

# PLANKTONIC FORAMINIFERA FROM THE PIETROȘIȚA AREA (Ialomița Valley – Țâța Valley)

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**Abstract.** The biostratigraphical study of the “Lower Turonian red and green marls” Formation from beneath the “Gura Beliei” Formation (Campanian-Maastrichtian) from the Țâța, Voievozii and Siliștea Valleys (Pietroșița – Ialomița Valley area) has established the presence of a remarkably rich planktonic foraminifera faunas. To them can be added, but in a much reduced percentage, benthic agglutinated and calcareous foraminifera. The careful study of the planktonic foraminifera associations has allowed the identification of the classical Turonian biozones (*H. helvetica*, *S. sigali*, *S. schneegansi*, *D. primitiva*, *D. concavata*) which also confirm the presence of the Coniacian. Also evident is the surprisingly biostratigraphically valuable biozones of *S. marianosi* and *S. kueperi*, which correspond to the uppermost part of the Lower Turonian and the lowermost part of the Middle Turonian. This paper also describes 32 species of foraminifera among which there are two new species: *Whiteinella napolisensis* and *Sigalitruccana mihailescui*.

**Key words:** Turonian, planktonic foraminifera, Romania.

**Résumé.** Les foraminifères planctoniques du Turonien de la région Pietroșița–Vallée Ialomița (à l’est) et Vallée Țâța (à l’ouest). Etude micropaléontologique. Le Cretacé supérieur dans le périmètre Pietroșița (entre les Vallées Ialomița et Țâța) est représenté dans la partie inférieure, par un complexe lithologique prédominant marneux, polychrome (rouge, verdâtre, gris-cendré) stratifié, avec de minces intercalations sableuses et faiblement cimenté. Du point de vue biostratigraphique, ce complexe appartient au Turonien et Coniacien. La partie supérieure du complexe lithologique polychrome aussi est dominée par des dépôts marneux compacts ayant 3–4 m épaisseur només “Formation de Gura Beliei”. Dans ce complexe la macrofaune est représentée par *Belemnitella carpathica* Neagu. Le complexe inférieur polychrome bien stratifié appartient par sa microfaune aux foraminifères planctoniques du Turonien et du Coniacien. L’âge est confirmé par la présence de biozones à *Dicarinella algeriana* – *Helvetoglobotruncana helvetica* dans la partie inférieure et par les biozones à *Sigalitruccana sigali* – *S. schneegansi* pour le Turonien moyen et supérieur et par les biozones à *Dicarinella primitiva* et *Dicarinella concavata* pour le Turonien supérieur terminal et le Coniacien. La biozone à *Dicarinella assymetrica* n’a pas été trouvée. Taxonomique sont présentés 32 espèces appartenant au genre *Hedbergella*, *Whiteinella*, *Dicarinella*, *Praeglobotruncana*, *Marginotruncana* et *Sigalitruccana*. Sont décrites aussi deux espèces nouvelles: *Whiteinella napolisensis* et *Sigalitruccana mihailescui*.

**Mots-clés:** Turonien, foraminifère planktonique, Roumanie.

## INTRODUCTION

In the southern part of the Eastern Carpathians between the Ialomița Valley (west) and Prahova Valley (east), the Upper Cretaceous deposits lie above the uppermost Lower Cretaceous deposits. It is important to note that unlike the sequence encountered in the Western and Eastern European Carpathians, the Upper Cretaceous deposits in the studied area start with the Dumbrăvioara Formation (Vraconian-Upper Cenomanian), followed by a massive complex of red-greenish marls which thin out to greenish bluish-grey marls belonging to the Turonian-Coniacian interval. The succession ends with the marls of the Gura Beliei Formation consisting of 2–3 meter thick banks of brick red or whitish

green marls with *Belemnitella carpathica* NEAGU. Biostratigraphically this formation starts in the Lower Campanian with the *Globotruncanita elevata*, *Globotruncana ventricosa*, *Globotruncanita calcarata* biozones and ends in the Upper Maastrichtian with the *Abathomphalus mayaroensis* biozone. The formation continues with Lower Paleocene deposits with *Eoglobigerina eoglobina* and continues to the Upper Eocene.

## GENERAL BIOSTRATIGRAPHICAL CONSIDERATIONS

### THE DUMBRĂVIOARA FORMATION

It is very rich in macrofauna and foraminifera. In its lower part (Vraconian), *Parahibolites tourtiaie* (WIENIG) appears in association with *Aucellina gryphaenoides* (SOWERBY). The planktonic foraminifera are represented by *Planomalina buxtorfi* (GANDOLFI), *Rotalipora apenninica* (GANDOLFI). This association of macrofauna and foraminifera is characteristic and proves the presence of the Vraconian stage (terminal part of the Upper Albian up to the *Stoliczkaia dispar* biozone). The Cenomanian in the Dumbrăvioara Formation is represented by a rich macrofauna consisting of *Neohibolites ultimus* (d' ORBIGNY), *Mantelliceras mantelli* (SOWERBY), *Acanthoceras rothomagense* (DEFRANCE), *Puzosia planulata* (SOWERBY), *Turillites cf. costatus* (LAMARCK), *Inoceramus crippsi* MANTELL. The planktonic marker foraminifera are represented by *Rotalipora brotzeni* (SIGAL), *Rotalipora reicheli* MORNOD, *Rotalipora cushmani* (MORROW). These foraminifera along with the macrofaunal elements further prove the existence of the Cenomanian. In the studied area, the uppermost portion of the Dumbrăvioara Formation and the basal part of the Lower Turonian frequently preserve a thick sedimentary breccia. Micropaleontological samples from this breccia revealed the presence of Turonian marker foraminifera, *Dicarinella algeriana*, *Rotalipora cushmani* and *Helvetoglobotruncana helvetica*.

### THE LOWER GREENISH AND REDDISH MARLS FORMATION (TURONIAN – CONIACIAN)

Biostratigraphically, the Turonian deposits contain all the planktonic marker biozones. Despite this, from the Lower Turonian (*Helvetoglobotruncana helvetica* biozone), the planktonic foraminifera begin to display the effects of an accelerated evolutionary radiation. Gradually, the test grows in size attaining gigantic proportions (for planktonic foraminifera) which will not be seen again until the Cretaceous (nearly 1 mm in diameter). This phenomenon is most clearly seen in the *Helvetoglobotruncana helvetica* biozone by the growth in size and height of the trochospire whorl of *Praeglobotruncana barbui*, *Praeglobotruncana prahovae*, *Whiteinella paradubia*, *Whiteinella brittonensis*. A remarkably accelerated pace of evolution become visible in the genus *Dicarinella* from the uppermost Cenomanian–Lowermost Turonian. The increase in size of the test until the Coniacian–Santonian generated a lot of new taxa which have become excellent markers such as *Dicarinella primitiva*, *Dicarinella concavata*, *Dicarinella assymetrica*. At the Lower–Middle Turonian boundary, an accelerated evolutionary process can be seen in the genera *Sigalitruncana* and *Marginotruncana* manifesting itself as a growth in size of the specimens but more importantly in the various incipient radiations occurring within these genera. The peak of evolution for this group will not be reached until the Lower Senonian (Coniacian–Santonian), after which it becomes extinct. This is the group to which J. Sigal referred to as “grandes Rosalines plates”. Using this rapid evolutionary radiation it was possible to select from these groups some genera to serve as “markers” for the Turonian–Lower Senonian biozones such as: *Sigalitruncana sigali* – *S. schneegansi* for the Middle Turonian – Coniacian; *Sigalitruncana marianosi* Lower Turonian – Middle Turonian boundary; *Dicarinella primitiva* – *Dicarinella concavata* for the Upper Turonian – Coniacian. Besides these “markers”, the stratigraphical interval from the Middle Turonian to the

Coniacian/Santonian is characterized by a lot of species with a long stratigraphical range such as: *Marginotruncana renzi*, *Marginotruncana pseudolinneiana*, *Marginotruncana tarfyensis*, *Marginotruncana pseudomarginata*, *Sigalitroncana undulata*, *Sigalitroncana kuepperi*, *Dicarinella concavata*. *Dicarinella assymetrica* is considered by all authors as a good marker species for the Santonian. Beginning with the Campanian as pointed out by the widespread occurrence of *Globotruncanita elevata*, the presence of *Globotruncana ventricosa* signals the beginning of the third lithostratigraphic unit of the Upper Cretaceous, the Gura Beliei Marls Formation of Campanian/Maastrichtian age.

### SYSTEMATIC PALEONTOLOGY

Class FORAMINIFERA Lee 1990

Order GLOBIGERINIDA Carpenter, Parker & Jones 1862

Superfamily ROTALIPORACEA Sigal 1952

Family HEDBEREGELLIDAE Loeblich & Tappan 1961

Subfamily HEDBEREGELLINAE Loeblich & Tappan 1961

Genus **HEDBERGELLA** BRONIMANN & BROWN 1958

*Hedbergella simplex* (MORROW) 1934

Plate 3, figs. 1–7

*Hastigerinella simplex* 1934, p. 198, pl. 30, fig. 6

*Hedbergella simplex* (MORROW), 1934; ROBASYNSKI-CARON M. 1979, vol. 1, p. 145, pl. 29–30; CARON M. 1985, p. 59, pl. 25, fig. 15

**Dimensions:** large diameter 0.36 mm – 0.43 mm; small diameter 0.28 mm – 0.36 mm

**Remarks:** This species has a good frequency in the samples from the Turonian deposits of the Pietroșița area and presents a large degree of morphological variability; chambers from the last whorl change from a globulous shape to an elongated outline but the spiral side is never flattened. Spiral side more or less planispiral.

**Occurrence:** Turonian Pietroșița area (Țâța Valley, Voivozii Valley)

**Stratigraphical distribution:** Turonian

**Specimens:** L.P.B. IV. 12185

Genus **WHITEINELLA** Pessagno 1967

*Whiteinella flandrini* (PORTHAULT) 1970

Plate 21, figs. 1–9

*Hedbergella flandrini* PORTHAULT 1970, p. 64, pl. 10, figs. 1–3; ROBASYNSKI-CARON 1979, vol. 1, p. 129, pl. 24, figs. 1–2, pl. 25, figs. 1–3.

