

MIDDLE MIOCENE FORAMINIFERA FROM ROMANIA: ORDER BULIMINIDA, PART II

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Abstract: This second paper on the order Buliminida is dedicated to the description and figuration of some species belonging to the superfamilies Turrilinacea (partly), Fursenkoinacea, Delosinacea, Pleurostomellacea, and Stilostomellacea.

The specimens described in this paper come from the same locations as those described in the first paper on the Buliminida, that is outcrops and drillings from the south-western border of the Pannonian Basin, and outcrops from the northern and north-western part of the Transylvanian Basin.

Key words: Buliminida, Middle Miocene, Romania

SYSTEMATIC DESCRIPTIONS

Family **UVIGERINIDAE** HAECKEL, 1894

Subfamily **Uvigerininae** HAECKEL, 1894

Genus *Uvigerina* D'ORBIGNY, 1826

Uvigerina acuminata HOSIUS, 1895

(pl. 7, fig. 1, 2)

Uvigerina acuminata HOSIUS, 1895, p. 167 (new name for *U. aculeata* Hosius, 1883, non d'Orbigny), p. 108, pl. 2, fig. 9; von Daniels, 1986, p. 92, pl. 5, fig. 1-8.

Remarks: The species was described from the Miocen (Reinbeckian) from Northern Germany. In the Carpathian area it occurs in the Middle Miocene deposits. Cicha et al. (1986) assign to this species a very large group of uvigerinas with variable morphology, including here morphotypes described as *U. barbatula* Macfadyen, *U. uniseriata* Jedlitschka and *U. grilli* Schmid.

Uvigerina asperula CZJZEK, 1849

(pl. 7, fig. 3, 4)

Uvigerina asperula CZJZEK, 1847, p. 146, pl. 13, figs. 14, 15.

Remarks: Cushman & Edwards (1939, p. 36) suspected the two species described by Czjzek as *U. asperula* and *U. orbignyana* Czjzek, (1847, p. 146, pl. 13, figs. 16, 17) were "varieties" of the species *Uvigerina aculeata* d'Orbigny. Papp & Turnovsky (1953, p. 127) consider *U. asperula* and *U. orbignyana* as synonymous and mentioned them as *U. aculeata orbignyana* Czjzek. Verhoeve (1970, p. 32) considers the two species as synonyms, representing a couple microsphaeric (*U. asperula*) and megalosphaeric (*U. orbignyana*).

Another similar species, suspected to be a junior synonym is *Uvigerina pudica* Luczkowska (1955, p. 150, pl. 8, fig. 17), described from the same stratigraphic level as Czjzek's species.

Range: Wielician.

Remarks. In our material there were recorded microspheric specimens (with acuminated apex) like in the type illustration and megalospheric specimens with rounded/blunt apex.

Uvigerina bellicostata LUCZKOWSKA, 1955

(pl. 7, fig. 5)

Uvigerina bellicostata LUCZKOWSKA, 1955, p. 150, pl. 8, figs 10-13; Popescu, 1979, p. 34, pl. 21, fig. 5.; Rögl, in Cicha et al., 1998, p. 133, pl. 51, figs. 9, 10.

Remarks. This species is typical for Upper Badenian (Kossovian) from Carpathian Area. It is characterized by high acuminated, non-continuous costae ornamentation. The species *U. costatoides* Papp & Schmid (1978) is suspected (Rögl, in Cicha et al., 1998, p. 133) to be a junior synonym.

Uvigerina lapugyensis n.sp.

(pl. 7, figs. 6-8)

Diagnosis: Test free, elongated; early chambers triseriately arranged, becoming pseudouniserial alterne in the adult; wall calcareous, finely perforated; chambers inflated, increasing gradually in size in the young stage; surface pustulated in the early stage, ornamented with longitudinal serrate, curved costae or small spines (in the initial part); aperture at the end of a short neck, larger at the base, surrounded by an everted lip; small rounded pores.

Holotype: Coll. LPB.IV, 11697; paratypes, Coll. LPB.IV, 11698

Type locality: Valea Cosului section, Lăpugiu de Sus (Hunedoara district, Bega Basin).

Age: Upper Langhian (Candorbulina universa/Globoturborotalita druryi Zone).

Remarks: This species is close to *U. pygmoides* Papp & Turnovsky differing only in ornamentation (serrate costae and pustulated intercostal surface). Papp & Schmid (1978, pl. 11, figs. 13, 14) figured a similar specimen as a transition from *U. venusta* to *U. romaniaca*.

Uvigerina macrocarinata PAPP & TURNOVSKY, 1953

(pl. 7, fig. 9, 10)

Uvigerina macrocarinata PAPP & TURNOVSKY, 1953, p. 123, pl. 5B, figs. 1-3; Papp, 1963, p. 249, pl. 4, figs. 6-10; Papp & Schmid, 1978, p. 280, pl. 9, figs. 1-4, pl. 11, figs. 2-4; Rögl, in Cicha et al., 1998, pl. 134, pl. 51, figs. 3, 4.

Remarks: Typical specimens occur in the Lower Lagenide Zone, characterized by its heavy costate

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ornamentation and relatively shorter neck. The species is closely related to *U. acuminata*; between the two species there is a continuous series of morphotypes as the one between *U. acuminata* and *U. uniseriata*. Stratigraphically, the occurrence of typical specimens of *U. macrocarinata* is immediately above *U. uniseriata*.

Uvigerina perornata PISHVANOVA, 1960

(pl. 7, fig. 11)

Uvigerina perornata PISHVANOVA, 1960 (in Subbotina et al., 1960), p. 195, pl. 7, fig. 11; Pishvanova, 1972, p. 267, pl. 21, fig. 9.

Remarks: Rare, strong costae, sometimes curved, which do not pass on the next chamber. The short neck is set in a depression. This is a typical species for Upper Badenian from Paratethys.

U. perornata is close to *U. bellicostata* Luczkowska, differing in thick and less elevated costae and to *U. macrocarinata*, from which differs in less heavy costae, which do not cross the sutures.

Uvigerina? pygmaea PAPP & TURNOVSKY,
1953

(pl. 7, fig. 12)

Uvigerina pygmaea PAPP & TURNOVSKY, 1953, p. 131, pl. 5/c, fig. 4; Papp & Schmid, 1978, p. 282, pl. 10, figs. 1-3; Cicha et al., 1986, p. 172, pl. 19, figs. 1-5.

Remarks: Test large and stout, chambers inflated, sutures deep, surface smooth, pores rounded, short and broad neck and strongly folded apertural inner tooth plate attached to margins of previous foramen (like in *Neouvigerina*) are the main features of this species. In our opinion, the species must be assigned to *Neouvigerina*.

Range: In Paratethys was mentioned from the Lower Badenian. Our illustrated material is coming from Lăpugiu de Sus and Coștei (Banat) from the Upper Langhian (N 9 Zone). The best conserved specimens were found in samples collected in Valea Cipkes, Notelec, Cluj district.

Uvigerina romaniaca PAPP & SCHMID, 1978

(pl. 7, fig. 13, 14)

Uvigerina romaniaca PAPP & SCHMID, 1978, p. 283, pl. 11, figs. 15-17.

Remarks. This species was described from the Central Paratethys by Luczkowska (1955, p. 116, pl. 8, fig. 9) and Popescu (1979) as *U. hispidocostata* Cushman & Todd. The test is small and delicate; test has a fusiform shape; surface pustulated ornamented with fine tuberculate costae in younger stages, pustulate hispid in the adult; aperture at the end of a long, slender, pustulated neck.

Range: Upper Badenian (Kossovian). The holotype is coming from Valea Morilor section (Colibași, western Oltenia).

Uvigerina striatissima PERCONIG, 1955

(pl. 7, figs. 15, 16)

Uvigerina striatissima PERCONIG, 1955, p. 177, pl. 3, figs. 1-4; Borsetti et al., 1986, p. 208, pl. 7, fig. 2.

Test large and stout; chambers inflated, triserial throughout; periphery lobate; sutures distinct, depressed; surface ornamented with numerous, low costae which cross the sutures; wall calcareous with numerous rounded irregularly distributed pores; aperture at the end of a neck, set into a depression.

Remarks: This species is similar with *U. laviculata* Coryell & Rivero (a possible junior synonym, see Boersma, 1984, p. 92). Another similar species is *U. longistriata* Perconig, 1955 from which differs in more numerous and lower costae. In Paratethys similar specimens were mentioned as *U. semiornata semiornata* (Cicha et al. 1986, pl. 8, only fig. 1).

Range: Middle Miocene to Pliocene. In Paratethys, specimens assigned to *U. striatissima* were recorded only in the Lower Badenian.

Uvigerina uniseriata JEDLITSCHKA, 1932

(pl. 7, fig. 17)

Uvigerina pygmaea (d'Orb.) var. *uniseriata* JEDLITSCHKA, 1932, p. 62, pl. 1, fig. 15.

