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LOWER CRETACEOUS CALCAREOUS AGGLUTINATED FORAMINIFERA FROM SOUTHERN DOBROGEA - ROMANIA PART IV. MISCELIANEA (LITULOLACEA, BIOKOVINACEA AND LOFTUSIACEA - SOME NEW TAXA)

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Abstract. In 1977 the author published the first detailed study of Upper Berriasian - Lower Aptian and Verneuilinacea - Ataxophragmiacea from Southern Dobrogea. This fourth paper in the series of studies of agglutinated foraminifera includes description of new taxa from the superfamilies Lituolacea, Biokovinacea and Loftusiacea. Taking in consideration both the external and internal morphological characters of the test, the following new taxa (genera and species) are decribed: *Hinogammina danubiana* n. gen., n. sp., *Comaliamma dobrogioca* n. sp., *Freixialina elphidii* n. sp., *F. planispira* Romalho 1969, *Carasuella cylindrica* n. gen., n. sp., *C. lenticulinae* n. gen., n. sp., *Nonionammina elegans* n. gen., n. sp., *Barkerina dobrogiaca* n. sp., *Charentia evoluta* (Gorbatchik) 1968, *Mesoendothyra involuta* n. sp. and *M. dobrogiaca* n. sp..

Keywords: Early Cretaceous calcareous agglutinated foraminifera, new taxa.

INTRODUCTION

Samples for this study were collected from outcrops situated on the right bank of the Danube River (near Cernavodă), from a quarry in nearby Cernavodă and Alimanu and from boreholes drilled along the bank of Hinog island (C.2, C.4, C.11, C.12 Hinog) or between Poarta Albă and Ovidiu - Nazarcea (near Constan[a), (Fig.1).

In southern Dobrogea the outcropping Upper Berriasian - Lower Hauterivian marin deposits are overlain succeded by "Purbeckian" continental on lacustrine or lagoonal facies. The letter are found in boreholes in the Carasu Valley (Danube - Black Sea Canal). Lithologically, the Purbeckian facies include anhydrite beds (more than 100 m thick in places) that overlie the Kimmeridigian limestones. These anhydrites are, in turn, overlain by alternating and multicoloured clay that contain a rich association of ostracodes and characeans (*Flabellochara*, *Nodosoclavator*, *Clavator*), typical of the Upper Purbeckian. Detrital limestones with "*Nerinea*" (see I. Pană) and ostreids gradually appear at the top of these beds. The zoogenic limestones with marly limestones or marls crop out on the right bank of the Danube River at Cernavodă Pod, as well as in the Alimanu quarry in the South. The macrofauna of these deposits is quite rich and represented by: sponges, pelecypods, gastropods, brachiopods and echinoids, inluding: *Actinostromaria, Granatiparietites, Steinerella, Matheronia backsaniensis, Monopleura eurystoma, M. vallangiensis, Ostrea germaini, Panope, Trigonia sp., Pinna sp., Nerinea, Ampullina, Purpuroidea, Leviatania, Scythiglobus, Harpagodes, Sellithyris sella lindensis, Cyrtothiris cyrta, Rouillieria tialbyensis, Acrosallenia patella, Hyposalenia stellata, Pseudodiadema roulini, Phyllobrisus duboisi.* Dragastan (1977) also cites a rich algal microflora represented by *Salpingoporella annulata, S. steinhauser, Acicularia elongata* and *Likanella berthielli.*

The microfauna associated with these deposits is also very rich. The numerous soft clay interbeds contain associations of foraminifera and ostracods. The most important taxa are: *Anchispyrocyclina neumanie, Everticyclammina div. sp., Pseudocyclammina lituus, Pseudocyclammina div. sp., Charentia evoluta, Feurtilia div. sp., Freixialina div. sp., Gerochella cylindrica, ?Pseudolituonella sp., Danubina obtusa, Verneuilinoides polonicus, V. danubiensis, Verneuilina angularis, Arenobulimina venusta, A. miletaeformis, Scythiloculina flabelii, S. infundibuliformis, S. cuneata, S. camposauri, Histerolina pileiformis, H. paxiliformis, H. elipsiformae, Kaminskia flabelata, K. acuta, K. exigua, K. filiformis, K. dissimile, Ammocyclololoculina erratica, Dobrogelina ovidi, Decussoloculina div. sp., Axiopolina sp., Scythiloculina div. sp., Istriloculina sp., Danubiella cernavodensis, D. gracillina, Andersenoilina bancilai, A. alpina, A. elongata, A. perconigi, A. cherchiae, A. delphinensis, A. chouberti, A. campanella, Trocholina invlouta, Neotrocholina div. sp., Ichnusella div. sp.*, etc.

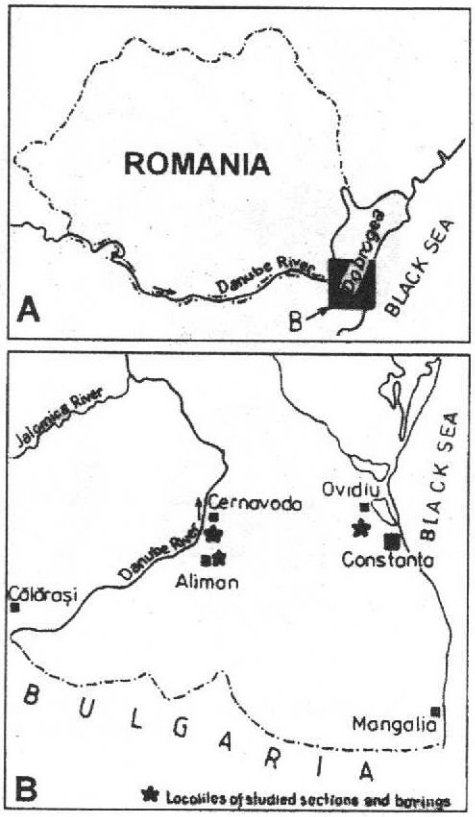

Figure 1 - Location of the studied area

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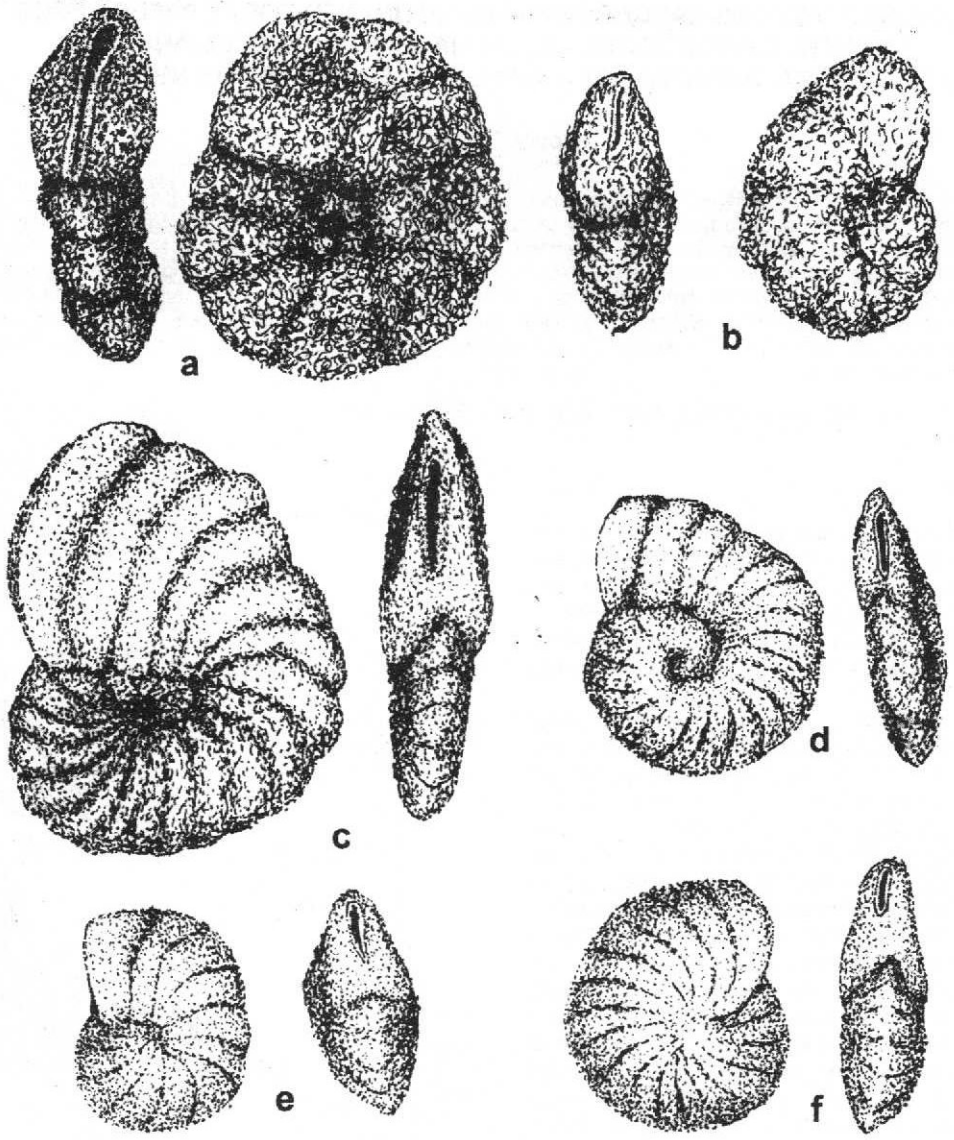

Figure 2 - a = *Hinogammina danubiana* Neagu n. gen., n. sp.; b = *Comaliamma dobrogiaca* Neagu n. sp.; c-d = *Freixialina planispira* Ramalho; e-f = *Freixialina elphidiae* Neagu n. sp.

