

The New and Reinstated Genera of Agglutinated Foraminifera published between 1996 and 2000

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ABSTRACT

During the four year period since the previous International Workshop on Agglutinated Foraminifera, some 33 genera of agglutinated foraminifera have been described as new, and an additional six genera have been reinstated by various authors. This brings the total number of new and reinstated genera to 121 since the publication of "Foraminiferal Genera and their Classification" by Loeblich & Tappan (1987).

INTRODUCTION

The purpose of this paper is to continue the compilation of validly described and reinstated genera of agglutinated foraminifera published after Loeblich & Tappan's (1987) book "Foraminiferal Genera and their Classification". In this paper, I provide a list of the newly described genera of agglutinated foraminifera published in the accessible literature, as well as several genera that were synonymised by Loeblich & Tappan, but have been newly reinstated. The current work is a continuation of a previous compilation containing 94 valid genera (Kaminski, 2000), and encompasses the years 1996 to 2000, inclusive.

It is my intention to update these "appendices" to Loeblich & Tappan (1987) approximately every four years as a regularly occurring chapter in the IWAF proceedings volumes. The goal of this work is to review recent changes and updates to the taxonomy with the goal of stabilising the generic nomenclature of the agglutinated foraminifera. The full up-to-date list of the new and reinstated genera can be found in "Agglut-2001", the database of agglutinated genera distributed in electronic form by the Grzybowski Foundation. The suprageneric affiliation of the genera follows Kaminski (this volume).

Part 1 - Genera reinstated since the publication of Loeblich & Tappan (1987)

KADRIAYINA Al-Najdi, 1975

Figure 1

Type species: *Gaudryina gradata* Berthelin, 1880, p. 24; *OD(M)*.

Kadriayina Al-Najdi, 1975, p. 3; *SD*, Holbourn & Kaminski, 1997, p. 51.

Test elongated, initially with a short trochospiral or triserial stage, enlarging rapidly, later biserial. Chambers are subglobular, with depressed sutures. The test

is rounded to ovoid in cross section. The wall is finely agglutinated, noncanaliculate, with calcareous cement. Aperture a low arch at the base of the apertural face. Aptian to Cenomanian; Indian Ocean; France.

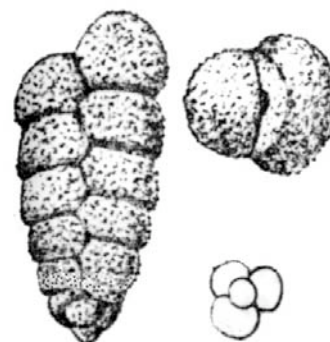


Figure 1. Type figure of *Gaudryina gradata*, from Berthelin (1880).

Remarks. The emended description of *Kadriayina* by Holbourn & Kaminski (1997) differs somewhat from the original description of Al-Najdi (1975). Al-Najdi described this genus as "subconical, circular in cross-section throughout; wall arenaceous, grains relatively large". Al-Najdi based his description on the drawings of *Gaudryina pupoides* d'Orbigny by Chapman (1892, pl. 11, fig. 8), who regarded Berthelin's *G. gradata* as a junior synonym. Al-Najdi designated *G. gradata* as the type species of his new genus, but erroneously cited the authorship as Chapman. Our definition of the genus is based on the description and drawings of Berthelin (1880) as well as on specimens from DSDP/ODP sites in the Indian Ocean, which have inflated chambers in the biserial part. Berthelin (1880) described the wall of *G. gradata* as "rough", but our specimens are finely agglutinated.

Loeblich & Tappan (1987) considered *Kadriayina* to be synonymous with *Gaudryinopsis* Podobina, 1975.

We reinstate this name owing to the fact that the type species *Gaudryina gradata* Berthelin, 1880 has calcareous cement. *Kadriayina* differs from *Gaudryina* in possessing a shorter triserial or trochospiral stage that is round in cross-section, whereas in *Gaudryina* the early stage is triserial and triangular in section. It may be related to *Praedorothia* Desai & Banner, 1987, but differs in the much reduced initial triserial or trochospiral part.

Holbourn, A.E.L. & Kaminski, M.A. 1997. *Lower Cretaceous deep-water benthic foraminifera of the Indian Ocean*. Grzybowski Foundation Special Publication, 4, 172 pp.

BOGDANOWICZIA Pishvanova & Vyalov, 1967

Figure 2

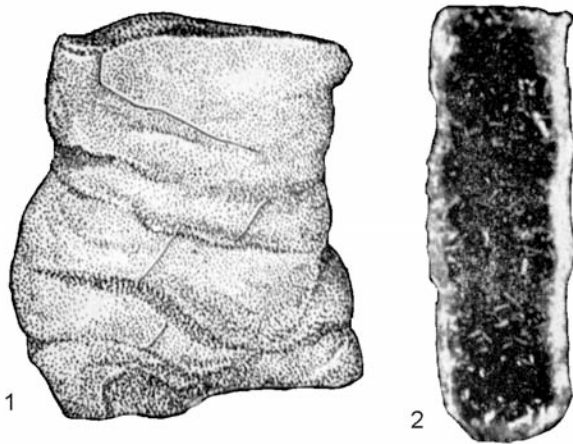


Figure 2. *Bogdanowiczia pocutica* from the upper Tortonian of the Ukraine, from Pishvanova & Vyalov (1967).

Type species: *Bogdanowiczia pocutica* Pishvanova, in Vyalov & Pishvanova, 1967; OD(M).

Bogdanowiczia Pishvanova & Vyalov, in Vyalov & Pishvanova, 1967, p. 39.

Originally regarded by Loeblich & Tappan to be a junior synonym of *Bathysiphon*. According to N. Gagic (personal communication to Popescu *et al.* in Cicha *et al.*, 1998), the description of the type species, wall structure, and features observed in transmitted light are different. The wall is densely agglutinated and silicified, translucent. The internal cavity shows constrictions at irregular distances. Miocene, Paratethys. Subfamily Bathysiphoninae.

Popescu, G., Cicha, I., & Rögl, F. 1998. Systematic Notes. in: Cicha, I., Rögl, F., Rupp, C., & Cytroka, J. (eds), Oligocene - Miocene foraminifera of the Central Paratethys. *Abhandlungen der senckenbergischen naturforschenden Gesellschaft*, 549, 69-325.

Vyalov, O.S. & Pishvanova, L.S., 1967. On some siliceous foraminifera from the Miocene of western regions of the Ukraine. *Paleontologicheskii Sbornik*, 4 (1), 35-42 + 1 pl.

PSAMMOSIPHONELLA Avnimelech, 1952

Figure 3

Type species: *Bathysiphon arenacea* Cushman, 1927 (OD). *Psammisiphonella* Avnimelech, 1952, p. 64.

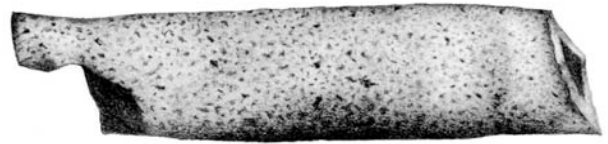


Figure 3. Type figure of *Bathysiphon arenacea* from Cushman (1927).

Test tubular, monothalamous, of round or elliptical cross section, straight or bent, of even diameter or slightly tapering in one direction without any distinct swelling or "centre of organisation". The inner surface of the tube is even, not constricted. Wall thick, composed of mineral grains, mostly quartz, with organic cement. Apertures at the open ends of the tube.

Remarks. Considered by Loeblich & Tappan to be a junior synonym of *Bathysiphon*. Avnimelech (1952) originally separated this genus and the subfamily Psammisiphonellinae Avnimelech, 1952 based on the composition of the wall, which was regarded to be wholly comprised of mineral grains, in contrast to common sponge spicules incorporated into the walls of the Bathysiphonidae. Cushman (1927) noted the "very thick wall" of *B. arenacea*. This distinction based on wall composition was upheld by Popescu *et al.* in Cicha *et al.*, (1998) who reinstated the genus *Psammisiphonella* and assigned the species *Rhabdammina cylindrica* Glaessner, 1937 to it. Subfamily Bathysiphoninae.

Avnimelech, M. 1952. Revision of the tubular Monothalamia. *Contributions from the Cushman Foundation for Foraminiferal Research*, 3, 60-68.

Popescu, G., Cicha, I., and Rögl, F. 1998. Systematic Notes. in: Cicha, I., Rögl, F., Rupp, C., & Cytroka, J. (eds), Oligocene - Miocene foraminifera of the Central Paratethys. *Abhandlungen der senckenbergischen naturforschenden Gesellschaft*, 549, 69-325.

MANGASHTIA Henson, 1948

Figure 4

Type species: *Mangashtia viennoti* Henson, 1948 OD.

Mangashtia Henson, 1948, p. 94; SD Fourcade *et al.* 1997, p. 183.

Test calcareous microgranular, imperforate, with a compressed discoidal shape and numerous cyclical or annular chambers. Apertures multiple, aligned in one row in the middle of the apertural face. The axes of the stolons are radial. Numerous subcylindrical or beam shaped pillars that are perpendicular to the septa are present in the central zone of the chambers. Pillars are arranged according to the same plan from one chamber to the next. The marginal zone of the chamber is not internally subdivided. The embryonic apparatus of the megalosphaeric form consists of a globular proloculus with a simple wall. Cenomanian to Turonian, Iraq.

Remarks. Originally listed by Loeblich & Tappan in their "genera of uncertain status", noting that the genus is "unrecognisable" because many of the essential characters were not described by Henson.

Fourcade *et al.* (1997) revised the genus based on the study of new topotype material as well as specimens preserved in the Henson Collection housed in the Natural History Museum, London, placing the genus in the subfamily Cyclopsinellinae. Their description is therefore regarded as the emendation. *Mangashtia* differs from *Cyclopsinella* in the nature of the internal structure (pillars in the form of beams) and in its apertural characteristics (a single row of pores rather than a double row). Subfamily Cyclopsinellinae.