Uvigerina uniseriata Jedlitschka. Rogl, in Cicha et al., 1998, p. 135, pl. 50, figs. 13-15.

Remarks. Typical specimens of *U. uniseriata* were recorded only in the Lower Moravian deposits (Lower Badenian), belonging, biostratigraphically to Zone N8. Thus, this morphotype seems to be restricted to a short interval. In Vienna Basin, *U. uniseriata*, mentioned by Papp (1963) as *U. uniserialis*, err. cit.) was recorded in Laaer Series (Papp, 1953, p. 249, pl. 4, figs. 1-5).

The species is close to *Uvigerina uniserialis* LeRoy (1944) described from Miocene deposits of Central Sumatra. This last species seems to be a junior synonym.

Uvigerina urnula d'ORBIGNY, 1846

(pl. 7, figs. 18-20)

Uvigerina urnula d'ORBIGNY, 1846, p. 189, pl. 11, figs. 21, 22; Cushman & Edwards, 1939, p. 34, pl. 8, figs. 19-26; Verhoeve, 1970, p. 33, pl. 2, fig. 14, pl. 3, figs. 1, 2; Haunold, 1995, p. 72, pl. 1, fig. 1-10;

Uvigerina semiornata d'Orbigny, 1846, p. 189, pl. 11, figs. 23, 24;

Uvigerina urnula d'Orbigny var. *semiornata* d'Orbigny. Cushman & Edwards, 1939, p. 34, pl. 8, figs. 8-14; Marks, 1951, p. 62.

Test elongated, medium sized; chambers distinct, depressed; surface ornamented with low costae, more prominent near the posterior suture, they do not cross the sutures; aperture at the end of a short, broad neck placed into a deep depressionary area.

Remarks. This species has a highly variable shape of the test and ornamentation. It is difficult to distinguish species as *U. urnula* d'Orb., *U. brunensis* Karrer, *U. cochlearis* Karrer or *U. semiornata karreri* Papp & Turnovsky. Cushman &

Edwards (1939) as first revisers of the species consider *urnula* as central species and *semiornata* as a variety. Verhoeve (1970) considers *urnula* and *semiornata* are synonyms. Papp & Schmid (1985) and von Daniels (1986) include *U. urnula* in the synonymy of *U. semiornata*. Haunold (1995) includes species *semiornata*, *grilli*, *karreri*, *brunensis*, *cochlearis* and *aculeata* in the synonymy of *urnula*. They differ only in the sizes and ornamentation of the test.

Range: *U. urnula* is a common species in the Badenian deposits from Romania.

Subfamily **Angulogerininae** GALLOWAY, 1927

Genus *Angulogerina* CUSHMAN, 1927

Angulogerina angulosa (WILLIAMSON), 1858

(pl. 8, fig. 1-3, 6)

Uvigerina angulosa WILLIAMSON, 1858. pg. 67, pl. 5, fig. 140.

Angulogerina angulosa (Williamson). Hottinger, Halicz & Reiss, 1993, p. 100, pl. 126, figs 1-7; Rőgl, in Cicha et al., 1998, p. 80, pl. 54, figs. 3-6.

Test small, elongate, triangular in transverse section; chambers arranged triserially in the initial part then with tendency to become uniserial; suture depressed; surface ornamented with longitudinal costae; aperture terminal, ovate.

Common species in pelitic distal shelf deposits in Badenian. The illustrated material was recorded from Valea Gemini section, Coştei, Timiş district.

Angulogerina alticarinata n. sp.

(pl. 8, figs. 4, 5, 7-9, 12, 13)

Test small to medium, short, triangular in transverse section; chambers arranged triserial throughout; suture depressed, covered by thin, high, serrate, irregular costae; the angle of the test carinate; aperture terminal, rounded to ovate at the end of a short neck, bordered by a thin rim; sinusoidal tooth plate on frontal face of the chambers.

The holotype and paratypes were collected from Valea Morilor section, Colibaşi, Mehedinţi district. A large amount of this species was found also at Meliceşti (Valea Cosmina section, Prahova district), in deposits of the same age: Kossovian.

Holotype: Coll. LPB.IV, 11699; paratypes, Coll. LPB.IV, 11700.

Type locality: Valea Morilor section, Colibaşi, Mehedinţi district. Age: Kossovian

Range in Carpathians realm: Kossovian.

The name derived from the shape of carina.

Angulogerina esuriens HORNIBROOK, 1961

(pl. 8, figs. 10, 11, 15-18)

Angulogerina esuriens HORNIBROOK, 1961, p. 69, pl. 9, figs. 154, 155; Rőgl, in Cicha et al., 1998, p. 80, pl. 54, figs. 1, 2.

Remarks: Test small, slender, triangular in transverse section, with acute, keeled margins in transverse section, ornamented with distinct, longitudinal costae, irregularly disposed on the test surface; aperture oval elongate to circular, with a

flat toothplate projected in the interior of the chamber.

The type species was described from Awamoan (Lower Miocen) Rifle Butts Formation, New Zealand, but the stratigraphic distribution is much wider (Lower Miocene - Pliocene, after Hornibrook's data).

A. esuriens Hornibrook recalls *Uvigerina angulosa* var. *pauperata* Heron-Allen & Earland (see also Wright, 1978). The differences consist in size, test shape, disposition and aspect of the costae which might be also due to the ecological conditions. In this case, the species *A. esuriens* could be suspected as a junior synonym.

Angulogerina? sp.

(pl. 8, fig. 19; pl. 9, figs. 1, 2)

This species is characterized by small, sub-rhombic test in outline; chambers inflated, increasing rapidly in sizes as added, triserially arranged in the initial part (about ½ from its high), with tendency to become uniserial and more loosely attached, with upper half of the chambers surface convex and lower one almost flat; sutures slightly depressed in the initial part, strongly depressed in the second half; ornamentation consists in small longitudinal undulate costae and the wall perforated by large pores in the lower half of the test, pustulate or smooth in the upper part; aperture rounded to ovate at the end of a large, truncate cone. No observations on the inner structure of the tooth plate.

Remarks. Similar specimen was assigned by Poignant & Pujol (1976, pl. 8, fig. 9) to *Trifarina byramensis anfracta* Todd.

Our illustrated specimens (deposited in Coll. LPB.IV, 11701) were recorded from Moravian (Langhian) deposits in Valea Coşului section, Lăpuş de Sus, Hunedoara district.

Family **Reusselidae** LOEBLICH & TAPPAN, 1961

Genus *Fijiella* LOEBLICH & TAPPAN, 1961

Fijiella cribrocostata n.sp.

(pl. 9, figs. 3-6)

Test free, large, pyramidal, triserial, triangular in transversal section; acute edges, spinate; the chambers grow gradually, triangular in apical view; sutures limbate, curved, bordered by larger pores compared with those on the test surface; apertural face slightly depressed, and primary aperture an elongated slit, interiomarginal; in adult stage multiple circular openings, bordered by high hyaline lips.

Remarks: In the specimens whose last chamber was removed the apertural face has prominent costae, disposed parallel to the primary aperture from the base of the last chamber.

Holotype: Col. LPB.IV, 11702, figured in pl. 9, fig. 6; paratypes: Coll. LPB.IV, 11703.

The name of the species comes from the aspect of the apertural face (cribrate and/or costate).

Type locality: Coştei, Valea Gemini section.

Age: Upper Moravian (Upper Langhian), Zone Candorbulina universa/ Globoturborotalita druyi.

Genus *Parareussella* n.g.

Test prismatic, triserial, triangular in transverse section; chambers grow rapidly in the early stage, then constantly, with parallel margins in the adult; sutures slightly depressed, distinct, oblique; wall calcareous, perforated, with large pores near the keeled margins and sutures; aperture terminal, ovate, bordered by a thin lip; inner folded tooth plate connecting the aperture with the previous one.

Type species: *Parareussella prismatica* n.sp.

Remarks: Differs from *Fijiella* and *Reussella* by its prismatic form, parallel margins and the shape of the aperture.

Parareussella prismatica n.sp.

(pl. 9, figs. 12-14)

Test small, triangular, prismatic, with keeled margins, sometimes toothed; early chambers grow rapidly, and then constantly; early part acuminate to microspheric specimens, rounded to the megalospheric ones; wall calcareous; sutures distinct, slightly curved and oblique, limbate and depressed; surface smooth, perforated with large pores near the sutures and keel; aperture terminal, ovate, near the base of the apertural face, bordered by a thin lip; inner folded tooth plate connecting the aperture with the previous one.

Holotype: Coll. LPB.IV, 11704, figured in pl. 9, fig. 12.

Type locality: Coștei, Valea Gemini section.

Age: Upper Moravian (Upper Langhian) (Zone N 9, Candorbulina universa/ Globoturborotalita druyi).

Genus *Reussella* GALLOWAY, 1933

Reussella spinulosa (REUSS), 1850

Verneuilina spinulosa REUSS, 1850, p. 374, pl. 47, fig. 12; Karrer, 1868, p. 126.

