. arietitiformis*. It must be noted that *planilateratus* was regarded as a gerontic variant of *H. rusticus* by MANFRIN et al. (2005, p. 498). This underscores the observation that the differences between HAUER’s species of *Halilucites* are indistinct.

FRECH (1903, pl. III, fig. 1) illustrated a very typical specimen of *H. arietiformis* from Felsőörs (the species name written erroneously as “*arietiformis*”).

The specimen figured as “*Hungarites arietiformis*” by RENZ (1906, text-fig. on p. 386) and re-figured in RENZ (1910, text-fig. 3), in the absence of ventral view, was included to the synonymy only with query.

BRACK & RIEBER (1986, pl. 2, figs 5, 6) figured a worn fragment as *Halilucites* cf. *arietiformis*. This specimen was checked in the collection PIMUZ, Zürich, and tentatively included to the synonymy.

Distribution

H. arietiformis was described from the upper Anisian of the Dinarides and probably the Southern Alps and the Hellenides. At the Balaton Highland it was collected from the Illyrian Avisianum Subzone.

Halilucites cf. *obliquus* (HAUER, 1896)

Plate XXIV: 11

v * 1896 *Ceratites* (*Hungarites*) *obliquus* n. sp. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 262, pl. IX, figs 5–7.

v ? 1896 *Ceratites* (*Hungarites*) *intermedius* HAU. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 263, pl. XII, figs 15–17.

Material

One incomplete specimen from Felsőörs.

Measurements

	D	WH	WW	U
INV 2017.234.1.	46.9	17.1	11.7	?

Description

Body chamber fragment of a medium-sized *Halilucites*. The whorl-section is high oval. The flanks are gently convex. The venter seems tricarinate; the keel is prominent. The ornamentation consists of coarse ribs bearing indistinct nodes. The ribs are sinuous and projected. Secondary ribs are intercalated in the interspace of the primaries in the inner third of the flank. Umbilical nodes are present on some primary ribs.

The suture line is not seen.

Remarks

The original specimen of *H. obliquus*, figured by HAUER (1896, pl. IX, figs 5–7), was examined in the collection NHMW (Wien). On the basis of the shared essential features, first of all the characteristic style of ribbing, and the umbilical nodosity, the identification of our specimen seems acceptable.

H. obliquus differs from *H. rusticus* (HAUER, 1896) by its weak ribbing and the absence of lateral nodes. *H. arietiformis* (HAUER, 1896) has coarser and almost falcoid ribbing and has no umbilical nodes.

The species *intermedius* HAUER, 1896, according to the opinion of the present author, may be tentatively synonymised with *H. obliquus*. It must be noted that *intermedius* was interpreted as closely allied to *H. obliquus* also by MIETTO et al. (2003b, p. 459) and MANFRIN et al. (2005, p. 498). This endorses the view that the differences between certain species of *Halilucites* introduced by HAUER (1896) are very weak.

Distribution

H. obliquus was described from the upper Anisian of the Dinarides. At the Balaton Highland it was collected from the Illyrian Crassus Subzone.

Genus **Stoppaniceras** RIEBER, 1973

Type species: *Stoppaniceras variabile* RIEBER, 1973

RIEBER (1973, p. 34) introduced *Stoppaniceras* with three species: *S. variabile* RIEBER, 1973, *S. grandinodus* RIEBER, 1973 and *S. artinii* (AIRAGHI, 1912), but the diagnostic differences of the genus from other genera of Paraceratitinae remained rather indistinct. Later BRACK & RIEBER (1986, 1993) described further specimens and taxa attributed to *Stoppaniceras*, which helped to formulate a more coherent picture of the genus. It is also important to note that BRACK & RIEBER (1986, p. 202, 203) gave a comprehensive description of the “Group of »*Ceratites*« *ellipticus* HAUER 1887” and suggested that these forms are closely connected to *Stoppaniceras*, *Repossia* and *Parakellnerites*. It was also mentioned that the group of *ellipticus* would be detailed in a planned monograph. Regrettably, a detailed work of this kind did not appear since then.

The late Anisian ammonoid fauna of the Balaton Highland comprises a few specimens representing *Stoppaniceras* in strict sense, but even more forms apparently belonging to the “group of *ellipticus*”. Without elucidating in details the taxonomy of the group, the present author had to reach an arbitrary solution, therefore in a previous work (VÖRÖS 1998) these forms were mentioned and/or illustrated as “*Stoppaniceras*” ex gr. *ellipticum* (HAUER). The close examination of the specimens illustrated as *Stoppaniceras* and “group of *ellipticus*” by RIEBER (1973) and BRACK & RIEBER (1986, 1993) in the collection PIMUZ, Zürich, convinced the present author that all these forms may belong to the genus *Stoppaniceras*. Furthermore, the “group of *ellipticus*” is here suggested to be divided to several distinct, mostly new, species.

In this concept, *Stoppaniceras* comprises (apart from the originally attributed species) various taxa with different lateral ornamentation, from finely to coarsely ribbed and nodose. The most important, shared feature lies in the venter, which is rather wide, almost tabulate, and bears a separate, distinct, blunt keel.

Stoppaniceras cf. *variabile* RIEBER, 1973

Plate XXV: 2.

- v * 1973 *Stoppaniceras variabilis* sp. n. — RIEBER, Grenzbittumenzone, p. 36, pl. 9, figs 1–20, pl. 10, figs 1–4, pl. 14, fig. 11, Text-figs 10f–k, 10n–q.
 1974 *Stoppaniceras variabilis* RIEBER — RIEBER, Tessiner Kalkalpen, p.171, pl. 2, figs 1–10, text-fig. 2c.
 v non 1989 *Stoppaniceras* cf. *variabilis* RIEBER, 1973 — VÖRÖS & PÁLFY, Vászoly, p. 21., pl. I, figs 1, 2.
 v 1998 “*Stoppaniceras*” cf. *variabile* RIEBER, 1973 — VÖRÖS, Balaton-felvidék, p. 21, 60.

Material

Two incomplete specimens and one imprint from Felsőörs.

Measurements

	D	WH	WW	U
INV 2017.236.1.	55.1	?	?	?

Description

Small-sized, moderately evolute *Stoppaniceras*. The umbilical wall seem to be subrounded. The flanks are gently convex. The ventrolateral margin and the venter are poorly seen. The ornamentation consists of regular ribs and nodes. The ribs are rectiradiate, straight. The primary ribs run from the umbilical margin to the ventrolateral shoulder. Their number is around 10 on a half-whorl. Few secondary ribs are irregularly inserted around the middle of the flank. There are three rows of nodes. The umbilical nodes are regular, distinct. The lateral nodes develop on each primary ribs at around the inner quarter of the flank. The ventrolateral nodes are poorly seen but seem to be pointed.

The suture line is not preserved.

Remarks

The original specimens illustrated as *Stoppaniceras variabile* by RIEBER (1973, pl. 9, figs 1–20, pl. 10, figs 1–4, pl. 14, fig. 11) were examined by the present author in the collection PIMUZ, Zürich. It was judged that the above described, poorly preserved specimens from Felsőörs may belong to *S. variabile* mainly on the basis of their lateral ornamentation.

In our previous paper (VÖRÖS & PÁLFY, 1989, l. c.), some specimens of *Asseretoceras camunum* (ASSERETO, 1963) were wrongly identified as *S. variabile*.

Distribution

S. variabile was described from the upper Anisian of the Southern Alps. At the Balaton Highland it was collected from the Illyrian Crassus Subzone.

Stoppaniceras rieberi n. sp.

Plate XXV: 3–7.

- v ? 1986 Group of “*Cerattites*” *ellipticus* HAUER 1887 — BRACK & RIEBER, Lower Buchenstein beds, p. 202, pl. 4, figs 3, 6, pl. 5, fig. 2.
 v ? 1986 *Stoppaniceras* — BRACK & RIEBER, Lower Buchenstein beds, p. 203, pl. 5, fig. 3.
 1993 “*Stoppaniceras*” sp. — GAETANI, (ed.), Anisian/Ladinian boundary field workshop, p. 66, pl. 7, fig. 4.
 v 1998 “*Stoppaniceras*” ex gr. *ellipticum* HAUER, 1887 A — VÖRÖS, Balaton-felvidék, p. 21, 60, pl. VIII, fig. 3.

Holotype: Hungarian Natural History Museum (Budapest), inventory number: M.98.26.

Locus typicus: Felsőörs, Bed 116.

Stratum typicum: Grey, siliceous limestone (Vászoly Formation); upper Illyrian, Secedensis Zone, Crassus Subzone.

Derivatio nominis: After the name of Hans RIEBER, outstanding expert of Triassic ammonoids.

Diagnosis: Medium to large-sized rather evolute *Stoppaniceras* with high oval to subtrapezoidal whorls and subrounded to vertical umbilical wall. Venter gently arched, with distinct blunt keel. Ribs sinuous, projected. Three rows of nodes. Umbilical nodes well-developed. Strong and pointed lateral nodes at the inner quarter of primary ribs. Ventrolateral nodes adorally projected; chevron-like ventral ornamentation. Suture ceratitic.

Material

Five, partly incomplete specimens from Felsőörs.

Measurements

	D	WH	WW	U
Holotype M.98.26	68.1	27.1	17.3	?
Paratype PAL 2017.33.1.	101.6	?	26.7	?
Paratype M.98.27	81.5	29.6	23.5	?
Paratype PAL 2017.34.1.	56.2	?	?	?
Paratype PAL 2017.35.1.	44.9	24.8	?	?

Description

Medium to large *Stoppaniceras* with rather evolute conch. The whorl-section is high oval to subtrapezoidal. The umbilical wall is subrounded to vertical. The flanks are gently convex. The ventrolateral margin is well-marked. The venter is gently arched, with a distinct and prominent, but blunt keel. The ornamentation consists of moderately strong ribs and nodes. The ribs are slightly prorsiradiate, sinuous and definitely projected. The primary ribs run from the umbilical margin to the ventrolateral shoulder. Their number is around 12 on a half-whorl of the body chamber. The secondary ribs are usually intercalated in the inner third or the middle of the flank; bifurcation also occurs at around the inner third of the flank. There are three rows of nodes. The umbilical nodes are well-developed on each primary ribs. The rather strong and pointed lateral nodes appear on the inner quarter of some primary ribs, and rarely at the points of bifurcations. The ventrolateral nodes (around 22 on a half-whorl) uniformly appear both at the primary and on the secondary ribs. They are adorally projected and develop into fine, projected growth rugae approaching diagonally to the ventral keel, giving a chevron-like appearance of the venter.

The suture line is poorly visible; ceratitic, with well-denticulated first lateral lobe.

Remarks

The specimens illustrated as “Group of »*Ceratites*« *ellipticus* HAUER” by BRACK & RIEBER (1986, pl. 4, figs 3, 6, pl. 5, fig. 2, and also in GAETANI 1993, pl. 7, fig. 4) were examined by the present author in the collection PIMUZ, Zürich. Their rather weak ornamentation is fairly different from the coarsely ribbed and nodose, typical “*Ceratites ellipticus*”, as figured by HAUER (1887, pl. VI, fig. 3) and HAUER (1896, pl. VIII, figs 3, 4). At the same time, they are very similar to our specimens from the Balaton Highland, both in ornamentation and in the character of the venter (not illustrated by BRACK & RIEBER, l. c.). Another specimen, figured with the simple use of name “*Stoppaniceras*” by BRACK & RIEBER (1986, l. c., pl. 5, fig. 3), shows also strong similarity to our specimens and probably belongs to *S. rieberi* n. sp.

By its rather fine ornamentation, *S. rieberi* is very different from *S. ellipticus* (HAUER, 1887). It stands close to *S. variable*, but differs by the weaker, sinuous and projected ribbing.

In a previous work of the present author (VÖRÖS, 1998, l. c.) some specimens of *S. rieberi* n. sp. were mentioned and illustrated as “*Stoppaniceras*” ex gr. *ellipticum* HAUER, 1887 A.

Distribution

Apart from the Balaton Highland, specimens now included into *S. rieberi* were recorded from the upper Anisian of the Southern Alps. At the Balaton Highland its range is restricted to the Illyrian Avisianum and Crassus Subzones.

Stoppaniceras aff. *rieberi* n. sp.

Plate XXVI: 1.

v 1998 “*Stoppaniceras*” ex gr. *ellipticum* HAUER, 1887 B — VÖRÖS, Balaton-felvidék, p. 21, 60, pl. VIII, fig. 2.

Material

One specimen from Felsőörs.

Measurements

	D	WH	WW	U
M.98.25	73.5	29.8	18.5	21.1

Description

Medium-sized *Stoppaniceras* with rather evolute conch. The whorl-section is high subtrapezoidal. The umbilical wall is poorly seen. The flanks are nearly flat. The ventrolateral margin is well-marked. The venter is gently arched, with a prominent, but blunt keel. The ornamentation consists of rather weak ribs and nodes. The ribs are slightly prorsiradiate, sinuous and projected. The number of primary ribs is around 12 on a half-whorl of the body chamber. Secondary ribs intercalate irregularly; bifurcation was not observed. There are three rows of nodes. The umbilical nodes are well-developed on each primary ribs. The weak lateral nodes appear irregularly on the inner third of some primary ribs. The ventrolateral nodes (around 30 on a half-whorl) uniformly appear both on the primary and on the secondary ribs. They are gently projected adorally and develop into fine, projected growth rugae approaching diagonally to the ventral keel, which gives a chevron-like appearance to the venter.

The suture line is poorly visible; ceratitic, with three lateral saddles.

Remarks

The single specimen of this taxon stands very close to *S. rieberi* n. sp., but differs by its significantly denser ribbing and the nearly total absence of lateral nodes. In spite of these important differences, considering the paucity of the material (single specimen), the introduction of a new species did not appear to be reasonable.

In the previous work of the present author (VÖRÖS, 1998, pl. VIII, fig. 2) the above described specimen of *S. aff. rieberi* was illustrated as "*Stoppaniceras*" ex gr. *ellipticum* HAUER, 1887 B.

Distribution

Up to now, *S. aff. rieberi* is recorded only from the Balaton Highland, where it was collected from the Illyrian Crassus Subzone.

Stoppaniceras cf. *ellipticum* (HAUER, 1887)

Plate XXVI: 2–4; Figure 59.

- v * 1887 *Ceratites ellipticus* n. sp. — HAUER, Han Bulog, p. 25, pl. VI, fig. 3.
- v 1896 *Ceratites ellipticus* HAU. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 259, pl. VIII, figs 3, 4.
- 1921 *Ceratites ellipticus* HAUER — BUBNOFF, Forno, p. 453, pl. III, fig. 8.
- v 1934 *Paraceratites ellipticus* (HAUER) — SPATH, Ammonoidea of the Trias, p. 436.
- v 1998 *Megaceratites ? friccensis* (ARTHABER, 1916) — VÖRÖS, Balaton-felvidék, p. 42, 52, 59 (partim) pl. IV, figs 11, 12 (only).
- v 1998 "*Stoppaniceras*" ex gr. *ellipticum* HAUER, 1887 — VÖRÖS, Balaton-felvidék, p. 29.

Material

Four fragmentary specimens from Szentkirályszabadja (1), Sóly (2) and Öskü (1).

Measurements

	D	WH	WW	U
INV 2017.237.1.	77.4	36.1	24.4	19.1
M.98.117	76.5	40.2	23.1	?
M.98.59	62.5	?	?	?

Description

Medium to large-sized *Stoppaniceras* with moderately involute conch. The body chamber shows definite umbilical egression. The whorl-section is high oval to subquadratic. The umbilical wall is subrounded. The flanks are gently convex and passes gradually into the fastigate venter. The ventrolateral margin is marked by a row of prominent nodes. The flanks are ornamented with massive, slightly prorsiradiate primary ribs (8 to 10 on a half whorl) and nodes. Secondary ribs were not observed. On the phragmocone the ribbing is weak and slightly sinuous whereas the body chamber bears very coarse and occasionally fibulate ribs (Plate XXVI:

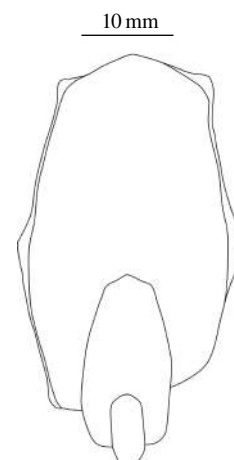


Figure 59. Cross section of *Stoppaniceras* cf. *ellipticum* (HAUER, 1887), M.98. 117, Sóly, road-cut, Reitzi Zone, Avisianum Subzone (?)

3). There are three rows of nodes. The umbilical nodes are weak. The row of the massive lateral nodes runs near the inner third and the middle of the flank. The ventrolateral nodes are of medium strength (around 18 on the half whorl) on the phragmocone and became very strong and less numerous (around 10) on the body chamber. The occasional fibulate ribs coalesce at these laterally expanded spine-like nodes.

Suture lines are not visible.

Remarks

The species "*Ceratites ellipticus*" was based on a single specimen by HAUER (1887, l. c.). This holotype (by monotypy), housed at the collection GBAW Wien (inventory number: 1887/01/34), was examined by the present author and the egression of the body chamber, the presence of occasional fibulate ribbing and the wide and blunt ventral keel were confirmed. Subsequently HAUER (1896, l. c.) described and figured another specimen of "*Ceratites ellipticus*", showing the same basic features. This specimen was also inspected by the present author in the NHMW, Wien (inventory number: NHMW 1998z0063/0011). By these comparisons the identification of the specimens from the Balaton Highland as "*ellipticus*" seems to be warranted.

The generic position of this species was variously suggested by previous authors and is still somewhat dubious. KUTASSY (1932, p. 473) used the name combination "*Ceratites (Semiornites) ellipticus*". SPATH (1934, p. 439) definitely attributed *ellipticus* to *Paraceratites* and compared it to "*Paraceratites subnodosus* (MOJSISOVICIS)" and "*Ceratites evolvens* HAUER". RIEBER (1973, p. 47), though not dealing with *ellipticus*, attributed the closely related species "*Ceratites evolvens* HAUER" to his new genus *Serpianites*. Probably following this idea, MIETTO & MANFRIN (1995, p. 554) wrote about "*Serpianites*" *ellipticus* (HAUER). However, this attribution is not feasible, because *ellipticus* has keeled venter and definite umbilical nodes, whereas the genus *Serpianites* was defined as having flat venter and smooth umbilical margin, devoid of nodes (RIEBER 1973, p. 44). After all, the present author preferred to ascribe *ellipticus* to the genus *Stoppaniceras*, the substantial morphological features of which, at least do not contradict to this attribution.

Stoppaniceras ellipticum differs from the previously described species of the genus (*S. variabile*, *S. rieberi*) by its extremely coarse ornamentation and the strong egression of the body chamber. The very coarsely ornamented *S. grandinodus* RIEBER, 1973 differs by its considerably more evolute conch and by the flat venter on the body chamber. The also strongly ornamented species, *S. hermanni* n. sp. and *S. budaii* n. sp. have more regular and denser ribbing.

The specimen figured as "*Ceratites ellipticus*" by BUBNOFF (1921, pl. III, fig. 8) corresponds very well to ours from the Balaton Highland, even including the fibulate ribbing.

One specimen listed as "*Paraceratites ellipticus*", by SPATH (1934) was examined in the collection NHML (London, inventory number: C. 30982, from Montenegro) and it is here regarded as a proper representative of *Stoppaniceras ellipticum*.

In the previous work by the present author (VÖRÖS 1998, l. c.) some specimens of *S. ellipticum* were wrongly identified and illustrated as *Megaceratites ? friccensis* (ARTHABER, 1916).

Distribution

S. ellipticum was described from the upper Anisian of the Dinarides and the Southern Alps. At the Balaton Highland its range is restricted to the Illyrian Avisianum Subzone.

Stoppaniceras hermanni n. sp.

Plate XXVI: 5; Plate XXVII: 1.

v 1993 "*Ceratites*" ex gr. *ellipticus* — VÖRÖS, Reitzi Zone, p. 27, pl. V, fig. 2.

v 1998 "*Stoppaniceras*" ex gr. *ellipticum* HAUER, 1887 — VÖRÖS, Balaton-felvidék, p. 31 (partim).

Holotype: Hungarian Natural History Museum (Budapest), inventory number: M.98.16.

Locus typicus: Vászoly, Trench P–11/a, Bed 16/A.

Stratum typicum: Ochre-yellow limestone (Vászoly Formation); upper Illyrian, Secedensis Zone, Crassus Subzone.

Derivatio nominis: After the name of Viktor HERMANN, who collected the holotype.

Diagnosis: Large, moderately evolute *Stoppaniceras* with high oval whorls and vertical to overhanging umbilical wall. Venter slightly arched, with distinct blunt keel. Ribs straight, prorsiradiate, of uniform strength on phragmocone and body chamber. Three rows of nodes. Umbilical nodes strong. Lateral nodes at the inner third of ribs. Very strong ventrolateral nodes. Suture ceratitic.

Material

Three specimens from Vászoly (2) and Mencshely (1).

Measurements

	D	WH	WW	U
Holotype M.98.16	100.1	38.5	26.1	29.5
Paratype PAL 2017.36.1.	~69.0	32.0	24.5	?

Description

Large *Stoppaniceras* with moderately evolute conch. The body chamber shows umbilical egression. The whorl-section is high oval to subquadratic. The umbilical wall is vertical to overhanging. The flanks are gently convex and passes gradually into the slightly arched and keeled venter. The blunt keel is definitely elevated from the wide venter. The ventrolateral margin is accentuated by a row of prominent nodes. The flanks are ornamented with coarse and straight, slightly prorsiradiate primary ribs (around 8 on a half whorl) and nodes. Secondary ribs are irregularly intercalated, partly near the umbilicus, partly at the outer third of the flank. The ribbing is of uniform strength throughout the phragmocone and the body chamber. There are three rows of nodes. The umbilical nodes are strong. The row of the moderately strong lateral nodes runs near the inner third of the flank. The very strong ventrolateral nodes (around 20 on a half-whorl) uniformly appear both on the primary and on the secondary ribs.

Suture lines are poorly preserved; ceratitic, with three lateral saddles and a rather wide first lateral lobe.

Remarks

On the basis of its wide venter, with separate, elevated blunt keel and the egression of the body chamber, *S. hermanni* n. sp. is regarded as belonging to the genus *Stoppaniceras*. By the characters of the venter, it stands close to the group of *S. rieberi* n. sp. The uniform, coarse, prorsiradiate ribbing differentiates *S. hermanni* from the other species of the genus.

In previous works of the present author (VÖRÖS 1993, 1998) the holotype of this species was cited and/or illustrated as belonging to the “group of *ellipticus* HAUER”.

Distribution

Up to now *S. hermanni* n. sp. is known only from the Balaton Highland, where it was found in the Illyrian Crassus Subzone.

Stoppaniceras budaii n. sp.
Plate XXVII: 2, 3; Figures 60, 61.

v 1998 “*Stoppaniceras*” ex gr. *ellipticum* HAUER, 1887 — VÖRÖS, Balaton-felvidék, p. 31 (partim), pl. VIII, fig. 1.

Holotype: Hungarian Natural History Museum (Budapest), inventory number: M.87.042.

Locus typicus: Vászoly, Trench P–11/a, Bed 16/A.

Stratum typicum: Ochre-yellow limestone (Vászoly Formation); upper Illyrian, Secedensis Zone, Crassus Subzone.

Derivatio nominis: After the name of Tamás BUDAI, renowned Hungarian geologist, who collected the holotype.

Diagnosis: Large-sized, moderately evolute *Stoppaniceras* with high oval whorls and subrounded to vertical umbilical wall. Venter fastigate. Ribs gently sinuous, prorsiradiate, uniform strength on phragmocone and on body chamber. Three rows of nodes. Umbilical nodes weak. Moderately strong lateral nodes at the inner third of ribs. Strong, projected ventrolateral nodes. Suture ceratitic, with numerous elements and peculiar, pointed peri-umbilical suspensive lobes.