**Dimensions:** large diameter 0.36 mm – 0.40 mm; small diameter 0.28 mm – 0.33 mm

**Remarks:** In the original description, Porthault 1970, p. 65, stated: “*Test faiblement biconvex nettement comprime lateralement*”. This morphological feature does not correspond with the feature of the genus *Hedbergella*: “*Test with globulous and gradually enlarging chambers*” (Loeblich & Tappan 1988, p. 462). These morphological characters correspond in fact to the genus *Whiteinella*. Specimens figured by Robaszynski & Caron 1979 show clearly a test which is a little flattened on spiral side, a feature which is completely missing in the genus *Hedbergella*. Our specimens closely resemble the genus *Whiteinella*.

**Occurrence:** Pietroșița area (Voivozii Valley)  
**Stratigraphic distribution:** Upper Turonian – Coniacian  
**Specimens:** L.P.B. IV. 12192

***Whiteinella paradubia brittonensis* (LOEBLICH & TAPPAN) 1961**

Plate 3, figs. 8–34

*Hedbergella brittonensis* LOEBLICH & TAPPAN, 1961, p. 274, pl. 4, figs. 1–8

*Whiteinella brittonensis* (LOEBLICH & TAPPAN); ROBASZYNSKI & CARON, 1979 vol. 1, p. 175, pl. 37, figs. 1–2, pl. 38, figs. 1–2

**Dimensions:** large diameter 0.40 mm – 0.45 mm; small diameter 0.33 mm – 0.36 mm height 0.15 mm – 0.19 mm

**Remarks:** The difference between the Sigal's species, "*paradubia*" and Loeblich & Tappan's "*brittonensis*", is only the presence of a high trochospiral whorl. Regarding this, Robaszynski & Caron, 1979 write the following: "*Le seul critere distinctif de cette espece (paradubia) par raport a W. brittonensis est la hauteur de la spire*". The height of the trochospire on the spiral side is not an essentially distinctive character. Loeblich & Tappan's species is synonymous with Sigal's 1952 species. In order to preserve this small but, in our view, important difference, we regard this difference as a sub-specific character.

**Occurrence:** Pietroșița (Voivozii Valley, Țâța Valley, Siliștea Valley, Ialomița Valley)

**Specimens:** L.P.B.IV. 12.173, 12174, 12175

***Whiteinella aprica* (LOEBLICH & TAPPAN), 1961**

Plate 4, figs. 1–15

*Ticinella aprica* LOEBLICH & TAPPAN 1961, p. 292, pl. 4, figs. 14–16

*Whiteinella aprica* (LOEBLICH & TAPPAN), ROBASZYNSKI & CARON, 1979 vol. 1, p. 159, pl. 32, figs. 1–2.

**Description:** Low trochospiral test with globulous chambers and deep, straight sutures both the spiral and umbilical sides, wide open umbilicus, intraumbilical aperture with a moderate porticus, lobate periphery, surface of the chambers ornamented with pustules arranged into a pseudo-keel.

**Dimensions:** large diameter 0.36 mm – 0.38 mm; small diameter 0.31 mm – 0.36 mm

**Remarks:** The presence of the apertural porticus frequently well developed in the last 2–3 chambers became confused with the umbilical apertures of *Ticinella*. Robaszynski & Caron solved this issue in their 1979 work.

**Occurrence:** Pietroșița area (Voivozii Valley, Siliștea Valley)

**Stratigraphic distribution:** Upper Turonian – Coniacian (*Sigalitrunca sigali*-*S. schneegansi* biozone up to the *Dicarinella primitiva* biozone)

**Specimens:** L.P.B.IV. 12179, 12180

***Whiteinella baltica* DOUGLAS & RANKIN, 1969**

Plate 1, figs. 16–1, pl. 21, figs. 10–15

*Whiteinella baltica* DOUGLAS & RANKIN, 1969, p. 198, text-fig. 9; ROBASZYNSKI & CARON 1990, pl. 27, figs. 1, 8; CARON, 1985, p. 179, pl. 37, figs. 1–3

**Dimensions:** large diameter 0.36 mm – 0.48 mm; small diameter 0.28 mm – 0.38 mm; height 0.19 mm – 0.24 mm



**Remarks:** By its very low trochospiral whorl and globulous chambers with straight depressionary sutures this species is very well defined.

**Occurrence:** Pietroșița area (Țâța Valley, Voivozii Valley, Ialomița Valley)

**Stratigraphic distribution:** Middle – Upper Turonian

**Specimens:** L.P.B.IV. 11711

*Whiteinella paradubia-paradubia* (SIGAL), 1952

Plate 3, figs. 8–14, pl. 21, figs. 16–21

*Globigerina paradubia* SIGAL, 1952, p. 28, text-fig. 28

*Whiteinella paradubia* (SIGAL) CARON, 1981, p. 79, pl. 37, figs. 8–9; ROBASZYNSKI & CARON, 1990, pl. 27, fig. 9

**Dimensions:** large diameter 0.33 mm – 0.48 mm; small diameter 0.31 mm – 0.38 mm; height 0.24 mm – 0.36 mm

**Remarks:** Although in 1952 Sigal gave a very summary description of this species, its text figure is very clear and correct, thereby allowing its identification. As Robaszynski & Caron 1979, p. 181 shows that this species differs from Loeblich and Tappan's *W. brittonensis*, only by its high whorl aspect. We regard this small change as irrelevant for species level identification but remark that it is probably useful at the sub-species level.

**Occurrence:** Pietroșița area (Voivozii Valley, Siliștea Valley)

**Stratigraphic distribution:** Middle-Upper Turonian (Sigalitruncana sigali-schneegansi biozone)

**Specimens:** L.P.B.IV. 12182

*Whiteinella inornata* (BOLLI), 1957

Plate 20, figs. 1–12

*Globotruncana inornata* BOLLI 1957, p. 57, pl. 13, fig. 5

*Whiteinella inornata* (BOLLI), PESSAGNO 1967, p. 299, pl. 71, figs. 3–5, CARON 1985, p. 79, pl. 37, figs. 6–7. ROBASZYNSKI & CARON 1990, p. 28, figs. 7, 9; NEAGU 2006, p. 118, pl. 1, figs. 1–15

**Dimensions:** large diameter 0.31 mm – 0.40 mm; small diameter 0.24 mm – 0.33 mm; height 0.12 mm – 0.14 mm

**Remarks:** From the beginning, the diagnosis of this species shows its distinction from *Globotruncana*. Pessagno 1967, put forward the opinion that this species belongs to the genus *Whiteinella*, an opinion later to be proved correct.

**Occurrence:** Pietroșița area (Voivozii Valley, Siliștea Valley)

**Stratigraphic distribution:** Upper Turonian – Lower Coniacian

**Specimens:** LPBIV. 12186

*Whiteinella napolisensis* NEAGU n. sp.

Plate 1, figs. 1–23, pl. 2, figs. 1–2

**Derivation of name:** From the Dacian name for the Ialomitza river “*Napolis*”

**Type level:** Middle Turonian – Lower Coniacian

**Type locality:** Pietroșița area (Ialomița Valley, Voivozii Valley, Siliștea Valley)

**Type specimens:** Holotype, L.P.B.IV. 12116, pl. 1, figs. 1–2 Voivozii Valley

Paratypes, L.P.B.IV. 12117, 12118 pl. 1, figs. 3–15 Voivozii Valley

**Description:** Low trochospiral test with globulous chambers gradually increasing in size with a stellate outline; 6–7 chambers in the last whorl covered by small rugosities, last 2–3 chambers becomes progressively elongated (digital aspect), a smooth umbilical area covered by porticus on the last 2–3 chambers. On spiral side, all the chambers have a rugose texture.

**Dimensions:** Holotype; large diameter 0.57 mm; small diameter 0.48 mm; height 0.19 mm

**Paratypes:** large diameter 0.43 mm – 0.67 mm; small diameter 0.38 mm – 0.52 mm

**Remarks:** By the stellate aspect of the outline with the last 2-3 elongated chambers (with a digital aspect) this species differs from *W. archaeocretacea* PESSAGNO which exhibits a weak tendency of elongation of the last chambers.

**Stratigraphic distribution:** Upper Turonian – Lower Coniacian (Dicarinella primitiva biozone)

**Location:** Pietroșița area (Voivozii Valley, Silișteea Valley)

Subfamily ROTUNDININAE Bellier & Salaj 1977  
Genus **PRAEGLOBOTRUNCANA** Bermudez 1052

*Praeglobotruncana prahovae* NEAGU, 1969

Plate 6, figs. 4–18

*Praeglobotruncana prahovae* NEAGU 1969, p. 144, pl. 21, figs. 11–13, pl. 22, figs. 4–6, 9–11, pl. 23, figs. 4–10, pl. 14, figs. 1–9

**Description:** Test free, trochospiral, with chambers arranged in 2 to 3 whorls with a strongly convex to conical-convex spiral side, the last whorl is composed of 6–8 large, triangular–rhomboidal chambers; the umbilicus is wide or very wide, deep and frequently covered with lamellar extensions of the anterior apertures; periphery is markedly lobate and provided with a faint keel; interiomarginal aperture protected by a lip that continues umbilically with a lamellar extension (original description 1969).

**Dimensions:** Holotype – large diameter 0.54 mm; small diameter 0.46 mm; height 0.29 mm

**Paratypes:** large diameter 0.48 mm – 0.58 mm; small diameter 0.42 mm – 0.53 mm; height 0.24 mm – 0.39 mm

**Remarks:** By its general petaloid outline of the test, this species is like *Praeglobotruncana oraviensis* SCHEIBNEROVA 1960, it differs from this however by the strongly convex outline of the test, a character which brings it close to *Praeglobotruncana stephani gibba* KLAUSS, but from which it differs in all other features, in its great number of chambers on the last whorl, in its wide umbilicus and strongly convex shape of the test this species is related to *P. paradubia* (SIGAL) but differs from it by the presence of the peripheral keel and the shape of the chambers.