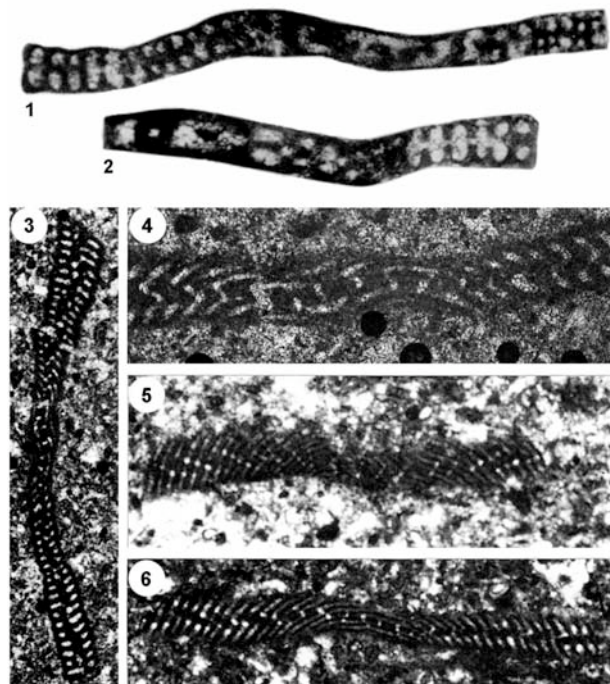


Figure 4. *Mangashtia viennoti* Henson. 1-2. Lectotype and paralectotype from Henson (1948); 3-6. Specimens from Fourcade *et al.* (1997). 3. Oblique section, 4. Subequatorial section, 5. Subequatorial section showing pillars and radial arrangement of stolon axes. 6. Subequatorial section.

Fourcade, E., Mouty, M., & Teherani, K.K. 1997. *Levantinella* nov. gen. et révision du genre *Mangashtia* Henson, grands foraminifères du Jurassique et du Crétacé du Moyen-Orient. *GEOBIOS*, 30 (2), 179-192.

Henson, F.R.S. 1948. *Larger imperforate foraminifera of southwestern Asia. Families Lituolidae, Orbitolinidae and Meandropsinidae.* British Museum (Natural History). 127 pp + 16 pls.

STYLOLINA Karrer, 1877

Figure 5

Type species: Styloolina lapugyensis Karrer, 1877, OD *Styloolina* Karrer, 1877, p. 371; OD(M); SD Popescu *et al.* in Cicha *et al.* 1998, p. 129.

Originally regarded as a synonym of *Lituola* by Loeblich & Tappan. *Styloolina* differs in possessing an internal pillar in the rectilinear portion and in its Miocene age. The specimen illustrated by Popescu *et al.* (1998) was designated the lectotype of *Styloolina lapugyensis*. Miocene (Badenian), Romania.

Remarks. In a letter A.R. Loeblich wrote to Gheorghe Popescu on April 25, 1988, he stated "in our book we

placed *Styloolina* as a synonym of *Lituola*, but this is incorrect". Family Haddoniidae.

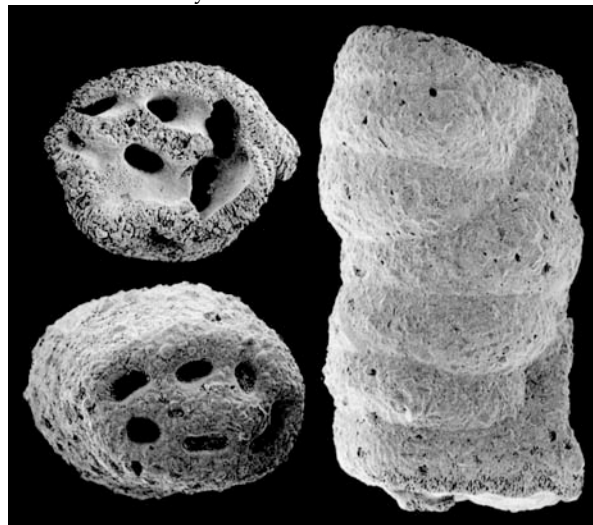


Figure 5. *Styloolina lapugyensis* from Popescu *et al.* (1998). Specimen on right is the lectotype.

Popescu, G., Cicha, I., & Rögl, F. 1998. Systematic Notes. in: Cicha, I., Rögl, F., Rupp, C., & Cytroka, J. (eds), *Oligocene - Miocene foraminifera of the Central Paratethys. Abhandlungen der senckenbergischen naturforschenden Gesellschaft*, 549, 69-325.

METAMORPHINA Browne, 1963

Figure 6

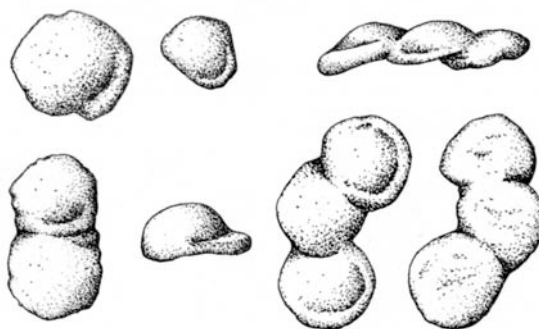


Figure 6. *Metamorphina tholus* (Moreman) from McClellan (1973).

Type species: Webbinella tholus Moreman, 1933, OD *Metamorphina* Browne, in Browne & Schott, 1963, p. 223; SD Bell, 1996, p. 97.

Originally regarded as a synonym of *Hemisphaerammina* by Loeblich & Tappan. Vdovenko *et al.* (1993) and Bell (1996) regarded it as a separate genus. Bell (1999) gave the following definition: "Test attached, numerous hemispherical chambers attached to one another linearly or in a spreading manner, usually with a basal flange." McClellan (1966) gave a full discussion of the criteria used to separate *Metamorphina* from *Hemisphaerammina*. Family Telamminidae.

Bell, K.N. 1999. *Taxonomy and biostratigraphy of Silurian - Devonian foraminifera from eastern Australia.* Ph.D. Thesis, Macquarie University. 415 pp.

Part 2. New Genera published since 1996

ASTRORRHIZACEA Brady, 1881

SPICULIDENDRON Rützler & Richardson, 1996

Figure 7

Type species: *Spiculidendron corallicolum* Rützler & Richardson, 1996, OD(M).

Spiculidendron Rützler & Richardson, 1996, p. 144. OD(M).

Test attached, arborescent, with tubular branches of the test gradually tapering, without apertures, into solid growth tips that support pseudopodia. Base of the test attached to rock, open at the bottom and connecting with crevices or burrows in the substrate. Simple agglutinated wall supported by spongin-like organic cement. Holocene, Caribbean.

Remarks. Differs from *Dendronina* and *Dendrophrya* in lacking terminal apertures, and from other tree-shaped forms, such as *Pelosina*, *Notodendroides* and *Arborammina*, in lacking the root structures which are adaptations to live in soft sediments. Family Dendrophryidae.

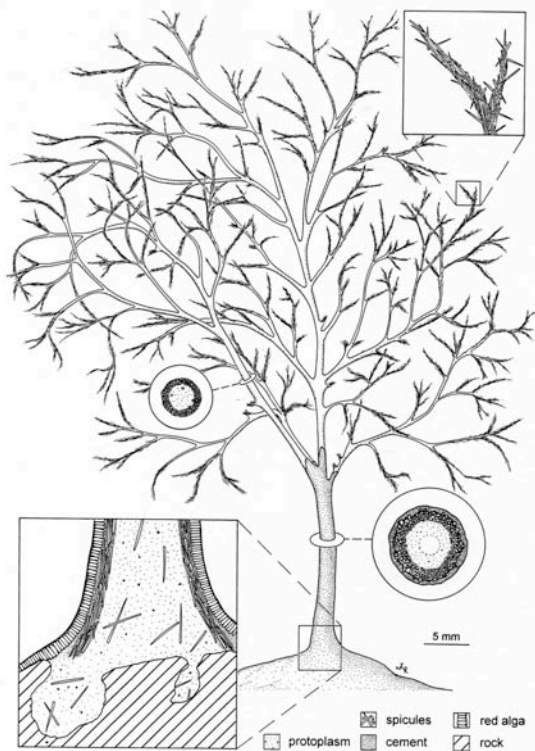


Figure 7. *Spiculidendron corallicolum* from Rützler & Richardson (1996).

Rützler, K. & Richardson, S. 1996. The Caribbean spicule tree: a sponge-imitating foraminifer (Astrorhizidae). Bulletin de l'Institut Royal des Sciences de Belgique, Biologie, 66, Supplement, 143-151.

LUEKATIELLA Zhigulina, 1999

Figure 8

Type species: *Leukatiella estonica* Zhigulina, 1999, OD(M).

Leukatiella Zhigulina, 1999, p. 498.

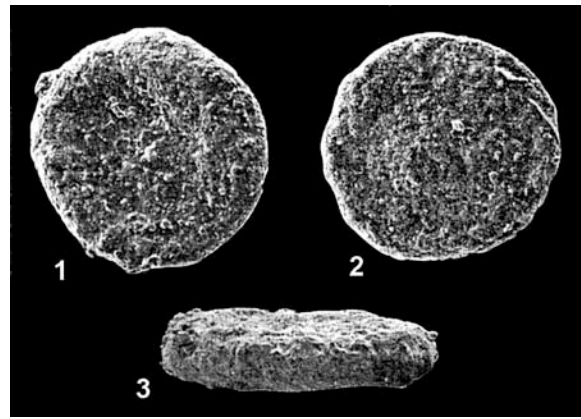


Figure 8. Type specimens of *Leukatiella estonica* from Zhigulina (1999). 1. Holotype; 2-3. Paratypes.

Test free, unilocular, round or oval, flattened, with thickened marginal edges, pale, almost white. One lateral side of the test is convex, while the other may be flat or concave. Aperture absent. Thin sections show small recurved canalicules. Pores are randomly arranged, round in section, up to 0.06 µm in diameter. Wall finely agglutinated, several grains thick, with a slightly rugose surface, apparently organically cemented. Lower Cambrian (Atdabanian), Baltic Sea region, Estonia, Poland.