SYSTEMATIC DESCRIPTIONS

Superfamily LITUOLACEA de Blainville 1827
Family HAPLOPHRAGMOIDIDAE Maync 1952
Genus *Hinogammina* Neagu n. gen.

Type species: *Hinogammina danubiana* Neagu n. gen., n. sp.

Derivation of name: from Hinog, the name of the island in front of the Cernavodă Pod outcrop.

Description: Test free, moderate agglutinated, with medium - sized grains, planispiral involute - evolute test; 7-9 weakly globulous and lateral flattened chambers in the last whorl. Sutures depressed. Wall simple, agglutinated with medium sized grains, imperforate, with calcareous cement. Aperture areal, appearing as an elongated median slit on the apertural face that is parallel to the plane of flattening, with a fine apertural lip.

Remarks: The general shape of the test is similar to that of the genus Haplophragmoides but it differs in the forme and position of the aperture. The structure of the compact wall and of the inner part of the chambers, which lack any secondary structures, is the argument to place this genus among Haplophragmoididae.

Stratigraphical distribution: Uppermost Berriasian - Lower Valanginian.

Hinogammina danubiana Neagu n. sp.
Plate 1, fig. 1-13, text-fig. 2a

Derivation of Name: Latin Danubius- ii = The Danube River

Type Level: Uppermost Berriasian - Lower Valanginian

Type Locality: ISPH Drillings C.11 Hinog, -82 -83 m.

Type Specimens: L.P.B.IV. holotype 11327 (pl. 1, fig. 12-13), paratypes 11328-11329

Description: Test free, planspirally coiled involute to evolute, with a moderately depressed umbilicus; Chambers moderately flattened parallel with the coiling plane, increasing gradually in dimensions, 7-9 chambers on the last whorl; the last one being largest. Sutures

weakly arcuated and depressed. Apertural face of the last chamber is slightly convex and supports the aperture, which is median elongated slit with a fine apertural lip. The inner side of the chambers is simple and the wall structure of the test is compact without any visible pore structures (with an aragonitic diagenized cement).

Dimensions: Holotype: large diameter 0.48 mm, small diameter 0.40 mm thickness 0.14 mm; paratypes: large diameter 0.36-0.43 mm, small diameter 0.31-0.36 mm.

Remarks: This species is distinquished by the form and position of the aperture, an areal - median slit.

Occurrence: Southern Dobrogea - Cernavodă, ISPH Drillings C.11 Hinog -82-83 m.

Stratigraphical distribution: Uppermost Berriasian - Lower Valanginian.

Family MAYNCINIDAE Loeblich & Tappan 1985

Genus *Comaliamma* Loeblich & Tappan 1985

Comaliamma dobrogiaca Neagu n. sp.

Plate 2, figs. 29-43; pl. 4, figs. 25-38; pl. 7, figs. 34-47; pl. 9, fig. 24; text-fig. 2b

Derivation of Name: from Dobrogea, the hystorical name of the territory between the Black Sea and Danube River.

Type Level: Lower Valanginian

Type Locality: Cernavodă, Ilie Barza's Quarry

Type specimens: L.P.B.IV. holotype 11330(pl. 7, figs. 38-39), paratypes 11331-11335

Description: Test free lenticular, planispirally coiled, with a weakly lobate periphery. The last whorl chambers (last 2 -3 chambers) show a tendency to uncoil; 7-12 slightly inflated chambers in the last whorl. Sutures arcuate and depressionary. Wall fine agglutinated with calacreous cement. The apertural face of the last chamber has a tringular shape in the coiled stage becoming elliptical in the uncoiled stage. In thin section the wall of the test is finely agglutinated, with primary aragonitic changed diagenetically into calcitic cement and deprived of any micro-structures. Aperture is an elongated slit with a fine lip and is disposed in the external peripheral angle of the test.

Dimensions: Holotype length 0.53 mm, breadth 0.29 mm, thickness 0.19 mm; paratypes lenght 0.40-0.50 mm, breadth 0.31-0.36 mm, thickness 0.17-0.19 mm (figured specimens)

Remarks: This species differs from *C. charentiiformis* Loeblich & Tappan 1985 by the position of the aperture and the general morphology of the test. It differs from the species of *Freixialina*, to with whom it has in common the aperture forme and position by the reduced number and slightly globular aspect of the chambers in the last whorl.

Occurrence: Cernavodă Pod, right bank of the Danube River, ISPH Drillings C. 2 Hinog -42-43 m, C. 4 Hinog -44. 10 -45m, C. 11 Hinog -92. 20 -93m, F VIII Nazarcea -68. 50 m.

Stratigraphical distribution: Uppermost Berriasian / Lower Valanginian

Genus *Freixialina* Ramalho 1969

Freixialina planispira Ramalho 1969

Plate 4, figs.1-15, 39-44; pl.5, figs. 55-64; pl. 9, figs. 20-23; text-fig. 2c-d

Freixialina planispira Ramalho 1969, p. 37, pl. 1-2; 1971, p. 144, pl. 13, fig. 10-11

Type specimens: L. P. B. IV., hypotypes 11302-11309

Dimensions: Large diameter 0.36-0.53 mm, small diameter 0.31-0.48 mm, thickness 0.072-0.096.

Remarks: The very rich material from the Uppermost Berriasian to Lower Hauterivian from the Cernavodă - Carasu Valley - Alimanu area made possible to notice the variability only in dimensions of the specimens of this species. In the Upper Valanginian - Lower Hauterivian samples from the Alimanu area specimens may reach over 1 mm in diameter (pl. 4, fig. 39-44). In our opinion the size by itself is not enough to separate a new taxon, not even at the subspecies level.

Occurrence: Cernavodă Pod, right bank of the Danube River, Ilie Barza's quarry, Alimanu's quarry ISPH Drillings F.VIII Nazarcea -68. 50 m, F. IV Poarta Albă - 662. 50 -64. 50 m, C. 4 Hinog -44-45 m, C. 11 Hinog -82-82. 20 m, C. 12 Hinog -92. 20-93 m.

Stratigraphical distribution: Uppermost Berriasian - Lowermost Hauterivian.

Freixialina elphidii Neagu n. sp.

Plate 5, figs. 1-54; pl. 9, figs. 16-19; text-fig. 2e-f

Derivation of Name: From the shape of the test which is homeomorphic with the calcareous genus *Elphidium*.

Type Level: Lower Valanginian

Type Locality: ISPH Drillings F. IV. Poarta Albă - 61.50 -64.50 m.

Type specimens: L. P. B. IV. holotype 11210(pl. 5, figs. 1-2), paratypes 11311-11314.

Description: Test lenticular, involute to weakly evolute, finely agglutinated with calcareous - aragonitic cement: 14-17 norow and crescentric chambers, with arcuated and weakly depressionary sutures in the last whorl. External periphery acute to weakly rounded. Apertural face of the last chamber with a triungular outline. The last 2-4 chambers of some specimens have an uncoiling tendency thus generating a slight umbilical depression. The aperture is a simple slit located in the external peripheral angle of the apertural face, with a narrow apertural lip. In thin section, the wall of the test and septa is slightly thin, compact, without any visible micro-structure.

Dimensions: Holotype large diameter, 0.34mm, small diameter 0.29mm, thickness 0.12mm: paratypes large diameter 0.34-0.50mm, small diameter 0.29-0.43mm, thickness 0.12-0.19 mm.

Remarks: By the general shape of the test this species is homeomorphic with genus *Elphidium* and differs from Ramalho species.

Occurrence: Cernavodă Pod, right bank of the Danube River, Ilie Barza's quarry, ISPH Drillings F.IV. Poarta Alba -61.50-64.50m, F.VIII Nazaracea -68.50m, C.2 Hinog, -42-43m, C.11 Hinog, -92-93m.

Stratigraphical distribution: Uppermost Berriasian - Valanginian

Genus *Carasuella* Neagu n.gen.

Type species: Carasuella cylindrica Neagu n.gen., n.sp.

Derivation of Name: from the name of Carasu Valley along which is located on the Danube - Black Sea Canal

Description: Test free, moderately agglutinated, planispiral in the early stage, becoming uncoiled in the latter part. Chambers increase gradually in dimensions and have weakly depressed sutures. The aperture is areal, on the convex apertural face of the last chamber, cribrate, and represented by many circular pores. In thin section, the wall and septa have compact structure

without any secondary elements the primary aragonitic cement is diagenetically changed in to calcite.

Remarks: This genus is homeomorphic in its external morphology to *Pseudocyclammina*. The wall of the test and septa, which are compact with simple structure makes a clear difference.

Stratigraphical distribution: Uppermost Berriasian -Valanginian

Carasuella cylindrica Neagu n. gen., n. sp.
Plate 1, figs. 14-25, pl. 2, figs. 24-28, pl. 3, figs. 11-23; pl. 9, figs. 10-12; text-fig. 3j

Derivation of name: Latin cylindrus - ii = cylinder, from the aspect of the unserial stage.

Type Level: Upermost Berriasian-Lower Valanginian

Type Locality: ISPH Drillings F.VIII Nazarcea - 68.50 m.

Type specimens: L.P.B.IV. Holotype 11317 (pl. 1, figs. 22-23), paratypes 11318-11320.