**Occurrence:** Pietroșița area (Voivozii Valley, Silișteea Valley)

**Stratigraphic distribution:** Lower Turonian (Helvetoglobotruncana helvetica biozone)

**Specimens:** L.P.B.IV. 12125

*Praeglobotruncana barbui* NEAGU, 1969

Plate 5, figs. 15–23, pl. 6, figs. 1–3

*Praeglobotruncana barbui* NEAGU 1969, p. 143, pl. 18, figs. 11–15, pl. 19, figs. 1–12, pl. 20, figs. 1–3

**Description:** Test free trochospiral, composed of 2–3 whorls on the spiralside, slightly convex with truncated chambers and sutures marked by strongly ornamented keels; the rather well developed umbilicus is frequently covered with lamellar extensions of the anterior apertures; peripherally the test is obviously lobate and provided with a well developed peripheral keel. (original description 1969).

**Dimensions:** Holotype – large diameter 0.49 mm; small diameter 0.42 mm; thickness 0.22 mm

**Paratypes:** large diameter 0.34 mm – 0.51 mm; small diameter 0.31 mm – 0.42 mm; thickness 0.20 mm – 0.24 mm

**Remarks:** On account of its shape and the disposition of the chambers in the last whorl this species is very morphologically similar to *W. inornata* (BOLLI), but differs from it in its other characters, particularly by the presence of a well developed peripheral keel on the spiral side.

**Occurrence:** Pietroșița area (Voivozii Valley, Siliștea Valley)

**Stratigraphic distribution:** Lower Turonian (Helvetoglobo truncvana helvetica biozone)

**Specimens:** L.P.B.IV. 12128

Subfamily HELVETOGLOBOTRUNCANINAE Lamolda 1976

Genus **Helvetoglobo truncana** REISS 1957

***Helvetoglobo truncana helvetica*** (BOLLI) 1945

Plate 5, figs. 9–14

*Globo truncana helvetica* BOLLI 1945, p. 226, text–fig. 1 (9–12), pl. 9, figs. 6–8; BOLLI, LOEBLICH & TAPPAN 1957, p. 56, pl. 13, fig. 1; SIGAL 1952, p. 31, text–fig. 32; KALANTARI 1969, p. 203, pl. 24, fig. 3

*Praeglobo truncana helvetica* (BOLLI) DOUGLAS 1969, p. 169, pl. 4, figs. 4–5; ROBASZYNSKI & CARON 1990, p. 42, pl. 5, figs. 5–8.

*Marginotruncana helvetica* (BOLLI) PESSAGNO 1967, p. 306, pl. 53, figs. 9–13, pl. 54, figs. 1–3

*Helvetoglobo truncana helvetica* (BOLLI) CARON 1985, p. 60, pl. 30, fig. 7–8; NEAGU 2006, p. 178, pl. 4, figs. 16–21

**Dimensions:** large diameter 0.43 mm – 0.48 mm; small diameter 0.38 mm – 0.48 mm; thickness 0.21 mm – 0.28 mm

**Remarks:** By the strongly truncated aspect of its spiral side, the clearly lobate periphery and the presence of only one peripheral keel and the globulous aspect of the umbilical chambers, large umbilicus and depressed sutures, the absence of the umbilical shoulders, this species is well defined.

**Occurrence:** Pietroșița area (Ialomița Valley, Voivozii Valley, Siliștea Valley, Lupului Valley)

**Stratigraphic distribution:** Lower Turonian (*Inoceramus labiatus* biozone)

**Specimens:** L.P.B.IV. 12120

***Helvetoglobo truncana praehelvetica*** (TRUJILLO) 1960

Plate 5, figs. 1–6

*Helvetoglobo truncana praehelvetica* (TRUJILLO) CARON 1985, p. 60, pl. 30, figs. 9–10; NEAGU 2006, p. 178, pl. 1, figs. 16–20

*Whiteinella praehelvetica* (TRUJILLO) ROBASZYNSKI & CARON 1990, pl. 42, fig. 4

*Praeglobo truncana praehelvetica* (TRUJILLO) NEAGU 1969, p. 142, pl. 15, figs. 6–7

**Dimensions:** large diameter 0.33 mm – 0.48 mm; small diameter 0.24 mm – 0.48 mm; thickness 0.21 mm – 0.26 mm

**Remarks:** This species differs from *Helvetoglobo truncana helvetica* (BOLLI) as M. Caron explained in his 1985 work, by the primitive aspect of the peripheral keel which could be absent on the last 1–2 chambers.

**Occurrence:** Pietroșița area (Siliștea Valley, Voivozii Valley, Lupului Valley)

**Stratigraphic distribution:** Lower Turonian (*Inoceramus labiatus* biozone)

**Specimens:** L.P.B.IV. 12123

Superfamily GLOBOTRUNCANACEA Brotzen 1942  
 Family GLOBOTRUNCANIDAE Brotzen 1942  
 Subfamily GLOBOTRUNCANINAE Brotzen 1942  
 Genus **DICARINELLA Porthault 1970**

***Dicarinella canaliculata* (REUSS) 1854**

Plate 6, figs. 1–12

*Rosalina canaliculata* REUSS 1854, p. 70, pl. 16, fig. 4 a–b

*Marginotruncana canaliculata* (REUSS) Pessagno 1967, p. 302, pl. 74, figs. 5–8

*Praeglobotruncana (Dicarinella canaliculata)* (REUSS) PORTHAULT 1970, p. 72, pl. 10, figs. 9–11, pl. 13, fig. 24

*Dicarinella canaliculata* (REUSS) CARON 1985, p. 43, pl. 17, figs. 5–6; ION J. 1983, p. 115, pl. 38, fig. 4 a–c

**Dimensions:** large diameter 0.45 mm – 0.60 mm; small diameter 0.40 mm – 0.52 mm; thickness 0.14 mm – 0.21 mm

**Remarks:** By the almost flat aspect of the spiral side with slightly arched sutures, keeled chambers, umbilical chambers and some globular chambers, large number of flat chambers and straight sutures together with a total absence of umbilical shoulders and absence of the sutural keels this species is very well defined.

**Occurrence:** Pietroșița area (Voivozii Valley)

**Stratigraphic distribution:** Middle-Upper Turonian

**Specimens:** L.P.B.IV. 12132

***Dicarinella algeriana* (CARON) 1966**

Plate 7, figs. 1–9

*Praeglobotruncana algeriana* CARON 1966, p. 74, pl. 16, fig. 8, pl. 17, fig. 8 (figured by Reichel under *Globotruncana aff. renzi*; THALMMANN & GANDOLFI

*Dicarinella algeriana* (CARON) ROBASZYNSKI & CARON 1979, p. 57, pl. 50

**Dimensions:** large diameter 0.43 mm – 0.60 mm; small diameter 0.38 mm – 0.52 mm; thickness 0.21 mm – 0.28 mm

**Remarks:** The presence of those two peripheral keels very near but not coalescent visible on the periphery of last chambers define this species. Frequently the last one or two chambers have only one keel.

**Occurrence:** Pietroșița area (Ialomița Valley)

**Stratigraphic distribution:** Uppermost Cenomanian – Lower Turonian

**Specimens:** L.P.B.IV. 12130, 12131

***Dicarinella marginata* (REUSS) 1845**

*Rosalina marginata* REUSS 1845, p. 36, pl. 8, figs. 54,74, pl. 13. fig. 6b emended by Reuss himself in 1854, p. 69, pl. 26, fig. 1 a–c.

**Remarks:** To bring up to date Reuss's first diagnosis (1845, p. 36) emended by Reuss himself 1854, p. 69, pl. 26, fig. 1) it could be translated from German language as "Typical low trochospiral test with the umbilical side with six low globulous chambers with straight, tilted arcuated depressed sutures without sutural keels or umbilical shoulders, spital side with arcuated sutures with weak surrounding keels, the periphery of the test has two very narrow peripheral keels". Because in the first

description of this species (1845), the figures and plates 8, figs. 54, 74 were inadequate, Reuss himself emended the paper from 1854 with an excellent depiction of the species (Pl. 26, fig. 1) in which the distinctive character (the peripheral keels) are clearly shown, along with the aspect of the spiral side. Regarding as an essentially discriminating character the aspect of those two peripheral keels and the aspect of the umbilical chambers, three subspecies can be defined: *Dicarinella marginata marginata* (REUSS 1854), *Dicarinella marginata rodai* (MARIANOS & ZINGULA) 1966, *Dicarinella marginata hagni* (SCHEIBNEROVA) 1962.

***Dicarinella marginata marginata* (REUSS) 1845**

Plate 7, figs. 14–20, pl. 13, figs. 1–3, 7–9, pl. 22, figs. 4–12

*Rosalina marginata* REUSS 1845, REUSS 1854, p. 69, pl. 26, fig. 1

*Dicarinella marginata* (REUSS) NEAGU 2012, pl. 1, figs. 10–15

**Dimensions:** large diameter 0.52 mm – 0.64 mm; small diameter 0.45 mm – 0.52 mm, thickness 0.21 mm – 0.24 mm

**Remarks:** This subspecies representing the 1854 opinion of the original author is defined by the low to very low trochospiral side with two narrow peripheral keels.

**Occurrence:** Pietroșița Area (Voivoda Valley, Țâța Valley, Siliștea Valley).

**Stratigraphic distribution:** Lower-Middle Turonian (*Helvetoglobotruncana helvetica* biozone to the middle part of the *Sigalitruncana sigali* – *S. schneegansi* biozone).