Remarks. It is not clear whether the tests were originally planoconvex or concavoconvex. Differs from *Psammosphaera* in its finely agglutinated wall that is several grains thick, and from *Placentammina* by the absence of a visible aperture. Specimens from the Cambrian of Poland illustrated by Alexandrowicz (1969) as *Thuramminoides sphaeroidalis* were listed by Zhigulina as synonyms. Subfamily Stegnammininae.

Zhigulina, M.S. 1999. A new species of foraminifera *Luekatiella estonica* from the Lower Cambrian of Estonia. Paleontologicheskii Zhurnal [English Translation], 33 (5), 498-501.

TITANOTHEKA Gaucher & Sprechmann, 1999

Figure 9

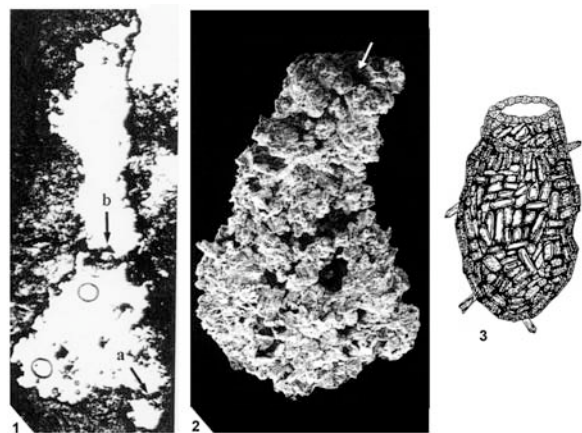


Figure 9. *Tithanoteka coimbrae* from Gaucher & Sprechmann, (1999). 1. Holotype: arrow (a) points to a probable bud; arrow (b) may be a septum. 2. Paratype: arrow points to aperture. 3. Authors' reconstruction.

Type species: Titanotheka coimbrae Gaucher & Sprechmann, 1999, OD(M).

Titanotheka Gaucher & Sprechmann, 1999, p. 66.

Test free, spheroidal to vase shaped, with walls composed of agglutinated rutile grains. The length of the neck increased logarithmically with maximum diameter, the largest resembling long-necked bottles. Wall is single layer, with organic cement. The rutile grains are well-sorted, with grain size fine to medium silt. Grain size is dependent on maximum diameter, with the largest specimens containing the coarsest grains. Grains are arranged with their long axes parallel to the surface of the test, probably acting as spines. Apertural end open. Maximum diameter of test between 0.1 and 1.5 mm. Upper Vendian, Uruguay.

Remarks. Specimens with two chambers separated by a perforated septum were found, which was interpreted as reproduction by means of budding (Gaucher & Sprechmann, 1999). Subfamily Saccammininae.

Gaucher, C. & Sprechmann, P. 1999. Upper Vendian skeletal fauna of the Arroyo de Soldado Group, Uruguay. *Beringeria*, **23**, 55-91.

AMMODISCACEA Reuss, 1862

AMMODISCELLITES Resig & Glenn, 1997

Figure 10



Figure 10. *Ammodiscellites prolixus* from Resig & Glenn (1997). Arrow points to the holotype.

Type species: Ammodiscellites prolixus Resig & Glenn, 1997, OD(M).

Ammodiscellites Resig & Glenn, p. 136.

Test attached, proloculus followed by a tunnel-like undivided chamber that is planispirally coiled initially,

then uncoils and follows an irregular course over the attachment surface. Wall agglutinated, of fine siliclastic grains, clay, and likely opal, incompletely developed against the attachment surface that is used as the chamber floor, with an inner proteinaceous layer that also lines the floor of the chamber. Test and lining reddish-brown in colour, aperture the open end of the tunnel. Recent, Peruvian Margin, 465-620 m.

Remarks. *Ammodiscellites* differs from *Lituotuba* in having an aseptate test and from *Tolypammina* in having an initial planispiral coil. Several middle to late Paleozoic species formerly assigned to *Tolypammina* belong in *Ammodiscellites*, including *T. botonicus* Gutschick & Treckman, *T. cyclops* Gutschick & Treckman, *T. delicatula* Cushman & Waters, *T. gersterensis* Conklin & Conklin, *T. grahamensis* Harlton, *T. helina* Crespín, *T. humphriesi* Frentzen, *T. irregularis* Blumenstengel, *T. revertens* Scherp, and *T. rotula* Gutschick & Treckman. Subfamily Tolypammininae.

Resig, J.M. & Glen, C.R. 1997. Foraminifera encrusting phosphoric hardgrounds of the Peruvian upwelling zone: Taxonomy, geochemistry, and distribution. *Journal of Foraminiferal Research*, **27** (2), 133-150.

ARENOMEANDROSPIRA Jones & Wonders, 2000

Figure 11

Type species: Glomospira glomerata Höglund, 1947, OD(M). *Arenomeandrosira* Jones & Wonders, 2000, p. 179.

Test free, spherical, consisting of a spherical proloculus and an elongate tubular post-prolocular second chamber; chamber arrangement modified streptospiral or "meandrosiral" (second chamber formed into a line of tight folds with subparallel axes, each fold approximately four times as high as wide, line of folds wound streptospirally around proloculus, typically four to six folds per whorl, only those of final whorl visible externally); wall finely arenaceous, organically cemented, inner and outer surfaces smooth; aperture terminal, at open end of tube. Miocene - Holocene, Borneo, Trinidad, Vietnam, Baltic Sea - Kattegat.

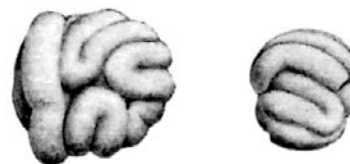


Figure 11. *Glomospira glomerata* from Höglund (1947).

Remarks. *Glomospira glomerata* Höglund, 1947 is a junior homonym of *G. glomerata* (Grzybowski, 1898) *auctt.* [*Ammodiscus glomeratus* Grzybowski, 1898]. SubFamily Ammovertellininae.

Jones, R.W. & Wonders, A.A.H. 2000. On *Arenomeandrosira* gen.nov. (Foraminiferida, Ammodiscidae), and its association with Natural Gas Seepage. In: Hart, M.B., Kaminski, M.A., & Smart, C.W. (eds), Proceedings of the Fifth International Workshop on Agglutinated Foraminifera. *Grzybowski Foundation Special Publication*, **7**, 179-184.

LITUOLACEA de Blainville, 1827

APOSTROPHOIDES McNeil, 1997

Figure 12



Figure 12. Holotype of *Apostrophoides silus*, from McNeil (1997).

Type species: Apostrophoides silus McNeil, 1997, OD(M).
Apostrophoides McNeil, 1997, p. 19.

Test planispirally enroled, laterally compressed, about two and one-half whorls, involute to semi-evolute, biumbilicate. Chambers numerous, separated by thick septa. Wall thin, finely agglutinated. Aperture areal, rounded. Apertural face projected forward above the aperture, but curved back below the aperture to form a sub-apertural notch between the aperture and the preceding whorl. Maastrichtian, Northwest Territories, Canada.

Remarks. Differs from other genera of the Haplophragmoididae in possessing a sub-apertural notch or indentation at the base of the apertural face. The notch gives the false impression that the test is in the initial stage of uncoiling, but the final chamber is always in contact with the previous whorl. Family Haplophragmoididae.

McNeil, D.H. 1997. New foraminifera from the Upper Cretaceous and Cenozoic of the Beaufort-MacKenzie Basin of Arctic Canada. *Cushman Foundation for Foraminiferal Research Special Publication*, 35, 95 pp.

PRAESPHAERAMMINA Kaminski & Filipescu, 2000

Figure 13



Figure 13. *Cystammina subgaleata* from Vaříãek (1947).

Type species: Cystammina subgaleata Vaříãek, 1947, OD.

Praesphaerammina Kaminski & Filipescu, 2000, p. 355.

Test planispirally enrolled involute, with about four strongly overlapping chambers per whorl, with the final embracing chamber overlapping 50-70% of the

test in the adult stage. Wall simple, imperforate, finely to coarsely agglutinated, with organic cement. Aperture interio-areal in the juvenile stage, becoming areal in the adult, oval to reniform in outline, with a thin lip. Paleocene to Miocene: Carpathians, Caribbean, West Africa, North Sea.

Remarks. Differs from *Sphaerammina* in possessing a less embracing final chamber (*Sphaerammina ovalis* is ~80% embracing) and in its simple aperture, which lacks a tooth. Family Sphaeramminidae.

Kaminski, M.A. & Filipescu, S. 2000. *Praesphaerammina*, a new genus of Cenozoic deep-water agglutinated foraminifera from the Carpathian flysch deposits. *Micropaleontology*, 46 (4), 353-359.

SOKOTINA Haynes & Nwabufu-Ene, 1998

Figure 14

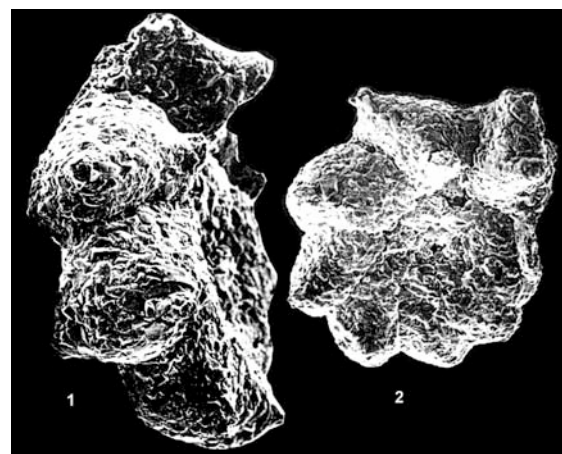


Figure 14. Holotype of *Sokotina sokotensis* from Haynes & Nwabufu-Ene (1998). 1. Edge view showing siphons; 2. Lateral view of same specimen.

Type species: Sokotina sokotensis Haynes & Nwabufu-Ene, 1998, OD(M).

Sokotina Haynes & Nwabufu-Ene, 1998, p. 55.