Description: Test medium sized, with 5-6 chambers in the whorl, becoming straight and cylindrical, in the uncoiled adult stage. The chambers are globular and increase gradually in dimensions, with straight depressed sutures. The aperture is areal, represented by many circular pores on the convex apertural face of the last chamber. In thin section the wall of the test and septa are moderately thickened, compact, without any secondary structures. The cement which was initially aragonite is diagenetically changed to calcite.

Dimensions: Holotype length 0.67 mm, thickness 0.31 mm: paratypes length 0.43-0.70 mm, thickness 0.36-0.40 mm (figured specimens).

Remarks: This species is homeomorphic with *Pseudocyclammina lituus* (Yabe & Hanzawa), whit respect to its external morphology and structure of the aperture. The difference resides in its simple, compact wall structure.

Occurrence: Cernavodă Pod, right bank of the Danube River, ISPH Drillings, F. VIII Nazarcea -68. 50 m, C. 2 Hinog - 42 -43 m, C. 4 Hinog - 47. 20 m, C. II Hinog -82 -82, 20 m.

Stratigraphical distribution: Upermost Berriasian - Valanginian.

Carasuella lenticulinae Neagu n. gen., n. sp.
Plate 1, figs. 26-32, pl. 2, figs. 1-23, pl. 3, figs. 1-10; pl. 9, figs. 13-15; text-fig. 3h

Derivation of Name: from the homeomorphic aspect of the test with that of the genus *Lenticulina* (Nodosariidae).

Type Level: Lower Valanginian.

Type Locality: Cernavodă Pod, right bank of the Danube River.

Type specimens: L.P.B.IV.Holotype 11323 (pl. 2, figs. 14-15), paratypes 11324-11325.

Description: Test robust moderately agglutinated, with a slightly lobate acute to rounded external periphery. 6 -7 chambers in the last whorl, with a triangular outline in transversal section and weakly arcuated and depressed sutures. The apertural face of the last chamber is triangular in outline and supports the aperture, which is represented by many circular pores. Some specimens have an uncoiled last whorl, with an obviously triangular outline (homeomorphic with *Saracenaria*). In thin section, the wall of the test and septa are compact, without any secondary structures, made of an aragonitic cement which is diagenetically altered.

Dimensions: Holotype length 0.67 mm, thickness 0.26 mm (uncoiled specimen), paratypes 0.36-0.82 mm, thickness 0.31-0.40 mm (figured specimens).

Remarks: Differs from *C. cylindrica* Neagu n. sp. in the triangular shape of the apertural face.

Occurrence: Cernavodă Pod, right bank of the Danube River: Ilie Barza's quarry, ISPH Drillings C. 4.Hinog -92. 20 -93 m.

Stratigraphical distribution: Lower Valanginian.

Genus *Nonionammina* Neagu n. gen.

Type species: *Nonionammina elegans* Neagu n. sp.

Derivation of Name: from the homeomorphic aspect of the test with the genus *Nonion*.

Description: Test free, small sized, finely agglutinated, globular, coiled slightly asymetrically, involute; with 8 -9 chambers in the last whorl. Sutures crescentric in outline and slightly depressed. Chambers are more wide than high. The crescentic apertural face of the last chambers has the aperture at the base, as a low slit, extending between the two umbilici. In thin section the wall of the test and septa are thin, compact without any visible secondary micro-structures. The initial aragonitic cement is diagenetically altered into calcite.

Remarks: The external morphology of the test is similar to that of *Barkerina dobrogiaca* Neagu n. sp. The difference lies in the absence of any internal secondary septula. The wall structure of the test suggests this genus belong to the family Mayncidae, and not to Haplophragmoididae, to which it resembles by its basal aperture.

Stratigraphical distribution: Uppermost Berriasian - Lower Valanginian.

Nonionammina elegans Neagu n. g., n. sp.
Plate 6, figs. 1-16; pl. 9, figs. 1-3; text-fig. 3a

Derivation of Name: Latin elegans - tis = elegant, from the elegant aspect of the test.

Type Level: Uppermost Berriasian - Lower Valanginian

Type Locality: Cernavodă Ilie Barza's quarry

Type specimens: L. P. B. IV. Holotype 11299 (pl. 6, figs. 7-8), paratypes 11300-11301.

Description: Test globular, smooth and finely agglutinated, involute, coiled slightly asymetrically with 8-9 crescentic chambers in the last whorl. Sutures arcuate and depressed. The crescentic apertural face, frequently with a median depression, has the aperture in the basal position as a slit between the two umbilici. In thin section, the wall of the test and septa are fine agglutinated, with diagenetically altered aragonitic initial cement and without any secondary structures or septula.

Dimensions: Holotype: largest diameter 0.34 mm, small diameter 0.31 mm, thickness 0.26 mm; paratypes large diameter 0.24-0.31 mm, small 0.21-0.26 mm, thickness 0.21-0.24 mm (figured specimens).

Remarks: In terms of its external morphology, this species is homeomorphic with *Barkerina dobrogiaca* Neagu n. sp. However, it differs in the absence of secondary septula.

Occurrence: Cernavodă, Ilie Barza' s quarry

Stratigraphical distribution: Uppermost Berriasian - Lower Valanginian.

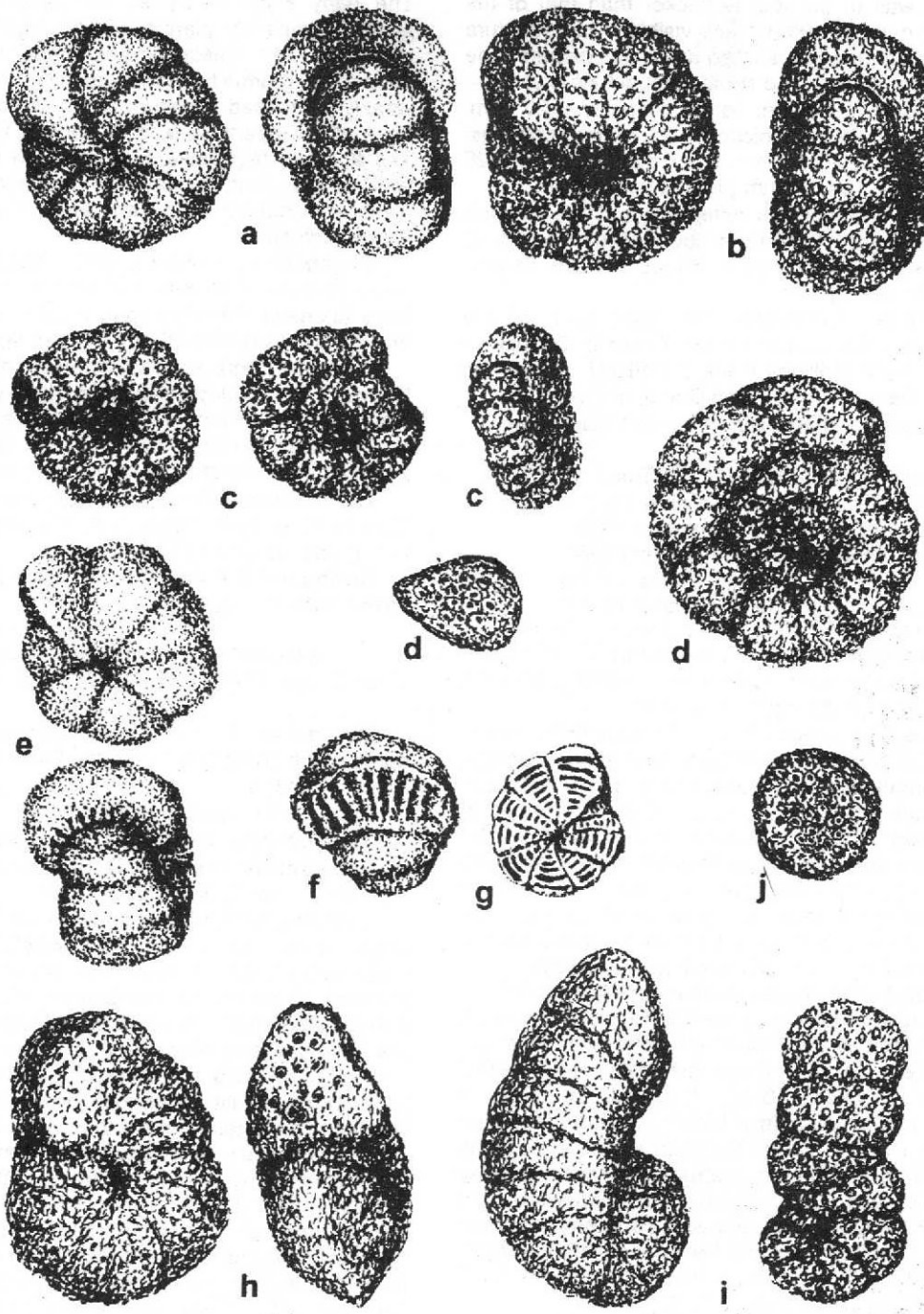

Figure 3 - a = *Nonionammina elegans* Neagu n. gen., n. sp.; b = *Mesoendothyra involuta* Neagu n. sp.; c-d = *Mesoendothyra dobrogiaca* Neagu n. sp., e-g = *Barkerina dobrogiaca* Neagu n.sp. (f = last chamber broken to show the secondary septula; g = corroded specimen to show the secondary septula); h = *Carasuella lenticulinae* Neagu n. gen., n. sp.; j = *Carasuella cylindrica* Neagu n. gen., n. sp.