**Specimens:** L.P.B.IV. 12193, 12183

***Dicarinella marginata rodai* (MARIANOS & ZINGULA) 1966**

Plate 7, figs. 10–11, pl. 22, figs. 13–21

*Globotruncana rodai* MARIANOSI & ZINGULA 1966, p. 340, pl. 39, fig. 5

**Dimensions:** large diameter 0.40 mm – 0.55 mm; small diameter 0.40 mm – 0.45 mm; thickness 0.16 mm – 0.19 mm

**Remarks:** This subspecies differs from the basic one by the middle high trochospiral aspect of the spiral side having a closely spaced double keel above. The median line becomes weaker and more closely spaced on the last chambers (Marianosi-Zinggula)

**Occurrence:** Pietroșița Area (Voivoda Valley, Siliștea Valley, Țâța Valley)

**Stratigraphic distribution:** Middle Turonian

**Specimens:** L.P.B.IV. 12191

***Dicarinella marginata hagni* (SCHEIBNEROVA) 1962**

Plate 22, figs. 22–27, pl. 23, figs. 16–21

*Praeglobotruncana hagni* SCHEIBNEROVA 1962, p. 219, text-fig. 6 a–c

**Dimensions:** large diameter 0.60 mm – 0.67 mm; small diameter 0.48 mm – 0.60 mm; thickness 0.28 mm – 0.36 mm

**Remarks:** From *D. marginata marginata* this subspecies differs by the peripheral keels which are, as a rule, more closely spaced, but the striking difference from the basic species is that the middle to high trochospiral aspect of the spiral side is related with the growth in size of the specimens.

**Occurrence:** Pietroșița Area (Voivodii Valley, Siliștea Valley)

**Stratigraphic distribution:** Middle Turonian

**Specimens:** L.P.B.IV. 12184

***Dicarinella imbricata* (MORNOD) 1950**

Plate 11, figs. 1–20

*Globotruncana imbricata* MORNOD 1950, p. 589, fig. 5; KALANTARI 1969, p. 204, pl. 23, fig. 5

*Praeglobotruncana imbricata* (MORNOD), CARON 1966, p. 76, pl. 6, fig. 4, HANZLIKOVA 1972, p. 102, pl. 26, figs. 7–10

*Dicarinella imbricata* (MORNOD), CARON 1976, p. 332, fig. 3 a–c; ROBASZYNSKI & CARON 1979, p. 87, pl. 58, fig. 59, CARON 1985, p. 45, pl. 18, figs. 4–5

**Dimensions:** large diameter 0.38 mm – 0.60 mm; small diameter 0.36 mm – 0.48 mm; thickness 0.26mm

**Remarks:** By its moderate-high trochospiral whorl, the tendency of the last chamber to be lean toward the umbilicus and frequent lack of a peripheral keel, this species is clearly distinguished from *D. algeriana*.

**Occurrence:** Pietroșița area (Voivozii Valley, Siliștea Valley)

**Stratigraphic distribution:** Middle – Upper Turonian

**Specimens:** L.P.B.IV. 12133, 12134, 12135

***Dicarinella primitiva* (DALBIEZ) 1955**

Pl. 12, figs. 7–12

*Globotruncana ventricosa* WHITE, *primitiva* DALBIEZ, DALBIEZ 1955, p. 171, fig. 6

*Dicarinella primitiva* (DALBIEZ), ROBASZYNSKI & CARON 1979, (vol. 2) p. 96, pl. 60, fig. 1; CARON 1985, p. 45, pl. 18, figs. 6–8

**Dimensions:** 0.60 mm – 0.67 mm; small diameter 0.50 mm – 0.57 mm; thickness 0.24mm

**Remarks:** The presence of the two proximal peripheral keels differs from *S. schneegansi* which it resembles with regard to the low, flat aspect of the trochospiral side and the high chambers of the umbilical side which have umbilical shoulders and a wide umbilicus. From *D. paraconcavata* this species differs by the typical sigmoidal keels on the spiral side.

**Occurrence:** Pietroșița area (Țâța Valley, Voivozii Valley, Siliștea Valley)

**Stratigraphic distribution:** Uppermost Turonian – Lower Coniacian

**Specimens:** L.P.B.IV. 12136, 12137, 12138

***Dicarinella concavata* (BROTZEN) 1934,**

Plate 17, figs. 1–3

*Globotruncana ventricosa carinata* DALBIEZ 1955, p. 168, text–fig. 8

*Globotruncana concavata* (BROTZEN), BOLLI, LOEBLICH & TAPPAN 1957, p. 57, pl. 13, fig. 3

*Globotruncana coronata* BROTZEN, *carinata* (DALBIEZ), EDGELL 1962, p. 150, pl. 1, figs. 1–3; KALANTARI 1969, p. 209, pl. 23, fig. 10, pl. 14, fig. 4

*Dicarinella concavata* (BROTZEN), ROBASZYNSKI & CARON 1979, vol. 2, p. 21, pl. 54, fig. 55

**Dimensions:** large diameter 0.69 mm – 0.72 mm; small diameter 0.55 mm – 0.60 mm; thickness 0.31 mm – 0.33 mm

**Remarks:** By its typical, almost planispiral aspect of the spiral side and high conical-truncate aspect of the umbilical side with a wide umbilicus and also by the total absence of some sigmoidal sutural keels on the spiral side, the two closely spaced peripheral keels are excellent identifying characters of this species.

**Occurrence:** Pietroșița area (Țâța Valley)

**Stratigraphic distribution:** Coniacian

**Specimens:** L.P.B.IV 12139

Genus **MARGINOTRUNCANA** HOFKER 1956

***Marginotruncana globigerinoides*** (BROTZEN) 1936

Plate 4, figs. 20–22, pl. 18, figs. 1–12

*Globotruncana globigerinoides* BROTZEN 1936, p. 177, pl. 12, fig. 3, pl. 13, fig. 3; BOLLI 1944, p. 233, pl. 9, fig. 16, text–figs. 1, 23, 24

*Globotruncana bulloides globigerinoides* BROTZEN & GANDOLFI 1955, p. 3, pl. 1, fig. 10 a–c

*Globotruncana globigerinoides* BROTZEN & KALANTARI 1969, p. 202, pl. 25, figs. 4–5

**Dimensions:** large diameter 0.43 mm – 0.48 mm; small diameter 0.36 mm – 0.43 mm; thickness 0.21 mm – 0.24 mm

**Remarks:** Although in 1936 Brotzen described and figured this species correctly, specifying clearly the globulous aspect of the chambers and the presence on the peripheral zone of two discrete, parallel and well keels, the most of the authors consider this species as a junior synonym of *Marginotruncana marginata* REUSS. In 1955, Gandolfi considers this taxon as a subspecies of *Globotruncana bulloides* VOGLER 1941, Robaszynski, Caron & *et al.*, p. 186 consider *Rosalinella globigerinoides* MARIEW 1941 as a homonym of Brotzen's species from 1936. The same author considers it as synonymous with *Archaeglobigerina cretacea* (d'ORB) 1840. Pessagno 1967 in the diagnosis of the genus *Archaeglobigerina* mentions, "with or without imperforate peripheral band on weakly developed double keel". Specimens which we consider as belonging to Brotzen's 1936 species differ from *Archaeglobigerina* by the presence of two well developed peripheral keels which can be absent in some ones specimens on the last two chambers. Taking into account all of these characters we do not consider that this species belongs to *Archaeglobigerina*. Regarding *Globotruncana cachensis* DOUGLAS 1966, our specimens differ by the absence of the sutural keels on the spiralside.

**Occurrence:** Pietroșița area (Voivoda Valley, Țâța Valley, Lupului Valley)

**Stratigraphic distribution:** Upper Turonian – Lower Coniacian

**Specimens:** L.P.B.IV 12152, 12153, 12154

***Marginotruncana renzi*** (GANDOLFI) 1942

Plate 17, figs. 4–12, 16–18

*Globotruncana linnei renzi* GANDOLFI 1942, pl. 3, fig. 1 a–c, pl. 4, fig. 17

*Globotruncana renzi* (GANDOLFI), Kalantari 1969, p. 209, pl. 25, fig. 7

*Praeglobotruncana renzi* (GANDOLFI), DOUGLAS 1969, p. 172, pl. 2, fig. 8

*Marginotruncana renzi* (GANDOLFI), PORTHAULT 1970, p. 49, pl. 10, figs. 13–14; ROBASZYNSKI & CARON 1979, vol 2, p. 139, pl. 69, figs. 1–3; ION 1983, p. 123, pl. 37, fig. 45, pl. 46, fig. 6, pl. 50, fig. 4; CARON 1985, p. 61, pl. 27, figs. 1–2; ROBASZYNSKI, CARON & *et al.*, 1990, pl. 43, fig. 7 a–c; NEAGU 2006, p. 180, pl. 3, figs. 10–12, 16–18

**Dimensions:** large diameter 0.62 mm – 0.69 mm; small diameter 0.48 mm – 0.62 mm; thickness 0.24 mm – 0.28 mm

**Remarks:** By the presence of two closely spaced peripheral keels with an acute to weakly rounded aspect of the periphery of the test in subsequent whorls, with umbilical sigmoidal sutural keels and a somewhat reduced flattened aspect of the umbilical side, this species is well defined. This species differs from *Marginotruncana coronata* BOLLI in apertural view by the presence of the two coalescing keels.

**Occurrence:** Pietroșița area (Siliștea Valley)  
**Stratigraphic distribution:** Turonian – Coniacian  
**Specimens:** L.P.B.IV. 12151

*Marginotruncana paraconcavata* PORTHAULT 1970  
 Plate 12, figs. 1–6

*Marginotruncana paraconcavata* PORTHAULT 1970, p. 77, pl. 10, figs. 21–23; ROBASZYNSKI & CARON 1979, vol. 2, p. 119, pl. 66, figs. 1–2; NEAGU 2006, p. 180, pl. 9, figs. 18–20

**Dimensions:** large diameter 0.62 mm – 0.67 mm; small diameter 0.60 mm – 0.62 mm; thickness 0.24 mm – 0.26 mm

**Remarks:** The existence of the two well developed peripheral keels as well as the umbilical side which has well developed umbilical shoulders and straight-sigmoidal sutures which are marked by a weak sutural keel represent the distinguishing characteristics of this species. From *Dicarinella concavata* which it resembles in the aspect of the test (a high umbilical side and flat spiral side), this species differs by the presence of the strong sutural keels on the spiral side and an umbilical side umbilical shoulders.