Test free, planispiral with rounded periphery and whorls slightly embracing with umbilical flanges. First one or two whorls non-septate, later whorls irregularly septate. Aperture (questionably) formed by the open end of the planispire in the early part, later replaced by small siphonate openings on the ends of mamillated protuberances. Wall of silt grains in a matrix of finer material, largely held by organic cement.

Remarks. Differs from *Trochamminoides* in its multiple apertures or siphons which occur as nipple-like tips to rounded protuberances on the later adult chambers. Family Trochamminoidae.

Haynes, J. & Nwabufu-Ene, K. 1998. Foraminifera from the Paleocene phosphate beds, Sokoto, Nigeria. *Revista Espanola de Micropaleontologia*, 30 (2), 51-76.

CARASUELLA Neagu, 2000

Figure 15

Type species: Carasuella cylindrica Neagu, 2000, OD.
Carasuella Neagu, 2000, p. 289



Figure 15. *Carasuella cylindrica* from Neagu (2000).

Test free, planispiral in the early stage, becoming uncoiled in the latter part, with chambers that increase gradually in size and weakly depressed sutures. Aperture is areal, on the convex apertural face of the last chamber, cribrate, represented by many circular pores. Wall and septa are imperforate, compact, agglutinated with medium sized grains. The primary aragonitic cement is diagenetically altered to calcite. Upper Berriasian to Valanginian, Romania.

Remarks. The genus is homeomorphic in external morphology to *Pseudocyclammina*, but differs in its compact, simple wall. Family Mayncinidae.

Neagu, T. 2000. Lower Cretaceous calcareous agglutinated foraminifera from southern Dobrogea - Romania. Part IV. Miscelanea (Litulolacea, Biokovinacea and Loftusiacea - some new taxa). *Acta Palaeontologica Romaniaae*, 2, 287-304.

HINOGAMMINA Neagu, 2000

Figure 16

Type species: Hinogammina danubiana Neagu, 2000, OD(M).

Hinogammina Neagu, 2000, p. 288.

Test free, involute to evolute planispiral, with 7 - 9 weakly globular and laterally flattened chambers in the last whorl. Sutures depressed, weakly arched. Wall simple, agglutinated with medium sized grains, imperforate, with calcareous cement. Aperture areal, an elongated median slit on the apertural face parallel to the plane of compression, surrounded by a fine lip. Upper Berrasian to Valanginian, Romania.

Remarks. Differs from *Haplophragmoides* in possessing a calcareous wall and a slit-like areal aperture. Family Mayncinidae

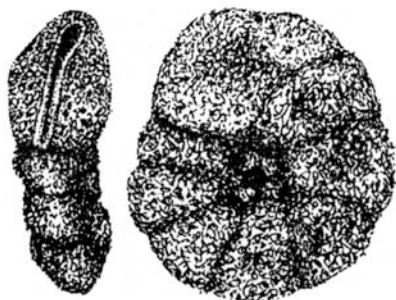


Figure 16. *Hinogammina danubiana* from Neagu (2000).

Neagu, T. 2000. Lower Cretaceous calcareous agglutinated

foraminifera from southern Dobrogea - Romania. Part IV. Miscelanea (Litulolacea, Biokovinacea and Loftusiacea - some new taxa). *Acta Palaeontologica Romaniaae*, 2, 287-304.

NONIONAMMINA Neagu, 2000

Figure 17



Figure 17. *Nonionammina elegans* from Neagu (2000).

Type species: Nonionammina elegans Neagu, 2000, OD(M).

Nonionammina Neagu, 2000, p. 290.

Test small, free, globular, involute, coiled slightly assymmetrically, with 8-9 chambers in the last whorl. Sutures are crescentic, slightly depressed. Chambers are wider than they are high. Apertural is a wide, low interiomarginal slit, extending between the two umbilici. Wall is thin, compact, finely agglutinated, without any visible microstructure. The original aragonitic cement is diagenetically altered to calcite. Upper Berriasian to Valanginian, Romania.

Remarks. The genus is externally similar to *Barkerina*, but differs in lacking any internal secondary septula. Family Mayncinidae.

Neagu, T. 2000. Lower Cretaceous calcareous agglutinated foraminifera from southern Dobrogea - Romania. Part IV. Miscelanea (Litulolacea, Biokovinacea and Loftusiacea - some new taxa). *Acta Palaeontologica Romaniaae*, 2, 287-304.

AGARDHELLA Nagy & Basov, 1998

Figure 18

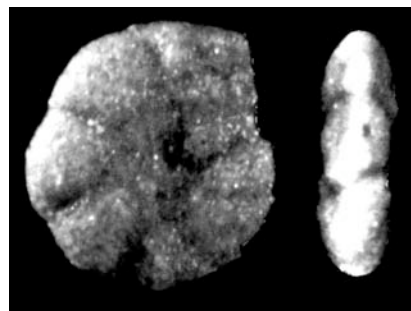


Figure 18. Holotype of *Agardhella placula* from Nagy & Basov (1998).

Type species: Agardhella placula Nagy & Basov, 1998, OD(M).

Agardhella Nagy & Basov, 1998, p. 237.

Test free, discoidal, multilocular, planispirally coiled with an open umbilical area. Septa straight, radial, increasing in thickness towards the umbilical margin.

Wall simple, noncalcareous, finely agglutinated. Aperture a large radially elongate subelliptical opening at the periphery, with a tendency to move to a more areal position in the last formed chambers. Volgian, Spitsbergen.

Remarks. Differs from other members of the Haplophragmoididae in possessing a large subelliptical aperture located at the peripheral margin of the apertural wall. *Kutsevella* differs in typically possessing a coarsely agglutinated wall, elongated chambers in the juvenile portion, as well as in the position of the aperture. Subfamily Ammomarginulininae.

Nagy, J., & Basov, V.A. 1998. Revised foraminiferal taxa and biostratigraphy of Bathonian to Ryazanian deposits in Spitsbergen. *Micropaleontology*, **44** (3), 217-255.

HAYMANELLA Sirel, 1999

Figure 19



Figure 19. Holotype of *Haymanella paleocenica* from Sirel (1999).

Type species: *Haymanella paleocenica* Sirel, 1999 OD(M). *Haymanella* Sirel, 1999, p. 122.

Test elongate, up to 5.8 mm, spherical large macrosphere and small microsphere followed by irregular coiled few chambers of the early stage; later chambers uniserial increasing gradually in length as added in both generations. Sutures straight and depressed. Wall very thick, coarsely agglutinated but not labyrinthic, constricted of small foraminiferal tests, vacuoles, and small calcite particles. Aperture terminal, radiate, showing as ribs that line the upper part of the chamber interior in the vicinity of the aperture and project into the openings. Dimorphism distinct. Paleocene, central Turkey.

Remarks. Differs from *Adhaerentia* in the lack of a biserial part, from *Acruliammina* in possessing an aperture with ribs, and from *Haplophragmium* in its apertural structure and in lacking an alveolar wall. *Haymanella* displays external similarity with *Bulbophragmium*, which differs in possessing the thick internal vertical radial partitions instead of a simple

wall. Subfamily Ammomarginulininae.

Sirel, E. 1999. Four new genera (*Haymanella*, *Kayseriella*, *Elazigella* and *Orduella*) and one new species of *Hottingerina* from the Paleocene of Turkey. *Micropaleontology*, **45** (2), 113-137.

COSCINOPHRAGMATACEA Thalmann, 1951

GOELLIPORA Senobari-Daryan & Zankl, 2000

Figure 20

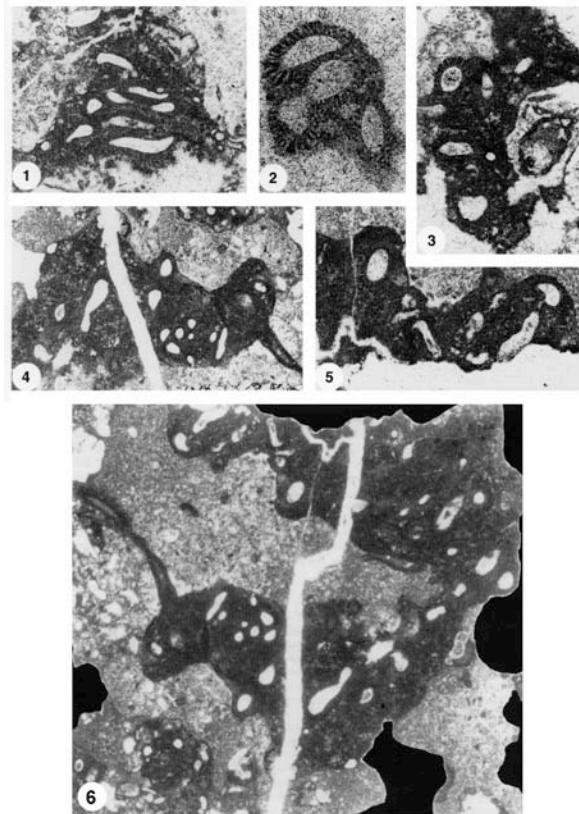


Figure 20. *Goellipora triassica* Senobari-Daryan & Zankl (2000). 1-3. Juvenile specimens showing coiling and perforations; 4-6. Views of the holotype specimen.

Type species: *Goellipora triassica* Senobari-Daryan & Zankl, 2000, OD(M)

Goellipora Senobari-Daryan & Zankl, 2000, p. 398.

Test attached, probably comprised of two chambers, with a convoluted and irregularly coiled deutero-loculus (in section circular, elliptical, or tubular). Wall calcareous, microgranular, and very finely agglutinated, perforate. Norian, Austria.

Remarks. Senobari-Daryan & Zankl (2000) did not observe the proloculus. They noted that type species may reach a size of 4 mm. The genus was placed in the Coscinophragmatidae owing to its sessile habitat, finely agglutinated wall, and stratigraphic occurrence. Family Coscinophragmatidae.

Senobari-Daryan, B. & Zankl, H. 2000. *Goellipora triassica* n.gen. n.sp.: Eine sessile Foraminifere aus den norischen Dachstein-Riffkalken des Hohen Gölls (Nördliche Kalkalpen, Österreich). *Senckenbergiana Lethaea*, **80** (2), 397-403.