Reussella spinulosa (Reuss). Cushman, 1945, p. 33, fig. 8, 9.

Common species in the Langhian deposits from Lăpușiu de sus and Coștei and very rare in Buitur (upper Kossovian). In Paratethys occurs only in Badenian deposits.

Reussella pulchra CUSHMAN, 1945

(pl. 9, fig. 8-11)

Reussella pulchra CUSHMAN, 1945, p. 34, pl. 6, figs. 11, 12.

The holotype was described from the Baden Tegel, Vienna; Cushman mentioned this species at Nussdorf (Austria), Coștei, Buitur (Romania), Dingden (Germany). Very similar specimens occur in the Miocene and Pliocene from Australia and Philippines.

Superfamily **FURSENKINACEA**, LOEBLICH & TAPPAN, 1961

Family **Fursenkoinidae**, LOEBLICH & TAPPAN, 1961

Genus *Fursenkoina*, LOEBLICH & TAPPAN, 1961

Fursenkoina schreibersiana CZJZEK, 1847

(pl. 9, fig. 7)

Virgulina schreibersiana REUSS, 1847, p. 147, pl. 13, figs. 18-21; Cushman, 1937, p. 18, pl. 2, figs. 11-20

This species occurs sporadically in our material collected from the Middle and Upper Badenian.

Genus *Sigmavirgulina*, LOEBLICH & TAPPAN, 1961

Sigmavirgulina tortuosa (BRADY), 1881

(pl. 9, fig. 15, 16)

Bolivina tortuosa BRADY, 1884, p. 420, pl. 52, figs. 31, 32; Cushman, 1937, p. 133, pl. 17, figs. 11-19.

Remarks. Sigmoidal initial chamber, twisted test and "granular wall texture", are the most important features in separating this species from genus *Bolivina*.

In Romania occurs in Moravian and Wielician deposits from north-western Transylvania and Banat. Well preserved specimens were recorded from Valea Gemini section, Coștei, Timiș district.

Family **VIRGULINELLIDAE**, LOEBLICH & TAPPAN, 1961

Genus *Virgulinea* CUSHMAN, 1932

Virgulinea pertusa (REUSS), 1860

(pl. 10, fig. 1, 2)

Virgulinea pertusa REUSS, 1860, pl. 362, pl. 2, fig. 16 (fide Ellis & Messina, 1940 et seq.).

Virgulinea (Virgulinea) pertusa Reuss. Cushman, 1937, p. 31, pl. 5, figs. 6-9.

Remarks: This taxon occurs very rarely in our material. There were some records in pelitic deposits from the Upper Langhian from the eastern border of the Pannonian realm.

Our specimens differ from the typical *V. pertusa* having some affinity with *V. fragilis* Grindell & Collen described from New Zealand (see Loeblich & Tappan, 1988, p. 153, pl. 579, figs. 16-19).

Range: Lower and Middle Badenian (Langhian-early Serravallian).

Superfamily **DELOSINACEA**, PARR, 1950

Family **Baggatellidae** N.K.BYKOVA

Subfam. **Baggatellinae** BYKOVA, 1959

Baggatella vs. *Caucasina*

Baggatella Howe, 1939 was treated by Popescu & Iva (1971) as senior synonym of *Caucasina* Khalilov (1951). In their opinion the type species of *Baggatella*, *B. inconspicua* Howe, 1939, represents in fact only the initial stage of a specimen. Initial stage of some "*Caucasina*" can be assigned to this genus. In the Carpathians there were found two short stratigraphic intervals rich in *Baggatella*: in the Upper Oligocene (Chattian) and in the Middle Miocene (Kossovian). Here, in the same sample with *Baggatella* coexist numerous

specimens of "*Caucasina*" in different ontogenetic stages.

Genus *Baggatella* HOWE, 1989

Baggatella elongata (d'ORBIGNY), 1826
(pl. 10, fig. 14)

Bulimina elongata d'ORBIGNY, 1826, An. Sci. Nat., 7, p. 269, no. 9 (fide Ellis & Messina); d'Orbigny, 1846, p. 187, pl. 11, figs. 19, 20; Luczkowska, 1955, p. 110, pl. 7, fig. 8.

Baggatella elongata (d'Orb.). Popescu, 1979, p. 32, pl. 19, figs. 4-6, pl. 21, fig. 2.

Range. Miocen. In Romania is frequent in Kossovian deposits and rare in lower Miocene from Transylvania (Chechiş Formation, Burdigalian) and Lower Badenian (Langhian).

Baggatella gutsulica (LIVENTHAL), 1953
(pl. 10, figs. 3-7)

Baggatella gutsulica LIVENTHAL, 1953, p. 181, pl. 7, figs. 11-20.

Caucasina schischkinskye Vengliniski, 1958 (non Samoilova) p. 135, pl. 29, figs. 6-9.

Caucasina lalovi Vengliniski, 1962, p. 109, pl. 17, fig. 4.

Caucasina gutsulica Liventhal. Rogl, 1998 (in Cicha et al.), p. 87, pl. 47, figs. 8-10.

The species is frequent in the Badenian deposits from Paratethys, especially in its upper part (Kossovian). In Romania occurs in Subcarpathians and on the eastern border of the Pannonian Depression.

Baggatella lappa (CUSHMAN & PARKER), 1937
(pl. 10, fig. 13)

Bulimina elongata d'Orbigny var. *lappa* CUSHMAN & PARKER, 1937, p. 51, pl. 7, fig. 8; Marks, 1951, p. 57, pl. 7, fig. 14; Verhoeve, 1970, p. 32, pl. 2, fig. 7.

The species is common in the normal marine Middle Miocene pelitic facies from north-western Transylvania, eastern border of the Pannonian Depression and Subcarpathians. Differs of *B. elongata* in bluntly, coarsely pustulate, rounded base.

Baggatella subulata (CUSHMAN & PARKER), 1937
(pl. 10, figs. 8-11)

Bulimina elongata d'Orbigny var. *subulata* CUSHMAN & PARKER, 1937, p. 51, pl. 7, fig. 6, 7; Marks, 1951, p. 57, pl. 7, fig. 13; Verhoeve 1970, p. 32, pl. 2, fig. 8; Rogl, in Cicha et al., 1998, p. 87, pl. 46, figs. 15-19.

In this species, the "discorbine" stage is followed by globular chambers, with constant sizes, arranged in a high spire with a reduced (3) number per whorl. Its base is provided with short, stout, spines. In some specimens conferred to this species (pl. 10, figs. 12, 15-17), the post "discorbine" stage is followed by more globular chambers increasing in sized as added, sutures more depressed and a zigzag disposition of the columellar tooth plates.

Superfam. **PLEUROSOMELLACEA** REUSS, 1860

Fam. **Pleurostomellidae** REUSS, 1860

Subfam. **Pleurostomellinae** REUSS, 1860

Genus *Delphinoidella* POPESCU, 1992

Delphinoidella rostrata POPESCU, 1992

(pl. 11, figs. 11-15)

Delphinoidella rostrata POPESCU, 1992, p. 46, pl. 1, figs. 1-9; pl. 2, figs. 1-6.

Test small, ovoidal; chambers arranged pseudouniserial, alternating in orientation by 180°, every new chamber enveloping the rest of the test; aperture slit-like curved along the rostrum and two slit-like openings near the base of the rostrum; wall calcareous; inner hemitube extending between successive apertures.

Remarks: This very rare species was recorded from Middle Badenian deposits. Usually, there are megalospheric specimens made up of 2, 3, and very rarely of 4 or more chambers. It was recorded one microspheric specimen which differs from the megalospheric ones by the dimension of the initial chamber, more chambers (8-9), and fusiform shape (acuminated initial part).

Paratypes: Coll. LPB.IV, 11705.

Genus *Nodosarella* RZEHAKE, 1895

Remarks: *Nodosarella* was restricted by Cushman (1959) to the species having a short biserial stage; Loeblich & Tappan (1964) demonstrated that the type species is uniserial throughout; thus, the genera *Ellipsonodosaria* Silvestri, 1900 and *Lingulonodosaria* Silvestri, 1900 become junior synonyms.

Nodosarella rotundata (d'ORBIGNY), 1846
(pl. 11, fig. 16, 17)

Lingulina rotundata d'ORBIGNY, 1846, p. 61, pl. 2, figs. 48-51; Karrer, 1866, p. 166.

Test uniserial; chambers inflated separated by deep horizontal sutures; wall calcareous, finely perforated; aperture terminal, slit-like, bordered by a faint lip, sometimes slightly asymmetrical.

Remarks: the lectotype of this species was selected and designated by Loeblich & Tappan (1964, p. C730, fig. 594/10) from d'Orbigny's collection in Paris.

Range: Upper Langhian.

Genus *Pleurostomella* REUSS, 1860
Pleurostomella alternans SCHWAGER, 1866
(pl. 11, figs. 1, 2)

Pleurostomella alternans SCHWAGER, 1866, p. 238, pl. 6, figs. 79, 80; Rogl, in Cicha et al., 1998, p. 118, pl. 55, figs. 10-12.