**Occurrence:** Pietroșița area (Țâța Valley, Voivozii Valley, Siliștea Valley)  
**Stratigraphic distribution:** Middle Turonian – Coniacian.  
**Specimens:** L.P.B.IV. 12140, 12141

*Marginotruncana tarfayaensis* (LEHMAN) 1963  
 Plate 10, figs. 1–6

*Globotruncana tarfayaensis* LEHMAN 1963, p. 146, pl. 5, fig. 4

*Marginotruncana tarfayaensis* (LEHMAN), PORTHAULT 1970, p. 80, pl. 11, figs. 6–8, ROBASZYNSKI & CARON 1979, p. 155, pl. 77, figs. 1–2; ION 1983, p. 127, pl. 46, figs. 3–4, pl. 50, fig. 1; NEAGU 1987, p. 300, pl. 13, figs. 10–18; NEAGU 2006, p. 180, pl. 6, figs. 7–9, 16–18

**Dimensions:** large diameter 0.65 mm – 0.75 mm; small diameter 0.59 mm – 0.65 mm

**Remarks:** This species differs from *M. coronata* BOLLI by the discoidal aspect of the test, by its larger chambers, a wide umbilicus and the lobate aspect of the test.

**Occurrence:** Pietroșița area (Voivozii Valley, Siliștea Valley)  
**Stratigraphic distribution:** Middle Turonian-Coniacian  
**Specimens:** L.P.B.IV. 121142

*Marginotruncana pseudolinneiana* PESSAGNO 1967  
 Plate 15, figs. 1–6, pl. 16, figs. 17–21

*Marginotruncana pseudolinneiana* PESSAGNO 1967, p. 310, pl. 65, figs. 24–27, pl. 76, figs. 1–3; DOUGLAS 1969, p. 195, pl. 3, fig. 2, text-fig. A–C (not pl. 3, figs. 3–4); PORTHAULT 1970, p. 79, pl. 11, figs. 9–10, pl. 13, figs. 19–22; DOLORES LINARES RODRIGUEZ 1977, p. 180, pl. 27, figs. 4–5, pl. 29, figs. 1–2; ROBASZYNSKI & CARON 1979, vol. 2, p. 123, pl. 67, figs. 1–2, pl. 67, figs. 1–2, pl. 68, fig. 12; ION 1983, p. 125, pl. 37, fig. 6; CARON 1985, p. 61, pl. 26, figs. 7–8; NEAGU 1987, p. 295, pl. 9, figs. 7–12, pl. 10, figs. 1–3, pl. 11, fig. 46; NEAGU 2006, p. 180, pl. 6, figs. 1–6, pl. 7, figs. 11–2.

**Dimensions:** large diameter 0.80 mm – 0.66 mm; small diameter 0.70 mm – 0.56 mm



**Remarks:** The almost flat aspect (very low trochospiral) of the test with both sides parallel and the two peripheral keels widely spaced, together with the umbilical sutural and sigmoidal keels sets this species apart from *Dicarinella canaliculata* which it resembles by the flat aspect of the test.

**Occurrence:** Pietroșița area (Voivozii Valley, Siliștea Valley)

**Stratigraphic distribution:** Middle Turonian – Coniacian

**Specimens:** L.P.B.IV. 12142, 12143

***Marginotruncana angusticarinata* (GANDOLFI) 1942**

Plate 14, figs. 1–9

*Globotruncana linneiana* (d' ORB) var. *angusticarinata* GANDOLFI 1942, p. 127, text–fig. 46/3, pl. 4, figs. 17, 36

*Globotruncana lapparenti* BROTZEN, *angusticarinata* (GANDOLFI), HAG & ZELL 1954, p. 44, pl. 7, figs. 9–10

*Globotruncana angusticarinata* GANDOLFI, SIGAL 1952, p. 34, text–fig. 37, KLAUSS 1959, p. 821, pl. 7, fig. 3, LEHMAN 1963, p. 145, pl. 4, fig. 5; CARON 1966, p. 79, pl. 4, fig. 55; SALAJ & SAMUEL 1966, p. 199, pl. 19, fig. 4

*Marginotruncana angusticarinata* (GANDOLFI), LINARES – RODRIGUEZ 1977, p. 166, pl. 13, fig. 4; PESSAGNO 1967, p. 300, pl. 65, fig. 14–19; NEAGU 1968, p. 299, pl. 6, fig. 11–12, pl. 7, figs. 4–12; PORTHAULT 1970, p. 76, pl. 10, figs. 15–7, pl. 13, fig. 18; NEAGU 1987, p. 299, pl. 6, figs. 1–12, pl. 7, figs. 4–12; ION 1983, p. 124, pl. 37, fig. 2, pl. 50, fig. 3; NEAGU 2006, p. 180, pl. 5, figs. 21–23, pl. 8, figs. 6–8

**Dimensions:** larger diameter 0.73 mm – 0.65 mm; small diameter 0.56 mm – 0.63 mm

**Remarks:** The correct name of this species raises certain taxonomical issues according to the law of priority (art. 23 ICZN) ROBASYNSKI & CARON 1979, p. 147 for unknown reasons do not take into account the laws stipulated in the ICZN regarding *Globotruncana linnei* var. *angusticarenata* GANDOLFI 1942. They consider Gandolfi's species as having a non exhaustive description although the figures are very clearly made and show that it represents what Porthault describes as *Marginotruncana sinuosa* (1970). ROBASYNSKI & CARON 1979 state: “l'observation des differents caracteres du test indique, var. *angusticarinata*, entre dans le domaine de variabilite de *M. sinuosa*”. We regard this as a sort of “*partie prie*” thinking in that the authors do not respect the law of priority and regard the correct name as “*angusticarenata*” GANDOLFI 1942 because the Porthault's species is described in 1970. Regarding the regulations set by the ICZN we consider Gandolfi's species as having priority.

**Occurrence:** Pietroșița area (Voivozii Valley, Siliștea Valley, Țâța Valley)

**Stratigraphic distribution:** Middle Turonian – Coniacian

**Specimens:** L.P.B.IV. 12144, 12145

***Marginotruncana coronata* (BOLLI) 1945**

Plate 17, figs. 13–15, pl. 18, figs. 13–15

*Globotruncana lapparenti coronata* BOLLI 1945, p. 233, figs. 1, 21, 22, pl. 9, figs. 14–15; MORNOD 1950, p. 591, text–fig. 13; KALANTARI 1962, p. 205, pl. 24, fig. 3; CARON 1966, p. 80, pl. 4, fig. 1 a–c

*Globotruncana coronata* (BOLLI) DOUGLAS 1969, p. 177, pl. 3, figs. 5–8

*Marginotruncana coronata* (BOLLI) PESSAGNO 1967, p. 305, pl. 65, figs. 11–13; PORTHAULT 1970, p. 78, pl. 11, figs. 1–3, pl. 13, fig. 20; ROBASYNSKI & CARON 1979, p. 103, pl. 62, figs. 5–8; ION 1983, p. 126, pl. 51, fig. 1; CARON 1985, p. 60, pl. 26, figs. 1–2; NEAGU 2006, p. 180, pl. 5, figs. 9–11, 18–20

**Dimensions:** large diameter 0.67 mm – 0.87 mm; small diameter 0.55 mm – 0.74 mm; thickness 0.26 mm

**Remarks:** Large size, nearly 1 mm diameter, a flat to very low trochospiral side, with chambers having keeled sutures, sigmoidal umbilical sutures, straight on the spiral side, lobate periphery underlined by two closely spaced keels. It differs from *M. renzi* (GANDOLFI) by its almost planispiral test.

**Occurrence:** Pietroșița area (Voivozii Valley, Silișteea Valley, Țâța Valley)

**Stratigraphic distribution:** Upper Middle Turonian – Coniacian

**Specimens:** L.P.B.IV. 12148, 12149, 12150

### *Marginotruncana sinuosa* PORTHAULT 1970

Plate 19, figs. 16–21

*Marginotruncana sinuosa* PORTHAULT 1970, p. 81, pl. 11, figs. 11–13; ROBASZYNSKI & CARON 1979, vol. 2, p. 147, pl. 74, figs. 1–2, pl. 75, figs. 1–2; ION 1983, p. 128, pl. 46, fig. 7; CARON 1985, p. 61, pl. 17, figs. 9–11; NEAGU 2006, p. 180, pl. 5, figs. 12–17, pl. 8, figs. 9–11

**Dimensions:** large diameter 0.60 mm – 0.76 mm; small diameter 0.55 mm – 0.64 mm; thickness 0.24 mm – 0.26 mm

**Remarks:** In general, this species is very close to *Globotruncana angusticarinata* GANDOLFI 1942, p. 126, fig. 46 a–c. A small but visible difference between these two species is seen in the chamber aspect. It is strange that Porthault who presents both species (*M. angusticarinata*, *M. sinuosa*) does not specify any similarities and/or differences between these closely related species. *M. angusticarinata* has visibly higher umbilical chambers, a larger umbilicus and well developed sigmoidal umbilical sutures. *M. sinuosa* has weakly inflated umbilical chambers and poorly developed sigmoidal sutures. Taxonomically we believe that there are two subspecies of the Gandolfi's *Globotruncana angusticariana* namely *M. angusticarinata angusticarinata* and *M. angusticarinata sinuosa*.

**Occurrence:** Pietroșița area (Voivozii Valley)

**Stratigraphic distribution:** Middle Turonian – Coniacian.

**Specimens** L.P.B.IV. 12146

### *Marginotruncana pseudomarginata* nomen novum

Plate 18, figs. 16–24, pl. 20, figs. 4–9

(nomen novum pro *Globotruncana linneiana marginata* JIROVA 1956 not REUSS 1845)

*Globotruncana linneiana marginata* JIROVA 1956, p. 248, pl. 1, fig. 1 (not pl. 2 figs. 1–3, pl. 3, fig. 1)

*Marginotruncana pseudomarginata* NEAGU nom. nov. 2011, pl. 1, figs. 1–9

By its globular chambers on both spiral and umbilical sides, the presence of two well spaced peripheral keels (typical character for the genus *Marginotruncana*); the presence of loose sutural keels on the spiral side, sometimes also a loose periumbilical shoulder distinguishes this species from *Rosalina marginata* REUSS 1845–1854

**Dimensions:** large diameter 0.57 mm – 0.67 mm; small diameter 0.48 mm; thickness 0.24 mm

**Remarks:** The specimen presented by D. Jirova 1956 as a neotype of *Globotruncana linneiana marginata* REUSS 1845 differs from Reuss's original definition (1845–1945) by the aspect of both the umbilical and the spiral sides, the presence of two well spaced peripheral keels, the presence of loose sutural keels on the spiral and umbilical sides and occasionally loose periumbilical shoulders.