Material

Three specimens from Felsőörs (1), Vászoly (1) and Mencshely (1).

Measurements

	D	WH	WW	U
Holotype M.87.042	99.8	39.8	22.9	31.9
Paratype PAL 2017.37.1.	113.2	?	28.2	?

Description

Large *Stoppaniceras* with moderately evolute conch. The body chamber shows moderate umbilical egression. The whorl-section is high oval to subquadratic. The umbilical wall is subrounded to vertical. The flanks are gently convex and pass gradually into the fastigate venter. The ventrolateral margin is accentuated by a row of prominent nodes. The flanks are ornamented with strong, gently sinuous, somewhat prorsiradiate primary ribs (around 10 on a half whorl) and nodes.

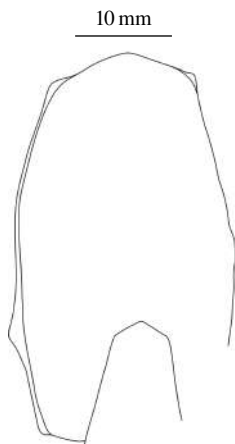


Figure 60. Cross section of *Stoppaniceras budaii* n. sp., Holotype, M.87.042, Vászoly, P-11a, Bed 16/A, Secedensis Zone, Crassus Subzone

Secondary ribs are irregularly intercalated, mostly near the umbilicus. The ribbing is of uniform strength throughout the phragmocone and the body chamber. There are three rows of nodes. The umbilical nodes are weak and disappear on the body chamber. The row of the moderately strong lateral nodes runs near the inner third of the ribs. The strong ventrolateral nodes (around 16 on a half-whorl) uniformly appear both on the primary and on the secondary ribs. The ventrolateral nodes are projected and pass into diagonally oriented, fine growth rugae.

Suture lines are ceratitic (Figure 61), with several, wide and entire lateral saddles; the first lateral lobe is rather deep and strongly denticulated, the second and third lateral lobes are reduced in all respects; the two peri-umbilical suspensive lobes are peculiarly pointed, like spear-heads.

Remarks

On the basis of the general features of the ornamentation and the egression of the body chamber, *S. budaii* n. sp. is regarded as belonging to the genus *Stoppaniceras*. By the fastigate character of the venter, it stands close to the group of *S. ellipticum* (HAUER, 1887), but differs by its denser ribbing, uniformly developed on the phragmocone and on the body chamber, and its less prominent lateral nodes.

In a previous work of the present author (VÖRÖS, 1998, pl. VIII, fig. 1) the holotype of this species was cited and illustrated as "*Stoppaniceras*" ex gr. *ellipticum* HAUER, 1887.

Distribution

Until now *S. budaii* n. sp. is known only from the Balaton Highland, where it was found in the Illyrian Avisianum and Crassus Subzones.

Genus *Repossia* RIEBER, 1973

Type species: *Repossia acutenodosa* RIEBER, 1973

Repossia cf. *acutenodosa* RIEBER, 1973

Plate XXVII: 4, 5.

v * 1973 *Repossia acutenodosa* sp. n. — RIEBER, Grenzbitumenzone, p. 52, pl. 10, fig. 16, pl. 11, figs 1–32, pl. 12, fig. 1, Text-figs 13m–o.

1974 *Repossia acutenodosa* RIEBER — RIEBER, Tessiner Kalkalpen, p.171, pl. 1, figs 4–6, text-fig. 2f.

? 1995 *Repossia acutenodosa* RIEBER, 1973 — DE ZANCHE et al., Dolomites, p. 146, pl. I, fig. 18.

v 1998 *Repossia* ? sp. — VÖRÖS, Balaton-felvidék, p. 21, pl. VII, fig. 3.

Material

Ten fragmentary specimens from Felsőörs.

Measurements

	D	WH	WW	U
INV 2017.238.1.	55.7	?	?	?
M.98.23	45.5	20.8	14.9	?

Description

Medium-sized *Repossia* with moderately involute conch. The whorl-section is high oval to subtrapezoidal. The umbilical wall is poorly preserved; seems to be subrounded. The flanks are gently convex and pass into the fastigate venter bearing a definite keel. The ventrolateral margin is marked by a row of prominent nodes. The flanks are ornamented with very weak, prorsiradial, slightly projected primary ribs (8 to 10 on a half whorl) and nodes. Secondary ribs appear rarely and irregularly at around

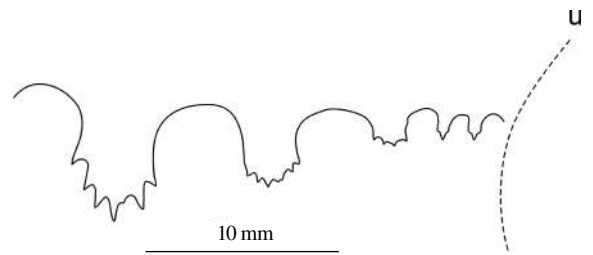


Figure 61. Suture line of *Stoppaniceras budaii* n. sp., Holotype, M.87.042, at 27 mm whorl-height, Vászoly, P-11a, Bed 16/A, Secedensis Zone, Crassus Subzone, u: umbilical margin

the mid-flank. The ribbing weakens and almost vanish toward the ventrolateral margin. There are three rows of nodes. The umbilical nodes are well-developed. The row of the high and spinose lateral nodes (around 10 on a half whorl) runs near the inner third of the flank. The strong, spinose ventrolateral nodes (12 to 14 on a half whorl) are projected adorally.

Suture lines are poorly seen; ceratitic, with three lateral saddles.

Remarks

R. acutenodosa is the type species and, at the same time, the only properly defined species of *Repossia*. The original specimens of *R. acutenodosa* were examined by the present author in the collection PIMUZ, Zürich. On the basis of their widely spaced and spinose lateral nodes and the almost total absence of ribbing, our incomplete specimens from the Balaton Highland were identified with this species. The similarity is especially remarkable with the specimens figured by RIEBER (1973, pl. 11, figs 1–3, 13, 14).

The specimen figured as *R. acutenodosa* by DE ZANCHE et al. (1995) is very poorly preserved, therefore this item is included into the synonymy only with question mark.

One of the specimens illustrated here (Plate XXVII: 5) was figured as *Repossia* ? sp. in a previous work by the present author (VÖRÖS 1998). Now, considering the monospecific character of the genus, the attribution to *R. acutenodosa* seems reasonable.

Distribution

R. acutenodosa was described from the upper Anisian of the Southern Alps. At the Balaton Highland its range is restricted to the Illyrian Crassus Subzone.

Subfamily Bulogitinae MIETTO & MANFRIN, 2005

Genus **Ticinites** RIEBER, 1973

Type species: *Ticinites ticinensis* RIEBER, 1973

The new subfamily Bulogitinae was introduced by MANFRIN et al. (2005, p. 499) supported by convincing morphological arguments. Besides *Ticinites*, they included to this subfamily the genera *Bulogites* ARTHABER, 1912, *Salterites* DIENER, 1915 and *Reiflingites* ARTHABER, 1896. On the other hand, they synonymised the latter genus with *Asseretoceras* BALINI, 1992, what is not accepted by the present author.

Ticinites cf. *ticinensis* RIEBER, 1973

Plate XXVIII: 1.; Figure 62.

v * 1973 *Ticinites ticinensis* sp. n. — RIEBER, Grenzbitumenzone, p. 56, pl. 7, figs 1–5, 8–10, pl. 10, fig. 7, Text-figs 17o, 17q–x.

v 1998 *Megaceratites* ? sp. — VÖRÖS, Balaton-felvidék, p. 49.

Material

One incomplete specimen from Barnag.

Measurements

	D	WH	WW	U
INV 2017.239.1.	56.1	27.1	29.1	?

Description

Medium-sized *Ticinites*, with moderately evolute conch. The whorl is stout; the cross-section is subquadratic. The umbilical edge is subrounded. The flanks are gently convex and pass gradually into the somewhat arched, almost flat venter. The flanks are ornamented with robust ribs and extremely strong, spinose nodes. The number of the slightly prorsiradiate ribs is six on the body chamber. A few secondary ribs irregularly appear by intercalation. The umbilical nodes are rather swellings on the ribs. The prominent, spinose lateral nodes develop on the inner thirds of the primary ribs. The ventrolateral nodes are exceptionally prominent; they appear as straight, long spines, elongated in lateral direction. Their number is 10 on a half-whorl of the body chamber. The inner whorls seem to be also strongly ornamented (Figure 62).

Suture lines are not seen.

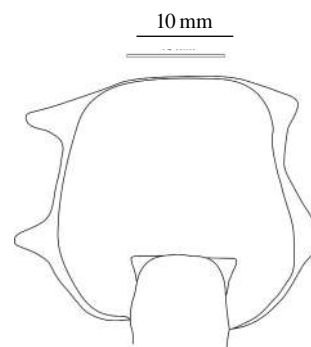


Figure 62. Cross section of *Ticinites* cf. *ticinensis* RIEBER, 1973, INV 2017.239.1., Barnag, loose, Secedensis Zone (?)

Remarks

The original specimens of *T. ticinensis* were examined by the present author in the collection PIMUZ, Zürich. On the basis of its widely spaced and extremely spinose lateral and ventrolateral nodes and the characteristic, stout whorl-section, our incomplete specimen from the Balaton Highland was identified with this species. The similarity is especially remarkable with the specimens of *T. ticinensis* figured by RIEBER (1973, pl. 7, figs 1–4, 10 and pl. 10, fig. 7).

In the previous work of the present author (VÖRÖS 1998, p. 49) the same single specimen was tentatively attributed to the genus *Megaceratites* BALINI, 1992. Subsequent, careful preparation revealed the style of nodosity what allowed the proper identification of the specimen.

Distribution

T. ticinensis was described from the upper Anisian of the Southern Alps. At the Balaton Highland it was collected loose, probably deriving from the Illyrian Crassus Subzone.

Ticinites hantkeni (MOJSISOVICS, 1882)

Plate XXVIII: 2–7.

- * 1882 *Ceratites Hantkeni* E. v. MOJSISOVICS — MOJSISOVICS, *Mediterranen Triasprovinz*, p. 42, pl. XXX, fig. 16.
- v 1986 “*Ceratites*” *hantkeni* MOJS. 1882 — BRACK & RIEBER, *Lower Buchenstein beds*, p. 203, pl. 5, fig. 1.
- v 1993 *Ticinites brescianus* n. sp. — BRACK & RIEBER, *Anisian/Ladinian boundary*, p. 473, pl. 9, figs 1–3, 11, text-fig. 15m.
- v 1993 *Ticinites dolomiticus* n. sp. — BRACK & RIEBER, *Anisian/Ladinian boundary*, p. 474, pl. 9, figs 4, 8, 9, text-figs 15n, 17a.
- v non 1993 *Nevadites ? hantkeni* — VÖRÖS, *Reitzi Zone*, p. 27, pl. III, fig. 8, pl. IV, figs 1, 2.
- v non 1993 *Nevadites ? hantkeni* — GAETANI (ed.), *Anisian/Ladinian boundary field workshop*, p. 117, pl. 13, figs 1, 2.
- v 1998 *Ticinites ? hantkeni* (MOJSISOVICS, 1882) — VÖRÖS, *Balaton-felvidék*, (partim) p. 21, 60, pl. VI, fig. 17, (non p. 31, 38).
- v 2002 *Ticinites cf. hantkeni* (MOJSISOVICS) — VÖRÖS, *Paleoenvironmental distribution*, p. 488, pl. 2, fig. 3.

Material

12 poorly preserved specimens from Felsőörs.

Measurements

	D	WH	WW	U
Topotype T.3088.	62.7	23.8	21.5	?
INV 2017.240.1.	74.9	22.8	20.4	?
INV 2017.243.1.	71.1	20.1	?	33.5
M.98.72	63.9	29.5	26.8	?
INV 2017.241.1.	54.2	16.1	?	24.1
INV 2017.242.1.	40.1	20.2	?	?

Description

Medium to large-sized *Ticinites*, with rather evolute conch. The whorl section is subtrapezoidal to quadratic. The umbilical edge is subrounded. The flanks are gently convex and pass gradually into the flat venter. The venter is crossed by very faint growth lines and, bears an indistinct, very thin, keel-like median elevation. The flanks are ornamented with robust ribs and nodes. The number of the slightly prorsiradiate ribs is 10 to 12 on the body chamber. A few secondary ribs irregularly appear by intercalation. Bifurcation was not observed. The umbilical nodes are rather swellings on the ribs. The prominent lateral nodes develop in the inner part of the primary ribs, very near the umbilicus. The very strong and spinose ventrolateral nodes appear at the ventrolateral ends of both the primary and the secondary ribs. Their number is 12 to 14 on a half-whorl of the body chamber. The inner whorls are also strongly ornamented with bullate lateral nodes.

Suture lines are poorly seen; ceratitic, with three lateral saddles and wide and deep first lateral lobe.

Remarks

The original description of “*Ceratites hantkeni*” by MOJSISOVICS (1882, l. c.) was based on a rather small specimen from the “Zone des *Trachyceras Reitzi*” at Felsőörs and, according to MOJSISOVICS (1882, l. c.) was deposited in the Geological Institute of Hungary. However, this specimen, which should be considered the lectotype of *T. hantkeni*, seems to be lost. It was indicated as a missing type even in the comprehensive catalogue by BODA (1964, p. 149). The present author, helped by

the staff of the Mining and Geological Survey of Hungary, made several unsuccessful efforts in the last three decades to find again this specimen, therefore, at the moment, this type specimen should be regarded as lost. On the other hand, in the last sentence of his original description, MOJSISOVICS (1882, l. c.) shortly described another, larger, incomplete specimen from Felsőörs which he tentatively identified as *hantkeni*. This specimen is kept in the collection of the MGSZ under the inventory number T.3088. and is figured here on Plate XXVIII: 2. Its lateral ornamentation more or less corresponds to the lost type, but its ventral side is worn and does not show any morphological details; moreover, it is a body chamber showing no suture lines. Partly because of these differences, and partly because, theoretically, it can not be excluded that the lost original type may turn up again, this topotypical specimen is not designated here as the neotype of *T. hantkeni*.

The most important diagnostic feature of *T. hantkeni* lies in the position of the lateral nodes, very near the umbilical margin. These lateral nodes, as MOJSISOVICS (1882, l. c.) wrote: “by superficial observation may be considered umbilical nodes”. The very thin, thread-like keel in the middle of the flat venter, as shown by the figure of the lost type (MOJSISOVICS 1882, pl. XXX, fig. 16b), was also found in one specimen of the new collections from Felsőörs (Plate XXVIII: 3, inventory number: M.98.72.), where the ventral part was well-preserved.

BRACK & RIEBER (1986, p. 203, pl. 5, fig. 1) described a specimen as “*Ceratites*” *hantkeni* MOJS. 1882. Later this specimen was selected by BRACK & RIEBER (1993, p. 473) as the holotype of the new species *Ticinities brescianus* and in the same work (p. 474), the authors introduced a further new species: *Ticinities dolomiticus*. All these specimens were investigated by the present author in the collection PIMUZ, Zürich. The holotype of *brescianus* (described originally as *hantkeni*) seems to stand the farthest from the typical *hantkeni* in the present author’s opinion, because it is too much evolute. On the other hand, the other specimens of *brescianus* and also of *dolomiticus* are very close to each other and also to *hantkeni*. The subquadrate whorl-section, the lateral ornamentation with almost peri-umbilical nodes and the faint ventral keel on the flat venter are shared features. The umbilical width, what BRACK & RIEBER (1993, l. c.) considered crucial difference between their new species and *hantkeni*, in fact, does not differ significantly. This value varies between 44–46% in *hantkeni* and 45–51% in *brescianus*–*dolomiticus*, thus an overlap exists.

BRACK & RIEBER (1993, p. 474) wrote that in their opinion the species *hantkeni* does probably not belong to *Ticinities*, but they did not offer any proof or explanation. After the comparative studies of the *Ticinities* material in Zürich and Budapest, the present author takes the liberty to ignore the above opinion and introduces the idea that *Ticinities hantkeni* (MOJSISOVICS, 1882), *T. brescianus* BRACK & RIEBER, 1993 and *T. dolomiticus* BRACK & RIEBER, 1993 form a single species and, by priority, the valid name of the species is *Ticinities hantkeni*. It may be remarked that the unification of *brescianus* and *dolomiticus* was implicitly suggested by DE ZANCHE et al. 1995, p. 138) and MIETTO & MANFRIN (1995, p. 554), although in the frame of *T. crassus* (HAUER, 1896). This latter part of their opinion can not be endorsed because in *T. crassus* the lateral nodes are near the mid-flank, while in *T. hantkeni* (and in *brescianus* and *dolomiticus*) they are very near the umbilicus.

In some previous papers (VÖRÖS 1993) and also in GAETANI (ed.) (1993) the present author interpreted too widely the species *hantkeni* and wrongly attributed some specimens to the genus *Nevadites*. In the present monograph these specimens are described in the taxon *Ticinities* ? aff. *hantkeni*, which differs from *T. hantkeni* by its more numerous, sinuous and sharper ribs; moreover, by its ventrolateral nodes, forming separate rows.

Distribution

T. hantkeni is known from the upper Anisian of the Southern Alps and the Balaton Highland, where its range is restricted to the Illyrian Crassus Subzone.

Ticinities ? aff. *hantkeni* (MOJSISOVICS, 1882)

Plate XXIX: 1–3; Figure 63.

v 1989 *Nevadites* ? cf. *hantkeni* (MOJSISOVICS, 1882) — VÖRÖS & PÁLFY, Vászoly, p. 21., pl. III, fig. 2.

v 1993 *Nevadites* ? *hantkeni* — VÖRÖS, Reitzi Zone, p. 27, pl. III, fig. 8, pl. IV, figs 1, 2.

v 1993 *Nevadites* ? *hantkeni* — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 117, pl. 13, figs 1, 2.

v 1998 *Ticinities* ? *hantkeni* (MOJSISOVICS, 1882) — VÖRÖS, Balaton-felvidék, (partim) 31, 38. (non p. 21, pl. VI, fig. 17).

Material

Four incomplete specimens from Vászoly (1) and Mencshely (3).

Measurements

	D	WH	WW	U
M.89.109	52.1	18.5	15.2	20.1
INV 2017.244.1.	49.2	17.4	14.6	?
INV 2017.245.1.	43.1	15.7	14.8	?

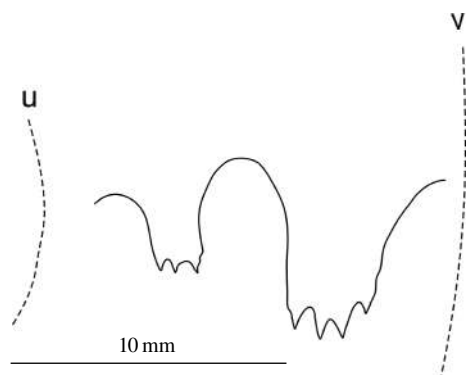


Figure 63. Suture line of *Ticinites* ? aff. *hantkeni* (MOJSISOVICS, 1882), INV 2017.244.1., at 15 mm whorl-height, Mensehly I, loose, Reitzi Zone, Reitzi or Avisianum Subzone, u: umbilical margin, v: ventrolateral margin

Description

Medium-sized *Ticinites*, with moderately evolute conch. The whorl section is subtrapezoidal to quadratic. The umbilical edge is subrounded. The flanks are gently convex and pass gradually into the flat venter. The venter bears an indistinct, keel-like median elevation. The flanks are ornamented with sharp ribs and nodes. The number of the slightly sinuous, projected ribs is 12 to 14 on a half whorl. A few secondary ribs irregularly appear by intercalation near the umbilicus. Bifurcation was not observed. The umbilical nodes form swellings on the ribs. The lateral nodes develop in the inner part of the primary ribs, near the umbilicus. The ventrolateral part of the ribs are weakened and the strong ventrolateral nodes form a separate row at the ends of the primary and secondary ribs. Their number is 16 to 18 on a half-whorl. The inner whorls are also strongly ornamented.

Suture lines are only partly seen (Figure 63); ceratitic, with three lateral saddles and wide and deep first lateral lobe; the ventral saddle is high and bifid, the ventral lobe is deeply incised.

Remarks

In some previous papers (VÖRÖS & PÁLFY 1989, VÖRÖS 1993) and also in GAETANI (ed.) (1993) and partly in VÖRÖS (1998) the present author interpreted too widely the species *T. hantkeni* and included some forms, described here as *T. ? aff. hantkeni*. The generic attribution to *Nevadites* was also wrong. The presently used attribution to *Ticinites* is only tentative, because of the differences in the lateral ornamentation.

T. ? aff. hantkeni differs from *T. hantkeni* by its more numerous, sinuous and sharper ribs and by its ventrolateral nodes forming separate rows. Moreover it was recorded from a significantly deeper stratigraphic level: *T. hantkeni* from the Crassus Subzone, while *T. ? aff. hantkeni* from the Reitzi Subzone.

Distribution

Up to now, *T. ? aff. hantkeni* was recorded only from the Balaton Highland, where its range is restricted to the Illyrian Reitzi Subzone.

Ticinites crassus (HAUER, 1896)

Plate XXIX: 4.

v * 1896 *Ceratites crassus* n. sp. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 259, pl. VIII, figs 1, 2.

v ? 1993 *Ticinites* sp. — BRACK & RIEBER, Anisian/Ladinian boundary, p. 475, pl. 9, fig. 5.

1995 *Ticinites crassus* (HAUER, 1896) — MIETTO & MANFRIN, Middle Triassic ammonoid, p. 551, pl. III, fig. 2.

1995 *Ticinites crassus* (HAUER, 1896) — DE ZANCHE et al., Dolomites, p. 148, pl. III, fig. 1.

v 1998 *Ticinites crassus* (HAUER, 1896) — VÖRÖS, Balaton-felvidék, (partim) 31, 60, pl. VI, fig. 1. (non p. 21).

v 2002 *Ticinites crassus* (HAUER) — VÖRÖS, Paleoenvironmental distribution, p. 488, pl. 2, fig. 4.

v 2015 *Ticinites* cf. *crassus* (HAUER, 1896) — VÖRÖS et al., New data, p. 320, pl. II, fig. 1.

Material

One well preserved specimen and one fragment from Vászoly.

Measurements

	D	WH	WW	U
M.98.61	91.8	31.5	33.8	37.6

Description

Large *Ticinites*, with rather evolute conch. The whorl section is subtrapezoidal to quadratic. The umbilical edge is subrounded. The flanks are gently convex. The venter is flat and bears a very low, blunt keel. The flanks are ornamented with robust ribs and nodes. The number of the rectiradiate ribs is nine on a half whorl. A few secondary ribs irregularly appear by intercalation. Bifurcation occurs rarely. The umbilical nodes are only swellings on the ribs. The prominent lateral nodes develop near the middle part of the primary ribs. The very strong, almost spinose ventrolateral nodes appear at the ventrolateral ends of both the primary and the secondary ribs. Their number is 14 on a half-whorl of the body chamber. The inner whorls are also strongly ornamented with strong ribs and lateral nodes.

Suture lines are not seen.

Remarks

The holotype (by monotypy) of *T. crassus* was inspected by the present author in the collection NHMW (Wien). Our specimen from the Balaton Highland is very similar to the holotype in the basic features (evolution, whorl section, style of ribbing) and in the position of the lateral nodes near the mid-flank. The only difference is in the number of ribs, which is higher in the holotype. In spite of this, our specimen may be identified with *T. crassus*. It is worth mentioning that the specimen figured as *T. crassus* by MIETTO & MANFRIN (1995) and DE ZANCHE et al. 1995) has also lower number of ribs, similar to our specimens.

The species “*Ceratites*” *crassus* HAUER, 1896 was first attributed to the genus *Ticinites* by MIETTO & MANFRIN (1995, l. c.) and DE ZANCHE et al. 1995, l. c.); this opinion is accepted here.