LOFTUSIACEA Brady, 1884

LEVANTINELLA Fourcade, Mouty & Teherani, 1997

Figure 21

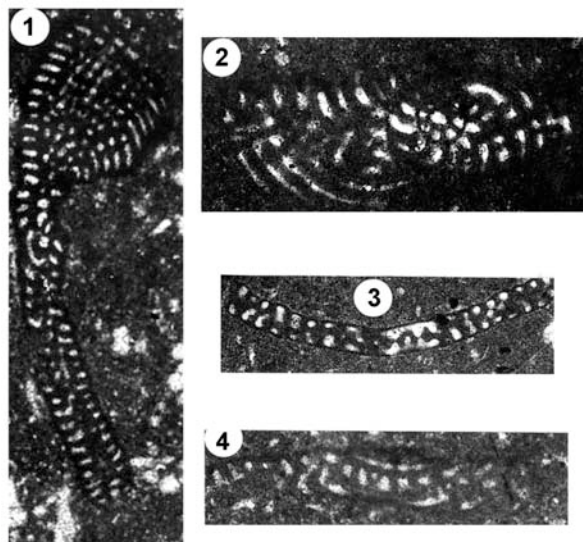


Figure 21. *Levantinella egyptiensis* from Fourcade *et al.* (1997). 1. Subequatorial section; 2. Equatorial section; 3. Subaxial section; 4. Tangential section.

Type species: Mangashtia? egyptiensis Fourcade, Arafa & Sigal, 1984. OD(M).

Levantinella Fourcade, Mouty & Teherani, 1997, p. 188.

Test calcareous microgranular, imperforate, planispirally enroled in the early stage, later uniserial. The test is axially compressed. The embryo has a simple wall. Apertures are aligned in rows that alternate from one side of the equatorial plane to the other. Chambers contain internal structures in the form of "pillars" in the shape of a zigzag blade situated in the median plane of the chamber. In the marginal zone of the chamber, this pilaroid structure forms intercalating digitations between two apertures of the same row, but it never reaches the lateral wall. Subepidermal partitions are absent. Oxfordian to Kimmeridgian, Iran, Syria, Lebanon, Egypt.

Remarks. Differs from Late Cretaceous *Mangashtia* in the presence of a planispiral stage and in the presence of multiple apertures in alternating rows. Subfamily Levantinellinae Fourcade, Mouty & Teherani, 1997.

Fourcade, E., Mouty, M., & Teherani, K.K. 1997. *Levantinella* nov.gen. et révision du genre *Mangashtia* Henson, grands foraminifères du Jurassique et du Crétacé du Moyen-Orient. *GEOBIOS*, 30 (2), 179-192.

THOMASELLA Sirel, 1998

Figure 22

Type species: Saudia labyrinthica Grimsdale, 1952 OD(M).

Thomasella Sirel, 1998, p. 41 (OD).

Test large, discoidal, biconcave, bilaterally symmetrical, margin slightly rounded. Microsphaeric embryo unknown. Megalosphaeric embryo is large (0.7 mm diameter), spherical to subspherical, followed by a

few undivided planispiral chambers. Successive chambers of the megalosphaeric generation are annular throughout ontogeny. A very narrow exoskeletal subepidermal layer is present at both sides of the test, consisting of two or more generations of vertical partitions (beams) perpendicular to the septa and two or more sets of horizontal partitions (rafters) parallel to the septa producing a complex subepidermal network with numerous alveolar compartments near the surface. The central (labyrinthic) zone consists of numerous pillars aligned from one chamber to the next. Numerous apertural openings on the peripheral face. Early Eocene, Turkey (Anatolia), Iraq, Yugoslavia.



Figure 22. *Saudia labyrinthica* from Sirel (1998).

Remarks. A suspected microsphaeric specimen illustrated by Grimsdale (1952) suggests the test has reniform and annular chambers in the adult specimen. *Thomasella* differs from *Vania* Sirel & Gündüz, 1985 in possessing a complex central zone with pillars. *Thomasella* is distinguished from the other discoidal sipirocyclolinid genera in possessing a complex marginal zone with more generations of vertical and horizontal partitions, and in its labyrinthic median zone with numerous pillars. Family Spirocyclinidae.

Sirel, E. 1998. Foraminiferal description and biostratigraphy of the Paleocene - lower Eocene shallow-water limestones and discussion on the Cretaceous - Tertiary boundary in Turkey. General Directorate of the Mineral Research and Exploration, Monography Series (Ankara), 2, 1-117 + 68 pl.

TROCHAMMINACEA Schwager, 1877

CALYPTAMMINA Nagy & Basov, 1998

Figure 23

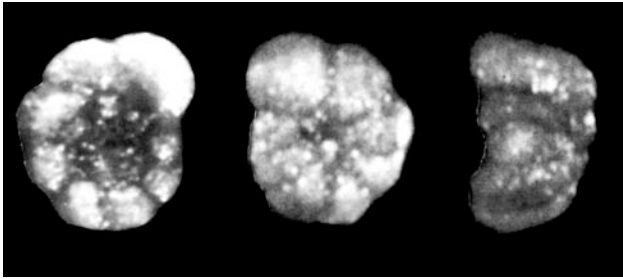


Figure 23. Specimen of *Calyptammina praegyroidiniformis* from Nagy & Basov (1997).

Type species: *Trochammina praegyroidiniformis* Bystrova & Kossitskaja (in Bystrova 1984), p. 67, pl. 1, figs. 5-6. OD. *Calyptammina* Nagy & Basov, 1998, p. 244.

Test free, multilocular, planispirally coiled, trapezoidal in lateral aspect; spiral side concave and displays all volutions; umbilical side flattened, with a deep funnel-shaped depression in the center, and shows only the last volution; sutures straight, radiating both on the spiral and umbilical sides; wall agglutinated, non-calcareous, thin and smoothly finished; aperture a long and low interiomarginal slit at base of final chamber. Upper Volgian to Valanginian, Spitsbergen, Pechora Basin, Sverdrup Basin.

Remarks. By its gross morphology, *Calyptammina* is similar to representatives of the subfamily Trochammininae, particularly *Trochammina* Parker & Jones, 1859 and *Insculptarenula* Loeblich & Tappan, 1985. *Calyptammina* differs, however, from *Trochammina* by its, principally planispiral coiling (pl. 8, figs. 22-24), concave spiral side, trapezoidal lateral aspect and elongate interiomarginal aperture. *Insculptarenula* resembles *Calyptammina* in possessing a concave spiral side, but diverges from it by having a triangular lateral aspect, recurved and elevated sutures on the spiral side, and a shorter aperture located closer to the umbilicus. Furthermore, *Insculptarenula* is more tightly coiled and does not have an umbilical depression. On the contrary, the umbilical depression of *Calyptammina* is deep, funnel-shaped, and marked by an umbilical shoulder. Subfamily Trochammininae.

Nagy, J. & Basov, V.A., 1998. Revised foraminiferal taxa and biostratigraphy of Bathonian to Ryazanian deposits in Spitsbergen. *Micropaleontology*, **44** (3), 217-255.

VERNEUILINACEA Cushman, 1911

CONVALLINA McNeil, 1997

Figure 24

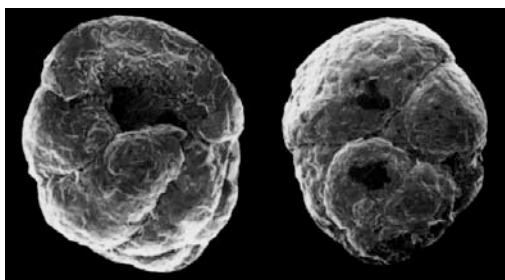


Figure 24. Holotype of *Convallina caverna* from McNeil (1997).

Type species: *Convallina caverna* McNeil, 1997, OD. *Convallina* McNeil, 1997, p. 35.

Test trochospirally coiled, with three or more chambers per whorl. Chambers wide, one-half test or more in width, overlapping, interior simple and undivided. Sutures slant obliquely to the axis of coiling. Umbilicus open, typically broad and deep, may contain eccentric axial depression formed by interiomarginal curve in the final chamber. Aperture an interiomarginal arch. Wall agglutinated with organic cement. Maastrichtian to Middle Eocene, MacKenzie Delta, Canada.

Remarks. Differs from *Arenobulimina* in using organic cement rather than calcareous cement and in having a deep open umbilicus. Differs from *Earlandammina* in having an open axial depression and in the interiomarginal-extraumbilical rather than areal aperture. Family Prolixoplectidae.

McNeil, D.H. 1997. New foraminifera from the Upper Cretaceous and Cenozoic of the Beaufort-MacKenzie Basin of Arctic Canada. Cushman Foundation for Foraminiferal Research Special Publication, **35**, 95 pp.

DANUBINA Neagu, 1997

Figure 25



Figure 25. Holotype of *Danubina obtusa* from Neagu (1997).

Type species: *Danubina obtusa* Neagu, 1997, OD(M). *Danubina* Neagu, 1997, p. 308.

Test conical-obtuse trochospiral, early stage with 2-3 whorls with 5-6 chambers per whorl, last stage with 4 or 4 1/2 chambers per whorl; arcuate weakly depressed sutures, apertural face flat or weakly to moderately concave. Aperture interiomarginal, simple, a low virgulate slit in the early stage, becoming textularoid with a large, valvular tooth in the adult stage. Wall finely agglutinated, compact, with calcareous cement. Lower Valanginian; Romania.

Remarks. The material from the lower Valanginian of Cernavoda possesses an early trochospiral stage similar to that of *Orientalia* Bykova, 1947 and *Eomarsionella* Levina, 1972. It clearly differs from *Eomarsionella* by its trochospiral terminal stage; and from *Orientalia* by the absence of a quadriserial chamber arrangement in the adult stage. In addition, a clear difference from the above mentioned two genera is the presence of an aperture with a valvular tooth. From *Riyadhella* Redmond, 1965 whose chamber disposition is also trochospiral with 4 chambers per whorl, *Danubina* differs by the presence of a valvular tooth. Family Prolixoplectidae.