**Occurrence:** Pietroșița area (Voivozii Valley, Silișteea Valley, Țâța Valley, Ialomița Valley)

**Stratigraphic distribution:** Middle Turonian Coniacian

**Specimens:** L.P.B.IV. 12155

Genus **SIGALITRUNCANA** KORCHAGIN 1982***Sigalitruncana sigali*** (REICHEL) 1950

Plate 8, figs. 16–21, pl. 9, figs. 1–6

*Globotruncana sigali* REICHEL 1950, p. 610, fig. 5 a–c; SIGAL 1952, p. 33, text–fig. 33*Marginotruncana sigali* (REICHEL) PESSAGNO 1967, p. 303, pl. 54, figs. 4–6, pl. 55, figs. 1–3, pl. 57, figs. 1–2; ROBASZYNSKI & CARON 1979, vol. 2, p. 144, pl. 72, figs. 1–2, pl. 72, fig. 1; CARON 1985, p. 61, pl. 27, figs. 7–8; NEAGU 2006, p. 179, pl. 4, figs. 28–30*Sigalitruncana sigali* (REICHEL) ROBASZYNSKI, CARON & *et al.*, 1990, pl. 43, fig. 2**Dimensions:** large diameter 0.40 mm – 0.52 mm; small diameter 0.36 mm – 0.48 mm; thickness 0.19 mm – 0.21 mm**Remarks:** This species was very well defined by Reichel (1950). The periphery of the test has only one keel. The presence of sutural keels both on the spiral side and umbilical side and the presence of the umbilical shoulders provide adequate identifying characters for this species. From *S. schneegansi* SIGAL it differs by the almost flat aspect of the spiral side and the wide umbilicus with the last 2–3 chambers of the last being more flattened. The peripheral keel is represented by a row of tubercles which can sometimes be spread out a little on the last 2–3 chambers.**Occurrence:** Pietroșița area (Voivozii Vally, Siliștea Valley, Țâța Valley)**Stratigraphic distribution:** Middle Turonian – Coniacian**Specimens:** L.P.B.IV. 12158, 12159, 12160***Sigalitruncana schneegansi*** (SIGAL) 1952

Plate 10, figs. 7–12

*Globotruncana schneegansi* SIGAL 1952, p. 33, text–fig. 34; KALANTARI 1969, p. 209, pl. 23, fig. 9*Praeglobotruncana schneegansi* (SIGAL), KLAUS 1959, p. 796, pl. 6, fig. 5; LEHMAN 1962, p. 144, pl. 4, fig. 4*Marginotruncana schneegansi* (SIGAL), ROBASZYNSKI & CARON 1979, p. 70, pl. 70, figs. 1–2, pl. 71, figs. 1–2; CARON 1985, p. 61, pl. 27, figs. 3–6; NEAGU 2006, p. 180, pl. 6, figs. 13–15**Dimensions:** large diameter 0.64 mm – 0.74 mm; small diameter 0.60 mm – 0.72 mm; thickness 0.26 mm – 0.31 mm**Remarks:** The peripheral keel is made up of two rows of very closely spaced tubercles which represent the best evidence that this species belongs to *Sigalitruncana*. Also, the general morphology is very close to *S. sigali* and confirms SIGAL's 1952, p. 53 opinion that “*toutes les formes existent depuis celle a une carene jusqu'a deux carenes franches etroitement accolles*”.**Occurrence:** Pietroșița area (Voivozii Valley, Siliștea Valley, Țâța Valley)**Stratigraphic distribution:** Middle Turonian – Coniacian.**Specimens:** L.P.B.IV. 12164, 12165***Sigalitruncana marianosi*** (DOUGLAS) 1969

Plate 9, figs. 7–15

*Globotruncana marianosi* DOUGLAS 1969, p. 182, pl. 2, fig. 3, text–fig. 5*Marginotruncana marianosi* (DOUGLAS), ROBASZYNSKI & CARON 1979, p. 115, pl. 65, figs. 1–2; CARON 1985, p. 61, pl. 26, figs. 5–6; NEAGU 2006, p. 181, p. 9, figs. 13–17*Sigalitruncana marianosi* (DOUGLAS), ROBASZYNSKI, CARON & *et al.*, 1990, pl. 38, fig. 5–6**Dimensions:** large diameter 0.64 mm – 0.74 mm; small diameter 0.60 mm – 0.72 mm; thickness 0.26 mm – 0.31 mm

**Remarks:** High-conical truncate spiral side with chambers growing progressively in height, a wide and deep umbilicus with umbilical shoulders with a normal to weakly developed keel and the presence of only one peripheral keel.

**Occurrence:** Pietroșița area (Voivozii Valley, Siliștea Valley, Țâța Valley)

**Stratigraphic distribution:** Upper part of the Middle Turonian to the middle part of the Upper Turonian

**Specimens:** L.P.B. IV. 12161, 12162, 12164

*Sigalitrucana undulata* (LEHMAN) 1963

Plate 14, figs. 10–11, pl. 15, figs. 7–12

*Globotruncana undulata* LEHMAN 1963, p. 148, pl. 1, fig. 3, text–fig. 2

*Marginotruncana undulata* (LEHMAN), RODRIGUEZ 1977, p. 1170, pl. 116, figs. 2–4; ROBASZYNSKI & CARON 1979, vol. 2, p. 159, pl. 77, figs. 1–2; NEAGU 1987, p. 300, pl. 10, figs. 4–9; NEAGU 2006, p. 180, pl. 18, figs. 12–14

**Dimensions:** large diameter 0.76 mm – 0.84 mm; small diameter 0.68 mm – 0.80 mm; thickness 0.34 mm

**Remarks:** Medium high trochospiral on the spiral side with a concave aspect of the chambers because of which the general aspect of the spiral side resembles the blades of a propellar. The periphery has a very narrow keel made up by two rows of tubercles. These characters are regarded as conclusive with respect to the inclusion of this species in the genus *Sigalitrucana*.

**Occurrence:** Pietroșița area (Voivozii Valley, Țâța Valley, Siliștea Valley)

**Stratigraphic distribution:** Middle Turonian – Santonian

**Specimens:** L.P.B.IV. 12167, 12168

*Sigalitrucana kupperi* (THALMANN) 1959

Plate 23, figs. 1–15

*Globotruncana (Praeglobotruncana) renzi* GANDOLFI, ssp. *primitiva* KUPPER 1956, p. 43, pl. 8, fig. 2

*Globotruncana kupperi* THALMANN 1959, nom. nov., p. 130; MARIANOS & ZINGULA 1966, p. 340, p. 139, fig. 6 a–c.

**Description:** Kupper 1956 stated: “The dorsal (spiral) side is almost flat. On the ventral (umbilical) side 5 chambers are present all inflated, separated by distinctly depressed sutures. The umbilicus is deep, no apertures are observable other than a very narrow slit at the base of the last chamber within the umbilicus. The terminal chamber is elongated and without a keel. The keel is broad and very distinct, a peculiar development is a ribbed texture which can be easily observed in lateral view (umbilical shoulders?)”. Unfortunately on plate 8, fig. 2 the figure of this taxon is nearly useless.

**Dimensions:** large diameter 0.57 mm – 0.67 mm; small diameter 0.48 mm – 0.60 mm; thickness 0.26 mm – 0.36 mm

**Remarks:** In 1959 (p. 130), THALMANN introduced the new name (nomen novum) for Kupper’s new subspecies without any comments. Marianos & Zingula 1966, p. 340 present not only a new and more comprehensive description but also a better figure of this taxon. In our opinion, this species represents an evolutionary ancestral link for *Sigalitrucana marianosi* (Douglas)

**Occurrence:** Pietroșița area (Țâța Valley)

**Stratigraphic distribution:** Middle Turonian, *Helvetoglobotruncana helvetica* biozone – basal part of the *Sigalitrucana sigali* biozone

**Specimens:** L.P.B.IV. 12188

***Sigalitruncana mihailescui* n. sp.**

Plate 2, figs. 3–21, pl. 8, figs. 1–15, pl. 19, figs. 13–15

**Derivation of name:** This species is dedicated to my excellent friend, geologist Mihăilescu Nicolae.**Type level:** Upper Turonian (*Sigalitruncana sigali* – *S. schneegansi* biozone)**Type locality:** Pietroșita area (Voivozii Valley)**Type specimens:** Holotype: L.P.B.IV 12169

Paratypes: L.P.B.IV. 12170, (pl. 2, figs. 13–14, 18–22, pl. 19, figs. 13–15)

**Description:** Low trochospiral test, almost planispiral with globular chambers, weakly flattened on the spiral side; six to eight chambers on the last whorl, straight, radial depressed sutures on the umbilical side and very slightly depressed on the spiral side. Typically stellate outline with a rugose texture on the initial chambers progressing to a very rough-rugose aspect. The peripheral rugosities form a pseudo-keel. The umbilicus is wide and the porticus is developed on the last two or three whorls. On more evolved individuals, a true keel can be observed on the last two or three chambers (pl. 8, figs. 1–15). On the greater part of the whorl the keel is missing and there are specimens in which the peripheral keel can be absent on the final two or three chambers. The surface of the chambers in the last whorl can be smooth and devoid of any peripheral keel.