The major distinctive feature of *T. crassus* is the position of the lateral nodes near the mid-flank. This separates it from most of the other species of *Ticinites*, notably the group of *T. hantkeni* (MOJSISOVICS, 1882), including the probably synonymous *T. brescianus* BRACK & RIEBER, 1993 and *T. dolomiticus* BRACK & RIEBER, 1993, where the lateral nodes are very near the umbilical margin. According to this distinction, the specimen figured as *Ticinites* sp. by BRACK & RIEBER (1993, pl. 9, fig. 5) may belong to *T. crassus*.

In a previous work (VÖRÖS 1998) this species was interpreted more widely; now some of those specimens are attributed to *T. hantkeni*.

Distribution

T. crassus was described from the upper Anisian of the Dinarides and the Southern Alps. At the Balaton Highland it was found in the Illyrian Crassus Subzone.

Subfamily Nevaditinae TOZER, 1994

Genus **Nevadites** SMITH, 1914

Type species: *Nevadites merriami* SMITH, 1914

Nevadites cf. *avenonensis* BRACK & RIEBER, 1993

Plate XXX: 2, 3.

- v 1986 Group of *Nevadites reitzi* (BÖCKH 1872) — BRACK & RIEBER, Lower Buchenstein beds, p. 200, pl. 2, fig. 2, pl. 4, fig. 4.
- v * 1993 *Nevadites avenonensis* n. sp. — BRACK & RIEBER, Anisian/Ladinian boundary, p. 480, pl. 11, figs 9–12, pl. 12, figs 5, 6.
- v 1993 *Nevadites avenonensis* n. sp. — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 66, pl. 7, figs 6, 8.
- v 2009 *Nevadites* cf. *avenonensis* BRACK and RIEBER, 1993 — VÖRÖS et al., Curionii Zone in Felsőörs, p. 331, pl. I, figs 1, 3.

Material

Four poorly preserved, incomplete specimens from Felsőörs

Measurements

	D	WH	WW	U
M 2009.343.1.	57.1	?	19.1	?
M 2009.342.1.	28.8	21.6	?	?

Description

Medium-sized *Nevadites* with seemingly moderately evolute conch. The whorl-section seems to be subtrapezoidal. The umbilical margin is poorly observed, seems to be subrounded. The flanks are gently convex. The ventrolateral margin is well-marked. The venter is flat. The ornamentation consists of strong ribs and nodes. The ribs are slightly prorsiradiate and projected. The primary ribs run from the umbilical margin to the ventrolateral shoulder. Their number is around eight on a half-whorl of the body chamber. The secondary ribs are usually intercalated; bifurcation was not observed. There are three rows of nodes. The umbilical nodes are rather bulla-like on each primary ribs. The moderately strong lateral nodes appear irregularly on some primary ribs in the inner third of the flank. The ventrolateral nodes (around 16 on a half-whorl) uniformly appear both at the primary and on the secondary ribs. They are adorally projected and become somewhat spinose.

Suture lines are not visible.

Remarks

The above described specimens were collected from almost the highest part of the Felsőörs section (Bed 126), a little below the horizon with *Chieseiceras chiesense* (MOJSISOVICS, 1882), marking the top of the Secedensis Zone. On the basis

of their stratigraphical position, our very incomplete specimens were tentatively attributed to the genus *Nevadites* (see also in VÖRÖS et al. 2009, l. c.). Their morphological features do not contradict this attribution. The morphologically closest *Nevadites* species is *N. avenonensis* BRACK & RIEBER, 1993.

In their earlier paper BRACK & RIEBER (1986, l. c.) described some ammonoids as belonging to the “group of *Nevadites reitzi* (BÖCKH, 1872)”. In their later work (BRACK & RIEBER 1993, l. c.) these, and the newly collected specimens formed the basis of their new species *N. avenonensis*. All these specimens were studied by the present author in the collection PIMUZ, Zürich. The specimens included to the type series by the authors seem to portray a very wide range of morphological variation, where our specimens from the Balaton Highland may well be fitted in.

Distribution

N. avenonensis was described from the upper Anisian of the Southern Alps. At the Balaton Highland its range is restricted to the Illyrian Secedensis Subzone.

Genus *Chieseiceras* BRACK & RIEBER, 1986

Type species: *Chieseiceras chiesense* (MOJSISOVICS, 1882)

Chieseiceras chiesense (MOJSISOVICS, 1882)

Plate XXIX: 6; Plate XXX: 1.

- v * 1882 *Trachyceras chiesense* E. v. MOJSISOVICS — MOJSISOVICS, Mediterr. Triasprovinz, p. 95, pl. XXXIV, fig. 4.
- ? 1882 *Ceratites zezianus* E. v. MOJSISOVICS — MOJSISOVICS, Mediterr. Triasprovinz, p. 44, pl. XXXVII, figs 3, 4.
- ? 1962 *Trachyceras (Protrachyceras)* sp. cf. *T. (P.) mascagni* TORNQUIST — PARNES, Israel, p. 46, pl. 8, figs 17–18, text fig. 10a.
- v 1986 *Chieseiceras chiesense* (MOJS., 1882) — BRACK & RIEBER, Lower Buchenstein beds, p. 195, pl. 1, figs 1–11, pl. 2, figs 1, 3, 4, 9, pl. 4, fig. 7, text-figs 9a–f.
- v ? 1986 *Chieseiceras* cf. *chiesense* (MOJS.) — BRACK & RIEBER, Lower Buchenstein beds, p. 199, pl. 2, figs 7, 8, text-fig. 9m.
- 1993 *Chieseiceras chiesense* (MOJS.) — GAETANI, (ed.), Anisian/Ladinian boundary field workshop, p. 66, pl. 7, figs 1–3, 5.
- 1995 *Chieseiceras chiesense* (MOJSISOVICS, 1882) — MIETTO & MANFRIN, Middle Triassic ammonoid, p. 551, pl. III, fig. 8, pl. IV, fig 5.
- 1995 *Chieseiceras chiesense* (MOJSISOVICS, 1882) — DE ZANCHE et al., Dolomites, p. 148, pl. III, figs 2, 3, 7.
- v non 1998 *Chieseiceras chiesense* (MOJSISOVICS, 1882) — VÖRÖS, Balaton-felvidék, p. 21, pl. VIII, fig. 4.
- v 2009 *Chieseiceras chiesense* (MOJSISOVICS, 1882) — VÖRÖS et al., Curionii Zone in Felsőörs, p. 329, pl. I, fig. 2, pl. II, figs 2, 3.

Material

Seven incomplete and poorly preserved specimens from Felsőörs.

Measurements

	D	WH	WW	U
M 2009.346.1.	129.5	41.1	?	?
M 2009.341.1.	79.4	37.7	?	?

Description

Medium to large-sized *Chieseiceras*, with seemingly moderately evolute conch. The whorl section is high subtrapezoidal. The umbilical edge is not seen. The flanks are gently convex and join the venter at a marked ventrolateral edge. The venter is rather wide and concave. The flanks are ornamented with prominent ribs and nodes. The rectiradiate primary ribs and the bifurcating secondary ribs are arranged into bundles. There are no definite umbilical and lateral nodes. Prominent nodes develop at the ventrolateral ends of the primary and secondary ribs. Their number is 32 to 44 on a half-whorl of the body chamber. The inner whorls are also strongly ornamented.

Suture lines are not seen.

Remarks

The holotype of *C. chiesense*, designated by BRACK & RIEBER (1986, p. 196), is housed in the collection GBAW (Wien). Both this, and the numerous specimens figured by BRACK & RIEBER (1986, l. c.) and kept in the collection PIMUZ, Zürich, were inspected by the present author. Thus the identification of the specimens from the Balaton Highland seems to be ascertained, despite of their poor state of preservation. This identification is further supported by the fact that they were collected from the highest exposed beds of the Felsőörs section (Bed 129/A) just below the first occurrence of *Eoprotrachyceras* species (VÖRÖS et al. 2009, l. c.).

The species described as “*Ceratites*” *zezianus* by MOJSISOVICS (1882, l. c.) from the Southern Alps and Felsőörs was identified with *Chieseiceras chiesense* by BRACK & RIEBER (1986, l. c.). This suggestion is accepted here, though it should

be remarked that the recent collections at Felsőörs did not yield any forms properly corresponding to “*Ceratites zezianus*”.

PARNES (1962, l. c.) described a specimen from the “lower Ladinian” of Israel under the name “*Trachyceras* (*Protrachyceras*) sp. cf. *T. (P.) mascagni* TORNQUIST”. This ammonoid is quite different from the species *mascagni*, as described by TORNQUIST (1898, p. 660, pl. XXI, fig. 4), which is more evolute, with narrow and fastigate venter. At the same time, PARNES’ specimen is very similar to *C. chiesense* in ribbing and sulcate venter, with the slight difference that its ventral furrow is narrower. Therefore this item is tentatively included in the synonymy of *C. chiesense*.

In the previous work by the present author (VÖRÖS 1998, l. c.) a *Chieseiceras* specimen was illustrated as *C. chiesense*. At present, that specimen, collected from somewhat deeper level in Felsőörs, is attributed to another, undetermined species of *Chieseiceras*.

Distribution

C. chiesense was described from the upper Anisian of the Southern Alps. At the Balaton Highland its range is restricted to the Illyrian Secedensis Subzone.

Chieseiceras sp. A

Plate XXIX: 5.

v 1998 *Chieseiceras chiesense* (MOJSISOVICS, 1882) — VÖRÖS, Balaton-felvidék, p. 21, pl. VIII, fig. 4.

Material

One well preserved body chamber from Felsőörs.

Measurements

	D	WH	WW	U
M.98.24	66.5	26.1	17.1	?

Description

Medium-sized *Chieseiceras*, with moderately evolute conch. The whorl section is high subtrapezoidal. The umbilical edge is subrounded. The flanks are gently convex and join the venter at a marked ventrolateral edge. The venter is wide and concave. The flanks are ornamented with prominent ribs. The primary ribs (around 12 on a half whorl of the body chamber) are rectiradiate and partly sinuous. The secondary ribs are inserted at around mid flank. There are no definite umbilical and lateral nodes. Prominent nodes develop at the ventrolateral ends of both the primary and the secondary ribs. Their number is 24 on a half-whorl of the body chamber.

The suture line is ceratitic, with three entire lateral saddles and moderately indented lateral lobes.

Remarks

This specimen was described by VÖRÖS (1998, l. c.) as *Chieseiceras chiesense* (MOJSISOVICS, 1882), though it was more coarsely ribbed. Discussions with H. RIEBER and P. BRACK convinced the present author, that this *Chieseiceras* may belong to another species occurring in deeper level, significantly below the true *chiesense* horizon (top of the Secedensis Subzone). The mentioned colleagues found this form in the Seceda section (pers. comm.), and also in Bagolino (BRACK et al. 2005, figs 5, 7) about two metres below the “*chiesense* groove”. Regrettably, they neither gave a species name to those findings, nor illustrated them. The scarcity of the Felsőörs material does not allow the introduction of a new species name.

Distribution

At the Balaton Highland this taxon was found in the Illyrian Crassus Subzone.

Family Hungaritidae WAAGEN, 1895

Genus **Hungarites** MOJSISOVICS, 1879

Type species: *Hungarites mojsisovicsi* (ROTH, 1871)

SPATH (1951, p. 9, 16, 17) argued that this genus should be restricted to the Ladinian (now late Anisian) forms, most of all to the type species *Hungarites mojsisovicsi* (ROTH, 1871), which had no connection/transition to the morphologically similar early Anisian forms. Nevertheless, in the “Treatise” (ARKELL et al. 1957, p. L155, L156) the early Anisian species “*Hungarites*” *yatesi* HYATT & SMITH, 1905 was selected to illustrate the genus *Hungarites*, and this might led to some misunderstandings. The new classification of the Triassic ammonoids by TOZER (1981, p. 93) gave a clearer view, and *Hungarites* was assembled with other Ladinian genera (from the Sephardic province) into the family Hungaritidae.

The type species, *Hungarites mojsisovicsi* (ROTH, 1871), was designated also by SPATH (1951, p. 16) who indicated the synonymy with “*Ceratites*” *zalaensis* (BÖCKH, 1872) but obviously gave priority to *H. mojsisovicsi*.

In the present monograph, the genus *Hungarites* is restricted to the smooth or variously ribbed forms without any kind of nodosity. The species having umbilical nodes are included to the new genus *Bullatihungarites*, whereas the forms with ventrolateral nodes are assembled into the new genus *Nodihungarites*. In the present interpretation the genus *Hungarites* (s. s.) comprises the following species:

Hungarites mojsisovicsi (ROTH, 1871, p. 213) = *H. zalaensis* (BÖCKH, 1872)

Hungarites costosus (MOJSISOVICS, 1882, p. 223, pl. VIII, fig. 4)

Hungarites lenis (HAUER, 1896, p. 252, pl. VI, figs 1, 2, 7 only)

Hungarites sinuosus n. sp.

Hungarites szentei n. sp.

The above listed species are described in detail in the present monograph, except *H. lenis* (HAUER, 1896), which does not seem to occur in the late Anisian of the Balaton Highland. Nevertheless the interpretation of *H. lenis* needs some comments below.

The specimen figured by HAUER (1896, pl. VI, figs 1, 2) was designated as the lectotype of *lenis* by SPATH (1934, p. 457, although described as *Semiornites lenis*). The lectotype (under the inventory number: NHMW 1998z0063/0007) is kept in the collection NHMW (Wien), besides further two ammonoids, described and figured by HAUER (1896, pl. VI, figs 3–6), who considered them belonging also to “*Ceratites*” *lenis*. The present author carefully examined these three specimens and concluded that they represent three different taxa. The lectotype (HAUER 1896, pl. VI, figs 1, 2) is a true *Hungarites*, with smooth umbilical rim, even in the inner whorls (in contrast to the figure given by HAUER, l. c.); with weak ribbing throughout the lateral sides (even on the body chamber) and fastigate venter. The second specimen figured by HAUER (1896, pl. VI, figs 3, 4) has definite umbilical nodes passing to radial swellings, and well-developed ventrolateral nodes and carinate venter; it may very probably belong to the genus *Parahungarites* n. gen. (introduced herein). The third specimen, figured by HAUER (1896) on pl. VI, figs 3, 4, shows a lateral ornamentation more or less similar to the previous one, but its venter bears a low, blunt keel; it seems rather close to the genus *Lardaroceras*. It can hardly be understood why HAUER (1896) lumped these apparently quite different forms into a single species; but anyhow, it was the source of later misinterpretations of the species *lenis*.

Hungarites mojsisovicsi (ROTH, 1871)

Plate XXX: 4–6; Plate XXXI: 1–5; Plate XXXII: 1–4; Plate XXXIII: 1, 2; Plate XXXIV: 1–3; Figures 64–69.

- v * 1871 *Ceratites mojsisovicsi* BÖCKH M. S. — ROTH, Forráshegy, p. 213.
v 1872 *Ceratites Zalaensis* n. sp. — BÖCKH, Bakony déli részének, p. 145, pl. VII, figs 1, 2.
v 1873 *Ceratites Zalaensis* n. sp. — BÖCKH, Südlichen Theiles des Bakony, p. 155, pl. VII, figs 1, 2.
v 1882 *Hungarites mojsisovicsi* (BÖCKH) E. v. M. — MOJSISOVICS, Mediterr. Triasprovinz, p. 222, pl. VII, fig. 6, pl. VIII, fig. 3.
non 1903 *Hungarites mojsisovicsi* ROTH sp. — FRECH, Neue Cephalopoden, p. 10, pl. III, figs 2, 3.
non 1910 *Hungarites mojsisovicsi* ROTH (*Judicrites*) — RENZ, Argolis, p. 33, pl. I, fig. 5.
v 1989 *Hungarites mojsisovicsi* (ROTH, 1871) — VÖRÖS & PÁLFY, Vászoly, p. 19., pl. I, fig. 4, pl. II, fig. 2.
v 1989 *Hungarites* cf. *lenis* (HAUER, 1896) — VÖRÖS & PÁLFY, Vászoly, p. 19., pl. I, fig. 6.
v ? 1993 *Hungarites zalaensis* (BÖCKH, 1872) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 461 (partim), pl. 1, figs 3, 7, 8 (only).
v 1993 *Hungarites lenis* — VÖRÖS, Reitzi Zone, p. 27, pl. IV, fig. 4.
v 1993 *Hungarites mojsisovicsi* — VÖRÖS, Reitzi Zone, p. 27, pl. V, fig. 3.
v 1993 *Hungarites mojsisovicsi* — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 117, pl. 13, fig. 3.
? 1995 *Hungarites zalaensis* (BÖCKH, 1872) — MIETTO & MANFRIN, Middle Triassic ammonoid, p. 551 (partim), pl. III, fig. 6 (only), non fig. 7.
v 1998 *Hungarites mojsisovicsi* (ROTH, 1871) — VÖRÖS, Balaton-felvidék, p. 21, 38, 42, (partim), pl. IV, figs 4, 5 (only) (non fig. 6), pl. VI, fig. 1.
v 2002 *Hungarites mojsisovicsi* (ROTH) — VÖRÖS, Paleoenvironmental distribution, p. 486 (partim), pl. 1, figs 1, 2.
? 2005 *Hungarites zalaensis* (BÖCKH, 1872) — MANFRIN et al., Latemar, p. 481 (partim), figs 9/24–27 (only), non fig. 28.

Material

79 specimens from Felsőörs (22), Vörösberény (2), Szentkirályszabadja (10), Vászoly (14), Mencshely (18), Sóly (8), Barnag (1), Hajmáskér (2) and Öskü (2).

Measurements

	D	WH	WW	U
Lectotype T.1662.	100.3	?	25.2	?
Paralectotype T. 3085.	68.1	36.1	?	12.5

	D	WH	WW	U
T 2017.12.1.	81.6	46.8	25.8	11.5
INV 2017.252.1.	110.5	46.1	25.5	20.7
INV 2017.251.1.	110.1	47.2	24.6	22.4
M.89.101	108.5	46.5	23.3	20.6
INV 2017.301.1.	96.3	45.0	?	17.4
INV 2017.249.1.	92.1	44.4	?	13.1
M.89.90	81.7	37.8	17.5	12.9
INV 2017.247.1.	74.9	33.6	16.3	?
INV 2017.248.1.	74.1	?	19.3	?
M.98.36	71.1	34.1	15.1	9.5
INV 2017.253.1.	70.6	40.8	?	?
INV 2017.246.1.	70.5	34.1	17.1	?
M.98.35	68.5	33.4	15.5	9.1
M.98.152A	64.1	31.1	14.5	9.5
INV 2017.250.1.	61.9	35.1	15.4	7.2

Description

Medium to large-sized *Hungarites* with very involute, compressed conch. The whorl-section is high oval. The umbilical wall is subrounded to vertical. The umbilical margin is smooth. The flanks are gently convex, almost flat and meet the venter at a definite ventrolateral shoulder. On the phragmocone and on the immature specimens, the venter has a mostly sharp keel, always well separated from the ventrolateral shoulders by flat bands (Figure 64). The keel gradually disappear on the mature body chamber and the venter becomes flat or gently fastigate (Figure 65). The body chamber shows definite umbili-

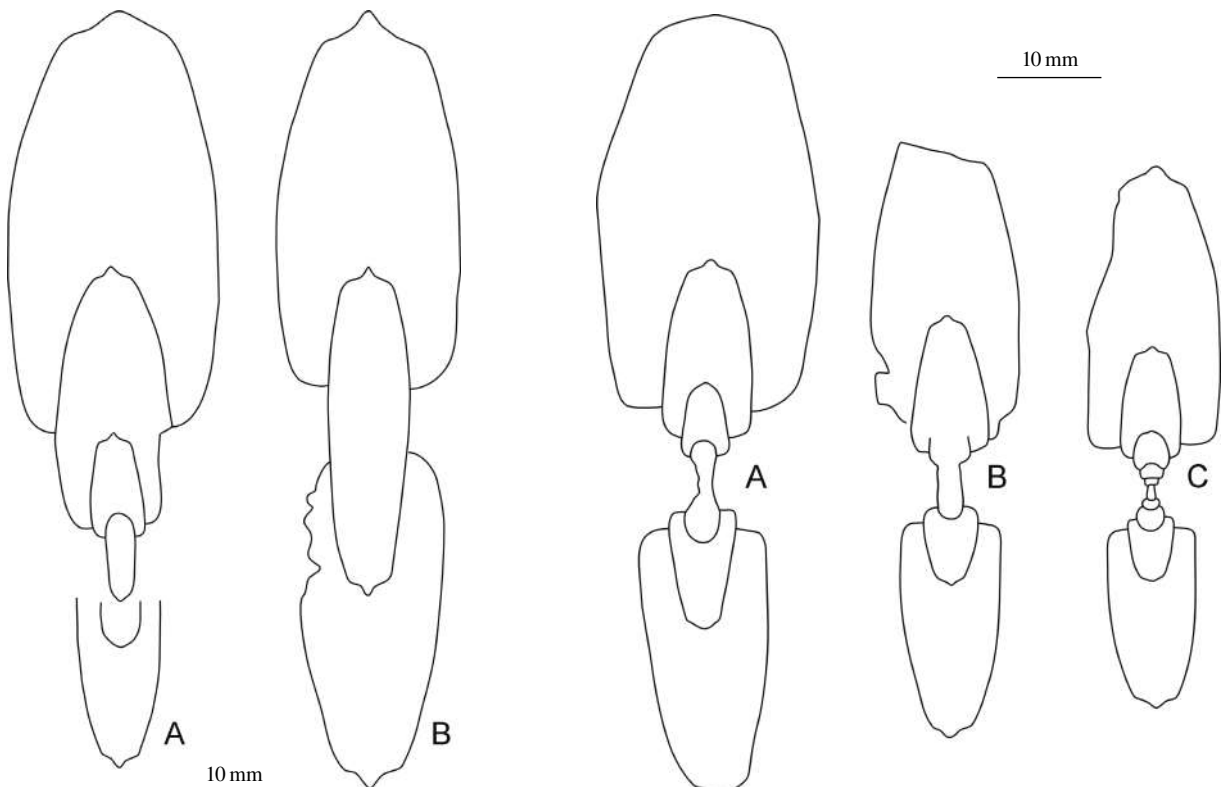


Figure 64. Cross sections of *Hungarites mojsisovicsi* (ROTH, 1871), A: M.89.126, Vászoly, P–11a, Bed 12, Reitzi Zone, Liepoldti Subzone; B: M.89.97, Vászoly, P–11a, Bed 16/A, Secedensis Zone, Crassus Subzone

Figure 65. Cross sections of *Hungarites mojsisovicsi* (ROTH, 1871), A: T 2017.12.1., Vászoly, P–11c, loose, Reitzi Zone, Reitzi Subzone (?); B: M.98.152A, Sóly, Bed 6, Reitzi Zone, Avisianum Subzone; C: INV 2017.298.1., Vászoly, P–2, Bed 4, Reitzi Zone, Reitzi Subzone

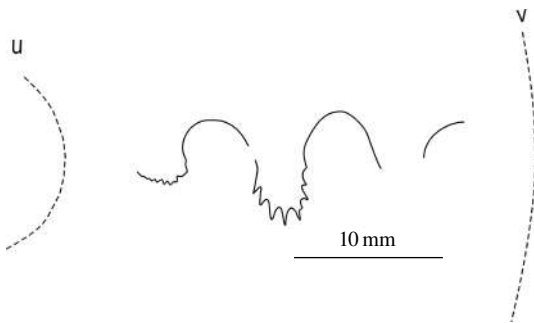


Figure 66. Suture line of *Hungarites mojsisovicsi* (ROTH, 1871), Paralectotype, T.3085., at 30 mm whorl-height, Felsőörs, loose, Reitzi Zone, Avisianum Subzone (?), u: umbilical margin, v: ventrolateral margin

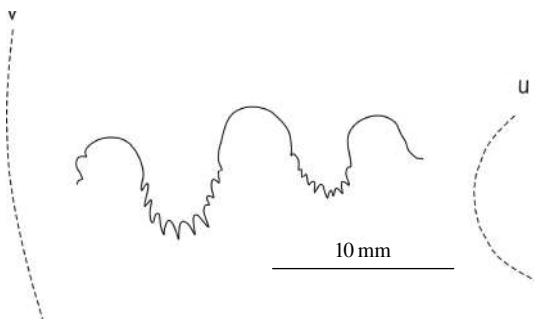


Figure 67. Suture line of *Hungarites mojsisovicsi* (ROTH, 1871), INV 2017.246.1., at 26 mm whorl-height, Felsőörs, Bed 111/E, Reitzi Zone, Avisianum Subzone, u: umbilical margin, v: ventrolateral margin

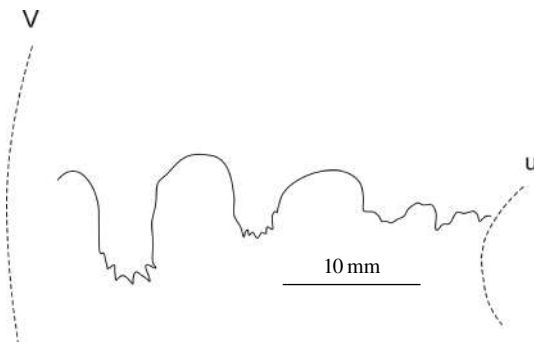


Figure 68. Suture line of *Hungarites mojsisovicsi* (ROTH, 1871), INV 2017.252.1., at 32 mm whorl-height, Mencshely I, Bed 9, Reitzi Zone, Reitzi Subzone, u: umbilical margin, v: ventrolateral margin

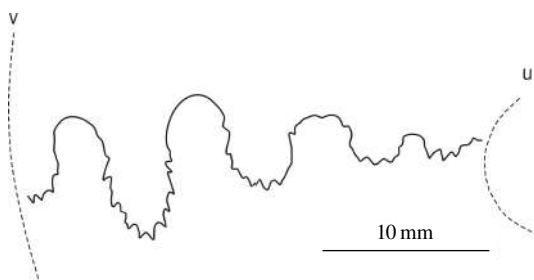


Figure 69. Suture line of *Hungarites mojsisovicsi* (ROTH, 1871), INV 2017.298.1., at 29 mm whorl-height, Vászoly, P-2, Bed 4, Reitzi Zone, Reitzi Subzone, u: umbilical margin, v: ventrolateral margin

cal egression. The ornamentation is very weak or absent. Most specimens show irregularly spaced, very gentle, sinuous and projected ribs, or rather radial folds. These radial folds are the strongest at around the mid-flank and gradually disappear ventrally; rarely, secondary folds are inserted near the venter. In many cases, the ornamentation of the body chamber becomes weaker and the folds develop into irregularly spaced bundles. Nodes are totally absent.