Neagu, T. 1997. Lower Cretaceous agglutinated foraminifera from Southern Dobrogea, Romania. Part 1. Verneulinacea- Ataxophragmiacea. *Annales Societatis Geologorum Poloniae*, 67, 307-323.

NEAGUAMMINA Kaminski, Holbourn & Geroch, 1997

Figure 26

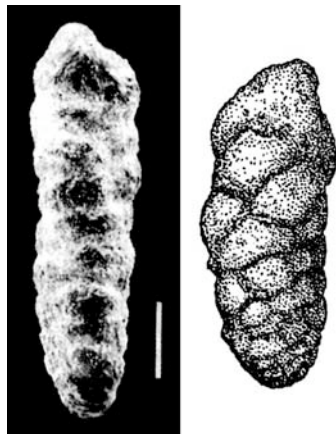


Figure 26. "*Gaudryina*" *cuvierensis* Holbourn & Kaminski, 1995, from Kaminski *et al.* (1997).

Type species: "*Gaudryina*" *cuvierensis* Holbourn & Kaminski, 1995. OD.

Neaguammina Kaminski, Holbourn & Geroch, 1997, p. 232.

Test elongate, subcircular in cross section, with sub-parallel sides. Coiling initially trochospiral, with up to three whorls of small chambers, quickly becoming triserial, and finally biserial in the adult stage. The triserial part comprises the bulk of the test length. The coiling axis may twist slightly as the coiling reduces from triserial to biserial. Chambers in the biserial part are inflated, with depressed sutures. Aperture is a low arch at the base of the last chamber. Wall is solid, noncanaliculate, composed of a multiple layer of fine mineral grains held together by an organic cement, preserved as silica. L. Cretaceous, Indian Ocean.

Remarks. The genus *Neaguammina* n.gen. differs from *Dorothia* Plummer, 1931, in possessing silicified organic cement, rather than calcareous cement, and in its well-developed triserial stage. It additionally differs from *Gaudryina* d'Orbigny, 1839 in possessing a small, initially trochospiral stage. Although *Paragaudryina* Suleymanov is almost certainly noncalcareous, it differs in possessing a areal aperture and in lacking an initial trochospiral stage. The Paleozoic genus *Mooreinella* Cushman & Waters, 1928 differs in having a much reduced triserial part. *Gaudryinopsis* Podobina, 1975 closely resembles *Neaguammina* n.gen. in possessing an interiomarginal aperture, but its early stage is short, described as either triserial or trochospiral with three chambers per whorl, with inflated and subglobular chambers. Family Prolixoplectidae.

Kaminski, M.A., Holbourn, AEL, & Geroch, S. 1997. *Neaguammina* n.gen., a new agglutinated foraminiferal genus from the Lower Cretaceous of DSDP Site 263 (Indian Ocean). *Annales Societatis Geologorum Poloniae*, 67, 231-235.

ATAXOPHRAGMIACEA Schwager, 1877

GEROCHELLA Neagu, 1997

Figure 27

Type species: *Gerochella cylindrica* Neagu, 1997 OD(M). *Gerochella* Neagu, 1997, p. 308.



Figure 27. *Gerochella cylindrica* from Neagu (1997).

Test with a trochospiral early stage, pyramidally square-rounded in transversal section, with 4 chambers per whorl; an intermediate short stage with 2-3 chambers irregularly uniserial; the adult stage well developed, uniserial, cylindrical, with low chambers, weakly inflated and straight depressed sutures. The aperture in the early stage is represented by a virgulate interiomarginal slit, becoming in the last uniserial stage multiple with many circular or elongated pores. Chambers simple without inner elements. Wall compact, finely agglutinated, with calcareous cement. Lower Valanginian; Romania.

Remarks. The general shape of the test is similar to that of *Pseudolituonella*, but the total absence of inner structure of the chambers, and the nature of the early stage indicate a clear difference. It is noteworthy that the early stage of this genus is similar in its chamber arrangement to *Riyadhella* Redmond, 1965, described from the Middle Jurassic. Subfamily Gerochellinae Kaminski (this volume).

Neagu, T. 1997. Lower Cretaceous agglutinated foraminifera from Southern Dobrogea, Romania. Part 1. Verneulinacea- Ataxophragmiacea. *Annales Societatis Geologorum Poloniae*, 67, 307-323.

SCYTHIOLINA Neagu, 2000

Figure 28

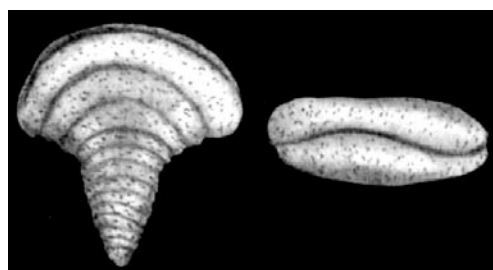


Figure 28. *Scythiolina flabellii* from Neagu (2000).

Type species: Scythiolina flabellii, Neagu, n.gen. n.sp. OD.

Scythiolina Neagu, 2000, p. 366.

Test free, small, smooth to slightly rough, flattened, flabelliform, triangular to elongated-triangular in outline. Early stage coiled in a very short planispiral with 3-5 chambers in the plane of biseriality. Primary chambers arched and broader than high. Aperture arched, slightly depressed. Wall comprised of a very thin compact epidermal layer and a thicker reticulate hypodermal layer. Interior of the primary chambers divided by vertical-radial septula into small rectangular chamberlets. Aperture an interiomarginal slit. The apertural face of the last two chambers with a pronounced convex shape (in larger specimens the aperture may become crenellate but is never a row of apertural pores). Uppermost Berriasian to lower Hauterivian; Romania.

Remarks. Resembles *Cuneolina* d'Orbigny in the flattened shape of the test and in the structure of the wall. It differs by possessing a planispiral early stage, by its reduced size, and by the absence of horizontal septula. The presence of an aperture with a crenellate shape in large-sized specimens suggests that this genus could be considered an ancestral stage of *Cuneolina*. Subfamily Scythiolininae Neagu (this volume).

Neagu, T. 2000. Lower Cretaceous Calcareous Agglutinated Foraminifera from Southern Dobrogea, Romania. Part II. Early Cretaceous Cuneolinidae. In: Hart, M.B., Kaminski, M.A. & Smart, C.W. (eds), Proceedings of the Fifth International Workshop on Agglutinated Foraminifera. Grzybowski Foundation Special Publication, 7, 363-386.

HISTEROLINA Neagu, 2000

Figure 29

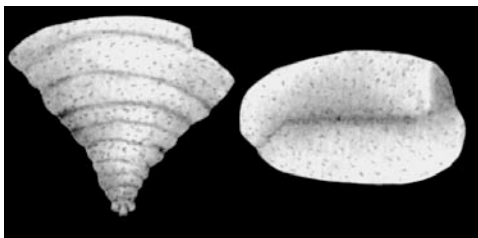


Figure 29. *Histerolina pileiformis* from Neagu (2000).

Type species: Histerolina pileiformis Neagu, n.sp. OD.
Histerolina Neagu, 2000, p. 369.

Test small, smooth to weakly rough, conical to ellipso-conical, never flattened. Early stage very short with 3-5 planispiral chambers. Sutures weakly depressed and arcuate. Wall structure of the test presents an epidermal thin, compact layer and a thicker reticulate hypodermal one. The apertural face of the last two chambers presents a clear flat-concave shape with an external acute periphery. The interior of the primary chambers is subdivided by radial-vertical septula into rectangular chamberlets. Aperture interiomarginal, a simple elongated slit becoming crenelated in larger

specimens but never as a basal row of pores. Uppermost Berriasian to lower Hauterivian, Romania.

Remarks. This genus differs from *Scythiolina* Neagu by the general conical or ellipso-conical shape of the test (never flattened) and by the flat-concave apertural face with an acute peripheral margin. Differs from *Pseudotextulariella salevensis* Charrolais, Brönnimann, Zaninetti, by the early stage, wall structure and the vertical-radial septula. From *Montsalevia* Zaninetti, Salvini, Barnard, Charrolais, 1987 (superficially described in thin section) it differs by the structure of the early stage and the wall structure. Because of its general conical test shape and the flat concave apertural face, this genus could represent the origin of *Sabaudia*, from which it differs by the structure of the early stage and wall structure. Subfamily Scythiolininae Neagu (this volume).

Neagu, T. 2000. Lower Cretaceous Calcareous Agglutinated Foraminifera from Southern Dobrogea, Romania. Part II. Early Cretaceous Cuneolinidae. In: Hart, M.B., Kaminski, M.A. & Smart, C.W. (eds), Proceedings of the Fifth International Workshop on Agglutinated Foraminifera. Grzybowski Foundation Special Publication, 7, 363-386.

CYMBRIAELLA Fugagnoli, 1999

Figure 30



Figure 30. *Cymbriaella lorigae* from Fugagnoli (1999).

Type species: Cymbriaella lorigae Fugagnoli, 1999, OD(M).

Cymbriaella Fugagnoli, 1999, p. 103, OD(M).

Test coarsely agglutinated, initially coiled in a low trochospire or planispirally, may later uncoil with a variable number of uniserial and rectilinear chambers; bilaterally compressed. Exoskeleton consisting of beams and shallow rafters (sensu Hottinger, 1978) which produce a coarse irregular subepidermal polygonal network, locally appearing as bifurcated alveolar cavities with a blind ending of polygonal outline below a thin epiderm. Endoskeleton consisting of massive septa perforated by multiple apertures. Megalosphaeric forms possessing a complex embryonic apparatus represented by a spherical proloculus enveloped by a semisphaerical deutero-

conch which is characterised by short beams perpendicular to the wall. Microsphaeric forms characterised by an irregular very close coiled young stage which becomes planispiral, followed by an uniserial and rectilinear later portion. Multiple aperture consisting of pores in the terminal face. Liassic (Domerian), Italy.

Remarks. *Cymbriaella* is the oldest representative of the Hauraniidae that developed a complex megalosphaere. Differs from *Amijiella* in its larger size, and more irregular, coarser subepidermal network. Subfamily Hauraniinae.