Very rare species in Lower Badenian. Some specimens were recorded from Lăpugiu de Sus and Coştei and very rare in north-western Transylvania (Popeşti, near Cluj).

Pleurostomella polymorpha n. sp.
(pl. 11, figs. 3-5, 7-10)

Test small, elongate, fusiform, with both ends acuminated; chambers biserially arranged, alternating, strongly overlapping earlier ones in the adult; wall thin, finely perforate; surface smooth;

sutures oblique, lobate; aperture subterminal, half-moon like, with internal tube.

Holotype: Coll. LPB.IV, 11706 (pl. 11, fig. 4)

Range. Middle Miocene (Lower Serravallian).

All illustrated specimens come from Valea Lupoaiei section, Archiș, Arad district.

The name wants to suggest the evolution of the shape during ontogenetic development.

Remarks. This species is close to *Pleurostomella parviapertura* Kennett, (1967, New Zealand Jour. Geology Geophysics, **10**/4, p. 1007, 1008, text-figs. 25, 26, fide Ellis & Messina), described from Miocene deposits of New Zealand and also found in Argentina in Middle Miocene (Boltkovskoy, 1981, p. 406, pl. 6, figs. 3, 4). Our species differs of *P. parviapertura* in the presence of a lobate sutural line and larger aperture.

Superfamily. STILOSTOMELLACEA FINLAY, 1947

Fam. *Stilostomellidae* FINLAY, 1947

Genus *Orthomorphina* STAINFORTH, 1952

Orthomorphina columella (KARRER), 1877
(pl. 11, figs. 6, 18-20)

Nodosaria columella KARRER, 1877, p. 379, pl. 16, fig. 21.

Remarks: In the marine Middle Miocene deposits from Romania the following species were recorded: *O. columella* (Karrer), *O. jedlitschkai* (Thalman) and *O. challengeriana* (Thalman) (see Popescu, 1975, p. 58, 59).

The differences between the mentioned species are not very important. Thus, *O. challengeriana* has inflated chambers, slightly elliptical and with longitudinal costae, less pronounced, unlike *O. columella* which has the chambers slightly elongated, subrectangular. *O. jedlitschkai* has a test with a similar shape as *O. challengeriana*, but differs from this one by the fact that the test ornamentation is hardly visible or missing.

A very close species (senior synonym?) to Karrer's species is *Orthomorphina perversa* (Schwager) in: Schwager, 1866, p. 212, pl. 4, fig. 29.

Genus *Stilostomella* GUPPY, 1894

Stilostomella adolphina (d'Orbigny), 1846
(pl. 12, figs. 1, 2)

Dentalina adolphina d'ORBIGNY, 1846, p.50, pl. 2, fig. 18-20

Stilostomella adolphina (d'Orb.). Rogl in: Cicha et al., 1998, p. 128, pl. 56, fig. 6

Common species in the Lower and Middle Miocene in Carpathians area.

Stilostomella subspinoso NEUGEBOREN, 1856
(pl. 12, figs. 3-7)

Dentalina subspinoso Neugeboren, 1856, p. 88, pl.4, figs. 8, a & b.

Test uniserial, slender, curved; chambers globular, slightly elongate in the adult; surface rough, covered by axial-elongated pores each of them containing, near the base of chamber, a pseudo-spine; aperture terminal, rounded, at the

end of a long, slender neck, provided with apertural tooth.

Remarks. A close species is *Dentalina scripta* d'Orbigny (1846, p.51, pl. 2, figs. 8-11). As the lectotype (see Papp & Schmid, 1985, p.31, pl. 15, figs. 8-11) was designated a broken specimen accompanied by a short description. Differs of *S. subspinoso* in having pores elliptical, elongated chambers and circular pores.

REFERENCES

- Boersma, Anne (1984) Handbook of common Tertiary Uvigerina. Microclimates Press Stony Point, New York, 207 p., New York.
- Boltkovskoy, E. (1981) Foraminiferos bentonicos del sito 360 del "Deep Sea Drilling Project" (Eoceno medio-Plioceno inferior). Asociacion Geologica Argentina, Revista, 36/4, p. 389-423, 7 pls.
- Borsetti, A. M., Iaccarino, S., Jorissen, F. J., Poignant, A., Sztrakos, K., Van der Zwaan, G. J., Verhallen, P. J. J. M. (1986) The Neogene development of Uvigerina in the Mediterranean (in: Van der Zwaan G. J., et al., ed. Atlantic-European Oligocene to Recent Uvigerina taxonomy, paleoecology and paleobiogeography). Utrecht Micropal. Bull. 35, p. 183-135, Utrecht.
- Brady, H. B. (1884) Report on the Foraminifera dredged by HMS Challenger, during the years 1873-1876 in Report on the Scientific Results of the Voyage of the HMS Challenger, during the years 1873-1876, Zoology, 9, 814 p., 115 pl., London
- Cicha, I., Khrovsky, J., Brzobohaty, R., Ctyroka, J., Daniels, C. H., von, Haunold, Th., Horvath, M., Luczkowska, L., Reiser, H., Rupp, Ch., Rijavec, L., Werner, W. (1986) Oligocene and Miocene Uvigerina from the Western and Central Paratethys (in: Van der Zwaan G. J., et al., ed. Atlantic-European Oligocene to Recent Uvigerina taxonomy, paleoecology and paleobiogeography). Utrecht Micropaleontological Bull., 35, p. 121-181, Utrecht.
- Cicha, I., Rögl, F., Rupp, Ch., Ctyroka, J., Ed. (1998) Oligocene-Miocene foraminifera of the Central Paratethys. Abh. senckenberg. naturforsch. Ges., 549, 325 p., 79 pl., Frankfurt a. M.
- Cushman, J. A. (1937) A monograph of the Subfamily Virgulininae of the foraminiferal Family Buliminidae. *Cushman Lab. Foram. Res., Special Publication*, **9**, 228 p., 24 pls., Sharon, Mass.
- Cushman, J. A. (1945) The species of the subfamily Reussellinae of the foraminiferal Family Buliminidae. *Cushman Lab. Foram. Res., Contr.* 21/2, p. 23-54, Sharon, Mass.
- Cushman, J. A., Edwards, P. G. (1939) Notes on the early described Miocene species of *Uvigerina*. *Cushman Lab. Foram. Res., Contr.* 15, p. 33-40, Washington D.C.
- Cushman, J.A., Parker, F.L. (1937) Notes on some European species of *Bulimina*. *Contributions from the Cushman Laboratory for Foraminiferal Research* **12**, p. 5-10.
- Cushman, J.A., Todd, Ruth (1941) Notes on the species of *Uvigerina* and *Angulogrina* described from the Pliocene and Pleistocene. *Cushman Lab. Foram. Res., Contr.*, 17/3, p. 70-78, pls. 17-20.
- Czjzek, J. (1847) Beitrag zur Kenntniss der fossilen Foraminiferen des Wiener Beckens. Naturwiss. Abh., 2/1, p. 137-150, Wien.