Family BARKERINIDAE Smouth 1956
Genus *Barkerina* Frizzel & Schwartz 1950
Barkerina dobrogiaca Neagu n. sp.
Plate 7, figs. 1-33; pl. 9, fig. 4; text-fig. 3 e,f,g

Derivation of Name: from Dobrogea, the historical name of the territory between the Black Sea and Danube River, Romania.

Type Level: Lower Valanginian.

Type Locality: Ovidiu, the border of the Canal Danube / Black Sea

Type specimens: L. P. B. IV. Holotype 11336 (pl. 7, figs. 22-28), paratypes 11337-11350

Description: Test small, globular nearly spherical, finely agglutinated and biumbilicated with 7-8 chambers in the last whorl. Sutures weakly depressed arcuate. The aperture is present as a row of small pores at the base of the apertural face. The interior of the chambers is subdivided into secondary chamberlets by secondary

septula, that are parallel to the coiling plane. In thin section the wall of the test is thicker than that of the septula, is compact, without any visible micro-structure and with a diagenetically altered aragonitic cement. The septa and septula have the same compact structure.

Dimensions: Holotype: large diameter 0.26 mm, small diameter 0.21 mm, thickness 0.21 mm; paratypes: large diameter 0.19-0.31 mm; small diameter 0.17-0.26 mm; thickness 0.19-0.21 mm (figured specimens).

Remarks: This species differs from *B. barkerensis* Frizzell & Schwartz 1950 from Lower Barremian by its small size and the presence of simple and thin septula parallel to the coiling axis.

Occurrence: Cernavodă Pod, right bank of the Danube River; the quarry of the Cement Factory - Cernavodă: ISPH Drillings F.VIII B OVIDIU -48 m; left Bank of the Danube - Black Sea Canal, at Ovidiu.

Stratigraphical distribution: Lower Valanginian

Superfamily BIOKOVINACEA Gusic 1977
Family CHARENTIIDAE Loeblich & Tappan 1985
Genus *Charentia* Neumann 1965
Charentia evoluta (Gorbatchik) 1968
Plate 3, figs. 24-29; pl. 9, figs. 25, 26

Tonasia evoluta Gorbatchik 1968, p. 8, pl. 2, fig. 1-5
Melatrokerion spirialis Gorbatchik 1968, p. 6, pl. 1, fig. 1-6

Type specimens: L.P.B.IV. hypotypes 11344-11347

Dimensions: length 1.08 mm; breadth 0.55 mm; thickness 0.21 mm (figured specimens)

Remarks: This species is very frequent in the Lower Cretaceous of Southern Dobrogea (Cernavodă - Carasu Valley - Alimanu area). In these very rich populations from different stratigraphic levels it was possible to follow the morphologic evolution of the test from the early involute stage to the specimens with a very well developed uncoiled one. The early stage presents a triangular apertural face and a large triangular areal aperture. This stage corresponds to what Gorbatchik (1968) described as *Melatrokerion spirialis*. The uncoiled stage with lateral flattened chambers and a large eliptical aperture corresponds to what the same author described as *Tonasia evoluta*. Because of its wall structure, *Tonasia* is a junior synonym of *Charentia* (Tappan & Loeblich, 1988). The wall structure of *Melatrokerion spirialis* is also identical to that described for *Tonasia evoluta*. In the uncoiled stage, specimens present a large and robust aperture, almost as wide as the apertural face. Occurrence: Cernavodă Pod, right bank of the Danube River, Ilie Barza's quarry, Alimanu quarry, right bank of the Lake Vedeoasa: ISPH Drillings F.VIII -68.50 m, F. IV. Poarta Albă - 61 -64 m, C. 2 Hinog -42-43 m, C. 4 Hinog - 42. 20-45 m.

Stratigraphical distribution: Uppermost Berriasian - Lower Hauterivian

Superfamily LOFTUSIACEA Brady 1884
Family MESOENDOTHYRIDAE Voloshinova 1958
Genus *Mesoendothyra* Dain 1958
Mesoendothyra involuta Neagu n. sp.
Plate 6, figs. 12-23; pl. 9, figs. 8, 9; text-fig. 3b

Derivation of Name: Latin involut - are = to cover, to warp up, from the general shape of the last whorls.

Type Level: Uppermost Berriasian

Type Locality: ISPH Drillings, F.VIII Nazarcea - 68.50 m

Type specimens: L. P. B. IV. holotype 11294 (pl. 6, figs. 26, 27), paratypes 11295-11298.

Description: Test small, globular, finely agglutinated. The early stage is closely streptospiral, changing to almost completely planispiral and involute in the latter part, with 9-11 crescentic chambers in the last whorl, increasing gradually in dimensions. Sutures arcuated weakly depressed. Aperture as an arcuate low slit at the base of the apertural face of the last formed chamber. The aperture may have a slight lip. In thin section the wall of the test displays, a microgranular primitive alveolar structure with an aragonitic diagenetically altered cement.

Dimensions: Holotype large diameter 0.39 mm, small diameter 0.34 mm, thickness 0.26 mm; paratytpes large diameter 0.29-0.40 mm, small diameter 0.26-0.36 mm, thickness 0.19-0.26 mm (figured specimens).

Remarks: This species differs from *M. dobrogiaca* Neagu n. sp. by its planispiral involute aspect of the last whorls. It differs from *Nonionammina elegans* Neagu n. sp. (to which is rather similar by the involute aspect of the last part of the test) by its alveolar wall structure.

Occurrence: Cernavodă Pod, right bank of the Danube River; ISPH Drillings, F, VIII Nazarcea -68.50 m, C. 2 Hinog -42 –43 m.

Stratigraphical distribution: Uppermost Berriasian - Lower Valanginian

Mesoendothyra dobrogiaca Neagu n. sp.
Plate 7, figs. 48-56; pl. 8, figs. 1-54; pl. 9, figs. 5-7; text-fig. 3a

Derivation of name: from Dobrogea, the hstorical name of the territory between the Black Sea and Danube River - Romania.

Type Level: Uppermost Berriasian

Type Locality: Cernavodă, Ilie Barza's quarry

Type specimens: L. P. B. IV. Holotype 11284 (pl. 8, figs. 16-18), paratypes 11285-11293

Description: Test free small to medium sized, finely agglutinated, with a well developed streptospiral early stage and a largely evolute latter stage, with 8 -14 small globular chambers in the last whorl. Sutures weakly depressed arcuate. Aperture a low interio-marginal slit at the base of the apertural face. In thin section the wall of the test and septa are rather thick, finely agglutinated, with microgranular and primitive alveolar structure. Initially with aragonitic cement.

Dimensions: Holotype large diameter 0.40 mm, small diameter 0.39 mm, thickness 0.19 mm; paratypes large diameter 0.31-0.53 mm; small diameter 0.29-0.48 mm; thickness 0.12-0.24 mm (figured specimens)

Remarks: This species is very well delimited from *M. involuta* Neagu n. sp. by the strongly evolute aspect of the last part of the test which makes the interior streptospiral visible whorls. Our specimens differ both in wall structure and external morphology from the type species *M. izjumiana* Dain, 1958. In our material the wall structure of the test presents a weakly alveolar microgranular aspect but the external thin imperforate layer is missing. The external morphology is also strikingly different. Only a revision of the original material could clear up the problem.

Occurrence: Cernavodă Pod, right bank of the Danube River, Ilie Barza's quarry, Alimanu quarry, ISPH Drillings F. IV Poarta Albă - 92, -92.50-94.50 m, F. VIII Nazarcea - 68.50 m, C. 2 Hinog - 42–43 m, C. 4 Hinog - 47.20 m, C. 12 Hinog -92.20-93 m.

Stratigraphical distribution: Uppermost Berriasian - Lower Hauterivian.