The suture line (Figures 66–69) is ceratitic, tending to be subammonitic, with at least three lateral saddles with occasional incisions at their sides. The first lateral lobe is very deep and strongly denticulated; the second (and the indistinct third) lateral lobe are reduced in all respects. Vague suspensive lobes are seen near the umbilical margin.

Remarks

The larger specimen figured by BÖCKH (1872, pl. VI, fig. 1) as “*Ceratites zalaensis*,” and subsequently by MOJSISOVICS (1882, p. 222, pl. VII, fig. 6) as *Hungarites mojsisovicsi*, was designated as the lectotype of *mojsisovicsi* by SPATH (1951, p. 16). The smaller (better preserved) specimen, figured by BÖCKH (1872, pl. VI, fig. 2) and later by MOJSISOVICS (1882, pl. VIII, fig. 3) became the paralectotype of *H. mojsisovicsi* (ROTH, 1871). Both specimens are kept in the collection of the MGSB, under the inventory numbers T.1662. (lectotype) and T.3085. (paralectotype), respectively. They are re-figured here on Plate XXXI: 1 and Plate XXX: 4.

Many authors (see the synonymy) preferred to denote this species as *zalaensis* (BÖCKH) instead of *mojsisovicsi* (ROTH). This nomenclatural contradiction will be discussed and cleared up in the following.

The first, regrettably laconic, but valid description of this species (as “*Ceratites mojsisovicsi* BÖCKH M. S.”) was published by ROTH (1871, p. 213), in Hungarian:

„Ezen alak [*Ceratites Böckhi* n. sp.] mely hármaz gömbösora, úgymint részint lobaszerkezete által *Cerat. binodosus*-ra emlékeztet, ettől jól kifejlődött taraja által már lényegesen különbözik. Ez utóbbi (a taraj) *Cerat. mojsisovicsi* BÖCKH M. S.-val hozza kapcsolatba, ettől pedig gömbökésítése, valamint nem szűkülő első oldallobusa által van elkülönítve.”

That is, in English translation:

“This form [*Ceratites Böckhi* n. sp.] by its three rows of nodes and partly by the structure of its suture line reminds to *Cerat. binodosus* but from this it differs substantially by its well developed crest. This latter (the crest) brings it into connection with *Cerat. mojsisovicsi* BÖCKH M. S., from which it is separated by its nodose ornament and its not narrowing first lateral lobe.”

It is a very simple differential diagnosis, with the definite statements that the species “*Ceratites mojsisovicsi*” is similar to “*Ceratites Böckhi*” in having a “crest” (i.e. fastigate or keeled venter) but it is different from “*C. Böckhi*” because it does not have nodose ornament (i.e. smooth) and its first lateral lobe is narrowing. This diagnosis meets the requirements of availability according to the Article 12.1. of the ICZN (ICZN 1999, p. 23) which says: “To be available, every new name published before 1931 must ... be accompanied by a description or a definition of the taxon that it denotes.” Therefore, the species name „*mojsisovicsi*” is available and has to be maintained. The name “*Cer. mojsisovicsi*” was mentioned again by BÖCKH (1872, p. 140 and 1873a, p. 150, in footnote) as reference to „*Cer. Zalaensis*” what he intended to introduce as a substitute name for “*Cer. mojsisovicsi*”. It is remarkable that ROTH (1871, p. 213), when first mentioning this species name, attributed the authorship to BÖCKH: “*Ceratites mojsisovicsi* BÖCKH M. S.” implying that this name was originally given by BÖCKH. The reason why BÖCKH wanted

to change this name is hardly comprehensible. After all, BÖCKH's "*C. Zalaensis*" is here taken as a junior objective synonym of "*C. mojsisovicsi* ROTH". Regrettably, the diagnosis of "*C. mojsisovicsi*" was published only in Hungarian, but this does not change its status in the zoological nomenclature. The Recommendation 13B of the ICZN (ICZN 1999, p. 24: "Authors should publish diagnoses of new taxa in languages widely used internationally in zoology.") applies only to names published after 1931.

As far as the authorship is concerned, not BÖCKH, but ROTH has to be regarded as the author of the species *mojsisovicsi*, because the latter author gave the first definition of this taxon (ROTH 1871, p. 213). Therefore the present author does not accept the action of MOJSISOVICS (1882, p. 222) who cited BÖCKH as the author of this species and agrees with the usage by SPATH (1951, p. 16) and in the "Treatise" (ARKELL et al. 1957, p. L156) where the authorship of "*Hungarites mojsisovicsi*" is given to ROTH, 1871.

The lectotype and paralectotype of *H. mojsisovicsi* are available in the collection of the MGSZ, moreover our recent collecting works yielded a great amount of *H. mojsisovicsi* specimens. On this basis, the wide morphological variation and the diagnostic features of this species were properly defined. Other species of *Hungarites* differ from the type species mostly in their stronger ornamentation. *H. costosus* MOJSISOVICS, 1882 has stronger ribbing and much higher and sharper keel, even on the body chamber. *H. lenis* (HAUER, 1896) stands very close to *H. mojsisovicsi*, but its ribbing is more regular, rectiradiate and runs through the flanks, from the umbilical to the ventrolateral margin. In *H. sinuosus* n. sp., the sinuous radial folds are more distinct, prorsiradiate and become stronger towards the venter. In *H. szentei* n. sp. the strong radial folds increase in width and strength ventrally and bear projected swellings at their ventral ends.

Two specimens illustrated as *H. mojsisovicsi* by FRECH (1903) show definite umbilical nodosity what renders them close to the new genus *Bullatihungarites*.

The specimen figured as *H. mojsisovicsi* by RENZ (1910, pl. I, fig. 5) has very distinct and strong ribbing, therefore it definitely does not belong to this species.

In some previous works the present author (VÖRÖS & PÁLFY 1989, VÖRÖS 1993), in lack of direct knowledge on the lectotype of *H. lenis* (HAUER, 1896), certain specimens of *H. mojsisovicsi* were wrongly attributed to *lenis*. Moreover, one of the specimens, figured as *H. mojsisovicsi* by VÖRÖS (1998, pl. IV, fig. 6), according to the present revision, is believed to belong to *Bullatihungarites* aff. *emiliae* (MOJSISOVICS, 1882).

BRACK & RIEBER (1993, l. c.), and also in GAETANI (ed.) (1993, l. c.), too widely and partly wrongly interpreted *H. mojsisovicsi* (what they mentioned and described under the invalid name *H. zalaensis*). Their specimens were examined by the present author in the collection PIMUZ, Zürich, and only a few of them (figured by BRACK & RIEBER 1993 on pl. 1, figs 3, 7, 8) may perhaps belong to *H. mojsisovicsi*. The majority of their figured specimens has definite nodes (or bullae) on the umbilical margin (BRACK & RIEBER 1993, pl. 1, figs 1, 2, 4–6). In the author's opinion these are attributed to *Bullatihungarites emiliae* (MOJSISOVICS, 1882).

Some of the specimens figured by MIETTO & MANFRIN (1995, l. c.) and MANFRIN et al. (2005, l. c.) (who also used the invalid name *H. zalaensis*) may belong to *H. mojsisovicsi*, although, as far as the photographs show, the umbilical margin seems somewhat nodose. Some others of their figured specimens (MIETTO & MANFRIN 1995, pl. III, fig. 7) and (MANFRIN et al. 2005, fig. 9/28) probably represent different species of *Bullatihungarites*.

Distribution

H. mojsisovicsi was described from the upper Anisian of the Balaton Highland and the Southern Alps. At the Balaton Highland it ranges from the Illyrian Felsőeersensis Subzone to the Crassus Subzone.

Hungarites costosus MOJSISOVICS, 1882

Plate XXXV: 4, 5.

- v 1872 *Ceratites* n. sp. indet. — BÖCKH, Bakony déli részének, p. 149, pl. VIII, fig. 6.
- v 1873 *Ceratites* n. sp. indet. — BÖCKH, Südlichen Theiles des Bakony, p. 159, pl. VIII, fig. 6. 2.
- v* 1882 *Hungarites costosus* E. v. MOJSISOVICS — MOJSISOVICS, Mediterranen Triasprovinz, p. 223, pl. VIII, fig. 4.
- ? 1903 *Hungarites costosus* MOJS. em. FRECH — FRECH, Neue Cephalopoden, p. 12, pl. III, fig. 4.
- v 1993 *Halilucites costosus* — VÖRÖS, Reitzi Zone, p. 25, pl. V, fig. 5, pl. VI, fig. 3.
- v 1993 *Halilucites costosus* — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 118, pl. 13, fig. 8.

Material

Five specimens from Felsőörs (1), Vászoly (2), Mencshely (1) and Balatoncsicsó (1).

Measurements

	D	WH	WW	U
Holotype T.693.	77.8	32.2	21.1	?
INV 2017.254.1.	35.4	?	?	?

Description

The new collections yielded only poor fragments, therefore this description is partly based on the holotype of *H. costosus*, available in the collection of the MGSZ (inventory number: T.693.), and re-figured here (Plate XXXV: 4).

Medium to large-sized *Hungarites* with involute, moderately compressed conch. The whorl-section is oval to subquadrate. The umbilical wall is poorly seen. The umbilical margin is smooth. The flanks are gently convex, and meet the venter at a definite ventrolateral shoulder. The venter has a very sharp and high keel, well separated from the ventrolateral shoulders by flat, almost concave belts. These give a tricarinate appearance to the actually unicarinate venter. The ornamentation consists of somewhat irregular, sinuous and projected ribs, starting in the inner third of the flank and becoming gradually stronger ventrally. At the ventrolateral margin the ribs become strongly projected, then fade out in the form of weak, diagonal folds.

The suture lines are poorly seen; ceratitic, with three lateral saddles and moderately denticulated first and second lateral lobes.

Remarks

The type specimen of *H. costosus* was first illustrated by BÖCKH (1872, 1873, l. c.) as “*Ceratites* n. sp. indet.”, but the first binominal description of this species was given by MOJSISOVIC (1882, l. c.). It may be mentioned that the figures published by BÖCKH (l. c.) is much more realistic than those of MOJSISOVIC (l. c.).

FRECH (1903, l. c.) illustrated two specimens of *H. costosus* from the type locality; they may, in all probability, belong to this species.

In a previous paper (VÖRÖS 1993, l. c.) and also in GAETANI (ed. 1993, l. c.) the present author attributed this species to the genus *Halilucites*. MIETTO et al. (2003, p. 459) and MANFRIN et al. (2005, p. 498) rightly criticized this attribution and suggested that the species *costosus* may belong to a new genus. Their criticism is accepted, but, instead of creation of a new genus, the species *costosus* is now attributed to *Hungarites* in the concept of the present revision of this genus.

Distribution

Up to now, *H. costosus* is known only from the Balaton Highland, where it occurs in the Illyrian Avisianum Subzone and probably in the Crassus Subzone.

Hungarites sinuosus n. sp.

Plate XXXIV: 4, 5; Plate XXXV: 1–3; Figures 70, 71.

Holotype: Hungarian Natural History Museum (Budapest), inventory number: PAL 2017.38.1.

Locus typicus: Mencshely I, Bed 6.

Stratum typicum: Red, green-spotted crinoidal limestone (Vászoly Formation); upper Illyrian, Reitzi Zone, Avisianum Subzone.

Derivatio nominis: Referring to the ornamentation, the sinuous ribbing on the flanks.

Diagnosis: Medium to large-sized, very involute *Hungarites* with high oval whorls and vertical umbilical wall. Umbilical margin smooth. Venter arched to fastigate, with distinct low keel. Ribs prorsiradiate, sinuous, projected, strength increasing ventrally. Ornament stronger on body chamber. Nodes absent. Suture subammonitic.

Material

Six specimens from Felsőörs (1), Vászoly (2) and Mencshely (3).

Measurements

	D	WH	WW	U
Holotype PAL 2017.38.1.	88.5	40.8	19.1	13.5
Paratype PAL 2017.39.1.	103.1	?	29.1	?
Paratype M.89.100	97.3	39.6	23.7	20.7
Paratype PAL 2017.40.1.	78.7	33.3	21.9	17.3
Paratype PAL 2017.41.1.	70.5	38.1	20.4	?

Description

Medium to large-sized *Hungarites* with very involute, compressed conch. The whorl-section is high oval. The umbilical wall is subrounded to vertical. The umbilical margin is smooth. The flanks are gently convex, almost flat and meet the venter at an indistinct ventrolateral shoulder. On the phragmocone and on the immature specimens, the venter has a narrow but

low and rounded keel, moderately separated from the ventrolateral shoulders. The mature body chamber has a gently fastigate venter and shows definite umbilical egression. The ornamentation consists of rather regularly spaced, prorsiradiate, sinuous and projected ribs, or folds. The ribs start near the umbilical margin and become stronger ventrally; rarely, secondary folds are inserted near the venter. In most cases, the strength of the ornamentation increases on the body chamber. Nodes are totally absent.

The suture line (Figure 71) is subammonitic, with four lateral saddles showing incisions at their sides. The first lateral lobe is very deep and strongly denticulated; the second and the third lateral lobes are reduced in all respects. Several suspensive lobes are seen near the umbilical margin.

Remarks

The most important distinctive feature of *H. sinuosus* is the moderately strong, prorsiradiate, sinuous ribbing, increasing in strength towards the ventrolateral margin. The ornamentation of *H. mojsisovicsi* (ROTH, 1871) is much weaker or absent, and it has higher and sharper keel. *H. costosus* MOJSISOVICS, 1882 has stronger ribbing and much higher and sharper keel, even on the body chamber. From some aspects *H. lenis* (HAUER, 1896) stands between *H. sinuosus* and *H. mojsisovicsi*, but its ribbing is more regular, rectiradiate and runs through the flanks in uniform strength, from the umbilical to the ventrolateral margin. In *H. szentei* n. sp. the ribs are straight and increase in width and strength ventrally and bear projected swellings at their ventral ends.

Distribution

Up to now *H. sinuosus* n. sp. is known only from the Balaton Highland, where it ranges from the Illyrian Avisianum Subzone to the Crassus Subzone.

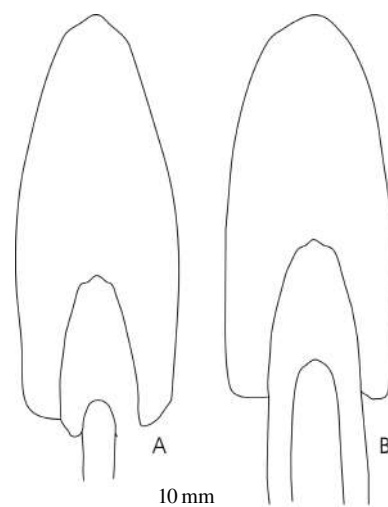


Figure 70. Cross sections of *Hungarites sinuosus* n. sp., A: Holotype, PAL 2017.38.1., Mencshely I, Bed 6, Reitzi Zone, Avisianum Subzone; B: Paratype, M.89.100, Vászoly, P-11a, Bed 16/A, Secedensis Zone, Crassus Subzone

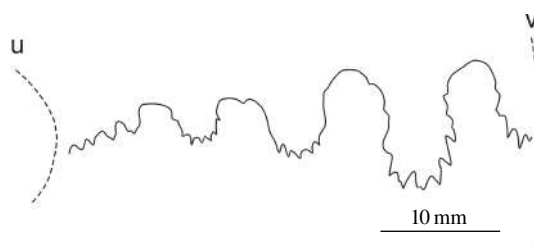


Figure 71. Suture line of *Hungarites sinuosus* n. sp., Holotype, PAL 2017.38.1., at 41 mm whorl-height, Mencshely I, Bed 6, Reitzi Zone, Avisianum Subzone, u: umbilical margin, v: ventrolateral margin

Hungarites szentei n. sp. Plate XXXVI: 1–4; Figure 72.

Holotype: Hungarian Natural History Museum (Budapest), inventory number: PAL 2017.42.1.

Locus typicus: Vászoly, Trench P-14 (loose).

Stratum typicum: Ochre-yellow limestone (Vászoly Formation); upper Illyrian, Secedensis Zone, Crassus Subzone.

Derivatio nominis: After the name of István SZENTE, renowned Hungarian palaeontologist.

Diagnosis: Medium to large-sized, involute *Hungarites* with high oval whorls and vertical umbilical wall. Umbilical margin smooth. Venter with low keel in the phragmocone; fastigate in body chamber. Ribs prorsiradiate, straight, strength increasing ventrally, projected swellings on ventrolateral ends of ribs. Ornament stronger on body chamber. Suture ceratitic to subammonitic.

Material

Four specimens from Szentkirályszabadja (2) and Vászoly (3).

Measurements

	D	WH	WW	U
Holotype PAL 2017.42.1.	98.6	40.8	23.3	26.7
Paratype PAL 2017.45.1.	82.5	34.2	?	20.8
Paratype PAL 2017.44.1.	81.5	30.6	18.1	15.8
Paratype PAL 2017.43.1.	76.6	32.5	18.5	14.4

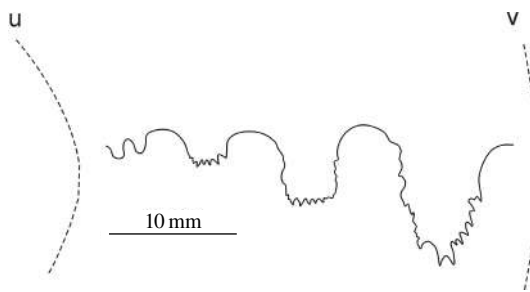


Figure 72. Suture line of *Hungarites szentei* n. sp., Holotype, PAL 2017.42.1., at 35 mm whorl-height, Vászoly, P-14, loose, Secedensis Zone (?), Crassus Subzone (?), u: umbilical margin, v: ventrolateral margin

Description

Medium to large-sized *Hungarites* with involute, moderately compressed conch. The whorl-section is high oval. The umbilical wall is subrounded to vertical. The umbilical margin is smooth. The flanks are gently convex, almost flat and meet the venter at a distinct ventrolateral shoulder. On the phragmocone the venter has a narrow but low and rounded keel, moderately separated from the ventrolateral shoulders. The mature body chamber has fastigate venter and shows definite umbilical egression. The ornamentation consists of regularly spaced, prorsiradiate, straight ribs. The ribs start not far from the umbilical margin and become very strong ventrally; rarely and irregularly, secondary riblets are inserted near the venter. At the ventrolateral margin the ribs end with prominent, projected swellings. The strength of the ornamentation increases on the body chamber.

The suture line (Figure 72) is ceratitic, tending to subammonitic, with four lateral saddles partially showing incisions at their sides. The very deep first lateral lobe is strongly and irregularly denticulated; the second and the third lateral lobes are weakly denticulated. Suspensive lobes appear near the umbilical margin.

Remarks

H. szentei differs from other species of *Hungarites* by its straight and very strong ribbing. *H. costosus* MOJSISOVICS, 1882 is similarly or even more strongly ribbed, but it has very high and sharp keel on the body chamber, which is simply fastigate in *H. szentei*.

Distribution

Up to now *H. szentei* n. sp. is known only from the Balaton Highland, where it ranges from the Illyrian Reitzi Subzone to the Crassus Subzone.

Genus *Bullatihungarites* n. gen.

Type species: *Bullatihungarites emiliae* (MOJSISOVICS, 1882).

Diagnosis: Small to medium-sized hungaritids with very involute conch. Whorl section high oval; umbilical wall vertical to oblique. Venter with sharp ventrolateral shoulder and high keel. Prorsiradiate to rectiradiate, partly sinuous radial folds, widening and fading out ventrally. Bullate umbilical nodes present; lateral or ventrolateral nodes absent. Suture ceratitic, tending to subammonitic; three to four, narrow and high lateral saddles, first lateral lobe deep with strong denticulation.

Derivatio nominis: Referring to the bullate ornament along the umbilical margin.

Nominal species belonging to *Bullatihungarites*:

Bullatihungarites emiliae (MOJSISOVICS, 1882, p. 223, pl. VIII, fig. 8.)

Bullatihungarites semiplicatus (HAUER, 1896, p. 265, pl. XI, figs 4–6.)

Discussion: Until recently, the late Anisian hungaritids of the Tethyan province (except the Sephardic ones) were assembled into one genus, namely the *Hungarites*, with the type genus *H. mojsisovicsi* (ROTH, 1871), according to the designation by SPATH (1951, p. 16). In the conception of the present monograph, considering the essential morphological characters of the type species, *Hungarites* includes only weakly ornamented species, without any nodes. Therefore, a new genus *Bullatihungarites* was necessary to be introduced for the forms with umbilical nodosity. In typical case these bullate umbilical nodes pass into radial swellings gradually widening and fading in ventral direction.

Distribution: Late Anisian; Southern Alps, Dinarides, Balaton Highland. At the Balaton Highland *Bullatihungarites* ranges from the Illyrian Reitzi to Crassus Subzones.

Bullatihungarites emiliae (MOJSISOVICS, 1882)
Plate XXXVII: 1–8; Plate XXXVIII: 1; Figures 73–75.

v * 1882 *Hungarites Emiliae* E. v. MOJSISOVICS — MOJSISOVICS, Mediterr. Triasprovinz, p. 223, pl. VIII, fig. 8.

v ? 1896 *Ceratites (Hungarites) plicatus* HAU. n. sp. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 266, pl. IX, figs 8–10.

v 1900 *Hungarites Emiliae* MOIS. — DIENER, Muschelkalk–Cephalopoden südl. Bakony, p. 27, pl. II, fig. 4.

v ? 1993 *Hungarites zalaensis* (BÖCKH, 1872) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 461 (partim), pl. 1, figs 1, 2, 4, 5, 6, text-figs 15a, b (only). (non figs 3, 7, 8).