- Daniels, C. H., von (1986) *Uvigerina* in the NW European Neogene (in: Van der Zwaan G. J., Jorisen, F. J., Verhallem, P. J. J. P., Von Daniels, C. H., ed. Atlantic-European Oligocene to Recent *Uvigerina* taxonomy, paleoecology and paleobiogeography). Utrecht Micropaleontological Bull., 35, p. 67-120, Utrecht.
- Ellis, B. F. & Messina, A., 1940 et seq. Catalogue of Foraminifera. Am. Mus. Nat. Hist., New York.
- Haunold, T. G. (1990) The new Neogene genus *Pappina* in the new family *Pappinidae*: polymorphine mode of chamber addition in the Buliminacea. Journal of Foraminiferal Research, 20/1, p. 56-64, Lawrence, Kansas.
- Haunold, T. G. (1995) Zur Taxonomie, Systematik und stratigraphischen Bedeutung uvigerinider Foraminiferen im Neogen des Wiener Beckens und benachbarter Gebite - 40 Jahre nach Papp & Turnovsky (1953). Jb. Geol. B. - A., 138/1, p. 67-87, Vienna.
- Hofker, J. (1951) the foraminifera of the Siboga Expedition, Part III. Siboga Expedition, Monogr. 4, p. 1-513, figs. 1-348.
- Hofmann, G.W. (1971) Comparison of the Tertiary Bolivina reticulate group (Foraminiferida) in New Zealand and Europe. New Zealand Journal of Geology and Geophysics, 14/2, p. 299-322, Wellington.
- Hosius, A. (1895) Beiträge zur Kenntnis der Foraminiferenfauna des Ober-Oligozans von Doberg bei Bunde. J. Ber. Naturwiss. Ver. Osnabruk, 10, p. 73-124.
- Hornibrook, N. de B. (1961) Tertiary Foraminifera from Oamaru District (N. Z.), part I - Systematics and Distribution. N. Z. Geological Survey, Paleontological Bull. 34/1, 192 p., 28 pl., Wellington.
- Hottinger, L., Halicz, E., Reiss, Z. (1993) Recent Foraminifera from the Gulf of Aqaba, Red Sea. Academia Scientiarum et Artium Slovenica. Classis IV: Historia Naturalis, 33, 179 pp., 230 pls, Ljubljani.
- Jones, R.W. 1994 The Challenger Foraminifera. 150 pp. Oxford University Press, Oxford New York Tokyo.
- Jung, Kyu Kui (1988) Morphology and Taxonomy of Late Cenozoic *Uvigerina* from Japan. Tohoku University, Science Reports, 2nd ser. (Geology), 59/2, p. 99-175, pls. 25-49. Sendai.
- Kantorova, V. (1975) *Vsevolodia*, a new foraminiferal genus from the Oncophora beds of southern Slovakia. Zapadne Karpaty. Seria Paleont., 1, p. 87-92.
- Karrer, F. (1868) Die Miocene Foraminiferenfauna von Kostež im Banat, Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Wien, Mathematische-Naturwissenschaftliche Klasse 58, p. 121-193.
- Karrer, F. (1877) Geologie der Kaiser Franz-Josefs Hochquellen-Wasserleitung. Eine Studie in der Tertiär-Bildungen am Westrande des Alpenen Theils der Niederung von Wien. K.K. Geol. Reichsanst., Abh., 9, 420 p., 20 pl., Wien.
- Leroy, L. W. (1944) Miocene Foraminifera of Central Sumatra, Netherlands East Indies. Quarterly of the Colorado School of Mines, 39/3, p. 7-69.
- Liventhal, V. E. (1953) Materialy k paleontologičeskoy charakteristike Buliminidae miotsenovykh otlozheniy predkarpat'ya. Lwowskogo geol. ob., gos. Univ. I. Franko, Trudy, Paleont. ser., 2, p. 158-197, 7 pl., Lwow.
- Loeblich, A. R., Jr., Tappan, H. (1964) Sarcodina chiefly "Thecamoebians" and Foraminiferida (in R. C. Moore, ed., Treatise on Invertebrate Paleontology), Part C, Protista 2. Geological Society of America and Univ. of Kansas Press, Lawrence.
- Loeblich, A. R., Jr. & Tappan, H. 1988, Foraminifera Genera and Their Classification. Van Nostrand Reinhold Co., 970 p., 847 pl., New York.
- Luczowska, E. (1955) O tortonskich otvornicach z warstw chodenickich i grabowieckich okolic Bochni. Pol. Tow. Geol., Roczn. 23 (1953), p. 77-156, pl. 4-10, Krakow.
- Marks, P. (1951) A revision of the smaller foraminifera from the Miocene of the Vienna Basin. Cush. Found. Forum. Res., Contr. 2/2, p. 33 - 73, Ithaca.
- Neugeboren, J.L. (1856) Die Foraminiferen aus der Ordnung der Stichostegier von Ober-Lapugy in Siebenbürgen. Denk. der Kaiserlichen Ak. der Wiss., Mathem.-Naturw. Cl., 12/2, p. 65 - 108, Wien.
- Orbigny, A. d' (1846) Foraminifères fossiles du Bassin Tertiaire de Vienne (Autriche). i-xxxvi, 312 p., Gide & Co., Paris.
- Papp, A. (1953) Über die Entwicklung der Artengruppe de *Uvigerina bononiensis* Fornasini im Jung tertiär. Kober-Festschrift, Skizzen zum Antlitz der Erde, p. 303-307, Viena.
- Papp, A. (1963) Die biostratigraphische Gliederung des Neogens in Wiener Becken. Mitt. Geol. ges. Wien, 56, p. 225-317, Vienna.
- Papp, A., Schmid, E. (1978) Die Entwicklung der *Uvigerina* im Badenien der Zentralen Paratethys (in: Papp A., Cicha I., Senes J., Steininger F., Eds.: Chronostratigraphie und Neostatotypen, Miozan der Zentralen Paratethys, IV, M4, Badenien, pp. 279-284, pls. 9-11.
- Papp, A., Turnovski, K. (1953) Die Entwicklung der *Uvigerina* im Vindobon (Helvet und Torton) des Wiener Beckens. Jb. Geol. B.-A., 91/1, p. 117-142, Wien.
- Perconig, E. (1955) Due nuove specie di *Uvigerina* del Neogene della Pianura Padova. Serv. Geol. d'Italia, Bull. 77/2-3, p. 186-187, Roma.
- Pishvanova, L. S. (1972) Foraminifery verkhneoligotsenovykh i miotsenovykh otlozheniy zapadnykh oblastey Ukr. SSR. Ukr. NIGRI, Tr., vyp. 27, p. 205-283, 24 pl., Moskva.
- Poignant, A., Pujol, C. (1976) Nouvelles donnees micropaleontologiques (Foraminifères planctoniques et petits Foraminifères benthoniques) sur le stratotype de l'Aquitainien. Geobios, 9/5, p. 607-663, 16 pls., Lyon.
- Popescu, Gh. (1975) Foraminiferal study of the Lower and Middle Miocene from north-western Transylvania (in Franch). Inst. Geol., Geophys., Mem. 23, 121 p., 106 pl., Bucuresti.
- Popescu, Gh. (1979) Kossovian foraminifera in Romania. Inst. Geol., Geophys., Mem. 29, p. 5-64, 42 pls., Bucuresti.
- Popescu, Gh. (1992) *Delphinoidella*, a new genus of the Family Pleurostomellidae (Foraminifera). Rom. J. Paleontology, 75, p. 45-46.
- Popescu, Gh., Iva, M. (1971) La microfaune oligocène des Couches de Valea L[pu=ului. Inst. Geol., Mem. 14, p. 35-51, 12 pl., Bucuresti.
- Reuss, A.E. (1850) Neues Foraminiferen aus den Schichten des osterreichischen Tertiärbeckens. Denk.d. K. Ak. d. Wiss., Math.-Naturw. Cl., 1, p. 365-390, Wien.
- Rögl, F. (1998) Systematics: In Cicha et al., Ed., Oligocene-Miocene foraminifera of the Central Paratethys. Abh. senckenberg. naturforsch. Ges.,

- 549, 325 p., 61 figs, 3 tab., 79 pls., Frankfurt am Main.
- Schwager, C. (1866) Fossile Foraminiferen von Kar Nikobar. Reise der Oesterreichischen Fregate Novara um die Welt in 1857. Geol. Theil., **2**, p. 187-268, pl. 4-7, Munchen.
- Subbotina N. N. (1960) Mikrofauna oligotsenovykh i miotsenovykh otlozheniy r. Vorotyshche (Predcarpatya). Tr. VNIGRI, vyp. 153, Mikrofauna SSSR, sb. XI, p. 157 - 263, 10 pls., Leningrad.
- Toula, F. (1900) Uber der marinen Tegel von Neudorf an der March (Deveny-Ujfalu) in Ungarn. Verh. Ver. Natur- & Heilk. Pressburg, 20, p. 3-30, Pressburg.
- Venglinski, I.V. 1958 Foraminifery miotzenu zacarpatiya. Vid-vo AN Ukr. SSR, 246 p., 34 pls. Kiiv.
- Venglinski, I.V. 1962 Biostratigrafiya miotsenu zacarpatiya za faunoyu foraminifer. Vid-vo AN Ukr.SSR, 120 p., 34 pls. Kiiv
- Verhoeve, D. (1970) Identification of the benthonic foraminifera of the "Badener Tegel", early Tortonian, at Sooss near Baden, Austria, illustrated by some scanning electron microscope photographs. Bull. Soc. belge Geol., Paleont., Hydrol., 79/1, p. 25-54, 4 pl., Bruxelles.
- Van der Zwaan, G. J., Jorisen, F. J., Verhallem, P. J. J. P., Von Daniels, C. H. (1986) Uvigerina from Atlantic, Paratethys and Mediterranean. (in: Van der Zwaan G. J., Jorisen, F. J., Verhallem, P. J. J. P., Von Daniels, C. H., ed. Atlantic-European Oligocene to Recent Uvigerina taxonomy, paleoecology and paleobiogeography). Utrecht Micropaleontological Bull. 35, p. 7-20, Utrecht.