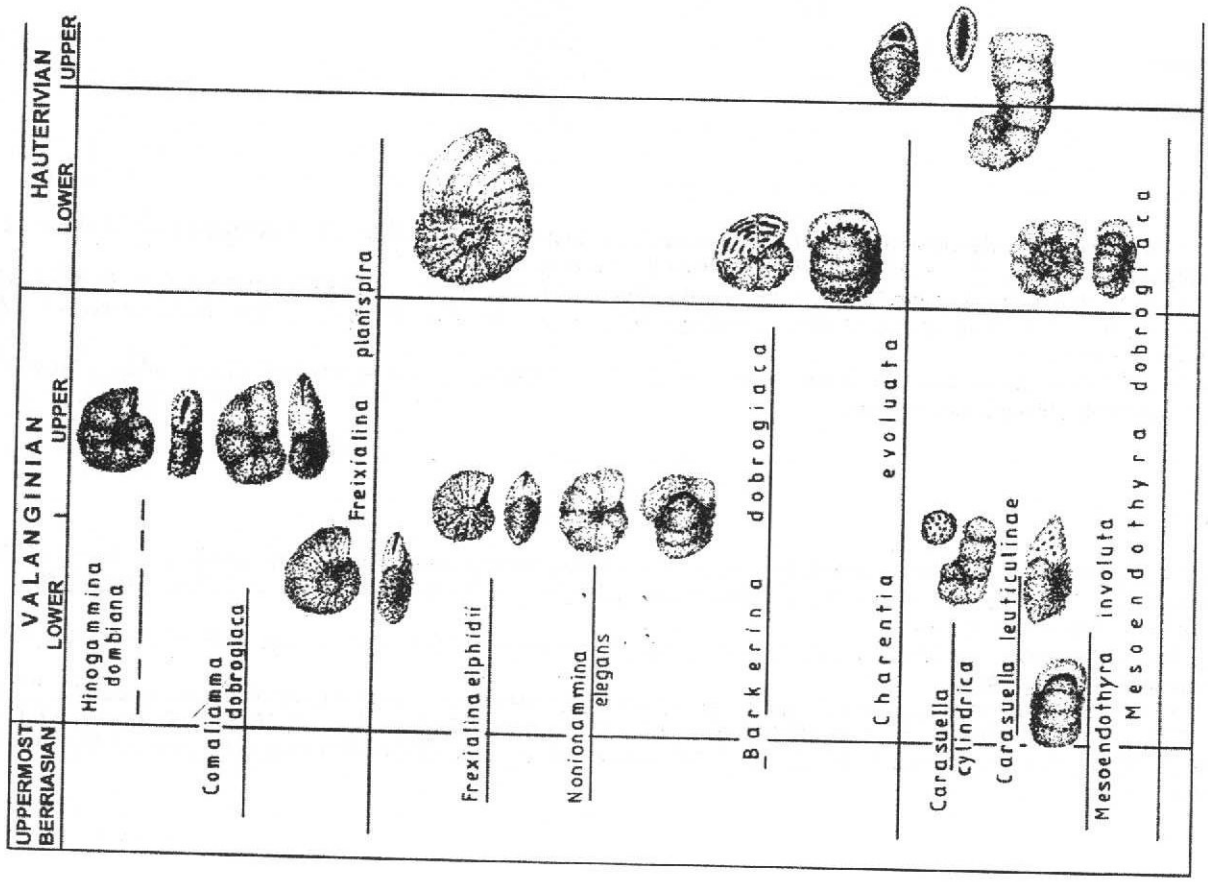

Figure 4 - The stratigraphical distribution of the studied taxa.

Acknowledgements

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PLATES

Plate I

Figs. 1-13 *Hinogamina danubiana* Neagu n. gen., n. sp. Uppermost Berriasian, figs. 12-13 holotype L. P. B. IV. 11327; paratypes figs. 1-11 L. P. B. IV 11326. ISPH Drillings C.11 Hinog -82-83m.
Figs. 14-25 *Carasuella cylindrica* Neagu n. gen., n. sp. Uppermost Berriasian, figs. 22-23 holotype, L. P. B. IV. 11317 ISPH Drillings F. VIII Nazarcea -68.50m; paratypes figs. 14, 21, 24-25 L. P. B. IV. 11318. ISPH Drillings F. VIII Nazarcea -68.50m.
Figs. 26-32 *Carasuella lenticulinae* Neagu n. gen., n. sp. Lower Valanginian, paratypes L. P. B. IV. 11325, Cernavodă Pod, right bank of the Danube River.

Plate II

Figs. 1-23 *Carasuella lenticulinae* Neagu N. gen., n. sp., Lower Valanginian, holotype figs. 14-15, L. P. B. IV. 11323, Cernavodă Pod, right bank of the Danube River; paratypes figs. 1-13, 16-23, L. P. B. IV. 11324, Cernavodă Pod, right bank of the Danube River.
Figs. 24-28 *Carasuella cylindrica* Neagu n. gen., n. sp., Uppermost Berriasian, paratypes L. P. B. IV. 11320, ISPH Drillings C.4 Hinog, -47m-.
Figs. 29-43 *Comaliamma dobrogiaca* Neagu n. sp., Uppermost Berriasian - Lower Valanginian, paratypes figs. 29-33, L. P. B. IV. 11333, Upper Berriasian, ISPH Drillings F. VIII Nazarcea -68.50m; figs. 34-39, L. P. B. IV. 11332, C.11 Hinog -92.20-93m; figs. 40-42, L. P. B. IV. 11334, Lower Valanginian, Cernavodă Pod, right bank of the Danube River.

Plate III

Figs. 1-10 *Carasuella lenticulinae* Neagu n. ge., n. sp., Lower Valanginian, paratypes L. P. B. IV. 11324, Cernavodă Pod, right bank of the Danube River.
Figs. 11-23 *Carasuella cylindrica* Neagu n. gen., n. sp., Lower Valanginian, paratypes L. P. B. IV. 11318, Cernavodă Pod, right bank if the Danube River.
Figs. 24-29 *Charentia evoluta* (Gorbatchik), 1968. Uppermost Berriasian, hipotypes L. P. B. IV. 11341, ISPH Drillings F.VIII Nazarcea -68.50m.

Plate IV

Figs. 1-15, 39-44 *Freixialina planispira* Ramalho, 1969. Uppermost Berriasian - Lower Hauterivian, hipotypes figs. 1-15, L. P. B. IV. 11302, Uppermost Berriasian, ISPH Drillings F.VII Nazarcea -68.50m; figs. 39-44, L. P. B. 11305, Lower Hauterivian, Alimanu quarry.
Figs. 25-38 *Comaliama dobrogiaca* Neagu n. sp., Uppermost Berriasian, paratypes L. P. B. IV. 11333, ISPH Drillings F.VIII Nazarcea -69.50m.

Plate V

Figs. 1-54 *Freixialina elphidii* Neagu n. sp., Uppermost Berriasian - Lower Valanginian, holotype figs. 1-2, L. P. B. IV. 11310, Uppermost Berriasian, ISPH Drillings F.IV Poarta Albă -61 -64m; paratypes figs. 3-11, L. P. B. IV. 11311, ISPH Drillings F.IV Poarta Albă -61 -64m; figs. 12-24, L. P. B. IV. 11312, Uppermost Berriasian, ISPH Drillings F.VIII Nazarcea -68.50m; figs. 25-35, L. P. B. IV. 11313, Uppermost Berriasian ISPH Drillings C.11 Hinog -92-93m; figs. 36-48, L. P. B. IV. 11314, Lower Valanginian, Cernavodă, Ilie Barza's quarry; figs. 49-54, L. P. B. IV. 11314, Lower Valanginian, Cernavodă Pod, right bank of the Danube River.
Figs. 55-64 *Freixialina planispira* Ramalho, 1969; hypotype L. P. B. IV. 11302, Uppermost Berriasian, ISPH Drillings F.VIII Nazarcea -68.50m.

Plate VI

Figs. 1-16 *Nonionammina elegans* Neagu n. gen., n. sp., Lower Valanginian, holotype figs. 7-8, L. P. B. IV. 11299, Cernavodă Ilie Barza's quarry; paratypes figs. 1- 6, 9-16, L. P. B. IV. 11300, Cernavodă Ilie Barza's quarry.
Figs. 17-33 *Mesoendothyra involuta* Neagu n. sp., Uppermost Berriasian, holotype figs. 26-27, L. P. B. IV. 11294, ISPH Drillings F.VIII Nazarcea -68.50m (fig. 17 a corroded specimen showing the absence of the septula).

Plate VII

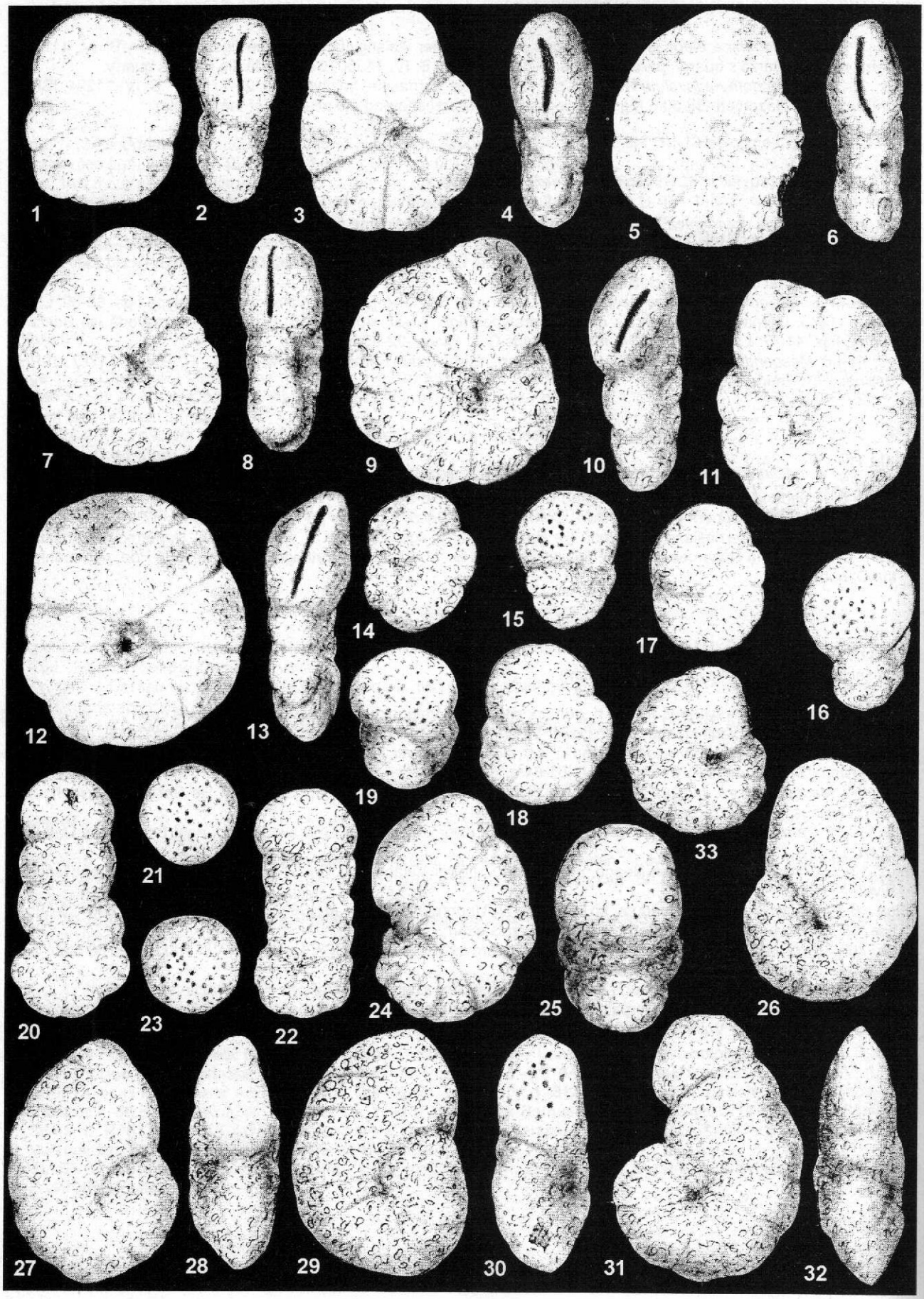
Figs. 1-33 *Barkerina dobrogiaca* Neagu n. sp., Lower Valnginian; holotype figs. 27-28, L. P. B. IV. 11336, Ovidiu bank of the Canal Danube - Black Sea; paratypes figs. 1-8, L. P. B. IV. 11337, ISPH Drillings F.B.Viii Ovidiu -48m; figs. 9-22, L. P. B. IV. 11338, Cernavodă Pod, right bank of the Danube River; figs. 23-26, 29-33, L. P. B. IV. 11337, Ovidiu bank of the Canal Danube - Black Sea.
Figs. 34-47 *Comaliama dobrogiaca* Neagu n. sp., Uppermost Berriasian - Lower Valanginianl holotype figs. 38-39, L. P. B. IV. 11330, Cernavodă Ilie Barza's quarry; paratypes figs. 34-37, 40, L. P. B. IV. 11331, Cernavodă Ilie Barza's quarry; figs. 41-47, L. P. B. IV. 11334, ISPH Drillings C.11 Hinog -92-95m.
Figs. 48-56 *Mesoendothyra dobrogiaca* Neagu n. sp., Uppermost Berriasian, paratypes L. P. B. IV. 11287, ISPH Drillings F.IV Poarta Albă -61-64m.