Fugagnoli, A. 1999. *Cymbriaella*, a new foraminiferal genus (Textulariina) from the Early Jurassic of the Venetian Prealps (Northeastern Italy). *Revue de Micropaleontologie*, 42 (2), 99-110.

SOCOTRAINA Banner, Whittaker, Boudagher-Fadel, & Samuel, 1997

Figure 31

Type species: Socotrainsa serpentina Banner, Whittaker, Boudagher-Fadel, & Samuel, 1997 OD(M).

Socotrainsa Banner, Whittaker, Boudagher-Fadel, & Samuel, 1997, p. 118.



Figure 31. Holotype of *Socotrainsa serpentina* from Banner *et al.*, (1997).

Test calc-agglutinating, noncanaliculate, septate, initially coiled planispirally or in a low trochospire, rapidly uncoiling to become uniserial and rectilinear, with the uniserial chambers filled with near-vertical, subradial partitions of sinuous, serpentine form. In the central areas of the chambers the partitions become very serpentine or vermiform, discontinuous but fusing laterally. The aperture consists of many small pores situated subterminally between the partitions. Late Liassic, Socotra Island, Yemen.

Remarks. The serpentine, anastomosing and dividing vertical subradial partitions that fill the uniserial chambers make this genus distinct from other genera of the Hauraniidae. *Trochamijiella* differs in its initial trochospiral coil. Subfamily Hauraniinae.

Banner, F.T., Whittaker, J.E., Boudagher-Fadel, M., & Samuel, A., 1997. *Socotrainsa*, a new hauraniid genus from

the Upper Lias of the Middle East (Foraminifera, Textulariina). *Revue de Micropaleontologie*, 40 (2), 115-123.

BOSTIA Bassoulet, 1998

Figure 32

Type species: Bostia irregularis Bassoulet, 1998.

Bostia Bassoulet, 1998, p. 185, OD(M).

Test strongly dimorphic between the megalosphaeric and microsphaeric generations, with an agglutinated-microgranular wall, and a subepidermal network formed by irregular radial and transverse partitions that constitute a superficial extension of the chambers. These elements are connected towards the interior by agglutinated grains that occupy an important part of the chamber interior. True pillars are absent. Apertures multiple. The megalosphaeric generation is comprised of an early planispiral stage followed by a uniserial stage that is either cylindrical or sometimes slightly compressed. The embryonic apparatus is multichambered, complex, with a spheroconch of large diameter. The microsphaeric generation rapidly becomes compressed, linguiform, or even digitate after the spiral part, with numerous chambers and irregularly sinuous septa. Bathonian, France.

Remarks. Characterised by its complex embryonic apparatus and lack of pillars. It is similar to other unpillared hauraniids such as *Amijiella* and *Alzonella*, but differs in possessing an ammobaculoid test morphology in both generations. Its wall structure is similar to that of *Spiraloconulus*, which differs by its conical orbitoliniform test. It may represent a more advanced stage in the evolution of the *Spiraloconulus* lineage. Subfamily Amijellinae.

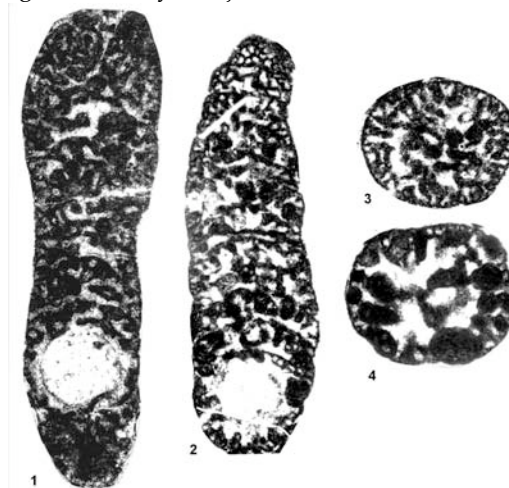


Figure 32. Holotype of *Bostia irregularis* from Bassoulet (1998).

Bassoulet, J.P. 1998. Un nouveau grand foraminifère *Bostia irregularis* n.gen. n.sp. (Lituolacea, Hauraniidae) du Jurassique moyen de Dordogne (France). *Revue de Micropaléontologie*, 41 (3), 181-195.

IJDRAVELLA Bassoulet, Boutakiout & Echarfaoui, 1999

Figure 33

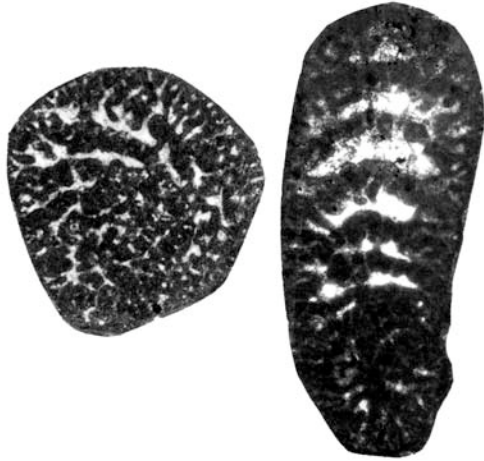


Figure 33. *Ijdranella atlasica* from Bassoullet *et al.* (1999).

Type species: *Ijdranella atlasica* Bassoullet, Boutakiout & Echarfaoui, 1999, OD(M).

Ijdranella Bassoullet, Boutakiout & Echarfaoui, 1999, p. 218.

A hauraniid with an involute planispiral test that becomes evolute, followed by an compressed peneropliform uncoiled stage, with an exoskeleton containing long radial blades superficially united by a coarse network. Pillars are absent. Pliensbachian, Morocco.

Remarks. Differs from *Amiliella* in its compressed test with its tendency to develop peneropliform chambers. *Trochamijiella* differs in its trochospiral initial coiling, canaliculate wall and in its cylindrical uncoiled stage. Subfamily Amijellinae.

Bassoullet, J.P., Boutakiout, M. & Echarfaoui, H. 1999. Deux nouveaux genres, *Palaeocyclammina* et *Ijdranella*, foraminifères (Textulariina) d'un niveau Liasique à *Orbitopsella praecursor* (Gümbel) du Moyen Atlas (Maroc). *Revue de Micropaléontologie*, **42** (3), 213-230.

PALAEOCYCLAMMINA Bassoullet, Boutakiout & Echarfaoui, 1999

Figure 34



Figure 34. *Palaeocyclammina complanata* from Bassoullet *et al.*, (1999).

Type species: *Palaeocyclammina complanata* Bassoullet, Boutakiout & Echarfaoui, 1999, OD(M).

Palaeocyclammina Bassoullet, Boutakiout & Echarfaoui, 1999, p. 217.

Test planispiral, compressed, involute, with large and low chambers tending to become falciform in the last whorl. Wall calcareous microgranular, agglutinated. Epidermus imperforate, covering a reticulate subepidermal skeleton comprised of an irregular superficial network prolonged toward the interior by very short radial blades that are perpendicular to the septa. This structure comprises fine alcoves that divide towards the surface. Aperture is multiple. Pliensbachian, Morocco.

Remarks. Differs from *Pseudocyclammina* by the structure of the exoskeleton, which in its deeper part form radial blades oriented perpendicular to the septa. Subfamily Amijellinae.

Bassoullet, J.P., Boutakiout, M., & Echarfaoui, H. 1999. Deux nouveaux genres, *Palaeocyclammina* et *Ijdranella*, foraminifères (Textulariina) d'un niveau Liasique à *Orbitopsella praecursor* (Gümbel) du Moyen Atlas (Maroc). *Revue de Micropaléontologie*, **42** (3), 213-230.

KARSELLA Sirel, 1997

Figure 35

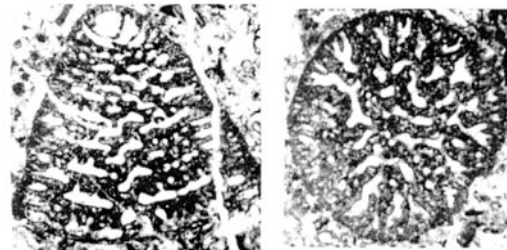


Figure 35. *Karsella hottingeri* from Sirel (1997).

Type species: *Karsella hottingeri* Sirel, 1997, OD(M). *Karsella* Sirel, 1997, p. 206.

Test large (up to 4.7 mm length), high conical, with a convex base. Apically located subspherical megalosphere is followed by large hemispherical chambers of the early stage, arranged in a trochoid spire of 1 1/2 whorls. Microspheric embryo unknown. Adult chambers rectilinear and discoidal (cup shaped), enlarging rapidly as added. Exoskeleton consists of a thick agglutinated wall, with numerous elongate vertical partitions (beams) subdividing the chamber interior. Additional generations of beams may be intercalated between adjacent major ones in the marginal zone. Longer primary beams may thicken rapidly, becoming irregularly undulating and continuing into the central zone of the cone. Several generations of beams and rafters form numerous chamberlets in the central zone and alveolar compartments in the marginal zone of the cone. Chamberlets alternate in position from chamber to chamber. Endoskeletal thick pillars are subcircular in section. Aperture in the early coil a single opening per chamber, in the rectilinear portion a circle of irregularly spaced pores in the central zone of the discoidal chamber floor. Marginal foramina are present. Thanetian, eastern Turkey.

Remarks. Differs from *Cushmania* Silvestri, 1925 in having a short series of trochospiral chambers instead

of completely annular chambers in the early stage. *Karsella* possesses many features in common with Upper Cretaceous genus *Calveziconus* Caus & Cornella, 1982, suggesting the two taxa may be related by evolution. *Karsella* differs in its more complex inner structure, with several generations of vertical and horizontal partitions forming numerous alveolar compartments with an irregular network below the epidermis. It additionally differs in possessing a large protoconch and periembryonic chambers. Subfamily Dictyoconinae.

Sirel, E. 1997. *Karsella*, a new complex orbitolinid (Foraminiferida) from the Thanetian limestone of the Van region (East Turkey). *Micropaleontology*, **43** (2), 206-210.