**Dimensions:** Holotype large diameter 0.55 mm; small diameter 0.48 mm; thickness 0.16 mm**Paratypes;** large diameter 0.40 mm – 0.55 mm; small diameter 0.36 mm – 0.48 mm; thickness 0.16 mm**Remarks:** This species differs from other known species of *Sigalitruncana* by the primitive structure of the peripheral keel.**ACKNOWLEDGEMENTS**

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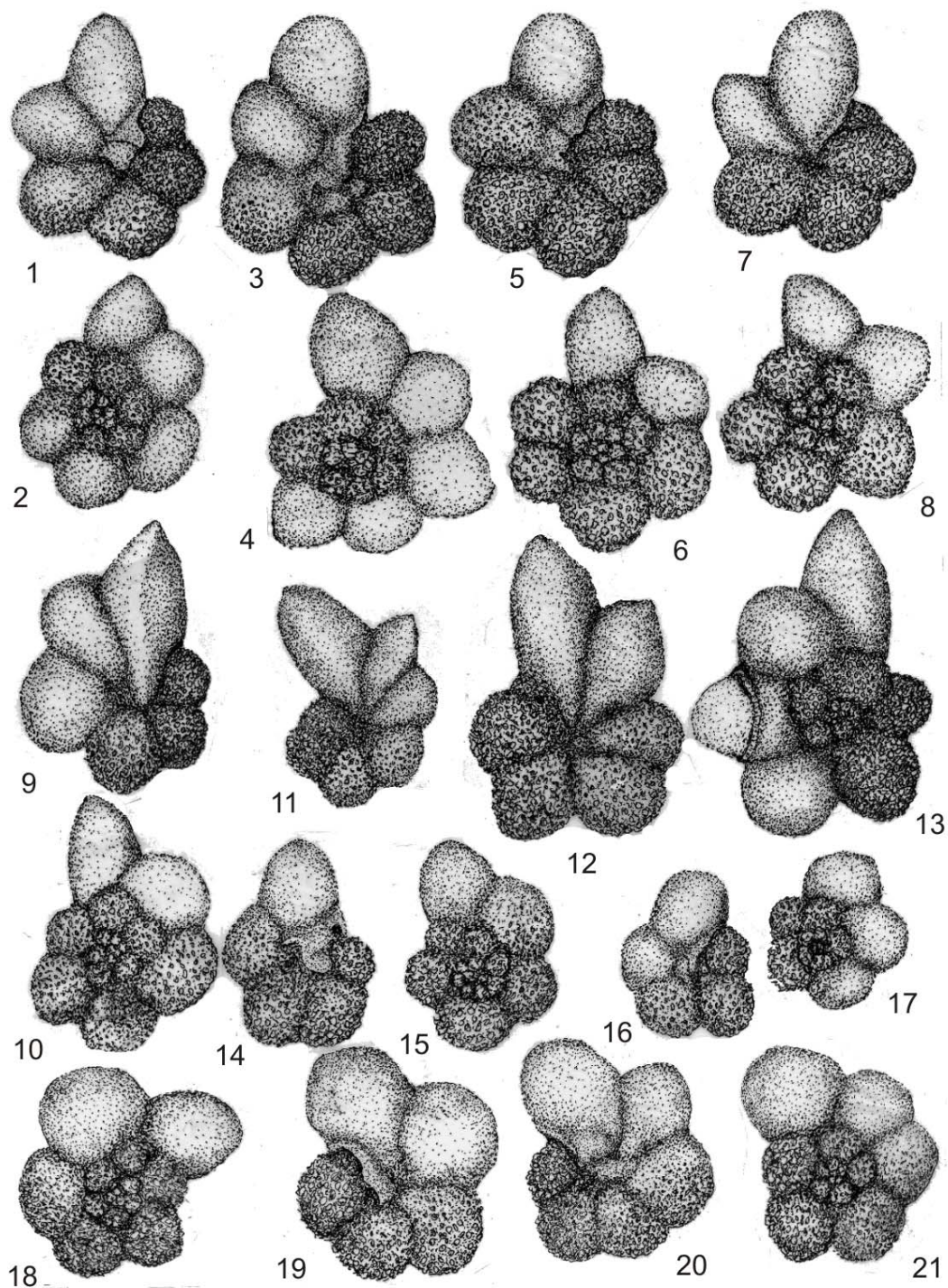
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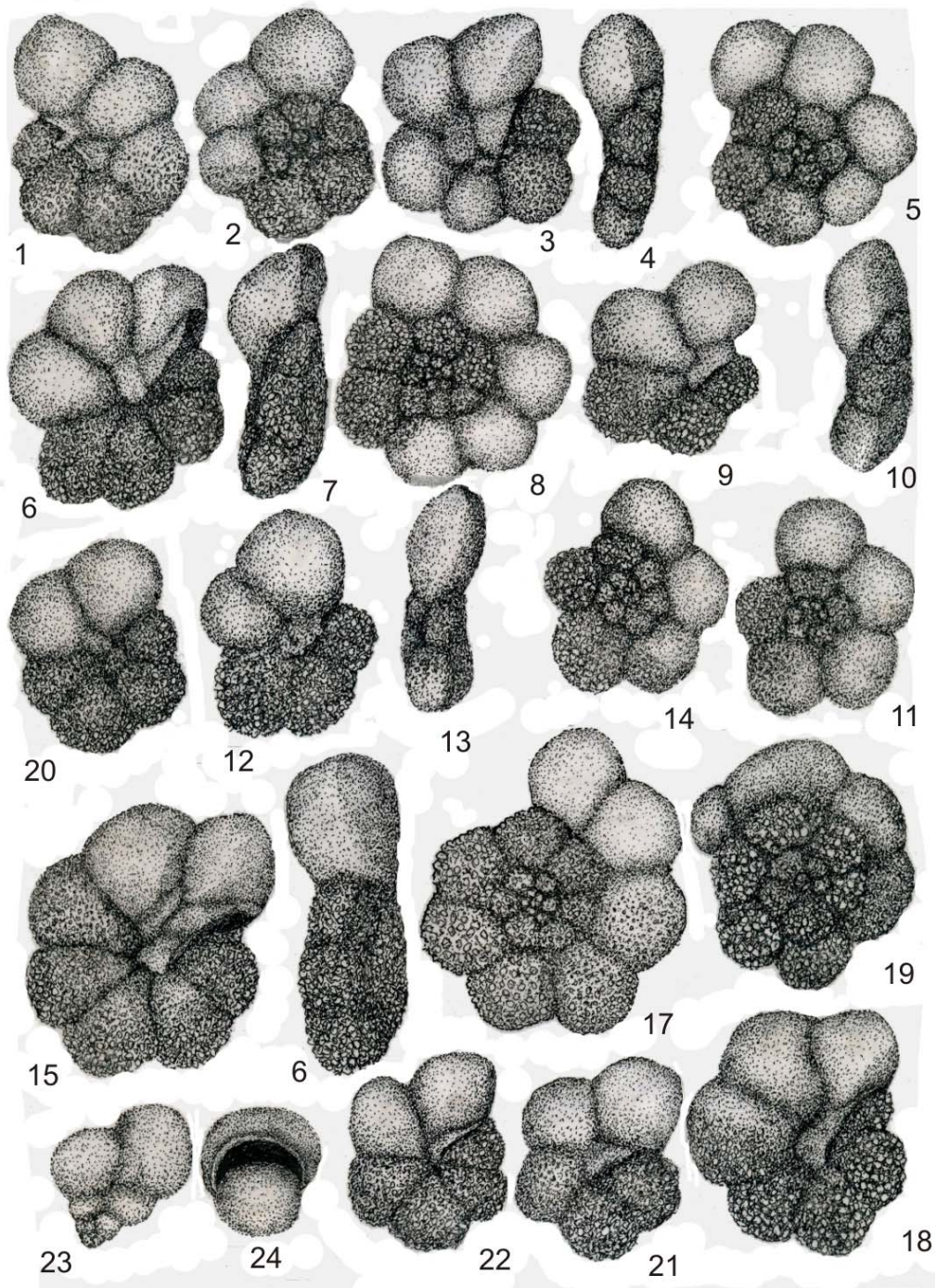
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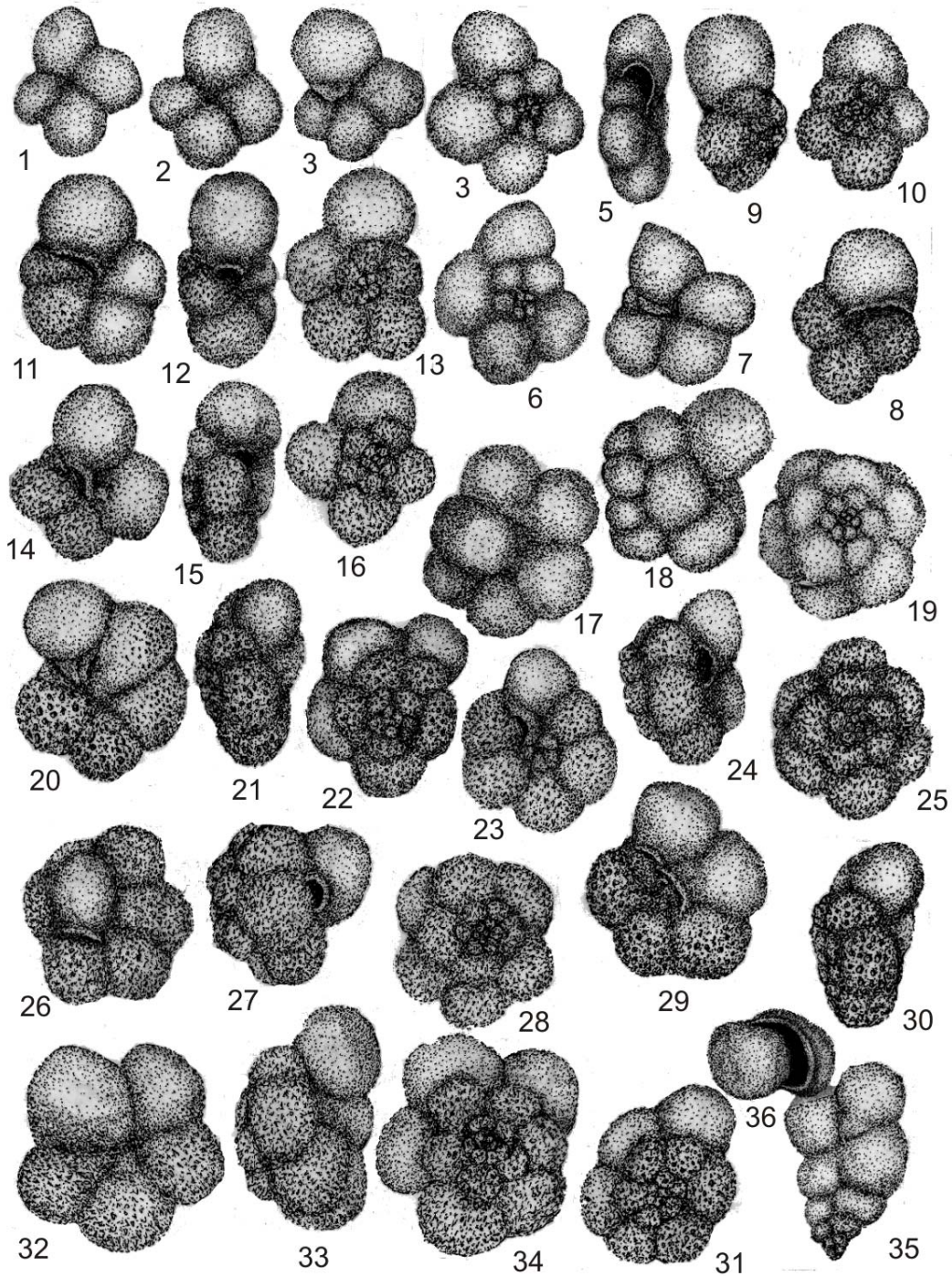
**PLATE 1.** Figs. 1–15 *Whiteinella napolisensis* NEAGU n. sp., Upper Turonian–Coniacian; figs. 1–2 holotype L.P.B.IV. 12116, Voivozii Valley, Pietroșița area; figs. 3–16 paratypes L.P.B.IV 12117, Voivozii Valley – Pietroșița area. Figs. 16–21 *Whiteinella baltica* DOUGLAS & RANKIN 1969, Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV. 12117, 12118.