Plate VIII

Figs. 1- 54 *Mesoendothyra dobrogiaca* Neagu n. sp., Uppermost Berriasian - Lower Valanginian; holotype figs. 16-18, L. P. B. IV. 11284, Uppermost Berriasian, Cernavodă Ilie Barza's quarry; paratypes figs. 1-15, 17-24, L. P. B. IV. 11286, Uppermost Berriasian, Cernavodă Ilie Barza's quarry; figs. 25-28, L. P. B. IV. 11286, Uppermost Berriasian, ISPH Drillings F.VIII Nazarcea -68.50m; figs. 29-54, L. P. B. 11287, Lower Valanginian, Cernavodă Pod, right bank of the Danube River.

Plate IX
(thin sections, photographs in transmitted light)

Figs. 1-3 *Nonionammina elegans* Neagu n. gen., n. sp., Lower Valanginian, Cernavodă Ilie Barza's quarry.
Fig. 4 *Barkerina dobrogiaca* Neagu n. sp., Lower Valanginian, Ovidiu bank of the Danube - Black Sea Canal.
Figs. 5-7 *Mesoendothyra dobrogiaca* Neagu n. sp., figs. 5-6, Lower Hauterivian, Alimanu's quarry; fig. 7, Uppermost Berriasian, ISPH Drillings F.IV Poarta Albă -61-64m.