PLATES CAPTIONS**PLATE 7**

- Figs. 1, 2. *Uvigerina acuminata* HOSIUS. Lateral views; fig. 2, apertural detail. Valea Coşului section, Lăpugiu de Sus, Hunedoara district. Moravian (Langhian).
- Figs. 3, 4 *Uvigerina asperula* CZJZEK. Lateral view. Cinciş Lake, Teliucul Superior, Hunedoara district. Wielician (Lower Serravallian).
- Fig. 5 *Uvigerina bellicostata* LUCZKOWSKA. Lateral view. Valea Morilor section, Colibaşi, Mehedinţi district. Kossovian (Lower Serravallian).
- Figs. 6-8 *Uvigerina lapugyensis* n.sp. Lateral views. Valea Coşului section, Lăpugiu de Sus, Hunedoara district. Moravian (Langhian). Fig. 6, holotype; figs. 7, 8, paratypes.
- Figs. 9-10 *Uvigerina macrocarinata* PAPP & TURNOVSKY. Lateral views of a micro- and megalospheric specimens. Valea Coşului section, Lăpugiu de Sus, Hunedoara district. Moravian (Langhian).
- Fig. 11 *Uvigerina perornata* PISHVANOVA. Lateral view. Valea Pute Rău section, Dobrota, Prahova district.
- Fig. 12 *Uvigerina? pygmoides* PAPP & TURNOVSKY. Lateral views. Valea Coşului section, Lăpugiu de Sus, Hunedoara district. Moravian (Langhian).
- Figs. 13, 14 *Uvigerina romaniaca* PAPP & SCHMID. Topotypes. Lateral views. Valea Morilor section, Colibaşi, Mehedinţi district. Kossovian (Lower Serravallian).
- Figs. 15, 16 *Uvigerina striatissima* PERCONIG. Lateral views. Valea Coşului section, Lăpugiu de Sus, Hunedoara district. Moravian (Langhian).
- Fig. 17 *Uvigerina uniseriata* JEDLITSCHKA. Lateral view. Valea Viilor section, Lăpugiu de Sus. Lower Moravian (Langhian).
- Figs. 18-20 *Uvigerina urnula* d' ORBIGNY. Lateral views. Valea Coşului section, Lăpugiu de Sus, Hunedoara district. Moravian (Langhian).

Plate 8

- Figs. 1-3, 6. *Angulogerina angulosa* (WILLIAMSON). Lateral view. Valea Gemini section, Coştei, Timiş district. Moravian (Langhian).
- Figs. 4, 5, 7-9, 12-14. *Angulogerina alticarinata* n.sp. Valea Morilor section, Colibaşi, Mehedinţi district. Kossovian (Lower Serravallian). Fig. 9, holotype.
- Figs. 10, 11, 15-18. *Angulogerina esuriens* HORNIBROOK. Lateral-apertural view. Valea Lupoaei section, Archiş, Arad district (Zarand Basin). Upper Moravian (Lower Serravallian)
- Fig. 19. *Angulogerina?* sp. Lateral view. Valea Coşului section, Lăpugiu de Sus, Hunedoara district. Moravian (Langhian).

PLATE 9

- Figs. 1,2. *Angulogerina?* sp. Lateral views. Valea Coşului section, Lăpugiu de Sus, Hunedoara district. Moravian (Langhian).
- Figs. 3-6 *Fijiella cribrocostata* n.sp. Fig. 3, 5, lateral views; figs. 4, 6, apertural views. Valea Coşului section, Lăpugiu de Sus, Hunedoara district. Moravian (Langhian).
- Fig. 7 *Fursenkoina schreibersiana* (CZJZEK). Lateral view of a broken (last chamber) specimen showing the inner tooth plate of the last chamber. Valea Morilor section, Colibaşi, Mehedinţi district. Kossovian.
- Figs. 8-11 *Reussella pulchra* CUSHMAN. Figs. 8, 10, 11, lateral views; fig. 9, apertural view. Valea Gemini section, Coştei, Timiş district. Upper Moravian.
- Figs. 12-14 *Parareussella prismatica* n. sp. Lateral views. Fig. 12, holotype. Valea Coşului section, Lăpugiu de Sus, Hunedoara district. Moravian (Langhian).
- Figs. 15, 16. *Sigmavirgulina tortuosa* (BRADY). Fig. 15, frontal view; fig. 16, view of the initial part of a broken specimen. Valea Coşului section, Lăpugiu de Sus, Hunedoara district. Moravian (Langhian).

PLATE 10

- Figs. 1, 2 *Virgulinea pertusa* (REUSS). Lateral views. Valea Gemini section, Coștei, Timiș district. Upper Moravian (Upper Langhian).
- Figs. 3-7. *Baggatella gutsulica* (LIVENTHAL). Figs. 3, 4, lateral-apertural views of young specimens; figs. 5-7, lateral views. Borehole 12-Balta Sărată, Caransebeș, Timiș district. Kossovian (Lower Serravallian).
- Figs. 8-11. *Baggatella subulata* (CUSHMAN & PARKER). Lateral views; fig. 11, apertural and tooth plate detail of fig. 9. Lateral views. Valea Coșului section, Lăpugiu de Sus, Hunedoara district. Moravian (Langhian).
- Figs. 12, 15-17 *Baggatella* cf. *B. subulata*. Lateral views; fig. 17, detail of the fig. 12. Borehole 12-Balta Sărată, Caransebeș, Timiș district. Kossovian (Lower Serravallian).
- Fig. 13. *Baggatella lappa* (CUSHMAN & PARKER). Lateral view. Dealul Martin, Telega, Prahova district, Kossovian.
- Fig. 14 *Baggatella elongata* (d'ORBIGNY). Lateral view. Valea Cosmina, Melicești, Prahova district, Kossovian.

PLATE 11

- Figs. 1, 2. *Pleurostomella alternans* SCHWAGER. Lateral view (fig. 1) and frontal view (fig. 2). Valea Coșului section, Lăpugiu de Sus, Hunedoara district. Moravian (Langhian).
- Figs. 3-5, 7-10 *Pleurostomella polymorpha* n. sp. Figs. 4, 5, 7-9, lateral views; fig. 10, apertural detail of fig. 9. Valea Lupoaei section, Archiș, Arad district (Zarand Basin). Upper Moravian (Lower Serravallian). Fig. 4, holotype.
- Figs. 6, 18-20. *Orthomorphina columella* (KARRER). Lateral views. Valea Coșului section, Lăpugiu de Sus, Hunedoara district. Langhian.
- Figs. 11-15. *Delphinoidella rostrata* POPESCU. Megalospheric specimens. Figs. 11, frontal views; fig. 12, apertural detail of fig. 11; figs. 13, 14, lateral views; fig. 15, detail of the apertural tooth plate of a broken specimen. Valea Lupoaei section, Archiș, Arad district (Zarand Basin). Upper Moravian (Lower Serravallian).
- Figs. 16, 17. *Nodosarella rotundata* (d'ORBIGNY). Fig. 16, apertural view; fig. 17, lateral view. Valea Gemini section, Coștei, Timiș district. Upper Moravian (Upper Langhian).

PLATE 12

- Figs. 1, 2. *Stilostomella adolphina* (d'ORBIGNY). Lateral views. Valea Gemini section, Coștei, Timiș district. Upper Moravian (Late Langhian).
- Figs. 3-7. *Stilostomella subspinosa* (NEUGEBOREN). Topotypes. Lateral views; figs 6, 7, surface detail of specimen from fig. 4, and, respectively, fig. 5. Valea Coșului section, Lăpugiu de Sus, Hunedoara district. Moravian (Langhian).
- Figs. 8-11. *Euuvigerina aculeata* (d'ORBIGNY). Fig. 8, lateral view of a broken specimen. fig. 9, apertural detail; fig. 10, lateral view, fig. 11 detail of the terminal part. Valea Coșului section, Lăpugiu de Sus, Hunedoara district. Moravian (Langhian).