- v ? 1993 *Hungarites zalaensis* (BÖCKH, 1872) — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 66, pl. 6, fig. 9.
 v ? 1993 *Hungarites* cf. *plicatus* (HAUER, 1896) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 462 (partim), pl. 2, figs 1–3, (only), (non figs 4, 8, 9).
 v 1998 *Hungarites emiliae* MOJSISOVICS, 1882 — VÖRÖS, Balaton-felvidék, p. 42, pl. V, fig. 8.
 v 1998 *Hungarites mojsisovicsi* (ROTH, 1871) — VÖRÖS, Balaton-felvidék, p. 42, (partim), pl. IV, fig. 6.
 v 2002 *Hungarites mojsisovicsi* (ROTH) — VÖRÖS, Paleoenvironmental distribution, p. 486 (partim), pl. 1, fig. 3.
 ? 2005 *Hungarites zalaensis* (BÖCKH, 1872) — MANFRIN et al., Latemar, p. 481 (partim), figs 9/24–27 (only), non fig. 9/28.

Material

32 specimens from Vászoly (2), Mencshely (8) and Sóly (22).

Measurements

	D	WH	WW	U
INV 2017.258.1.	92.7	41.5	20.3	14.5
M.98.229A	66.1	31.5	17.5	12.8
M.98.37	56.1	28.8	12.4	5.8
M.98.208A	56.0	29.6	14.4	10.5
INV 2017.256.1.	53.1	?	14.5	9.1
M.98.40	52.1	26.2	11.5	7.8
M.98.239A	31.3	15.4	7.3	5.7
INV 2017.255.1.	31.1	14.6	7.2	5.1
INV 2017.257.1.	31.1	?	?	?

Description

10 mm

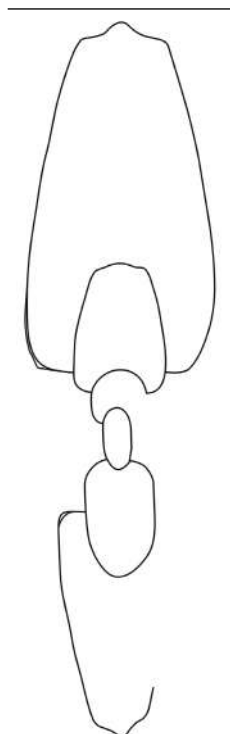


Figure 73. Cross section of *Bullatihungarites emiliae* (MOJSISOVICS, 1882), INV 2017.299.1., Mencshely I, Bed 9, Reitzi Zone, Reitzi Subzone

Small to medium-sized *Bullatihungarites* with very involute, compressed conch. The whorl-section is high oval. The umbilical wall is subrounded to vertical. The flanks are gently convex, almost flat and meet the venter at a sharp and smooth ventrolateral shoulder. The venter has a rather high, subrounded keel, separated from the ventrolateral shoulders by narrow, concave belts. The ornamentation consists of prorsiradiate, partly sinuous ribs, or rather folds. The ribs start with definite umbilical nodes or bulges (7 to 8 on a half whorl) at the umbilical margin; here they have the form of wide swellings with narrower interspaces. Towards the mid-flank, the swellings become even wider and very low. Further ventrally they gradually fade out, and rarely reach the ventrolateral margin. The strength of the ornamentation increases on the body chamber and nodes appear at the ventrolateral margin (lateral nodes are absent). The mature body chamber (over 75 mm diameter) has a keeled venter with rather strong, projected ventrolateral nodes, and shows definite umbilical egression.

The suture line (Figures 74, 75) is ceratitic to partly subammonitic, with four, rather narrow and high lateral saddles. The first lateral lobe is very deep, widely expands posteriorly and strongly denticulated; the second and the third lateral lobes are reduced in all respects. Suspensive lobes are seen near the umbilical margin in one specimen (Figure 75). The shape of the saddles changes according to ontogeny: in small specimens (Figures 74a, 74b) they have monophyllic heads and show few incisions at their sides; in larger specimens

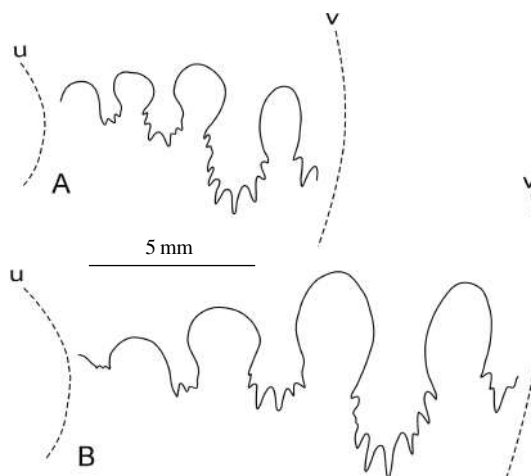


Figure 74. Suture lines of *Bullatihungarites emiliae* (MOJSISOVICS, 1882); M.98.239A, Sóly, Bed 7, Reitzi Zone, Avisianum Subzone, A: suture line at 8 mm whorl-height, B: suture line at 14 mm whorl-height, u: umbilical margin, v: ventral margin

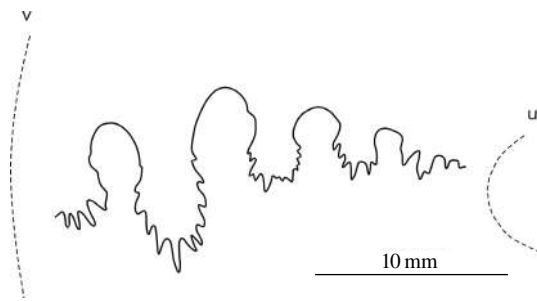


Figure 75. Suture line of *Bullatihungarites emiliae* (MOJSISOVICS, 1882); M.98.37, at 26 mm whorl-height, Sóly, Bed 6, Reitzi Zone, Avisianum Subzone, u: umbilical margin, v: ventral margin

(Figure 75) the saddles are ceratitic to subammonitic, with more lateral incisions.

Remarks

The holotype (by monotypy) of *B. emiliae*, described and illustrated by MOJSISOVICS (1882, l. c.), is kept in the collection GBAW, Wien (inventory number: 1882/03/269). Another specimen, figured as *B. emiliae* by DIENER (1900, l. c.) was found in the collection of the MGSB (under the inventory number: T.1639.). Both mentioned specimens were studied by the present author and thus the identification of our specimens from the Balaton Highland is ascertained.

B. emiliae differs from *B. semiplicatus* (HAUER, 1896) by its narrower umbilicus and by smaller number of umbilical nodes and ribs.

The specimen figured as “*Ceratites (Hungarites) plicatus*” by HAUER (1896, pl. IX, figs 8–10), checked by the present author in the collection NHMW (Wien), stands very close to *B. emiliae*, and here they are tentatively synonymised.

In the present author’s opinion, BRACK & RIEBER (1993, l. c.) too widely interpreted the species “*Hungarites zalaensis*” (BÖCKH, 1872), which is, in fact, the junior synonym of *H. mojsisovicsi* (ROTH, 1871). They have a large collection of “*zalaensis*” from the Latemar; it was studied by the present author in the collection PIMUZ, Zürich. Some of their figured specimens (BRACK & RIEBER 1993, pl. 1, figs 3, 7, 8) correspond to *H. mojsisovicsi*. On the other hand, most specimens [l. c., pl. 1, figs 1, 2, 4, 5, 6, text-figs 15a, b; and also in GAETANI (ed.) 1993, pl. 6, fig. 9] show definite characters of *B. emiliae*, including the distinctive umbilical nodes/bulges, and the fading out lateral swellings. Especially the umbilical nodosity strongly contradicts the attribution to *H. mojsisovicsi* (= “*zalaensis*”), which has absolutely smooth umbilical margin.

The specimens figured as “*Hungarites cf. plicatus* (HAUER, 1896)” by BRACK & RIEBER (1993, l. c.) were also examined by the present author. By applying the synonymy between the species *plicatus* and the senior synonym *emiliae*, the specimens figured by BRACK & RIEBER (1993, pl. 2, figs 1–3) may belong to *B. emiliae*. The others (BRACK & RIEBER 1993, pl. 2, figs 4, 8, 9) are tentatively attributed to *B. semiplicatus* (HAUER, 1896).

One specimen figured as *H. mojsisovicsi* by the present author (VÖRÖS 1998, pl. IV, fig. 6.) is now included into the synonymy of *B. emiliae*.

The nomenclatural and taxonomical misinterpretation of “*H. zalaensis*” (= *H. mojsisovicsi*) can be seen also in MANFRIN et al. (2005, l. c., figs 9/24–27), who figured typical specimens of *B. emiliae* under the name “*zalaensis*”. On the other hand, one of their figured specimens (l. c., fig. 9/28), in the present author’s opinion, seems to belong to *B. semiplicatus* (HAUER, 1896).

Distribution

B. emiliae was described from the upper Anisian of the Southern Alps and the Balaton Highland, where it ranges from the Illyrian Reitzi Subzone to the Crassus Subzone.

Bullatihungarites semiplicatus (HAUER, 1896)

Plate XXXVIII: 2–4; Figures 76, 77.

v * 1896 *Ceratites (Hungarites) semiplicatus* n. sp. — HAUER, Cephalopoden aus der Trias von Bosnien, II, p. 265, pl. XI, figs 4–6.

v ? 1993 *Hungarites cf. plicatus* (HAUER, 1896) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 462 (partim), pl. 2, figs 4, 8, 9 (only), (non figs 1–3).

1995 *Hungarites zalaensis* (BÖCKH, 1872) — MIETTO & MANFRIN, Middle Triassic ammonoid, p. 551 (partim), pl. III, fig. 7 (only), non fig. 6.

1995 *Hungarites zalaensis* (BÖCKH, 1972) — DE ZANCHE et al., Dolomites, p. 145, pl. II, fig. 7.

Material

Four specimens from Vászoly (2) and Mencshely (2).

Measurements

	D	WH	WW	U
INV 2017.261.1.	54.6	25.3	13.9	?
INV 2017.260.1.	45.4	21.4	10.8	9.4
INV 2017.259.1.	35.3	17.1	9.1	7.1

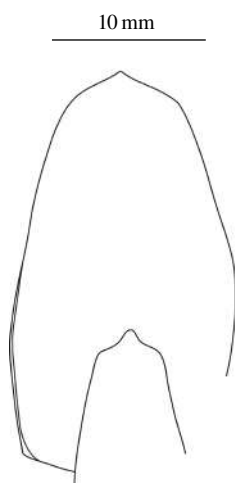


Figure 76. Cross section of *Bullatihungarites semiplicatus* (HAUER, 1896), INV 2017.261.1., Mencshely I, Bed 6, Reitzi Zone, Avisianum Subzone

Description

Small *Bullatihungarites* with very involute, compressed conch. The whorl-section is high oval. The umbilical wall is subrounded to oblique. The flanks are gently convex, almost flat and meet the venter at a sharp and smooth ventrolateral shoulder. The venter has a narrow and rather high, subrounded keel, separated from the ventrolateral shoulders by narrow, concave belts. The ornamentation consists of rectiradial, partly sinuous ribs, or rather folds. The ribs start with small nodes or bulges (9 on a half whorl)

at the umbilical margin; here they have the form of wide swellings with narrower interspaces. Towards the mid-flank, the swellings become wider and lower. Further ventrally they gradually fade away, and usually do not reach the ventrolateral margin. Lateral and ventrolateral nodes are absent.

The suture line (Figure 77) is ceratitic, tending to subammonitic, with at least three, narrow and high lateral saddles. The first lateral lobe is very deep, and profoundly denticulated; the second and the third lateral lobes are reduced in all respects. Suspensive lobes are seen near the umbilical margin.

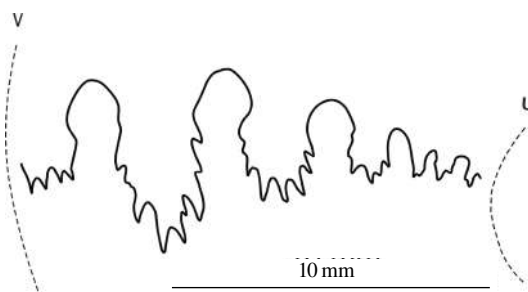


Figure 77. Suture line of *Bullatihungarites semiplicatus* (HAUER, 1896); INV 2017.259.1., at 15 mm whorl-height, Mencshely, loose, Reitzi Zone, Reitzi or Avisianum Subzone, u: umbilical margin, v: ventral margin

Remarks

The original specimen (holotype by monotypy) of *B. semiplicatus*, described and illustrated by HAUER (1896) was examined by the present author in the collection NHMW (Wien), thus the identification of the specimens from the Balaton Highland is approved.

In constitution, and general features of ornamentation, *B. semiplicatus* has many similarities to *B. emiliae* (MOJISOVICS, 1882). It differs from the type species by having a significantly wider umbilicus and denser ribbing.

The specimens figured as "*Hungarites* cf. *plicatus* (HAUER, 1896)" by BRACK & RIEBER (1993) were examined by the present author in the collection PIMUZ, Zürich. Some of them (BRACK & RIEBER 1993, pl. 2, figs 4, 8, 9) are tentatively attributed to *B. semiplicatus*, the others BRACK & RIEBER (1993, pl. 2, figs 1–3) may belong to *B. emiliae*.

One of the specimens figured as "*Hungarites zalaensis* (BÖCKH, 1872)" by MIETTO & MANFRIN (1995, pl. III, fig. 7) and figured again by DE ZANCHE et al. 1995, pl. II, fig. 7) is here regarded as a typical representative of *B. semiplicatus*.

Distribution

B. semiplicatus was described from the upper Anisian of the Dinarides and the Southern Alps. At the Balaton Highland its range is restricted to the Illyrian Reitzi and Avisianum Subzones.

Genus *Nodihungarites* n. gen.

Type species: *Nodihungarites bocsaensis* (ARTHABER, 1903)

Diagnosis: Medium to large-sized hungaritids with involute, compressed conch. Whorl section high oval to subtrapezoidal; umbilical wall vertical. Venter with sharp ventrolateral shoulder and high keel on phragmocone; fastigate on body chamber. Smooth umbilical margin and flank on phragmocone; weak to stronger ribs and very strong ventrolateral nodes on body chamber. Suture ceratitic, four lateral saddles, first lateral lobe very deep with moderate denticulation.

Derivatio nominis: Referring to the coarse nodes at the ventrolateral margin of the body chamber.

Nominal species:

Nodihungarites bocsaensis (ARTHABER, 1903, p. 25, pl. II, fig. 1.)

Nodihungarites vinczei n. sp.

Discussion: Hitherto, the late Anisian hungaritids of the Tethyan province (except the Sephardic ones) were assembled into one genus, namely the *Hungarites*, with the type species *H. mojsisovicsi* (ROTH, 1871). In the concept of the present monograph, considering the essential morphological characters of the type species, *Hungarites* includes only weakly ornamented species, without any nodes. Therefore, a new genus *Nodihungarites* was necessary to be introduced for the forms with strong ventrolateral nodes on the body chamber. The phragmocone of the new genus is weakly ornamented or smooth, just as that of *Hungarites*. The diagnostic difference appears on the body chamber which has strong ventrolateral nodes in *Nodihungarites* whereas it remains smooth in *Hungarites*. The venter and especially the ventrolateral nodosity of

Nodihungarites shows similarities to the Sephardic genera *Israelites*, described by PARNES (1962) from Israel, but the latter has strong lateral nodes, in contrast to the smooth or only ribbed flanks of *Nodihungarites*.

Distribution: Late Anisian; Balaton Highland. At the Balaton Highland *Nodihungarites* ranges from the Illyrian Avisianum to Crassus Subzones.

Nodihungarites bocsaensis (ARTHABER, 1903)
Plate XXXVIII: 5, 6; Plate XXXIX: 1; Figures 78, 79.

v * 1903 *Hungarites Bocsaensis* ARTH. — ARTHABER, Neue Funden Muschelkalk des südl. Bakony, Revision, p. 25, pl. II, fig. 1.

v non 1989 *Hungarites bocsaensis* ARTHABER, 1903 — VÖRÖS & PÁLFY, Vászoly, p. 19., pl. II, fig. 1.

v non 1993 *Hungarites bocsaensis* — VÖRÖS, Reitzi Zone, p. 27, pl. V, fig. 4.

Material

Three specimens from Vászoly.

Measurements

	D	WH	WW	U
Holotype T.771.	72.5	40.2	18.2	11.4
INV 2017.262.1.	114.9	46.6	26.9	22.9
INV 2017.263.1.	107.5	47.5	24.4	21.3

Description

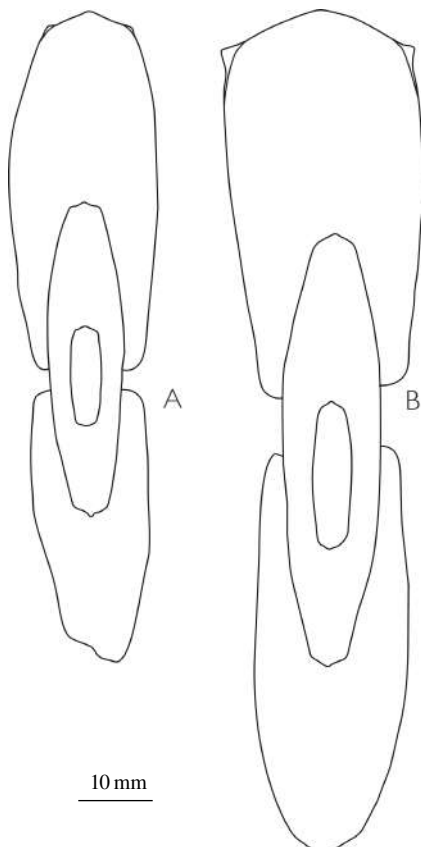


Figure 78. Cross sections of *Nodihungarites bocsaensis* (ARTHABER, 1903), A: T 2017.13.1., Balatonfüred, Bocsa Hill, loose, Reitzi Zone (?); B: INV 2017.262.1., Vászoly, P-11a, loose, Reitzi Zone, Avisianum Subzone (?)

Large *Nodihungarites* with involute, compressed conch. The whorl-section is high oval to subtrapezoidal. The umbilical wall is subrounded to vertical. The umbilical margin is smooth. The flanks are gently convex, almost flat and meet the venter at a sharp ventrolateral shoulder. On the phragmocone the venter has a rounded but definite keel, well separated from the ventrolateral shoulders by gently concave bands. The ornamentation on the phragmocone is very weak or absent. Widely spaced, coarse and pointed nodes appear gradually on the mature body chamber, which has a fastigate venter and shows definite umbilical egression.

The suture line (Figure 79) is ceratitic, with four entire lateral saddles. The first lateral lobe is very deep and moderately denticulated; the second and the third lateral lobe are reduced in all respects. Suspensive lobes are seen near the umbilical margin.

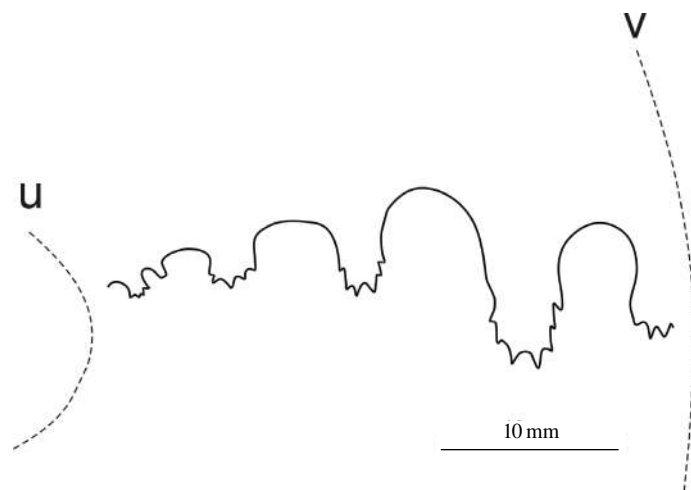


Figure 79. Suture line of *Nodihungarites bocsaensis* (ARTHABER, 1903); Holotype, T.771., at 42 mm whorl-height, Balatonfüred, Bocsa Hill, loose, Reitzi Zone (?), u: umbilical margin, v: ventral margin

Remarks

The type specimen (holotype by monotypy) of *N. bocsaensis* is kept in the collection of the MGSZ (under the inventory number: T.771.) and was examined by the present author. The original figure by ARTHABER (1903, pl. II, fig.1) properly illustrates that only the initial part of the body chamber was preserved on the holotype, showing gradually stronger ventrolateral nodes. Our specimens from Vászoly have more complete body chamber with more developed nodosity; nevertheless their identification with *N. bocsaensis* is endorsed.

MIETTO & MANFRIN (1995, p. 554) used the combination of names "*Israelites bocsaensis* (ARTHABER)". This view can not be accepted because the genus *Israelites* PARNES, 1962, besides the strong ventrolateral nodosity, has pointed lateral nodes, which are absent in *N. bocsaensis*.

In previous papers (VÖRÖS & PÁLFY 1989, VÖRÖS 1993) the present author used a too wide interpretation of *N. bocsaensis*; the cited items are here described as *N. vinczei* n. sp.

Distribution

Up to now, *N. bocsaensis* was recorded only from the Balaton Highland where its range is restricted to the Illyrian Avisianum Subzone and the Crassus Subzone.

Nodihungarites vinczei n. sp. Plate XXXVIII: 7; Plate XL: 1.

v 1989 *Hungarites bocsaensis* ARTHABER, 1903 — VÖRÖS & PÁLFY, Vászoly, p. 19., pl. II, fig. 1.

v 1993 *Hungarites bocsaensis* — VÖRÖS, Reitzi Zone, p. 27, pl. V, fig. 4.

Holotype: Hungarian Natural History Museum (Budapest), inventory number: M.89.81.

Locus typicus: Vászoly, Trench 11a, Bed 16/A.

Stratum typicum: Ochre-yellow limestone (Vászoly Formation); upper Illyrian, Secedensis Zone, Crassus Subzone.

Derivatio nominis: After the name of Péter VINCZE, renowned Hungarian geologist and fossil hunter.

Diagnosis: Medium to large-sized *Nodihungarites* with involute, compressed conch. Whorl section high oval to subtrapezoidal; umbilical wall vertical. Venter fastigate on phragmocone and on body chamber. Smooth umbilical margin and flank on phragmocone; strong ribs and very strong ventrolateral nodes on body chamber. Suture ceratitic.

Material

Two specimens from Vászoly.

Measurements

	D	WH	WW	U
Holotype M.89.81	98.3	39.7	23.1	21.3
Paratype PAL 2017.46.1.	80.7	32.7	16.8	16.5

Description

Medium to large-sized *Nodihungarites* with involute, compressed conch. The whorl-section is high oval to subtrapezoidal. The umbilical wall is subrounded to vertical. The umbilical margin is smooth. The flanks are gently convex, almost flat and meet the venter at a marked ventrolateral shoulder. The phragmocone and the body chamber are fastigate. The ornamentation on the phragmocone is very weak or absent. On the body chamber widely spaced, coarse ribs appear gradually, starting in the inner third of the flank. The ribs become stronger ventrally and bear pointed nodes at the ventrolateral margin. The body chamber shows definite umbilical egression.

The suture line is very poorly seen; indecipherable.

Remarks

This new species stands rather close to *N. bocsaensis* (ARTHABER, 1903) but differs by its strong ribbing on the body chamber. Moreover, the phragmocone of *N. vinczei* is simply fastigate, in contrast to the keeled venter of *N. bocsaensis*.

In previous works of the present author (VÖRÖS & PÁLFY 1989, VÖRÖS 1993) a specimen of *N. vinczei* was attributed to *N. bocsaensis*.