TEXTULARIIDA Lankester, 1885

COLOMINELLA Popescu, 1998

Figure 36

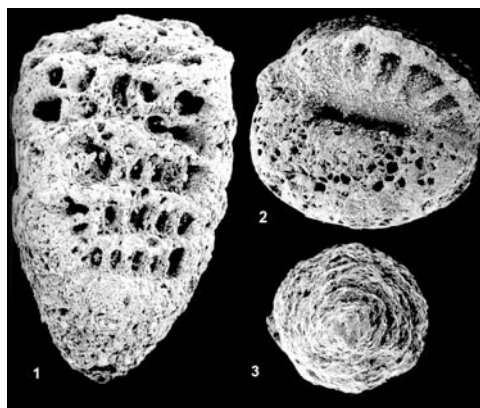


Figure 36. *Textulariella paalzowi* from Popescu *et al.*, (1998).

Type species: Textulariella paalzowi Cushman, 1936, OD(M). *Colominella* Popescu, 1998, p. 71.

Test free, large, elongate to fusiform. Early stage triserial, later biserial, with interior of chambers subdivided by vertical and sometimes horizontal plates except for the initial ones. Sutures horizontal, sometimes obscured. Wall agglutinated, canaliculate, with a rough surface. Aperture an interiomarginal slit. Miocene, Paratethys.

Remarks. Differs from *Colomita* Gonzalez-Donoso in its distinct triserial initial part and circular cross section. The type species, *C. paalzowi* (Cushman) is similar in size and lumen partitions to *Matanzia bermudezi* Palmer, but differs in the chamber arrangement, which is trochospiral (with 5-6 chambers in the initial whorl) in the latter. Subfamily Colominellinae Popescu, 1998.

Popescu, G, Cicha, I., & Rögl, F. 1998. Systematic Notes. in: Cicha, I., Rögl, F., Rupp, C., & Cytroka, J. (eds), Oligocene - Miocene foraminifera of the Central Paratethys. *Abhandlungen der senckenbergischen naturforschenden Gesellschaft*, **549**, 69-325.

PARAGAUDRYINELLA Popescu, 1998

Figure 37

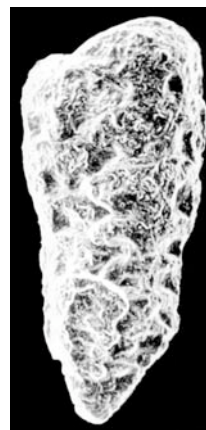


Figure 37. *Gaudryina (Siphogaudryina) interjuncta* from Popescu *et al.* (1998).

Type species: Gaudryina (Siphogaudryina) interjuncta Cushman, 1937, OD.

Paragaudryinella Popescu, 1998, p. 73.

Test free, elongate. Early stage triserial, later biserial, subquadrangular in cross section. Sutures horizontal, obscured by backward projecting lobes of the basal border of the chambers. Wall agglutinated, canaliculate. Aperture an interiomarginal slit. Miocene, Gulf Coast, Paratethys.

Remarks. Differs from *Pseudogaudryina* Cushman in having a lenticular to subquadrangular cross section instead of a test that is triangular throughout. Cushman (1936) placed the Miocene species of this genus in *Siphogaudryina*, which differs in its non-caliculate wall and in its aperture which is an interiomarginal arch. Subfamily: Pseudogaudryininae.

Popescu, G, Cicha, I., & Rögl, F. 1998. Systematic Notes. in: Cicha, I., Rögl, F., Rupp, C., & Cytroka, J. (eds), Oligocene - Miocene foraminifera of the Central Paratethys. *Abhandlungen der senckenbergischen naturforschenden Gesellschaft*, **549**, 69-325.

KAMINSKIA Neagu, 1999

Figure 38

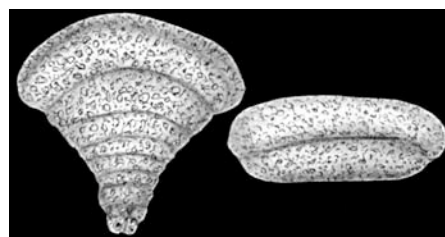


Figure 38. Holotype of *Kaminskia flabellata* from Neagu (1999).

Type species: Kaminskia flabellata Neagu, 1999, OD. *Kaminskia* Neagu, 1999, p. 174.

Test free, consisting of a short planispiral stage of 3-5 chambers followed by a textulariid biserial stage which may be flattened in the plane of biseriality until it becomes flabellate in outline. Sutures weakly depressed, straight to arcuate. Chambers are simple,

not subdivided by secondary septula. Test medium to finely agglutinated with calcareous cement; chamber wall is thick and perforated by simple, straight canaliculi (typical for textulariaceans). Aperture a simple interiomarginal slit. Upper Berriasian to Lower Hauterivian, Romania.

Remarks. Some species of the genus are externally homeomorphic to the Cuneolininae, but differ in the presence of their canaliculate wall structure and in the absence of any internal septula. Family Kaminskiidae.

Neagu, T. 1999. Kaminskiinae n.subfam. and *Kaminskia* n.gen., a new Early Cretaceous calcareous agglutinated foraminifera from southern Dobrogea, Romania. *Annales Societatis Geologorum Poloniae*, **69**, 173-188.

PSEUDODICTYOPSELLA Septfontaine & De Matos, 1998

Figure 39

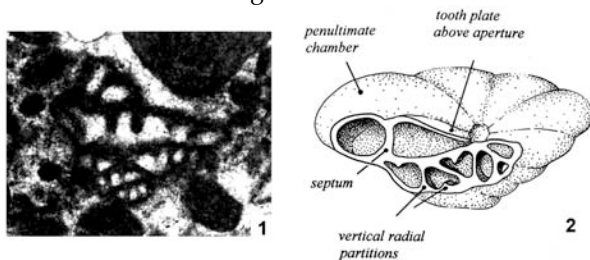


Figure 39. *Pseudodictyopsella jurassica* from Septfontaine & De Matos (1998). 1. Holotype, section parallel to axis of coiling; 2. Authors' reconstruction.

Type species: *Pseudodictyopsella jurassica* Septfontaine & De Matos, 1998

Pseudodictyopsella Septfontaine & De Matos, 1998

Test free, trochospirally coiled with 2 or 3 whorls. Interior of chambers subdivided by vertical radial partitions in a subepidermal position. More rarely transverse partitions can be present. This exoskeletal microstructure is interpreted as a primitive hypo-dermal network. Wall calcareous microgranular, with some agglutinated material. Aperture an umbilical interiomarginal slit below a simple valvular tooth plate. An axial siphon may be present in some forms, as an ancestral relict character. Bajocian, Oman.

Remarks. Differs from *Praekurnubia* in its low conical test, and lack of a central columella and valvular tooth plate. It differs from *Dictyopsella* in its less complex inner structure. It lacks the endoskeletal microstructure (such as pilars) that occur in the penderinids. Subfamily Pseudodictyopsellinae Septfontaine & De Matos, 1998.

Septfontaine, M & De Matos, J.E. 1998. *Pseudodictyopsella jurassica* n.gen. n.sp., A new foraminifera from the early middle Jurassic of the Musandam Peninsula, N. Oman Mountains; sedimentological and stratigraphical context.

Revue de Micropaleontologie, **41**, 71-87.

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Additional References

- Al-Najdi, A.M. 1975. Verneulinidae foraminifera from Cenomanian rocks of France and England. *Benthonics '75*, Abstracts, Dal Graphics, Halifax, Nova Scotia: 3-4.
- Alexandrowicz, S.W. 1969. *Thuramminoides sphaeroidalis* Plummer (Foraminifera) from Cambrian beds of the vicinity of Sandomierz. *Rocznik Polskiego Towarzystwa Geologicznego*, **39** (1-3), 27-34.
- Bell, K.N. 1996. Early Devonian (Emsian) agglutinated foraminiferans from Buchan and Bindi, Victoria, Australia. *Proceedings of the Royal Society of Victoria*, **108** (2), 73-106.
- Berthelin, G. 1880. Mémoire sur les Foraminifères fossiles de l'Etage Albien de Montcley (Doubs). *Mémoires de la Société Géologique de France* (3), 1 (5): 1-84.
- Chapman, F. 1891-1898. The Foraminifera of the Gault of Folkestone. *Journal of the Royal Microscopical Society*, London, Pt. 1-10.
- Cushman, J.A. 1927. Recent foraminifera from off the west coast of America. *Bulletin of the Scripps Institute of Oceanography, Technical Series*, 1, 119-188 + 6 pls.
- Hottinger, L. 1978. Comparative anatomy of elementary shell structures in selected foraminifera. In: Hedley, R. & Adams, C. (eds), *Foraminifera*, vol. 3. Academic Press, London, pp. 203-266.
- Kaminski, M.A. (this volume). The year 2000 classification of the Agglutinated Foraminifera.
- Kaminski, M.A. 2000. The New and Reinstated Genera of Agglutinated Foraminifera published between 1986 and 1996. In: Hart, M.B., Kaminski, M.A., & Smart, C.W. (eds), *Proceedings of the Fifth International Workshop on Agglutinated Foraminifera*. Grzybowski Foundation Special Publication, 7, 185-219.
- Loeblich, A.R., & Tappan, H. 1987. *Foraminiferal Genera and their Classification*. Van Nostrand Reinhold. 970 pp + 847 pls.
- McClellan, W.A. 1966. Arenaceous foraminifera from the Waldron Shale (Niagaran) of southeast Indiana. *Bulletins of American Paleontology*, **50**, 447-518.
- McClellan, W.A. 1973. Siluro-Devonian microfossil biostratigraphy in Nevada. *Bulletins of American Paleontology*, **62**, 235-375.
- Vdovenko, M.V., Rauzer-Chernousova, D.M., Reitlinger, E.A., & Sabirov, A.A. 1993. *Spravochnik po sistematike melkikh foraminifer Paleozoya (za isklyucheniem endotiroidey I permskikh mnogokamernykh lagenoidey)*. [A reference book on the systematics of Paleozoic Foraminifera (excluding endothyrids and Permian multichambered lagenids)] Izdatelstvo "Nauka", Moscow, 1-125.