PLATE 7

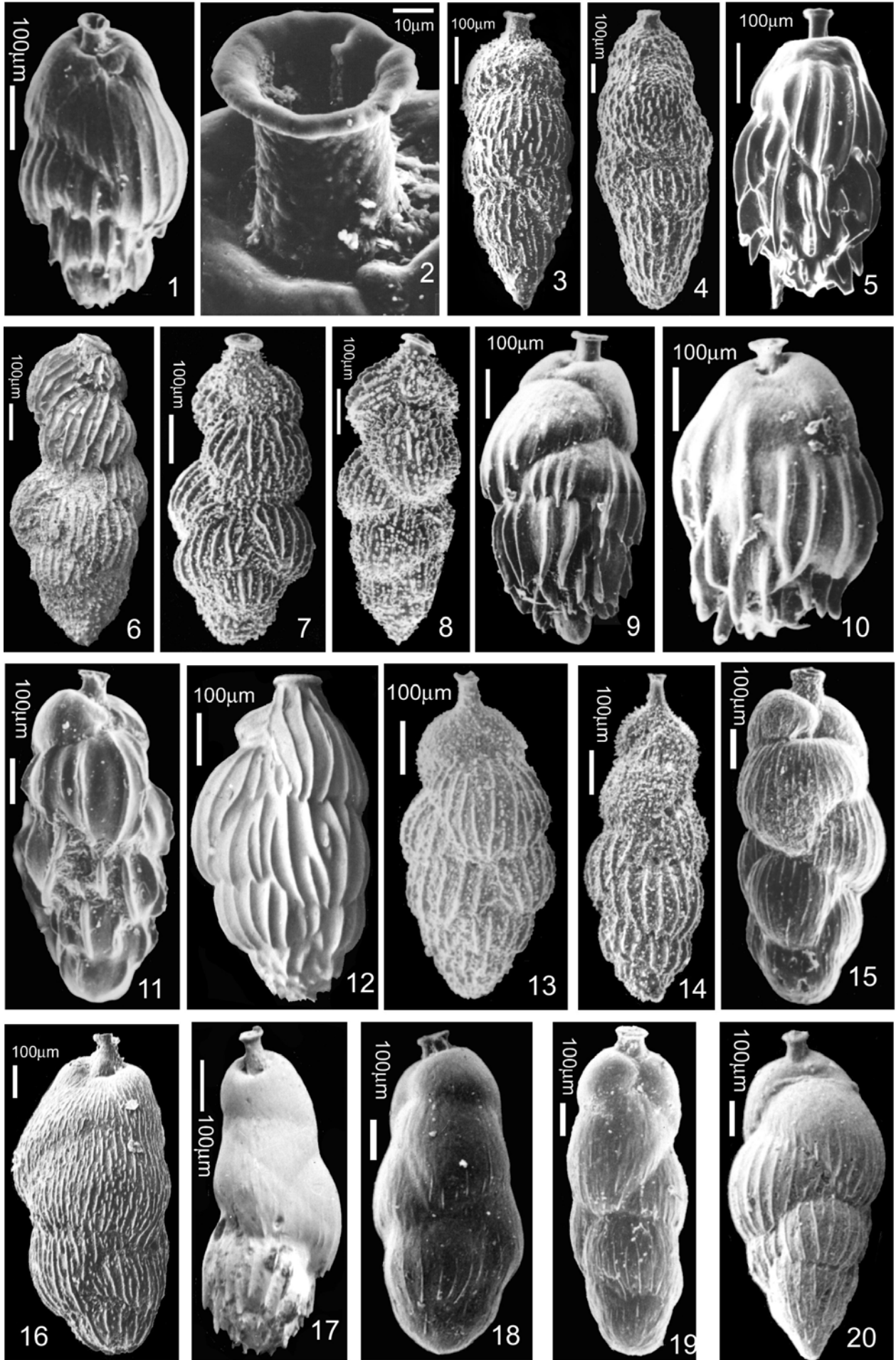


PLATE 8

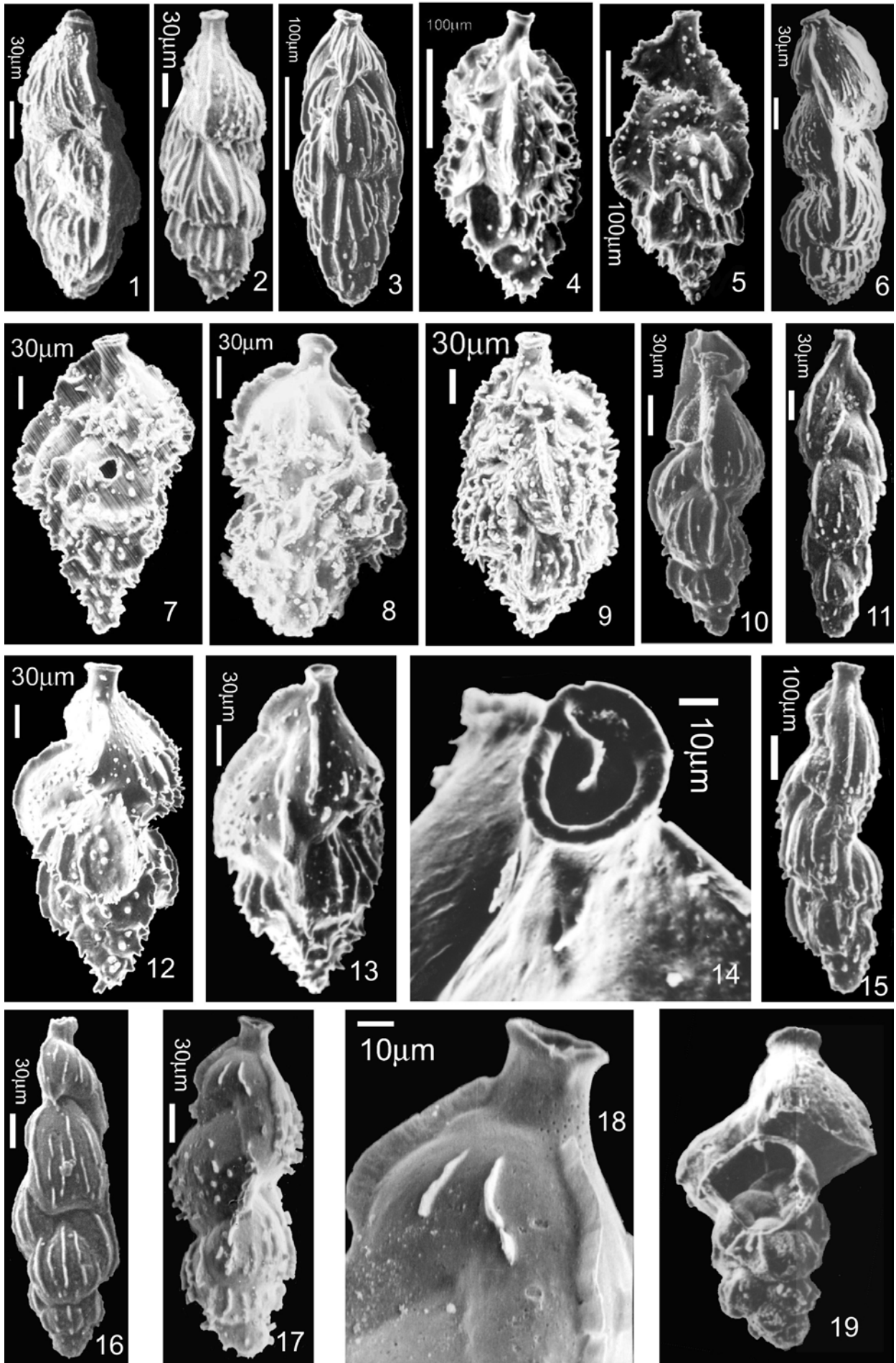


PLATE 9

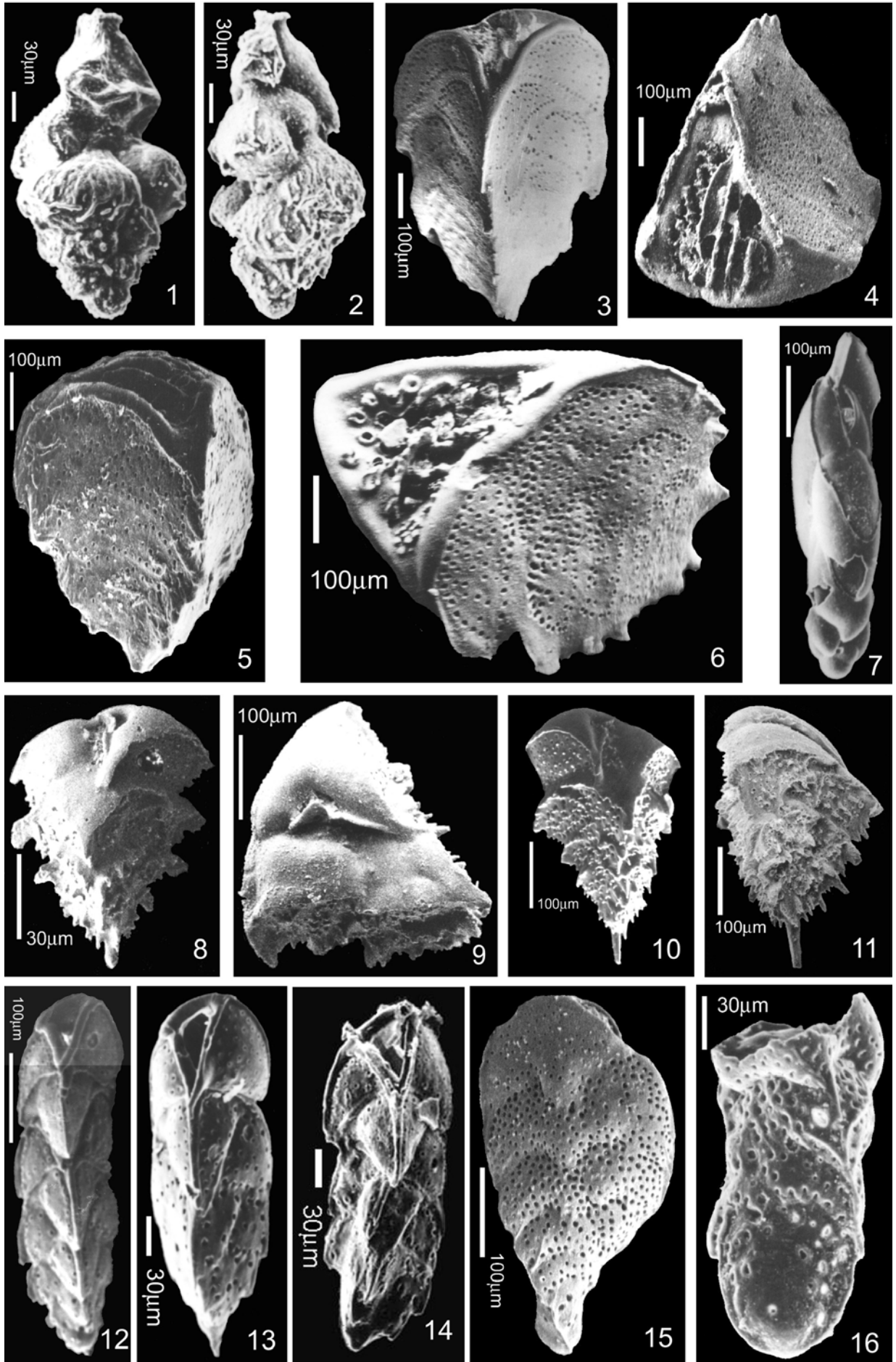