Distribution

Hitherto, *N. vinczei* is known only from the Balaton Highland where it was found in the Illyrian Crassus Subzone.

Superfamily Danubitoidea SPATH, 1951
 Family Danubitidae SPATH, 1951
 Subfamily Danubitinae SPATH, 1951
 Genus **Celtites** MOJISOVICS, 1882
 Type species: *Celtites epolensis* (MOJISOVICS, 1878)

Celtites ? sp. A
 Plate XL: 6.

Material

Two specimens from Felsőörs (1) and Mencshely (1).

Measurements

	D	WH	WW	U
INV 2017.269.1.	22.8	6.5	6.4	10.3

Description

Small *Celtites* with very evolute, nearly serpenticone conch. The whorl-section is oval to subquadratic. The umbilical wall is subrounded. The flanks are moderately convex and meet the arched venter at an indistinct ventrolateral margin. The flanks are ornamented with mostly prorsiradiate and somewhat projected ribs (around 14 on a half whorl) and nodes. There are no umbilical nodes. The ribs bear lateral nodes on the inner third of the whorl, and stronger nodes at the ventrolateral margin. There is a very low and broad blunt keel on the smooth venter.

Suture lines are not seen.

Remarks

The scarcity of the material and the poor preservation do not allow any more specific identification of these ammonoids. On the basis of the rather strong ribbing, the ventrolateral nodosity and the definite, but very low and broad ventral keel, our specimens have similarity to those figured as "*Celtites* ? nov. sp. ind. B." by SALOMON (1895, p. 187, pl. VI, fig. 19). This original specimen was checked by the present author in the BSM (München). The similarity is also apparent with the specimens figured as "*Celtites* sp. B (sensu SALOMON, 1895)." by MIETTO et al. (2005, p. 493, figs 9/4–8, 13, 14). Our specimens differ from both above mentioned items by the presence of lateral nodes. Some specimens, figured as "*Celtites* cfr. *Buchii* KLIPST." by DE LORENZO (1897, p. 145, pl. XX, fig. 1), *Celtites* div. sp. by AIRAGHI (1912, pl. IV, figs 1–5) and as *Celtites* sp. by RIEBER (1973, p. 70, pl. 17, figs 7–9, only), show similar nodosity but their lateral nodes are very near to the umbilical margin.

Distribution

At the Balaton Highland this taxon occurs in the Illyrian Avisianum and Crassus Subzones.

Celtites ? sp. B
 Plate XL: 7.

Material

One specimen from Balatoncsicsó.

Measurements

	D	WH	WW	U
M.89.6.	31.5	7.1	5.8	17.5

Description

Medium-sized *Celtites* with very evolute, serpenticone conch. The whorl-section is oval. The umbilical wall is subrounded. The flanks are moderately convex and pass gradually into the arched venter. The flanks are ornamented with slightly prorsiradiate ribs or rather swellings (around 10 on a half whorl). There are no true nodes; the radial swellings become stronger at mid-flank.

Suture lines are not seen.

Remarks

This specimen can not be identified with any species of *Celtites* known from the accessible literature. It shows some degree of similarity to the largest specimen figured as “*Celtites* sp. A.” by MANFRIN et al. (2005, p. 493, fig. 9/19, only).

Distribution

At the Balaton Highland this taxon occurs in the Illyrian Avisianum Subzone.

Family Aplococeratidae SPATH, 1951

Genus **Aplococeras** Hyatt, 1900

Type species: *Aplococeras avisianum* (MOJSISOVICS, 1882)

Aplococeras avisianum (MOJSISOVICS, 1882)

Plate XXXIX: 2–5; Plate XL: 2, 4.; Figure 80.

- v * 1882 *Dinarites avisianus* E. v. MOJSISOVICS — MOJSISOVICS, Mediterr. Triasprovinz, p. 13, pl. XXVII, figs 17–21.
 v 1882 *Dinarites Doelteri* E. v. MOJSISOVICS — MOJSISOVICS, Mediterr. Triasprovinz, p. 14, pl. XXVII, figs 22–24.
 1921 *Dinarites avisianus* MOJS. sensu lato — BUBNOFF, Forno, p. 418, pl. III, figs 1–5, text-figs 3, 10.
 ? 1927 *Dinarites avisianus* MOJSISOVICS — OGILVIE GORDON, Dolomiten, p. 61, pl. VII, fig. 10.
 1969 *Aplococeras avisianus* (MOJSISOVICS) — ASSERETO, Zona ad Avisianus, p. 126, figs 1/1–5, 2/1–6, 8, 9, 11.
 v 1973 *Aplococeras* cf. *misanii* (MOJSISOVICS) — RIEBER, Grenzbitumenzone, p. 64 (partim), pl. 17, figs 3, 5, 6, 14.
 v 1993 *Aplococeras avisianum* (MOJS., 1882) — BRACK & RIEBER, Anisian/Ladinian boundary, p. 478, pl. 12, figs 9, 11, 12, text-fig. 17c.
 v 1993 *Aplococeras avisianum* — VÖRÖS, Reitzi Zone, p. 27, pl. IV, figs 5, 6.
 v 1993 *Aplococeras avisianum*. — GAETANI (ed.), Anisian/Ladinian boundary field workshop, p. 117, pl. 13, figs 4, 5.
 1995 *Aplococeras avisianum* (MOJSISOVICS, 1882) — MIETTO & MANFRIN, Middle Triassic ammonoid, p. 549, pl. II, figs 8–10.
 1995 *Aplococeras avisianum* (MOJSISOVICS, 1882) — DE ZANCHE et al., Dolomites, p. 138, pl. I, fig. 1, pl. II, figs 1, 2.
 v 1998 *Aplococeras avisianum* (MOJSISOVICS, 1882) — VÖRÖS, Balaton-felvidék, p. 38, 42, 50, pl. IV, figs 8–10.
 v 2002 *Aplococeras avisianum* (MOJSISOVICS) — VÖRÖS, Paleoenvironmental distribution, p. 486, pl. 1, figs 18, 19.
 2003 *Aplococeras avisianum* (MOJSISOVICS, 1882) — MIETTO et al., Bagolino, p. 457, pl. 1, figs 1, 2, pl. 2, figs 3, 5.
 2005 *Aplococeras avisianum* (MOJSISOVICS, 1882) — MANFRIN et al., Latemar, p. 487, figs 5/5–9, 26–28.

Material

20 specimens from Felsőörs (1), Szentkirályszabadja (1), Vászoly (1), Mencshely (7), Sóly (6) and Balatoncsicsó (4).

Measurements

	D	WH	WW	U
INV 2017.265.1.	35.1	10.1	?	?
M.98.38	31.5	10.8	?	13.6
M.98.170A	29.8	8.4	?	12.5
INV 2017.266.1.	26.5	9.6	7.2	11.6
INV 2017.264.1.	17.4	5.8	4.1	6.2
INV 2017.268.1.	13.1	4.7	4.6	4.9

Description

Small *Aplococeras* with very evolute, nearly serpenticone conch. The whorl-section is oval. The umbilical wall is subrounded. The flanks are moderately convex, form continuous curve from the umbilicus to the arched and smooth venter. The flanks are ornamented with mostly rursiradiate and convex to sinuous ribs or rather swellings (12 to 16 on a half whorl). The strength and style of the ribbing are variable. In typical case the ribs start near the umbilicus with strong, or even bullate swelling and gradually fade out towards the venter. A few secondary ribs intercalate irregularly. The ribbing is stronger on the phragmocone; the body chamber usually bears only growth rugae, or finer ribs, without bulges.

Suture lines are poorly seen (Figure 80): ceratitic, with three lateral saddles and a moderately denticulated first lateral lobe

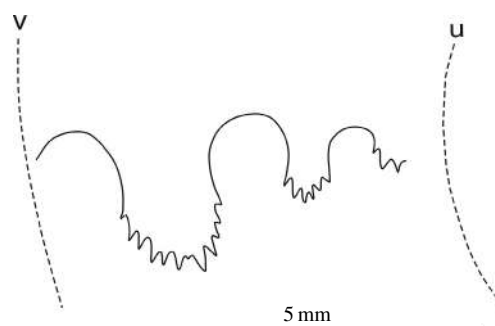


Figure 80. Suture line of *Aplococeras avisianum* (MOJSISOVICS, 1882); M.98.38, at 7 mm whorl-height, Sóly, Bed 6, Reitzi Zone, Avisianum Subzone, u: umbilical margin, v: ventral margin

Remarks

The type series of *Aplococeras avisianum* (= "*Dinarites avisianus*") figured by MOJSISOVICS (1882, pl. XXVII, figs 17–21) was examined by the present author in the collection GBAW (Wien) thus the identification of the specimens from the Balaton Highland is approved. The same syntypes were studied in detail, and re-figured by ASSERETO (1969, l. c.) but a lectotype was not designated by him, neither by the present author. Nevertheless, the range of the morphological variation of *A. avisianum* is well demonstrated by the syntype series.

The figured types of "*Dinarites Doelteri*" (MOJSISOVICS, 1882) were also investigated in the collection GBAW (Wien), and the synonymy of this species with *A. avisianum* was endorsed, as it was stated previously also by several authors (KITTL 1894, p. 105; SALOMON 1895, p. 197; BUBNOFF 1921, p. 418; SPATH 1951, p. 35; MANFRIN et al. 2005, p. 487).

The specimens figured as "*Aplococeras cf. misanii*" (MOJSISOVICS) by RIEBER (1973, pl. 17, figs 3, 5, 6, 14.) were examined by the present author in the collection PIMUZ, Zürich; some of them (RIEBER 1973, pl. 17, figs 3, 5, 6, 14) are regarded as belonging to *A. avisianum*, the others (l. c., pl. 17, figs 1, 2, 4: smooth and more evolute forms) probably represent the species *Lecanites misanii*. The specimens do not reveal suture lines, therefore this generic attribution remains doubtful.

One of the specimens figured as *A. avisianum* in previous works by the present author (VÖRÖS 1993, pl. IV, fig. 6; and also in GAETANI [ed.] 1993, pl. 13, fig. 4) was tentatively identified as *A. aff. smithi* SILBERLING & NICHOLS, 1982 by MIETTO et al. (2003, p. 457) and MANFRIN et al. (2005, p. 487), though without any explanation. This rather coarsely ribbed specimen (re-figured here on Plate XL: 2) was compared to the figures of *A. smithi* given by SILBERLING & NICHOLS (1982, pl. 21, figs 31–37), portraying very finely costate specimens, and no kind of apparent similarity was found between the two items. Therefore the suggestion by MIETTO et al. (2003) and MANFRIN et al. (2005) was not accepted.

MANFRIN et al. (2005, p. 489, figs 5/10–18) described a new species: *Aplococeras transiens* MIETTO & MANFRIN, 2005, a rather evolute and very weakly ornamented form, and claimed that it represents a transition from *A. avisianum* to *Lecanites misanii* (MOJSISOVICS, 1882). *A. transiens* can be accepted as a new species of the genus *Aplococeras*, comprising the extremely finely ornamented marginal forms. On the other hand, its ceratitic suture severely contrasts to the goniatic suture of *Lecanites*, therefore it can not be a "connecting link".

Following the ideas expressed by ASSERETO (1969) on the possible identity between *A. avisianum* and "*Lecanites vogdesi*" HYATT & SMITH, 1905, MIETTO et al. (2003) and MANFRIN et al. (2005) made very thorough comparative studies and concluded that the Alpine and the North American species are synonymous. Although the morphological arguments of the mentioned authors seem convincing, the present author does not wish to be committed in this question and the items regarding the species "*vogdesi*" are not included into the present synonymy.

Distribution

A. avisianum was described from many places of the upper Anisian of the Southern Alps. At the Balaton Highland it ranges from the Illyrian Avisianum Subzone to the Crassus Subzone.

Aplococeras laczkoi (ARTHABER, 1903)

Plate XL: 5.

v * 1903 *Dinarites Laczkói* ARTH. — ARTHABER, Neue Funden Muschelkalk des südl. Bakony, Revision, p. 19, pl. I, fig. 3.

v 1998 *Aplococeras cf. laczkoi* (ARTHABER, 1903) — VÖRÖS, Balaton-felvidék, p. 42, pl. IV, fig. 7.

v 2002 *Aplococeras cf. laczkoi* (ARTHABER) — VÖRÖS, Paleoenvironmental distribution, p. 486, pl. 1, fig. 20.

2003 *Aplococeras cf. laczkoi* (ARTHABER, 1911) — MIETTO et al., Bagolino, p. 458, pl. 1, fig. 3, pl. 2, fig. 4.

2005 *Aplococeras laczkoi* (ARTHABER, 1911b) — MANFRIN et al., Latemar, p. 490, figs 5/1–4.

Material

Two specimens, from Vászoly (1) and Sóly (1).

Measurements

	D	WH	WW	U
M.98.52	20.2	6.4	6.1	9.4

Description

Very small *Aplococeras* with very evolute, serpenticone conch. The whorl-section is oval to subcircular. The umbilical wall is subrounded. The flanks are convex and form continuous curve from the umbilicus to the arched and smooth venter. The flanks are ornamented with mostly rursiradiate and partly sinuous, rather strong ribs (around seven on a half whorl). The ribs start near the umbilicus with strong bulges; reach the venter with uniform strength, where they bear strong, nearly pointed nodes. The nodes are in opposite position at the sides of the smooth venter. Secondary ribs were not observed. The inner whorls show coarse swellings instead of true ribbing.

Suture lines are not seen.

Remarks

The type specimen (holotype by monotypy) of *A. laczkoi* was examined by the present author in the collection of the MGSB (under the inventory number: T.1646.). It is a fragment with half whorls, but the coiling and the characteristic ornamentation are properly seen. Moreover, it shows a ceratitic suture what supports the attribution of *laczkoi* to *Aplococeras*. The identification of our newly collected specimens with *A. laczkoi* is fully endorsed.

The specimens figured as *A. laczkoi* by MIETTO et al. (2003) and MANFRIN et al. (2005), from Bagolino and the Latemar, respectively, are typical representatives of this species.

Distribution

A. laczkoi was described from the upper Anisian of Balaton Highland and the Southern Alps. At the Balaton Highland its range is restricted to the Illyrian Avisianum Subzone.

Family Lecanitidae HYATT, 1900

Genus **Lecanites** MOJSISOVICS, 1882

Type species: *Lecanites glaucus* (MÜNSTER, 1834)

The family Lecanitidae, represented solely by the genus *Lecanites*, was tentatively inserted to the superfamily Danubitoidea by TOZER (1981, p. 95) and this solution is accepted here. MANFRIN et al. (2005, p. 487) suggested to synonymise the family Lecanitidae with the Aplococeratidae, with giving priority to the former. They argued that, in external shell morphology, continuous transition seemed to connect the two key species of the mentioned families, namely *Lecanites misanii* (MOJSISOVICS, 1882) and *Aplococeras avisianum* (MOJSISOVICS, 1882). At the same time, they stated that *L. misanii* has goniatitic suture in contrast to the ceratitic suture of *A. avisianum*. Considering the rather simple shell morphology and small size of the mentioned species, the present author gives greater importance to the type of the suture, which is essentially different in the two species and this difference is diagnostic for the two genera and, consequently for the two families. Therefore the family Lecanitidae, enclosing the genus *Lecanites*, is kept as a separate unit in the present monograph.

Lecanites misanii (MOJSISOVICS, 1882)

Plate XL: 3; Figure 81.

* 1882 *Dinarites Misanii* E. v. MOJSISOVICS — MOJSISOVICS, Mediterr. Triasprovinz, p. 15, pl. XXX, figs 11–13.

? 1897 *Dinarites Misanii* MOJS. — DE LORENZO, Lagonegro, p. 146, pl. XX, fig. 2.

1901 cf. *Dinarites Misanii* MOJS. — REIS, Fauna des Wettersteinkalkes I., p. 76, pl. II, figs 11–13.

v ? 1903 *Lecanites sibyllinus* nov. sp. — FRECH, Neue Cephalopoden, p. 17, pl. II, fig. 4.

? 1914 *Dinarites avisianus* MOJS. — HORN, Knollenkalkstufe, p. 18, pl. I, fig. 2.

v 1973 *Aplococeras* cf. *misanii* (MOJSISOVICS) — RIEBER, Grenzbitumenzone, p. 64 (partim), pl. 17, figs 1, 2, 4 (non figs 3, 5, 6, 14), (*avisianum*).

1995 “*Aplococeras*” *misanii* (MOJSISOVICS, 1882) — DE ZANCHE et al., Dolomites, p. 152, pl. I, figs 2–5.

2003 *Lecanites misanii* (MOJSISOVICS, 1882) — MIETTO et al., Bagolino, p. 458, pl. 1, fig. 7; pl. 2, fig. 1.

2005 *Lecanites misanii* (MOJSISOVICS, 1882) — MANFRIN et al., Latemar, p. 490, figs 5/19–25.

Material

Eight specimens from Mencshely.

Measurements

	D	WH	WW	U
INV 2017.267.1.	29.1	7.2	?	14.2

Description

Small-sized *Lecanites* with very evolute, serpenticone conch. The whorl-section is high oval. The umbilical wall is sub-rounded. The flanks are moderately convex, form continuous curve from the umbilicus to the arched and smooth venter. The flanks are smooth, or ornamented only with very weak growth lines.

The suture lines are partly seen (Figure 81): goniatitic, with three lateral saddles and two entire lateral lobes.

Remarks

From among the three original specimens of “*Dinarites Misanii*” figured by MOJSISOVICS (1882, pl. XXX, figs 11–13) only one, that on pl. XXX, fig. 13, was inspected by the present author. This incomplete specimen is kept in the

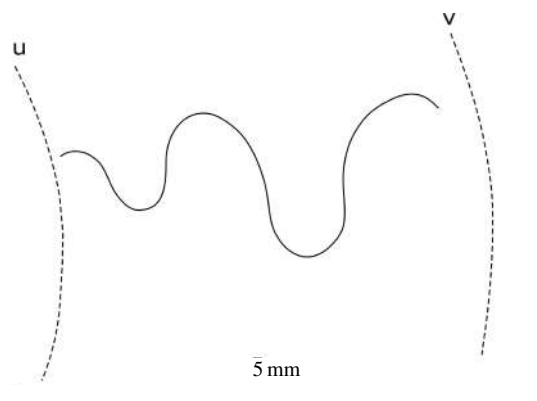


Figure 81. Suture line of *Lecanites misanii* (MOJSISOVICS, 1882); INV 2017.267.1., at 4 mm whorl-height, Mencshely I, Bed 5, Reitzi Zone, Avisianum Subzone, u: umbilical margin, v: ventral margin

L. misanii, but its general shape, morphology and the goniatitic suture do not contradict to the idea that *L. sibylinus* may be a junior synonym of *L. misanii*.

The specimens figured as “*Aplococeras* cf. *misanii* (MOJSISOVICS) by RIEBER (1973) were examined by the present author in the collection PIMUZ, Zürich; some of them (RIEBER 1973, pl. 17, figs 3, 5, 6, 14) are regarded as belonging to *A. avisianum*, the others (l. c., pl. 17, figs 1, 2, 4: smooth and more evolute forms) probably represent the *Lecanites misanii*. The specimens do not reveal suture lines, therefore their generic attribution remains doubtful.

Distribution

L. misanii was described from the upper Anisian of the Southern Alps the Northern Calcareous Alps and perhaps the southern Apennines. At the Balaton Highland its range is restricted to the Illyrian Avisianum Subzone.

Family Longobarditidae SPATH, 1951

Subfamily Longobarditinae SPATH, 1951

Genus **Longobardites** MOJSISOVICS, 1882

Type species: *Longobardites breguzzanus* MOJSISOVICS, 1882

Longobardites zsigmondyi (BÖCKH, 1873)

Plate XL: 10, 11.

- v * 1873 *Ammonites (Sageceras) Zsigmondyi* n. sp. — BÖCKH, Bakony Cer. Reitzi, p. 62.
- v 1874 *Ammonites (Sageceras) Zsigmondyi* BÖCKH — BÖCKH, Südlichen Theiles des Bakony II, p. 177, pl. IV, fig. 14.
- v 1882 *Longobardites Zsigmondyi* (BOECKH) E. v. M. — MOJSISOVICS, Mediterr. Triasprovinz, p. 185, pl. LII, fig. 4.
- v 1901 *Longobardites parvulus* nov. spec. — REIS, Fauna des Wettersteinkalkes I., p. 92, pl. IV, figs 28–31; pl. VII, fig. 15.
- v 1907 *Longobardites parvulus* REIS — REIS, Fauna des Wettersteinkalkes II., p. 117, pl. I, figs 5–8.
- 1963 *Longobardites zsigmondyi* (BÖCKH) 1874 — ASSERETO, Val Camonica, p. 71, pl. VIII, fig 2, text-fig. 27.
- 1966 *Longobardites (Longobardites) zsigmondyi* (BÖCKH, 1874) — ASSERETO, Longobardites, p. 974, pl. 68, figs 2–6, text-figs 6c, 7c, 10.
- 1968 *Longobardites (Longobardites) cf. zsigmondyi* (BÖCKH) — VENZO & PELOSIO, Lenna in Val Brembana, p. 118, pl. XIV, figs 5, 7, 11.
- v 1973 *Longobardites (Longobardites) zsigmondyi* (BOECKH) — RIEBER, Grenzbitumenzone, p. 64, pl. 17, fig. 15.
- v 1973 *Longobardites (Longobardites) cf. zsigmondyi* (BOECKH) — RIEBER, Grenzbitumenzone, p. 64, pl. 17, fig. 13.
- 1982 *Longobardites* cf. *L. zsigmondyi* (BÖCKH) — SILBERLING & NICHOLS, Humboldt Range, p. 51, pl. 21, figs 26–28, text-fig. 34.
- v 1989 *Longobardites zsigmondyi* (BÖCKH, 1872) — VÖRÖS & PÁLFY, Vászoly, p. 19.
- v 1998 *Longobardites zsigmondyi* (BÖCKH, 1872) — VÖRÖS, Balaton-felvidék, p. 20, 26, 31, 38, 42, 48, pl. V, fig. 9.
- 2005 *Longobardites zsigmondyi* (BÖCKH, 1874) — MONNET & BUCHER, Nevada, p. 50, pl. 31, figs 10–13, text-fig. 49.

Material

51 specimens from Felsőörs (2), Szentantalfa (1), Vászoly (3), Mencshely (5), Sóly (36), Monosló (1) and Iszkaszentgyörgy (3).

collection of the MGSH (under the inventory number: T.860.). On the body chamber it has fine rursiradiate riblets or rather growth lines, reminding the weakly ornamented variants of *Aplococeras avisianum* (MOJSISOVICS, 1882). On the other hand the very evolute coiling, the high oval whorls and the suture with non-denticulated lobes (as stated by MOJSISOVICS 1882, p. 15) are clearly different from *Aplococeras* and support the attribution of *misanii* to the genus *Lecanites*. This is in accordance with the generic attribution by MIETTO et al. (2003) and MANFRIN et al. (2005).

On the basis of the very poor figure given by DE LORENZO (1897, pl. XX, fig. 2), this item of *L. misanii* is included into the synonymy only with query.

FRECH (1903) described a new species *Lecanites sibylinus* from the “Buchenstein beds” of Felsőörs. The type specimen is kept in the collection of the MGSH (under the inventory number: T.1273.). It is somewhat larger than the usual representatives of

Measurements

	D	WH	WW	U
M.98.44	65.3	36.7	13.4	1.8
INV 2017.272.1.	36.1	22.5	7.1	?

Description

Medium to large *Longobardites* with extremely involute and compressed, oxycone conch. The whorl-section is very high lanceolate. The umbilicus is occluded; the umbilical margin is subrounded. The flanks are nearly flat. The venter is extremely sharp. The ornamentation is very weak or absent. One specimen shows irregularly spaced, very gentle, sinuous radial folds. These radial folds are the strongest at around the mid-flank and gradually disappear ventrally.

The suture line is poorly seen; ceratitic, with at least seven saddles visible.