Figs. 8-9 *Mesoendothyra involuta* Neagu n. sp., Uppermost Berriasian, fig. 8, Cernavodă Ilie Barza's quarry; fig. 9, ISPH Drillings F.VIII Nazarcea -60.50m.
Figs. 10-12 *Carasuella cylindrica* Neagu n. gen., n. sp., Lower Valanginian, Cernavodă Pod, right bank of the Danube River.
Figs. 13-15 *Carasuella lenticulinae* Neagu n. gen., n. sp., Lower Valanginian, Cernavodă Pod, right bank of the Danube River.
Figs. 16-19 *Freixialina elphidii* Neagu n. sp., figs. 16-17, Uppermost Berriasian, ISPH Drillings F.VIII Nazarcea -68.50m; figs. 18-19, Lower Valanginian, Cernavodă Ilie Barza's quarry.
Figs. 20-23 *Freixialina planispira* Ramalho, 1969, Uppermost Berriasian, ISPH Drillings F.VIII Nazarcea -68.50m; fig. 23, Lower Hauterivian, Alimanu's quarry.
Fig. 24 *Comaliamma dobrogiaca* Neagu n. sp., Uppermost Berriasian, ISPH Drillings F.VIII Nazarcea -68.50m
Figs. 25-26 *Charentia evoluta* (Grorbatchik), 1968, fig. 25, Uppermost Berriasian, ISPH Drillings F.VIII Nazarcea - 68.50m; fig. 26, Lower Valanginian, Cernavodă Pod, right bank of the Danube River.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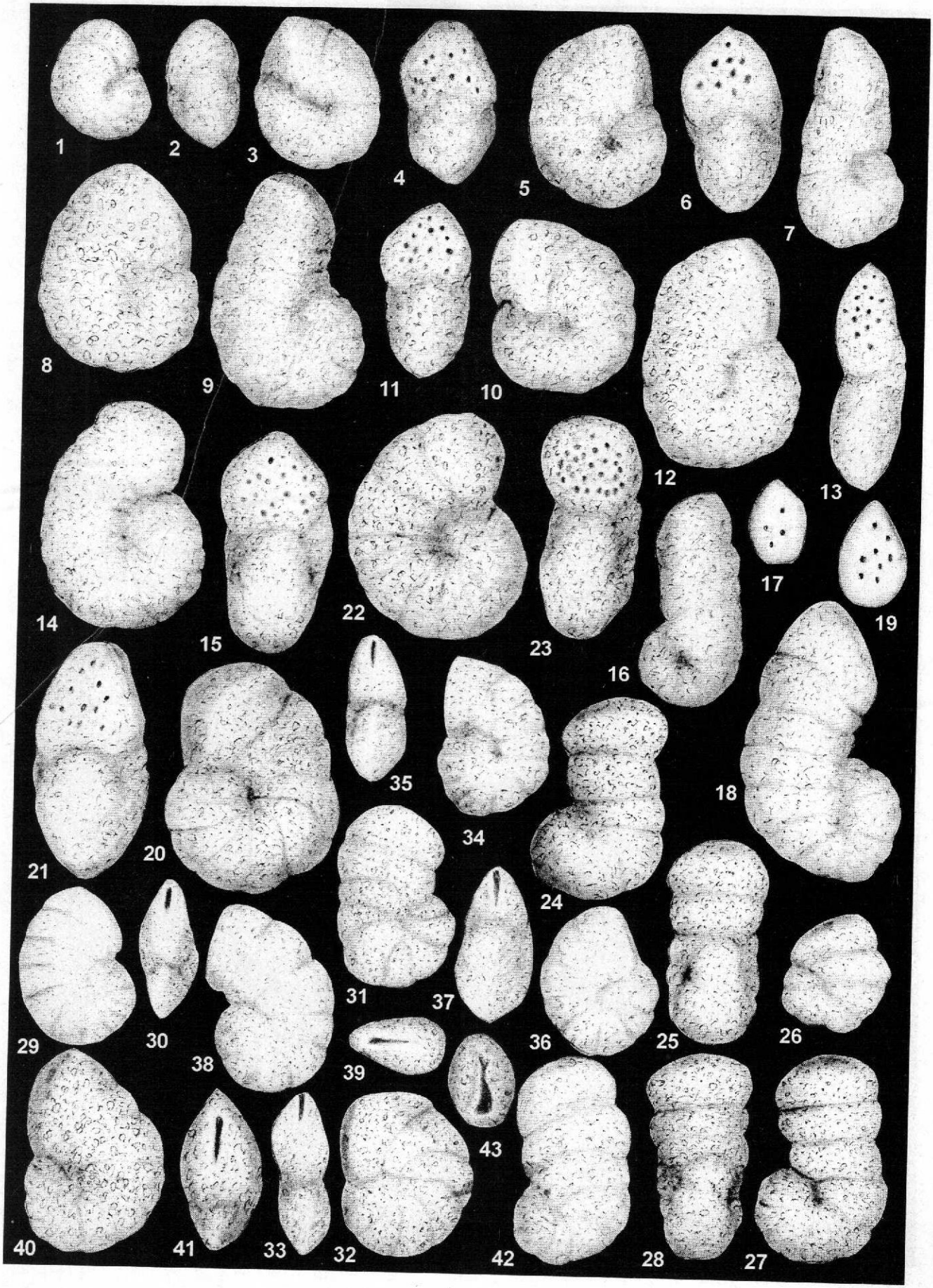
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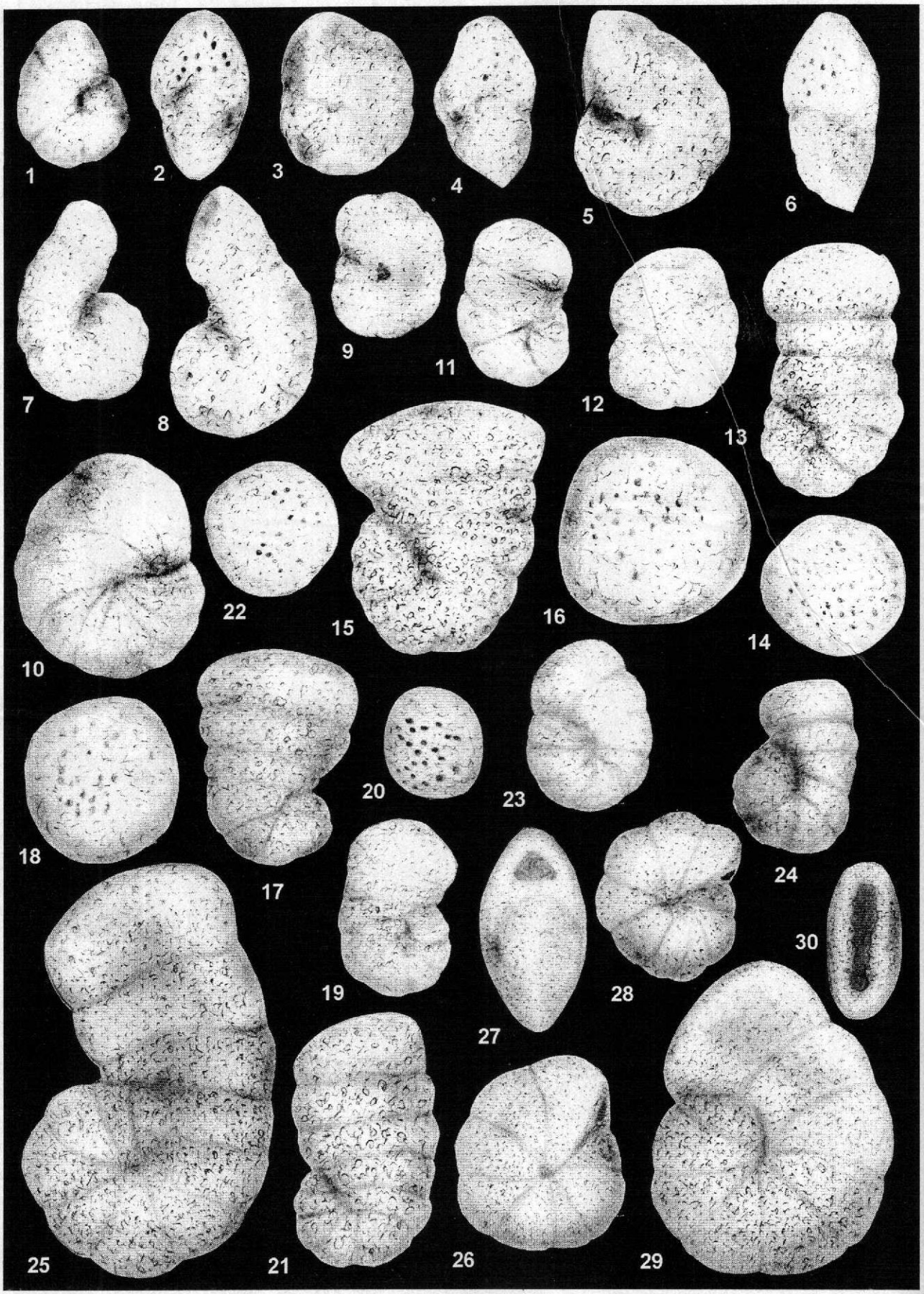
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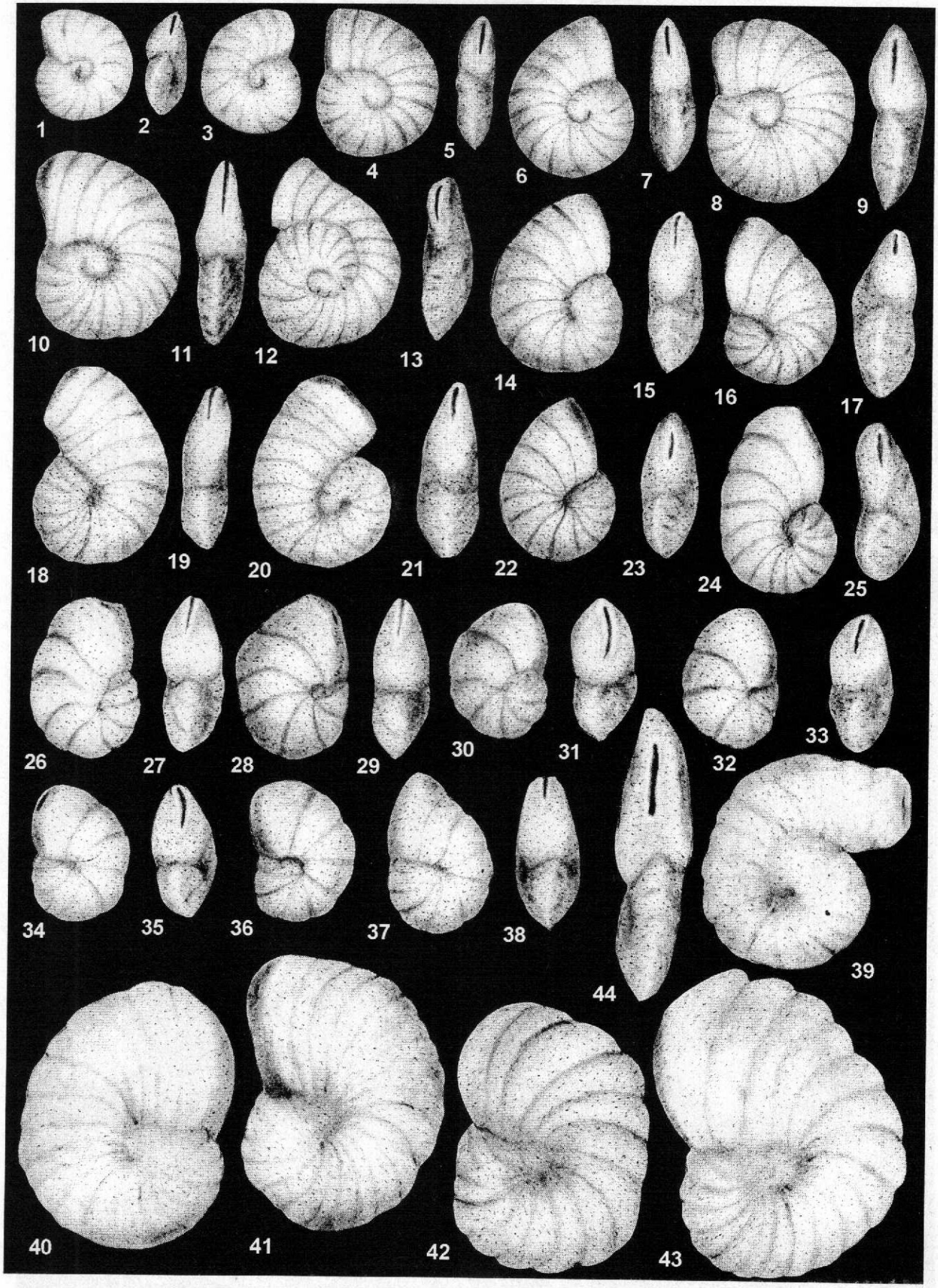
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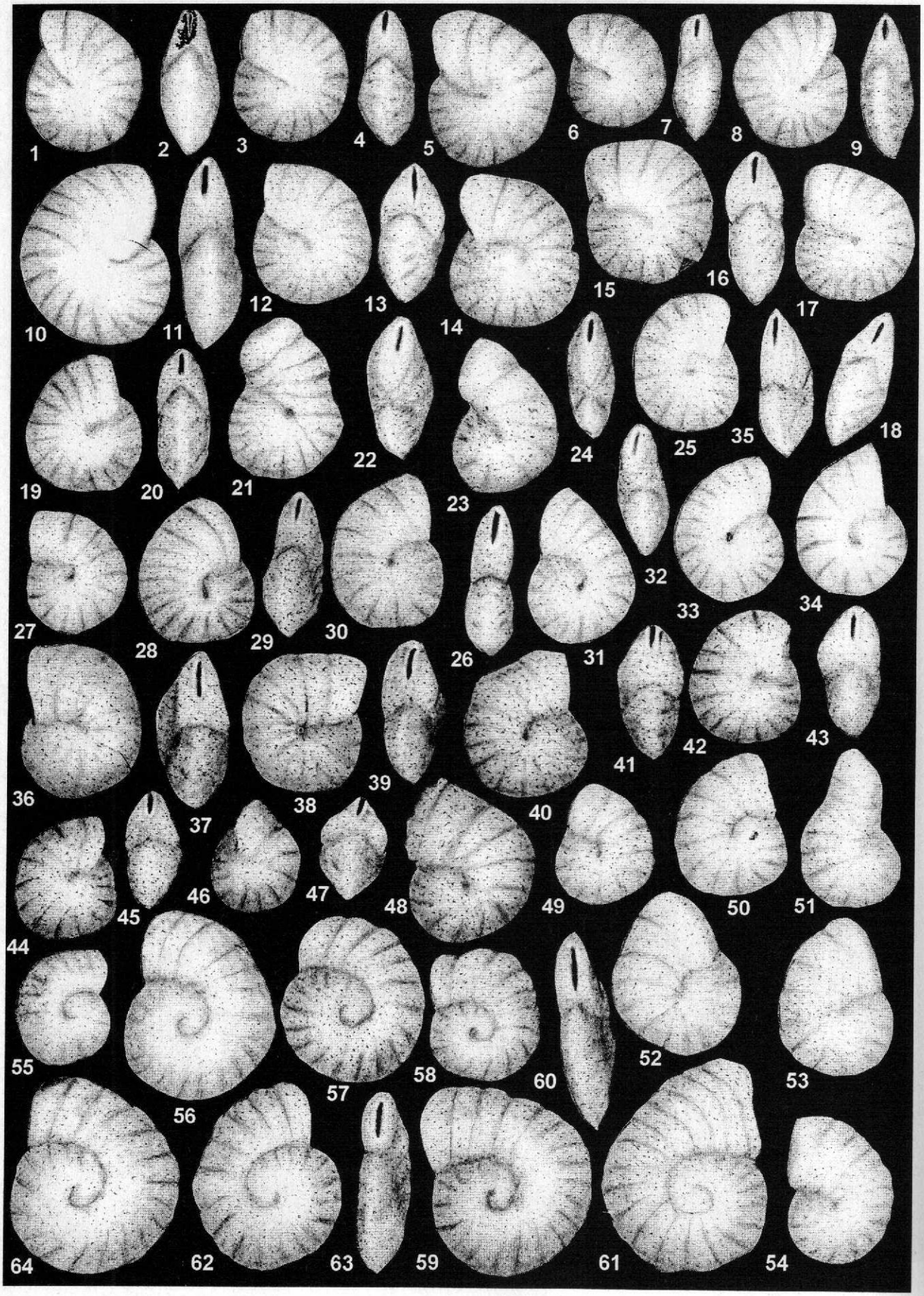
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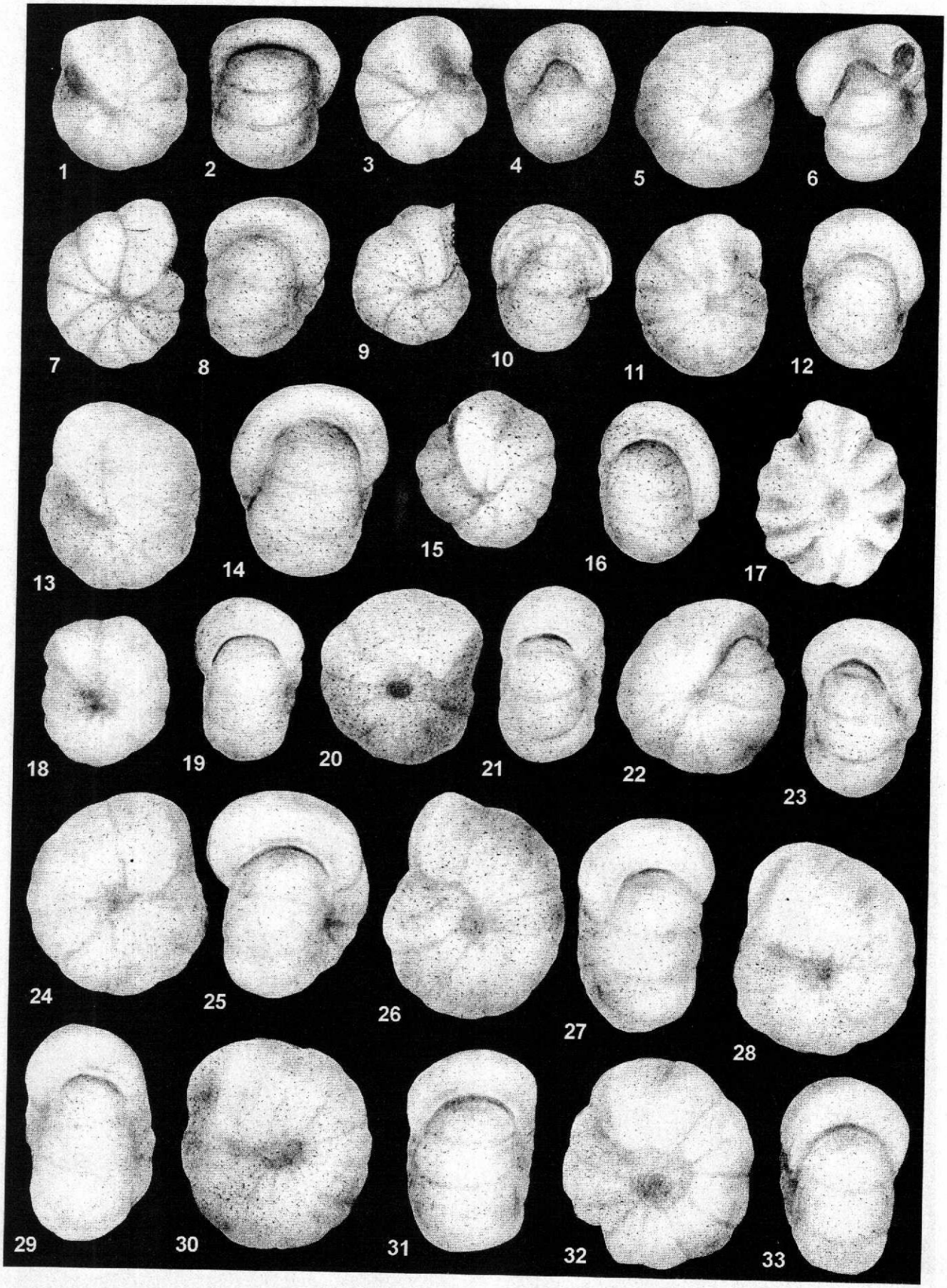
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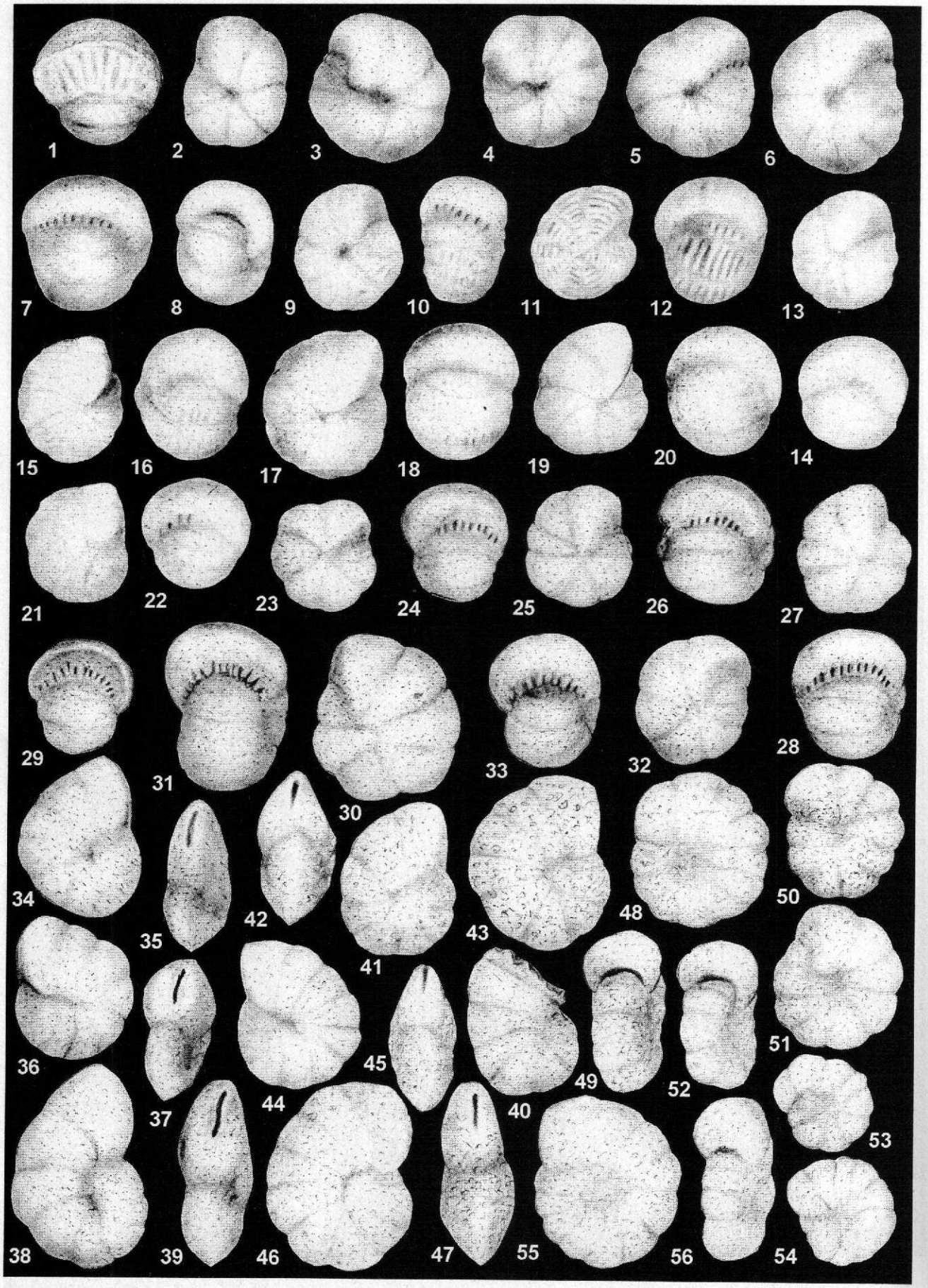
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