PLATE 10

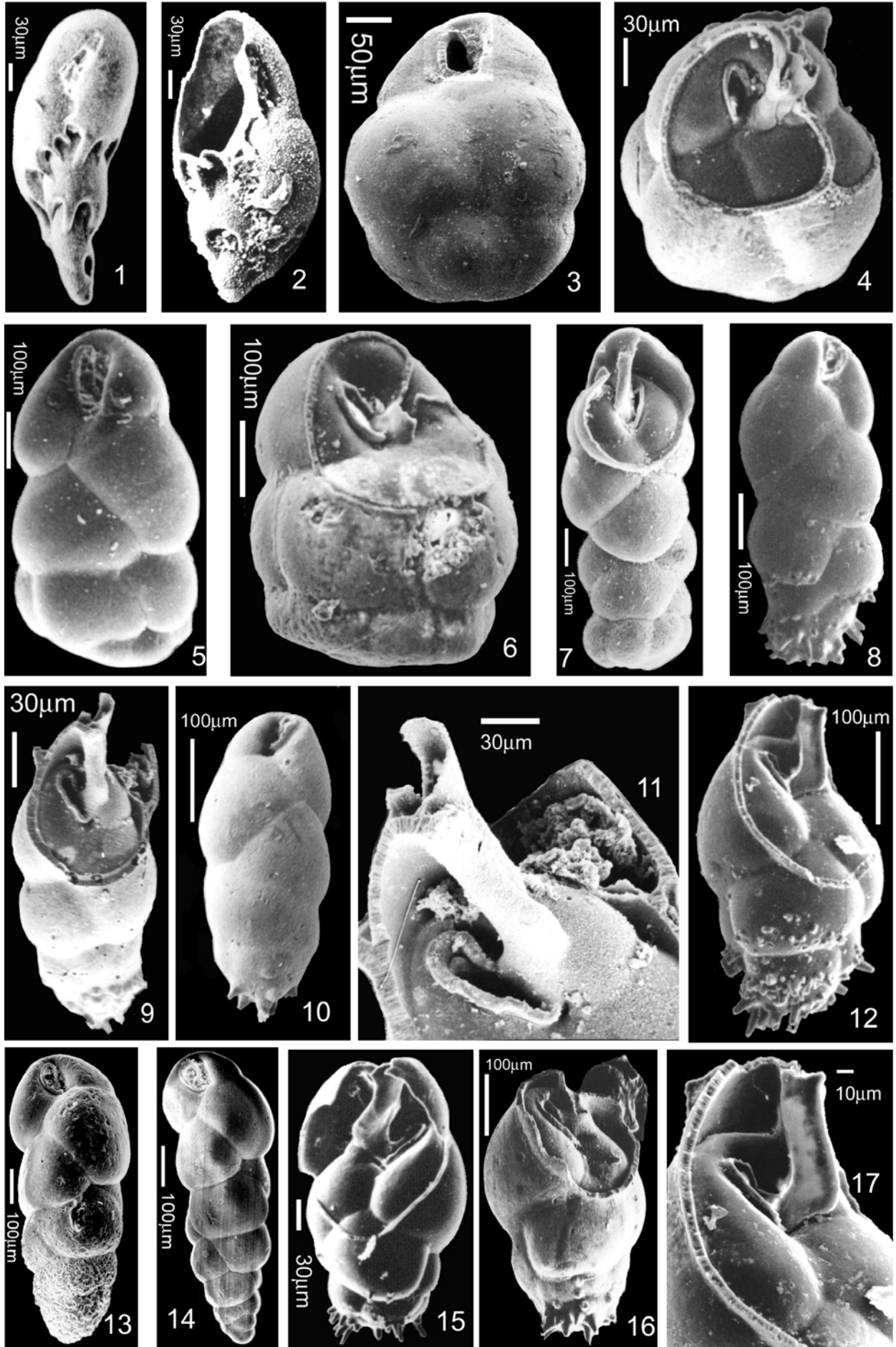


PLATE 11

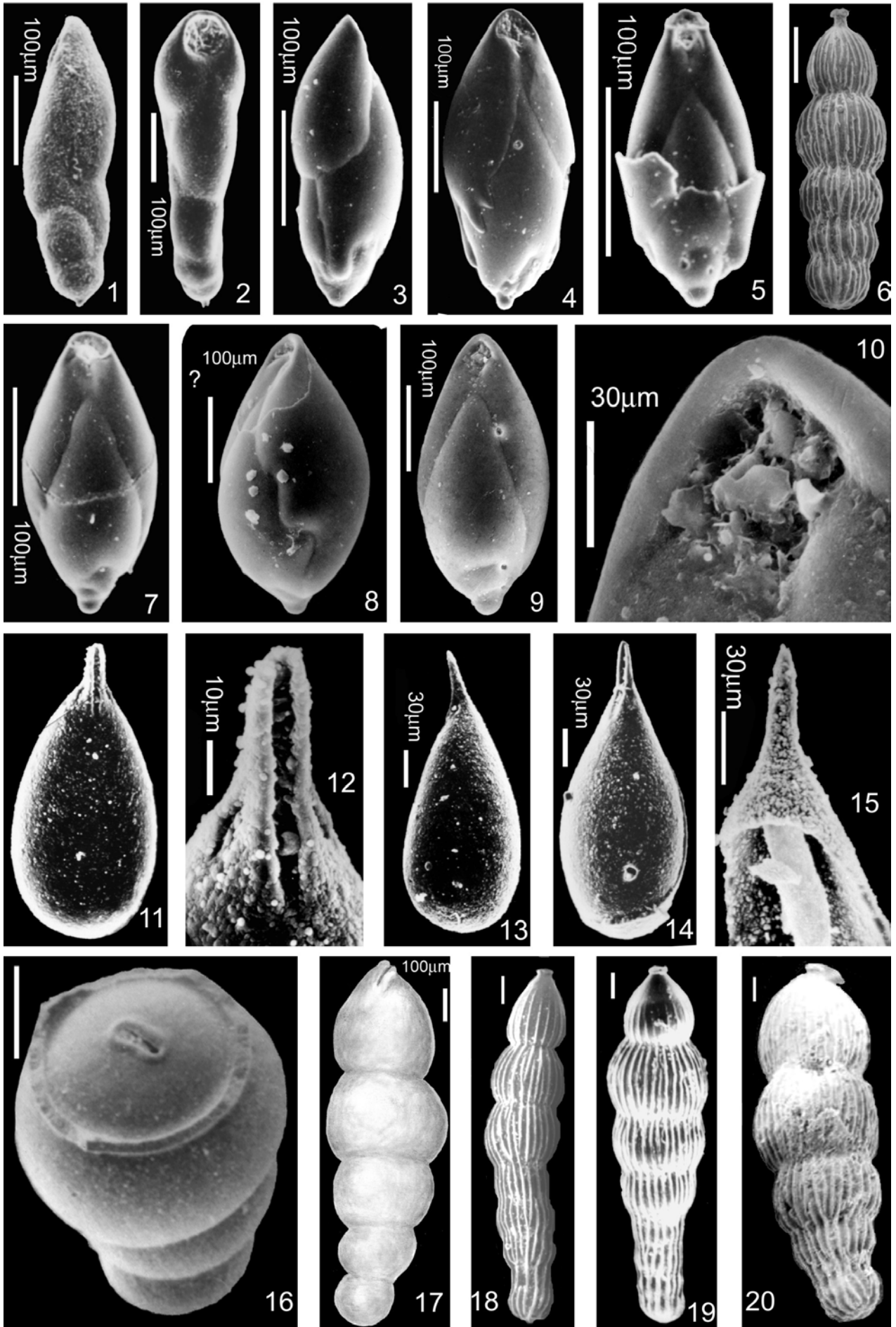


PLATE 12