Remarks

The original specimen (holotype by monotypy) of *L. zsigmondyi* is deposited in the collection of the MGSB (inventory number: T.844.), and was inspected by the present author. This species is particularly characteristic, therefore it can usually be identified easily even from fragmentary specimens.

ASSERETO (1966) produced an exhaustive taxonomical analysis of the genus *Longobardites*, including all Alpine and North American species, among others *L. zsigmondyi*. This species has simple, sharply lanceolate venter, whereas the venter of the type species *L. breguzzanus* MOJISOVICS, 1882 tends to be fastigate.

Certain authors (including the present author) cited *L. zsigmondyi* with incorrect publication date (1872 or 1874). In fact BÖCKH (1873, p. 62) published a detailed description of *L. zsigmondyi*. It is only in Hungarian, nevertheless, the valid year of publication is 1873. The first illustration of *L. zsigmondyi* was published one year later by BÖCKH (1874, pl. IV, fig. 14).

Distribution

L. zsigmondyi was described from the upper Anisian of the Balaton Highland, the Southern Alps, the Northern Calcareous Alps and from Nevada. At the Balaton Highland it ranges from the Illyrian Camunum Subzone to the Avisianum Subzone.

Longobardites breguzzanus MOJISOVICS, 1882 Plate XL: 8, 9.

* 1882 *Longobardites breguzzanus* E. v. MOJISOVICS — MOJISOVICS, Mediterr. Triasprovinz, p. 185, pl. LII, figs 1, 2.

? 1882 *Longobardites* indet. ex aff. *Zsigmondyi* — MOJISOVICS, Mediterr. Triasprovinz, p. 186, pl. LII, fig. 3.

? 1936 *Longobardites* cf. *breguzzanus* MOJS. — STEFANOFF, Golo-Bärdo, p. 160, pl. IV, figs 19, 20.

1966 *Longobardites (Longobardites) breguzzanus* MOJISOVICS, 1882 — ASSERETO, *Longobardites*, p. 969, pl. 67, figs 1–5, text-figs 6a, 7a.

1968 *Longobardites breguzzanus* (MOJS.) — VENZO & PELOSIO, Lenna in Val Brembana, pl. XIV, fig. 10.

v 1998 *Longobardites breguzzanus* (MOJISOVICS, 1882) — VÖRÖS, Balaton-felvidék, p. 20, 26, 31, 51, 52.

Material

24 specimens from Felsőörs (3), Szentantalfa (1), Sóly (18), Hajmáskér (1) and Öskü (1).

Measurements

	D	WH	WW	U
INV 2017.271.1.	23.4	13.5	?	?
INV 2017.270.1.	21.7	?	?	?

Description

Small to medium-sized *Longobardites* with extremely involute and compressed, oxycone conch. The whorl-section is high lanceolate. The umbilicus is occluded; the umbilical margin is subrounded. The flanks are nearly flat. The venter is sharply fastigate, with definite ventrolateral shoulders. The ornamentation is absent or consists of very weak growth lines.

The suture line is not visible.

Remarks

ASSERETO (1966) published an exhaustive taxonomical analysis of the genus *Longobardites*, including all Alpine and North American species, among others the type species *L. breguzzanus*. The venter of this species is fastigate, with definite ventrolateral shoulders; this gives the main difference from *L. zsigmondyi* (BÖCKH, 1873), where the venter is simply and very sharply lanceolate.

Some items of the present synonymy are included only on the basis of opinions by ASSERETO (1966) because the published figures do not allow to check the features of the venter of the respective specimens. This regards the items “*Longobardites* indet. ex aff. *Zsigmondyi*.” by MOJSISOVICS (1882) and “*Longobardites* cfr. *breguzzanus* MOJS.” by STEFANOFF (1936).

Distribution

L. breguzzanus was described from the upper Anisian of the Southern Alps, the Balaton Highland and perhaps from the Balkan Mountains. At the Balaton Highland it ranges from the Illyrian Pseudohungaricum Subzone to the Avisianum Subzone.

Superfamily Pinacoceratoidea MOJSISOVICS, 1879

Family Japonitidae TOZER, 1971

Genus **Japonites** MOJSISOVICS, 1893

Type species: *Japonites planiplicatus* (MOJSISOVICS, 1888)

Japonites ? sp.

Plate XLI: 1.

Material

One specimen from Felsőörs.

Measurements

	D	WH	WW	U
INV 2017.273.1.	65.5	27.5	?	?

Description

Medium-sized *Japonites* with moderately evolute, compressed conch. The whorl-section is high oval. The umbilical margin is crushed. The flanks are gently convex, and pass gradually into the arched venter. The ornamentation is very weak; it consists of very slightly rursiradiate radial folds. These radial folds are stronger in the inner half of the flank and gradually disappear ventrally.

The suture line is partially seen; ammonitic, with at least three phylloid lateral saddles. The first lateral lobe is very deep and wide and strongly denticulated; the second lateral lobe is also deep but very narrow.

Remarks

This single and incompletely preserved ammonoid specimen is only tentatively attributed to *Japonites*, mainly by the sutural characteristics. It is less evolute than the typical species of the genus.

Distribution

The genus has worldwide distribution in the Middle Triassic. At the Balaton Highland it was collected from the Illyrian Reitzi Subzone.

Family Sturiidae KIPARISOVA, 1958

Genus **Discoptychites** DIENER, 1916

Type species: *Discoptychites megalodiscus* (BEYRICH, 1867)

Discoptychites cf. *megalodiscus* (BEYRICH, 1867)

Figure 82.

* 1867 *Ammonites megalodiscus* — BEYRICH, Muschelkalk der Alpen, p. 135, pl. II.

1882 *Ptychites megalodiscus* (BEYRICH) E. v. M. — MOJSISOVICS, Mediterranen Triasprovinz, p. 253, pl. LXXVII, fig. 1, pl. LXXVIII, figs 1, 2.

- 1896 *Ptychites megalodiscus* BEYRICH spec. var. — TOULA, Kleinasien, p. 174, pl. XXI, fig. 1.
 1907 *Ptychites megalodiscus* BEYR. (? var.) — REIS, Fauna des Wettersteinkalkes II., p. 137, pl. III, fig. 2, pl. IV, fig. 2, Text-fig. 14.
 ? 1913 *Ptychites megalodiscus* BEYR. sp. — TOULA, Westbosnien, p. 677, pl. XXIII, fig. 1.
 1936 *Ptychites megalodiscus* BEYRICH sp. — STEFANOFF, Golo-Bärdo, p. 152, pl. II, figs 7, 8.
 ? 1960 *Discoptychites* cf. *megalodiscus* (BEYRICH) — KUMMEL, New Zealand, p. 494, figs 8, 22.
 ? 1963 *Discoptychites* cf. *megalodiscus* (BEYRICH) 1867 — ASSERETO, Val Camonica, p. 78, pl. VIII, fig. 7, text-fig. 28.
 1984 *Discoptychites megalodiscus* (BEYRICH, 1867) — LEITHNER & KRYSZYN, Mitterberg, p. 190, pl. 2, fig. 1.
 v 1998 *Discoptychites* cf. *megalodiscus* (BEYRICH, 1867) — VÖRÖS, Balaton-felvidék, p. 59.
 2005 *Discoptychites* cf. *D. megalodiscus* (BEYRICH, 1867) — MONNET & BUCHER, Nevada, p. 48, text-fig. 46, pl. 23, fig. 10.
 v 2010 *Discoptychites megalodiscus* (BEYRICH, 1867) — VÖRÖS, North Hungary, p. 10, pl. IV, fig. 3.

Material

24 incomplete and fragmentary specimens from Felsőörs (2), Vörösberény (10), Szentkirályszabadja (2) and Mencshely (10).

Measurements: The diameters of the largest, but still incomplete specimens: Felsőörs, Bed 84/F ~240 mm; Mencshely I, Bed 8 ~220 mm; Szentkirályszabadja, Bed 7 ~180 mm.

Description

Large *Discoptychites*, with involute, discoidal conch. The outer whorls and the body chamber are compressed, very high, oxycone; the inner whorls are gradually lower; the nucleus is globose (Figure 82). The maximum width of the whorl lies near the umbilical margin. The umbilicus is very narrow and tends to be occluded; the umbilical wall is subrounded. The flanks are almost flat, very slightly convex. The venter of the outer whorl and body chamber is acute. Ornamentation is not seen, except some fine growth lines.

The suture line is ammonitic with at least three, phylloid lateral saddles.

Remarks

D. megalodiscus is the type species of the genus *Discoptychites*. It reaches significantly the largest size within the genus; moreover, it differs from other species of *Discoptychites* by its narrower umbilicus and much compressed conch and by the fact that the early globose stage is restricted to the innermost part (less than ten millimeter diameter) of the phragmocone. This feature is well seen in our specimens (Figure 82).

REIS (1907) figured good specimens of *D. megalodiscus*, but in the caption of his text-fig. 14, one of the specimens is cited as “*Beyrichites megalodiscus* MOJS. (? var.)”, obviously by mistake.

The items by TOULA (1913) and KUMMEL (1960) are included to the present synonymy only with query, because the respective specimens are rather poorly preserved and/or very small.

As far as the poor photographs allow, the specimens figured by STEFANOFF (1936) probably belong to *D. megalodiscus*.

The specimen figured by ASSERETO (1963) corresponds to the diagnostic criteria of *D. megalodiscus*, except its rather small size.

Distribution

D. megalodiscus seems to have worldwide distribution; it was described from the upper Anisian of the Southern Alps, the Northern Calcareous Alps, Northern Hungary, the Balkan Mountains, Turkey, Nevada and probably from the Dinarides and New Zealand. At the Balaton Highland it ranges from the Illyrian Binodosus Subzone to the Avisianum Subzone.

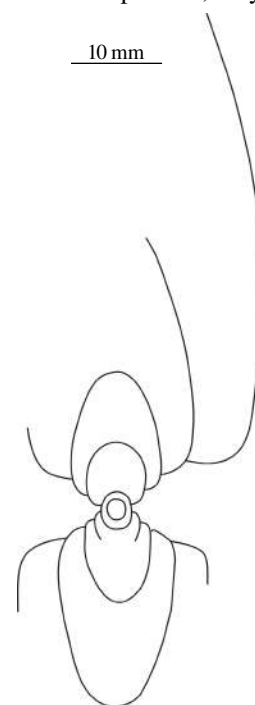


Figure 82. Cross section of *Discoptychites* cf. *megalodiscus* (BEYRICH, 1867); INV 2017.300.1., Mencshely I, Bed 6, Reitzi Zone, Avisianum Subzone

Family Gymnitidae WAAGEN, 1895

Genus **Gymnites** MOJSISOVICS, 1882

Type species: *Gymnites incultus* (BEYRICH, 1867)

Gymnites sp.

Plate XLI: 2.

Material

Two specimens from Felsőörs (1) and Mencshely (1).

Measurements

	D	WH	WW	U
INV 2017.274.1.	58.7	?	?	31.8

Description

Medium to large *Gymnites* with evolute, nearly serpenticone conch. The whorl-section is high oval. The umbilical wall is subrounded. The flanks are moderately convex and form continuous curve from the umbilicus to the arched and smooth venter. The flanks are smooth, or ornamented only with very weak growth lines.

The suture lines are not visible.

Remarks

This taxon is represented by a large, but incomplete and poorly preserved fragment and a mould, showing the impression of inner whorls (Plate XLI: 2 is a rubber cast of that). These specimens are only tentatively attributed to *Gymnites*, mainly by the form and coiling of the whorls.

Distribution

The genus has worldwide distribution in the Middle Triassic. At the Balaton Highland it was collected from the Illyrian Avisianum Subzone.

Genus **Tropigymnites** SPATH, 1951

Type species: *Tropigymnites planorbis* (HAUER, 1896)

Tropigymnites sp.
Plate XLI: 3.

v 2015 *Tropigymnites* sp. — VÖRÖS et al., New data, p. 320, pl. II, fig. 2.

Material

One specimen from Szentbékállá (in the private collection of K. TAMÁS, Kővágóörs).

Measurements

	D	WH	WW	U
K. Tamás collection, Kővágóörs	42.0	17.0	?	16.0

Description

Small-sized *Tropigymnites* with very evolute conch. The whorl-section is very high oval. The umbilical wall is subrounded. The flank is moderately convex, almost flat and forms continuous arch from the umbilicus to the acute venter. The flanks are smooth, or ornamented only with very weak growth lines.

The suture lines are not visible.

Remarks

This single ammonoid specimen is only tentatively attributed to *Tropigymnites*, mainly by its coiling and acute venter. It is smaller than the typical representatives of the genus. The same specimen was illustrated by VÖRÖS et al. (2015, l. c.).

Distribution

The genus has worldwide distribution in the Middle Triassic. At the Balaton Highland it was collected loose from the scree of the Illyrian Substage.

Genus **Epigymnites** DIENER, 1916

Type species: *Epigymnites ecki* (MOJSISOVICS, 1882)

Epigymnites ecki (MOJSISOVICS, 1882)
Plate XLI: 4, 5.

* 1882 *Gymnites Ecki* E. v. MOJSISOVICS — MOJSISOVICS, *Mediterranen Triasprovinz*, p. 238, pl. LX, fig. 3.

- v 1895 *Gymnites Ecki* MOJS. — SALOMON, Marmolata, p. 191, pl. VIII, fig. 1.
 1908 *Gymnites Ecki* MOJS. (C. RENZ) — FRECH & RENZ, Hydra, p. 459, pl. XV, fig. 4.
 1910 *Gymnites Ecki* MOJSISOVICS — RENZ, Argolis, p. 39, pl. IV, fig. 2.
 ? 1910 *Gymnites* cfr. *Ecki* MOJS. — SIMIONESCU, Deşli-Cătra, p. 472, fig. 4.
 ? 1960 *Epigymnites ecki* (MOJSISOVICS) 1882 — ROSSI RONCHETTI, Grigne, p. 37, pl. VIII, fig. 4, text-fig. 3.
 v 1973 *Gymnites* cf. *ecki* MOJSISOVICS, 1882 — RIEBER, GRENZbitumenzone, p. 71, pl. 16, fig. 8.
 1994 *Epigymnites ecki* (MOJSISOVICS) — FANTINI SESTINI, Calcare di Esino 1, p. 269, pl. 1, fig. 1.
 v 1998 *Epigymnites ecki* (MOJSISOVICS, 1882) — VÖRÖS, Balaton-felvidék, p. 45, pl. XVI, fig. 3.

Material

Two specimens from Mencshely.

Measurements

	D	WH	WW	U
INV 2017.275.1.	102.5	44.8	18.1	26.1
INV 2017.276.1.	65.5	31.1	12.8	14.5

Description

Small to medium-sized *Epigymnites* with moderately evolute, compressed conch. The whorl-section is very high oval. The umbilical wall is subrounded. The flank is moderately convex, almost flat and forms continuous curve from the umbilicus to the highly arched venter. The flanks are smooth, apart from the body chamber, where a distinctive, longitudinal row of blunt nodes appears at around the mid-flank. The nodes are somewhat elongated adorally.

The suture lines are not visible except a few phylloid saddles.

Remarks

E. ecki is a very characteristic species, easy to recognize and identify by its single row of elongated nodes at the mid-flank. The item by SIMIONESCU (1910) is queried because the illustration is only a very poor drawing.

The specimen figured as *E. ecki* by ROSSI RONCHETTI (1960) is only a fragment with some suture line and does not show the distinctive ornament, therefore it is included into the synonymy only with question mark.

Distribution

E. ecki was described from the Anisian and Ladinian of the Southern Alps, the Northern Calcareous Alps, Greece and doubtfully from Romania (Dobrogea). At the Balaton Highland, the figured specimen was collected from the Illyrian Avisianum Subzone, but *E. ecki* was also recorded in the Ladinian Archelaus Zone (VÖRÖS 1998).

Family Ptychitidae MOJSISOVICS, 1882

Genus **Ptychites** MOJSISOVICS, 1875

Type species: *Ptychites rugifer* (OPPEL, 1865)

Ptychites cf. *oppeli* MOJSISOVICS, 1882

Plate XLI: 6.

- * 1882 *Ptychites Oppeli* E. v. MOJSISOVICS — MOJSISOVICS, Mediterranen Triasprovinz, p. 248, pl. LXXI, figs 1, 3, pl. LXXII, figs 1, 2.
 1904 *Ptychites Oppeli* MOJSISOVICS 1882 — MARTELLI, Boljevic, p. 114, pl. IX, figs 1–3.
 1910 *Ptychites Oppeli* MOJSISOVICS — RENZ, Argolis, p. 28, text-fig. 2.
 1968 *Ptychites oppeli* (MOJS.) — VENZO & PELOSIO, Lenna in Val Brembana, p. 119, pl. XIV, figs 13–17, pl. XV, figs 1, 3–5, pl. XVI, fig. 1.
 1984 *Ptychites oppeli* MOJSISOVICS, 1882 — LEITHNER & KRYSSTYN, Mitterberg, p. 190, pl. 1, fig. 2.
 1988 *Ptychites oppeli* MOJSISOVICS, 1882 — PRLJ & MUDRENOVIĆ, Pribudića, p. 17, pl. V, fig. 4.
 v 1998 *Ptychites oppeli* MOJSISOVICS, 1882 — VÖRÖS, Balaton-felvidék, p. 21, 22, 48.
 v 2010 *Ptychites oppeli* MOJSISOVICS, 1882 — VÖRÖS, North Hungary, p. 12, pl. II, fig. 7.

Material

35 specimens from Felsőörs (18), Vörösberény (1) and Szentbékállá (16).

Measurements

	D	WH	WW	U
M.87.018A	55.6	28.5	?	9.2

Description

Small to medium-sized *Ptychites* with involute conch. The whorl-section is moderately high oval with maximum width near the umbilicus. The umbilicus is narrow and deep. The umbilical wall is subrounded, tending to be overhanging in the inner whorls. The flanks are gently convex and pass gradually into the moderately arched venter. The ornamentation consists of rectiradiate, gently sinuous folds separated by depressions of similar width. The folds gradually appear near the umbilical margin, strengthen in the middle of the flanks, may bear bulges at the ventrolateral margin and fade out on the venter. Their number increases by irregular insertion of secondary folds and reaches 13 on a half-whorl. The folding becomes weaker on the body chamber of larger specimens.

The suture line is rarely seen; it is ammonitic, with a deep and wide, deeply incised first lateral lobe and a similarly large, phylloid first lateral saddle; the auxiliary elements towards the umbilicus are much reduced.

Remarks

P. oppeli was profusely illustrated by MOJSISOVICS (1882) and VENZO & PELOSIO (1968) thus the identification of our specimens from the Balaton Highland seems satisfactory. The difference of *P. oppeli* from other member of the “rugiferi group” of MOJSISOVICS (1882: *P. dontianus* (HAUER, 1850), *P. eusomus* (BEYRICH, 1865), *P. seebachi* MOJSISOVICS, 1882, *P. stachei* MOJSISOVICS, 1882 and *P. breunigi* MOJSISOVICS, 1882) was portrayed by MOJSISOVICS (1882) and was discussed also by VÖRÖS (2010).

Distribution

P. oppeli was described from the Anisian of the Southern Alps, the Northern Calcareous Alps, the Dinarides, North Hungary and Greece. At the Balaton Highland it ranges from the Illyrian Trinodosus Subzone to the Felsőeoersensis Subzone.

Genus **Flexoptychites** SPATH, 1951

Type species: *Flexoptychites flexuosus* (MOJSISOVICS, 1882)

Flexoptychites cf. *studer* (HAUER, 1857)

Plate XLI: 7.

* 1857 *Ammonites Studeri* HAUER — HAUER, Val Inferna, p. 146, pl. I, figs 1–4.

1867 *Ammonites Studeri* HAU. — BEYRICH, Muschelkalk der Alpen, p. 123, pl. I, fig. 5.

1882 *Ptychites Studeri* (Fr. v. HAUER) E. v. M. — MOJSISOVICS, Mediterranen Triasprovinz, p. 260, pl. LXIII, fig. 1.

1904 *Ptychites Studeri* HAUER sp. 1857 — MARTELLI, Boljevici, p. 127, pl. XII, fig. 1.

1913 *Ptychites Studeri* v. HAU. — TOULA, Westbosnien, p. 659, pl. XXIII, fig. 4.

1913 *Ptychites flexuosus* v. MOJS. nov. var. — TOULA, Westbosnien, p. 666, text-fig. 24, pl. XXV, fig. 16.

? 1936 *Ptychites studeri* HAU. — *plexuosus* MOJS. — STEFANOFF, Golo-Bärdo, p. 151, pl. I, figs 11, 12; pl. II, figs 1, 2.

? 1963 *Flexoptychites studeri* (HAUER) 1857 — ASSERETO, Val Camonica, p. 86, pl. XI, fig. 5, text-fig. 31.

1988 *Flexoptychites studeri* (HAUER), 1857 — PRLJ & MUDRENOVIĆ, Pribudića, p. 19, pl. IV, fig. 1.

v 2010 *Flexoptychites* cf. *studer* (HAUER, 1857) — VÖRÖS, North Hungary, p. 12, pl. III, fig. 2.

Material

One specimen from Vászoly.

Measurements

	D	WH	WW	U
INV 2017.277.1.	53.4	29.1	15.1	5.4

Description

Medium-sized *Flexoptychites* with moderately compressed, involute conch. The whorl-section is high oval with maximum width near the umbilicus. The umbilicus is moderately narrow and deep. The umbilical margin is subrounded. The flanks are very slightly convex and pass gradually into the highly arched, narrowly rounded venter. The rather weak ornamentation consists of rectiradiate folds of uneven strength; some of them appear as secondary intercalations. The folds appear near the umbilical margin, become gently convex around mid-flank and fade out on the ventrolateral margin, where they tend to be slightly rursiradiate.

Suture lines are poorly visible; ammonitic, with wide and deeply denticulated first lateral lobe.

Remarks

F. studeri is similar to *F. flexuosus* (MOJSISOVICS, 1882) and *F. angustoumbilicatus* (BÖCKH, 1872) but it differs by its weaker and denser lateral folds which tend to be rursiradiate near the venter.

The specimens described as “*Ptychites studeri* HAU. — *plexuosus* MOJS.” (sic) by STEFANOFF (1936) were illustrated by very poor photographs which do not allow to decide if the identification was correct. Moreover, STEFANOFF (1936) seems to merge, without any explanation, the species *studeri* and *flexuosus* (written correctly in the plate explanation), which view is not accepted by the present author.

The specimen figured as *F. studeri* by ASSERETO (1963) shows unusually wide and rounded venter, therefore this item is queried in the synonymy.

Distribution

F. studeri was described from the Anisian of the Southern Alps, the Dinarides, North Hungary and doubtfully from the Balkan Mountains. At the Balaton Highland it was collected from the Illyrian Reitzi Subzone.

Flexoptychites angustoumbilicatus (BÖCKH, 1872)

Plate XLII: 1–5.

- v * 1872 *Arcestes angusto-umbilicatus* n. sp. — BÖCKH, A Bakony déli részének, p. 149, pl. VIII, figs 7, 8, pl. IX, fig. 9.
 v 1873 *Arcestes angusto-umbilicatus* n. sp. — BÖCKH, Südl. Theiles des Bakony, p. 160, pl. VIII, figs 7, 8, pl. IX, fig. 9.
 v 1875 *Arcestes angusto-umbilicatus* BÖCKH — STÜRZENBAUM, Ceratites Reitzi-szint, p. 258, pl. V, fig. 3.
 1882 *Ptychites angusto-umbilicatus* (BOECKH) E. v. M. — MOJSISOVICS, Mediterranen Triasprovinz, p. 257, pl. LXV, figs 5, 6, pl. LXVI, fig. 1.
 1882 *Ptychites noricus* E. v. MOJSISOVICS — MOJSISOVICS, Mediterranen Triasprovinz, p. 258 (partim), pl. LXIV, fig. 5 (non. pl. LXIV, fig. 6).
 1901 *Ptychites angustoumbilicatus* BOECKH var. (?) — REIS, Fauna des Wettersteinkalkes I., p. 92, pl. V, figs 1–2.
 1903 *Ptychites anguste-umbilicatus* BÖCKH — FRECH, Neue Cephalopoden, p. 13, pl. I, fig. 1.
 1904 *Ptychites anguste-umbilicatus* BOECKH sp., 1873 — MARTELLI, Boljevici, p. 123, pl. XII, fig. 4.
 ? 1913 *Ptychites flexuosus* MOJS. — TOULA, Westbosnien, p. 663, text-fig. 23, pl. XXIV, fig. 9.
 1968 *Flexoptychites angusto-umbilicatus* (BÖCKH) — VENZO & PELOSIO, Lenna in Val Brembana, p. 130, pl. XVII, figs 8, 10, 11, 13 (?).
 v 1989 *Flexoptychites* cf. *angustoumbilicatus* (BÖCKH, 1872) — VÖRÖS & PÁLFY, Vászoly, p. 21.
 non 1997 *Flexoptychites angustoumbilicatus* (BÖCKH) — URLICHS & Kurzweil, Württemberg, p. 4, figs 2, 3.
 v 1998 *Flexoptychites angustoumbilicatus* (BÖCKH, 1872) — VÖRÖS, Balaton-felvidék, p. 21, 22, 59.
 v 2010 *Flexoptychites* cf. *angustoumbilicatus* (BÖCKH, 1872) — VÖRÖS, North Hungary, p. 14, pl. III, fig. 1.

Material

188 specimens from Felsőörs (53), Vörösberény (2), Szentanatalfa (3), Szentkirályszabadja (41), Vászoly (47), Mencshely (36), Sóly (2), Balatoncsicsó (3) and Szentbékállá (1).

Measurements

	D	WH	WW	U
INV 2017.278.1.	98.1	52.8	26.1	11.1
INV 2017.281.1.	95.8	52.5	24.8	9.1
INV 2017.279.1.	54.1	28.5	15.1	6.1
INV 2017.280.1.	51.9	26.9	?	?
M.89.130A	48.1	23.1	13.1	?

Description

Medium to large-sized *Flexoptychites* with compressed, involute conch. The whorl-section is high, acutely oval, with maximum width near the umbilicus. The umbilicus is very narrow. The umbilical margin is rounded but well-defined. The flanks are slightly convex and pass gradually into the moderately acute venter. The ornamentation consists of rectiradiate, irregularly spaced, strongly sinuous folds. The primary folds arise close to the umbilical margin and fade out near the venter. Their number is 10 to 12 on a half-whorl. On the ventral half of the flanks, the primary folds are intercalated by weaker falcoid secondary folds, one to four in number in each interspace. In one specimen the sinuous rim of the aperture seems to be preserved (Plate XL: 5).

Suture lines are rarely seen; ammonitic, with relatively narrow but deep, denticulated first lateral lobe and high, phylloid first lateral saddle; further, at least four, auxiliary elements of decreasing amplitude, appear towards the umbilicus.

Remarks

The original specimens of *F. angustoumbilicatus*, deposited in the collection of the MGSZ (inventory numbers: T.308., T.325. and T.350.), and another, very typical specimen figured by STÜRZENBAUM (1875, pl. V, fig. 3, inventory number:

T.700.) were inspected by the present author. On the basis of its particularly characteristic ornamentation, this species can be identified easily even from fragmentary specimens, thus the identification of our specimens from the Balaton Highland is satisfactorily right.

In the description of his new species "*Ptychites noricus*", MOJSISOVICS (1882, p. 258) correctly stated that it was closely related to *F. angustoumbilicatus* in the ornamentation of the larger figured specimen (l. c., pl. LXIV, fig. 5). Detailed studies by MANFRIN et al. (2005, p. 500) proved that this specimen in fact belongs to *F. angustoumbilicatus*, while the other specimen figured by MOJSISOVICS (1882, pl. LXIV, fig. 6) remains the true "*Ptychites noricus*", i.e. by its correct name: *Lanceoptychites noricus* (MOJSISOVICS, 1882).

F. angustoumbilicatus is similar to *F. flexuosus* (MOJSISOVICS, 1882) in the character of the sinuous primary folds, but differs by the appearance of the secondary folds and by the significantly narrower umbilicus and highly arched venter. The rather strong and characteristic ornamentation, with falcoid secondary folds distinguishes *F. angustoumbilicatus* also from most other species of *Flexoptychites*.

The specimen figured as *F. flexuosus* by TOULA (1913) seems to belong rather to *F. angustoumbilicatus*.

The specimens figured as *F. angustoumbilicatus* by VENZO & PELOSIO (1968) are proper representatives of this species, with the only exception of (l. c., pl. XVII, fig. 13) which shows a sharply lanceolate body chamber, unknown, or at least quite unusual in *F. angustoumbilicatus*.

The specimen figured by URLICHS & KURZWEIL (1997) from Württemberg shows an ornamentation somewhat resembling *F. angustoumbilicatus*, but according to MANFRIN et al. (2005, p. 500), its suture line has a typical character of the genus *Parasturia*. This opinion is accepted here.

Distribution

F. angustoumbilicatus was described from the Anisian of the Balaton Highland, the Southern Alps, the Northern Calcareous Alps, the Dinarides and North Hungary. At the Balaton Highland it ranges from the Illyrian Camunum Subzone to the Crassus Subzone.

Flexoptychites flexuosus (MOJSISOVICS, 1882)

Plate XLIII: 1–3.

* 1882 *Ptychites flexuosus* E. v. MOJSISOVICS — MOJSISOVICS, *Mediterranean Triasprovinz*, p. 261, pl. LXIII, figs 2–8, pl. XLIV, figs 1–3, pl. XLVI, figs 2, 3.

1904 *Ptychites flexuosus* MOJSISOVICS 1882 — MARTELLI, *Boljevici*, p. 125, pl. X, 2–7.

1910 *Ptychites flexuosus* MOJSISOVICS — RENZ, *Argolis*, p. 25, text-fig. 1.

1913 *Ptychites flexuosus* MOJS. — TOULA, *Westbosnien*, p. 663, pl. XXIV, fig. 9.

? 1913 *Ptychites flexuosus* MOJS. — SIMIONESCU, *Hagighiol*, p. 342, 367, pl. VIII, fig. 7.

1915 *Ptychites flexuosus* MOJS. Var. — ARTHABER, *Die Trias von Bithynien*, p. 144, pl. XIII, fig. 1.

? 1931 *Ptychites flexuosus* MOJS. — ŽIVKOVIĆ, *Zlatar*, p. 90, pl. V, fig. 1.

? 1936 *Ptychites studeri* HAU. — *flexuosus* MOJS. — STEFANOFF, *Golo-Bárdo*, p. 151, pl. I, figs 11, 12; pl. II, figs 1, 2.

? 1958 *Ptychites flexuosus* MOJSISOVICS — SACCHI VIALLI & VAI, *Fauna triassica bresciana*, p. 75, pl. IV, fig. 34.

? 1963 *Flexoptychites flexuosus* (MOJSISOVICS) 1882 — ASSERETO, *Val Camonica*, p. 82, pl. IX, figs 1, 2, text-fig. 29.

1968 *Flexoptychites flexuosus* (MOJS.) — VENZO & PELOSIO, *Lenna in Val Brembana*, p. 127, pl. XVI, fig. 18, pl. XVII, fig. 9.

1988 *Flexoptychites flexuosus* (MOJSISOVICS), 1865 — PRLJ & MUDRENOVIĆ, *Pribudića*, p. 19, pl. V, fig. 2.

v 1989 *Flexoptychites acutus* (MOJSISOVICS, 1882) — VÖRÖS & PÁLFY, *Vászoly*, p. 21.

? 1992 *Flexoptychites flexuosus* (MOJSISOVICS), 1882 — SAKAČ, *Central Croatia*, p. 32, pl. V, fig. 4.

v 1998 *Flexoptychites flexuosus* (MOJSISOVICS, 1882) — VÖRÖS, *Balaton-felvidék*, p. 21, 22, 59.

1998 *Flexoptychites flexuosus* (MOJSISOVICS, 1865) — PETEK, *Hrastenica*, p. 132 and 139, pl. 4, figs 1–5.

v 2010 *Flexoptychites flexuosus* (MOJSISOVICS, 1882) — VÖRÖS, *North Hungary*, p. 13, pl. III, figs 4, 5.

Material

250 specimens from Felsőörs (19), Vörösberény (21), Szentantalfa (8), Szentkirályszabadja (47), Vászoly (53), Menshely (67), Sóly (12), Balatoncsicsó (13), Szentbékállá (3), Vöröstó (1) and Iszkaszentgyörgy (6).

Measurements

	D	WH	WW	U
INV 2017.282.1.	87.7	44.5	23.1	11.5
INV 2017.284.1.	58.9	29.9	19.1	8.1
INV 2017.283.1.	42.1	20.6	12.8	7.2

Description

Medium to large *Flexoptychites* with moderately compressed, involute conch. The whorl-section is rather high oval with maximum width near the inner third of the whorl. The umbilicus is rather narrow and deep. The umbilical wall is nearly vertical; the umbilical margin is rounded but rather well-marked. The flanks are slightly convex and pass gradually into the moderately and evenly arched venter. The ornamentation consists of rectiradiate, sinuous folds separated by depressions of similar width. The folds gradually appear near the umbilical margin and strengthen towards the venter where they fade out. The number of folds increases by occasional and irregular insertion of secondary folds and together are around 10 on a half-whorl. The inner whorls are usually smooth.

Suture lines are rarely and partly seen; ammonitic. The first lateral lobe is well-developed and deeply incised; the second lateral saddle is significantly higher than the first one; at least five accessory elements, with gradually decreasing amplitude appear towards the umbilicus.

Remarks

F. flexuosus is the type species of *Flexoptychites*. It differs from other species of the genera by its generally stronger lateral folds and less compressed conch with widely arched venter. The ample illustration given by MOJISOVICS (1882) and VENZO & PELOSIO (1968) provides adequate picture on the morphology of *F. flexuosus* and reliable basis for the identification of our specimens from the Balaton Highland.

The specimens figured as *F. flexuosus* by SIMIONESCU (1913) and ASSERETO (1963) show rather straight lateral folds, therefore they are included in the synonymy only with question marks.

Some other items of the synonymy are queried because the published figures are very poor and do not show distinctive features; this regards the items by ŽIVKOVIĆ (1931), SACCHI VIALLI & VAI (1958) and SAKAČ (1992).

The specimens described as "*Ptychites studeri* HAU. — *plexuosus* MOJS." (sic) by STEFANOFF (1936) were illustrated also by very poor photographs. Moreover, STEFANOFF (1936) seems to merge, without any explanation, the species *studeri* and *flexuosus* (written correctly in the plate explanation), which opinion is not accepted here.

Distribution

F. flexuosus was described from the Anisian of the Southern Alps, the Northern Calcareous Alps, the Dinarides, Greece, Turkey and North Hungary and doubtfully from Romania (Dobrogea) and the Balkan Mountains. At the Balaton Highland it ranges from the Illyrian Trinodosus Subzone to the Crassus Subzone.

Flexoptychites cf. *acutus* (MOJISOVICS, 1882)

Plate XLIII: 4.

* 1882 *Ptychites acutus* E. v. MOJISOVICS — MOJISOVICS, *Mediterranen Triasprovinz*, p. 263, pl. LXIV, fig. 4, pl. LXV, fig. 1, pl. LXVI, figs 4–6.

? 1901 *Ptychites acutus* MOJS. var. (?) — REIS, *Fauna des Wettersteinkalkes I.*, p. 93, pl. V, figs 3–13, pl. VII, figs 16–27.

? 1903 *Ptychites acutus* MOJS. — FRECH, *Neue Cephalopoden*, p. 13, pl. I, fig. 2.

? 1904 *Ptychites acutus* MOJISOVICS 1882 — MARTELLI, *Boljevići*, p. 128, pl. XI, figs 5, 6.

1910 *Ptychites acutus* MOJISOVICS — RENZ, *Argolis*, p. 26, pl. I, fig. 8.

? 1913 *Ptychites acutus* MOJS. — SIMIONESCU, *Hagighiol*, p. 341, 367, pl. V, fig. 2., text-fig. 73.

1963 *Flexoptychites acutus* (MOJISOVICS) 1882. — ASSERETO, *Val Camonica*, p. 80, pl. IX, fig. 3.

1967 *Flexoptychites acutus* (MOJISOVICS, 1882) — CASATI & GNACCOLINI, *Alpi Orobie*, p. 135, pl. 10, fig. 7.

v 1973 *Flexoptychites acutus* (MOJISOVICS, 1882) — RIEBER, *GRENZbitumenzone*, p. 71, pl. 17, figs 21, 24, Text-fig. 19ad.

1988 *Flexoptychites acutus* (MOJISOVICS), 1882 — PRLJ & MUDRENOVIĆ, *Pribudića*, p. 20, pl. V, fig. 1.

v 1989 *Flexoptychites acutus* (MOJISOVICS, 1882) — VÖRÖS & PÁLFY, *Vászoly*, p. 21.

1996 *Flexoptychites acutus* (MOJISOVICS, 1882) — FANTINI SESTINI, *Calcarea di Esino 2*, p. 223, pl. 1, fig. 1.

v 1998 *Flexoptychites* cf. *acutus* (MOJISOVICS, 1882) — VÖRÖS, *Balaton-felvidék*, p. 26, 29, 31, 38, 59.

1998 *Flexoptychites acutus* (MOJISOVICS, 1882) — PETEK, *Hrastenica*, p. 133 and 140, pl. 5, fig. 1.

v 2010 *Flexoptychites acutus* (MOJISOVICS, 1882) — VÖRÖS, *North Hungary*, p. 13, pl. IV, figs 1, 2.

Material

76 specimens from Vörösberény (11), Szentantalfa (13), Szentkirályszabadja (1), Vászoly (20), Mencshely (23), Balatoncsicsó (1), Örvényes (2), Szentbékállá (1), Vöröstó (2), Hajmáskér (1) and Iszkaszentgyörgy (1).

Measurements

	D	WH	WW	U
M.87.017	100.5	48.5	23.4	13.5

Description

Medium to large *Flexoptychites* with strongly compressed, involute conch. The whorl-section is high oval to acute, tending to be lanceolate in some cases, with maximum width near the umbilicus. The umbilicus is narrow and deep. The umbilical wall is nearly vertical; the umbilical margin is subrounded. In a mature specimen (Plate XLIII: 1) the body chamber shows egression. The flanks are slightly convex; on the last whorl, and especially on the body chamber, the venter is acute. The ornamentation is rather weak; it consists of irregularly developed sinuous folds (10 to 12 on a half whorl), and growth lines. The inner whorls of the phragmocone is smooth.

Suture lines are partly seen; ammonitic. The first lateral lobe is well-developed and deeply incised; the second lateral saddle is about as high as the first one; multiple accessory elements, with gradually decreasing amplitude appear towards the umbilicus.

Remarks

F. acutus differs from all other species of *Flexoptychites* by its markedly and consistently acute venter. MOJSISOVICS (1882) and FRECH (1903) put emphasis on the strongly sinuous folds, showing very convex parts at mid-flank; this phenomenon occurs, but is not a general feature.

REIS (1901) illustrated a series of specimens under the name "*Ptychites acutus*". They are included into the synonymy only with question mark, because none of them shows an acute venter; it is true that most of the specimens are very small.

Some other items of the synonymy (FRECH 1903, MARTELLI 1904, SIMIONESCU 1913) are also queried, because they did not contain the diagnostic ventral views. Without this information the identification of the respective specimens with *F. acutus* remains doubtful.

Distribution

F. acutus was described from the Anisian of the Southern Alps, the Northern Calcareous Alps, the Dinarides, Greece and North Hungary and perhaps from Romania (Dobrogea). At the Balaton Highland it ranges from the Illyrian Trinodosus Subzone to the Crassus Subzone.

Genus *Parasturia* SPATH, 1951

Type species: *Meekoceras emmrichi* (MOJSISOVICS, 1882)

The systematic position of the genus *Parasturia* changed in the last decades. In the "Treatise" (ARKELL et al. 1957, p. L182) it was listed among the Ptychitidae. According to the proposed classification by TOZER (1981, p. 93) this genus was ranked into the family Sturiidae. Recently, MANFRIN et al. (2005, p. 500) argued convincingly that *Parasturia* should be included again to the Ptychitidae, and this opinion is accepted here.

Parasturia cf. *emmrichi* (MOJSISOVICS, 1882)

Plate XLIII: 5; Figure 83.

- v * 1882 *Meekoceras Emmrichi* E. v. MOJSISOVICS — MOJSISOVICS, Mediterranen Triasprovinz, p. 219, pl. L, fig. 4.
 ? 1901 *Beyrichites Emmrichi* MOJS. spec. var. — REIS, Fauna des Wettersteinkalkes I., p. 100, pl. VI, fig. 19, pl. VII, fig. 32.
 ? 1907 *Beyrichites Emmrichi* var. *lateumbilicatus* REIS — REIS, Fauna des Wettersteinkalkes II., p. 136, pl. II, fig. 10, text-figs 12, 13.
 non 1978 *Parasturia* cf. *emmrichi* (MOJSISOVICS) — URLICHS, Zwei alpine Ammoniten, p. 7, pl. 1, fig. 2., text-fig. 2.
 1997 *Flexoptychites angustoumbilicatus* (BÖCKH) — URLICHS & Kurzweil, Württemberg, p. 4, figs 2, 3.
 2005 *Parasturia emmrichi* (MOJSISOVICS, 1882) — MANFRIN et al., Latemar, p. 500, figs 10/9–14.

Material

Two specimens from Mentshely.

Measurements

	D	WH	WW	U
INV 2017.285.1.	42.7	21.8	13.8	5.6

Description

Small *Parasturia* with compressed, very involute conch. The whorl-section is high oval, with maximum width near the umbilicus. The umbilicus is very narrow. The umbilical margin is rounded but well-defined. The flanks are slightly convex and pass gradually into the highly arched venter. The flanks are almost smooth, except a few, irregularly spaced, gently sinu-

ous folds. On the ventral part of the flanks the primary folds are intercalated by extremely weak, falcoid secondary folds. This weak ornamentation is restricted to the body chamber; the phragmocone is smooth.

The suture lines are partly seen (Figure 83); ammonitic, with relatively narrow but deep, denticulated first lateral lobe; the phylloid first lateral saddle is narrowed at its base, the second lateral saddle is considerably higher than the first one; further, auxiliary elements of decreasing amplitude, appear towards the umbilicus.

Remarks

The original specimen (holotype by monotypy) of *P. emmrichi* figured by MOJSISOVICS (1882) was checked by the present author in the collection GBAW, Wien (inventory number: 1882/03/265). The very weak ornamentation and the diagnostic constriction at the base of its first lateral saddle was clearly seen on the holotype. Thus the identification of our specimens from the Balaton Highland is ascertained.

The specimens of “*Beyrichites Emmrichi*” by REIS (1901) are illustrated by very poor figures, and this regards even more to the item “*Beyrichites Emmrichi* var. *lateumbilicatus*” by REIS (1907) where the drawing of suture line (REIS l. c., text-fig. 12) is only subammonitic and does not show at all the distinctive features of the lateral saddles. Nevertheless, these two items by REIS are tentatively included into the synonymy, with reliance on the opinion of MANFRIN et al. (2005, l. c.) who, hopefully by comparative study of the original material of REIS, definitely listed these items in their synonymy.

The specimen described and illustrated as “*Parasturia* cf. *emmrichi*” by URLICHS (1978) does not belong here but probably to a species of *Flexoptychites*, as it is well shown by the drawings of its suture line and cross section.

On the other hand, the specimen described as “*Flexoptychites angustoumbilicatus* (BÖCKH)” by URLICHS & KURZWEIL (1997), as MANFRIN et al. (2005, p. 500) affirmed previously, is a typical representative of *P. emmrichi*; the figured suture line (URLICHS & KURZWEIL, l. c., fig. 3) is perhaps the best and most complete illustration of the suture of *emmrichi*, with the diagnostic constriction of the first lateral saddle.

Distribution

P. emmrichi was described from the Anisian of the Southern Alps, from the German Muschelkalk and probably from the Northern Calcareous Alps. At the Balaton Highland it was collected from the Illyrian Avisianum Subzone.

Superfamily Arcestoidea MOJSISOVICS, 1875

Family Arcestidae MOJSISOVICS, 1875

Genus **Proarcestes** MOJSISOVICS, 1893

Type species: *Proarcestes bramantei* (MOJSISOVICS, 1869)

Proarcestes sp.

Plate XLIII: 6–9.

v 1993 *Proarcestes* sp. — VÖRÖS, Reitzi Zone, p. 25, pl. IV, fig. 1.

v 1998 *Proarcestes* sp. — VÖRÖS, Balaton-felvidék, p. 21, 35, 51, 53.

v 2002 *Proarcestes* sp. — VÖRÖS, Paleoenvironmental distribution, p. 488, pl. 2, fig. 5.

Material

48 specimens from Felsőörs (13), Vászoly (3), Mencshely (30) and Balatoncsicsó (2).

Measurements

	D	WH	WW	U
INV 2017.289.1.	37.4	21.1	23.1	?
INV 2017.287.1.	30.8	16.1	25.1	4.2
INV 2017.286.1.	25.5	13.1	22.1	2.4
INV 2017.288.1.	13.1	7.5	10.4	1.5

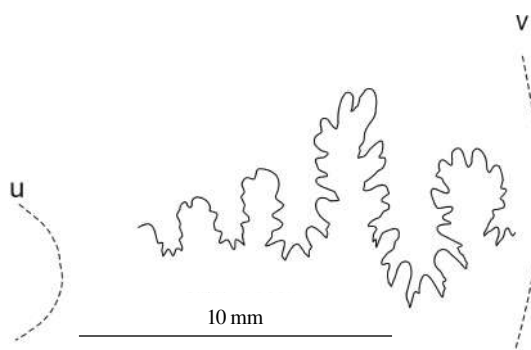


Figure 83. Suture line of *Parasturia* cf. *emmrichi* (MOJSISOVICS, 1882); INV 2017.283.1., at 16 mm whorl-height, Mencshely I, Bed 3, Reitzi Zone, Avisianum Subzone, u: umbilical margin, v: ventral margin

Description

Small *Proarcestes* with globose, involute conch. The whorl-section is strongly depressed, with maximum width near the umbilicus. The umbilicus is very narrow, but the other details are concealed by matrix. The flanks are very convex and form a continuous arch with the convex venter. The shell surface is smooth, without ornamentation. Most specimens have no constrictions, others show two marked, gently projected constrictions on a whorl; in one case four rectiradiate constrictions per whorl were observed (Plate XLIII: 9).

Suture lines are poorly visible; ammonitic, with multiple, equally narrow lobes and saddles, highest at the venter.

Remarks

The abundant *Proarcestes* material from the upper Anisian of the Balaton Highland consists of merely small and incomplete specimens. They probably represent more than one species. Most of the relatively better preserved specimens seem to stand close to those figured by RIEBER (1973, pl. 15, figs 19, 22, 23, 25) as "*Arcestes (Proarcestes) extralabiatus* MOJSISOVICS, 1875" (examined by the author in the collection PIMUZ, Zürich). However, as MOJSISOVICS (1882, p. 154) stated, *P. extralabiatus* has much similarity to *P. trompianus* (MOJSISOVICS, 1882). Moreover, the external features (globosity, the character and number of constrictions) of *P. bramantei* (MOJSISOVICS, 1869) do not differ significantly from the above mentioned two species. After all, the specific identification of our *Proarcestes* specimens from the Balaton Highland remains open.

Distribution

The genus *Proarcestes* has a worldwide distribution in the Middle Triassic; especially frequently recorded in the upper Anisian of the Southern Alps, the Northern Calcareous Alps, the Dinarides. At the Balaton Highland it ranges from the Illyrian Reitzi Subzone to the Secedensis Subzone, but was also recorded in the Ladinian Gredleri and Archelaus Zones (VÖRÖS 1998).