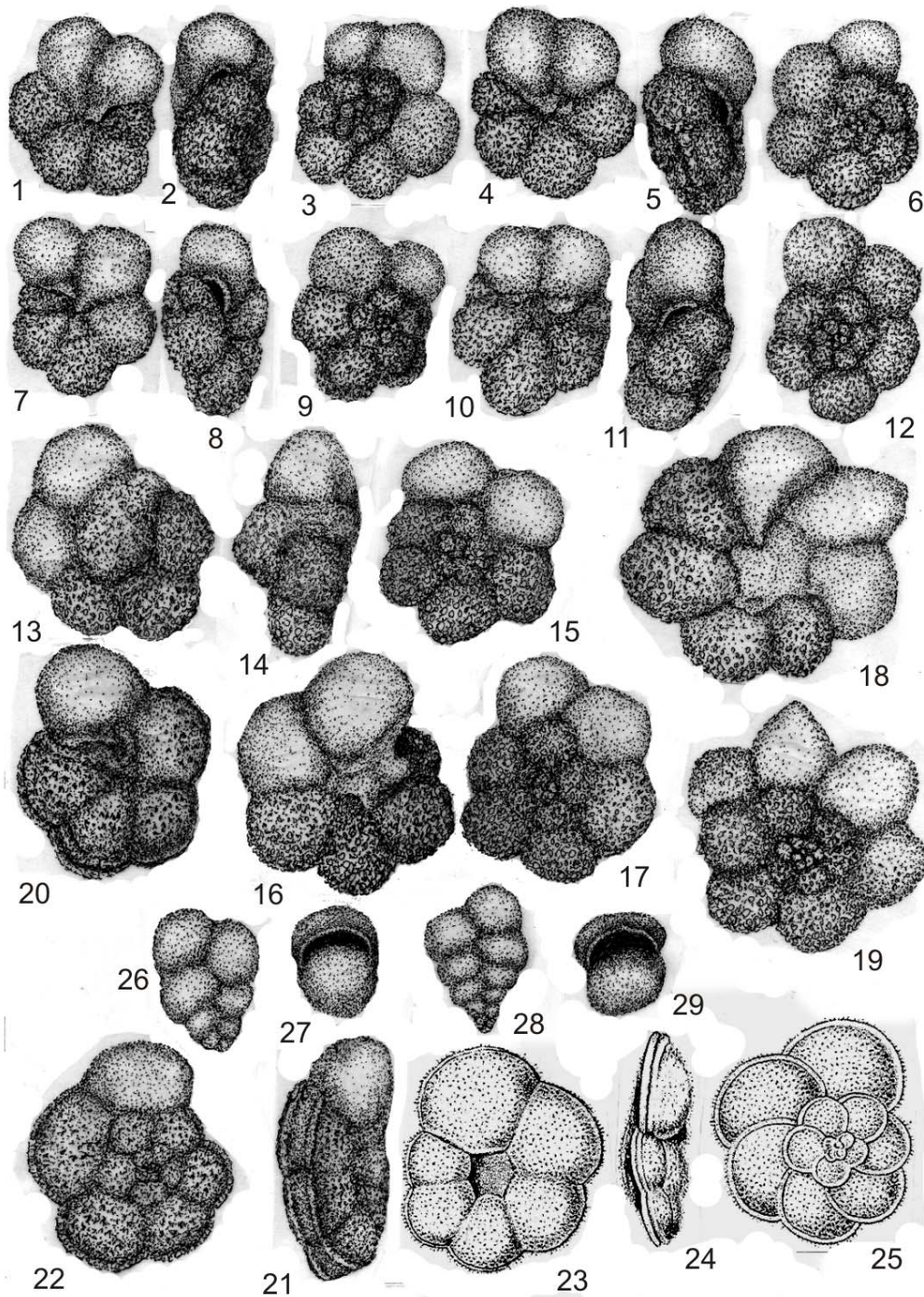
**PLATE 2.** Figs. 1–2 *Whiteinella napolisensis* NEAGU n. sp., paratype L.P.B.IV, 12117, Upper Turonian – Coniacian, Voiozii Valley, Pietroșița area. Figs. 3–21 *Sigalitrucana mihailescui* NEAGU n. sp., figs. 15–17, holotype L.P.B.IV, 12169, figs. 13–14, 18–22, paratypes L.P.B.IV.12170. Figs. 23–24 *Heterohelix globulosa* (EHRENBERG) 1838, Upper Turonian–Coniacian, Voiozii Valley, Pietroșița area, L.P.B.IV. 12195.





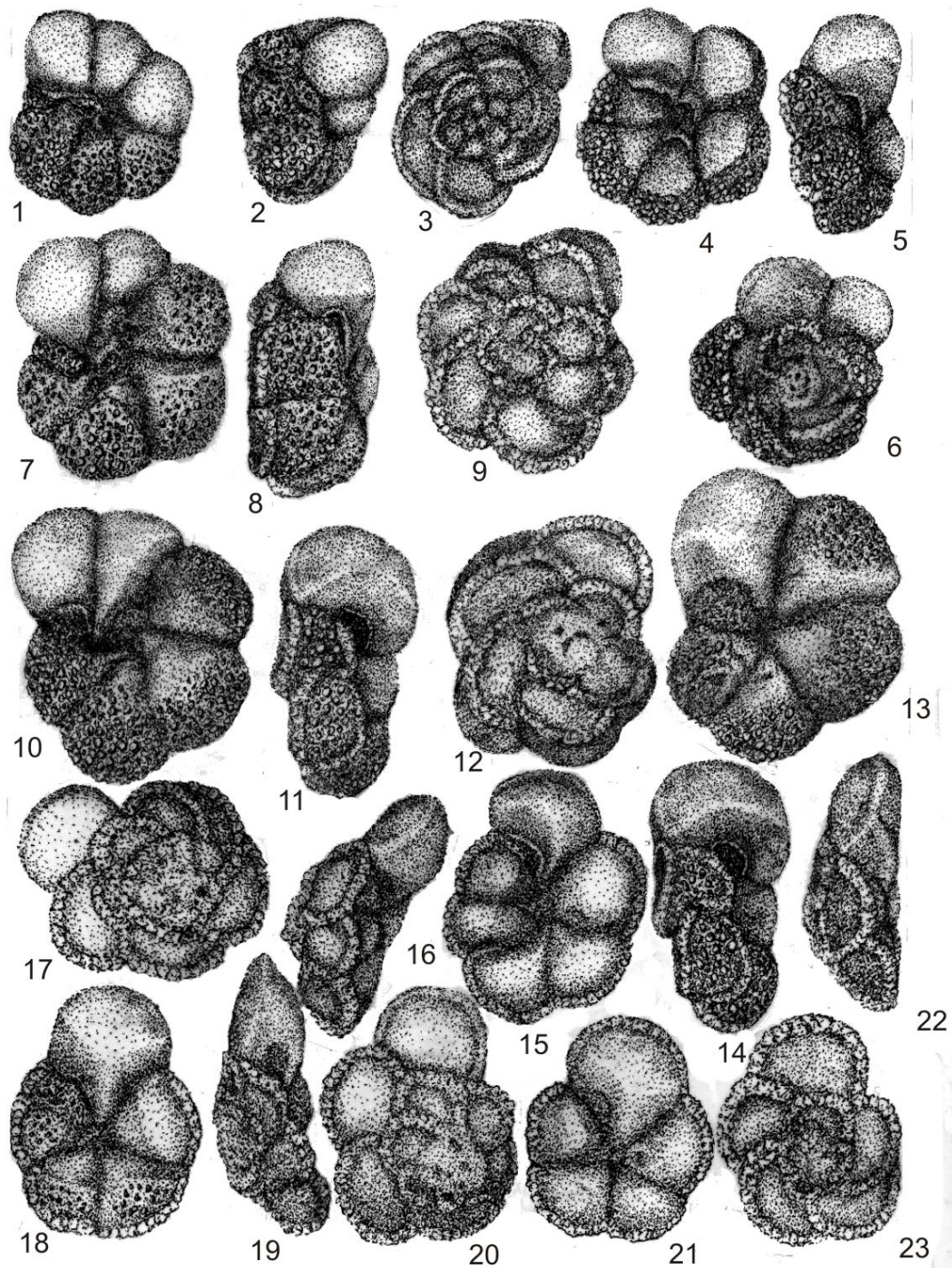
**PLATE 3.** Figs. 1–7 *Hedbergella simplex* (MORROW) 1934, Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12185. Figs. 8–14 *Whiteinella paradubia paradubia* (SIGAL) 1952, Turonian–Lower Coniacian Voivozii Valley, Ialomița area, L.P.B.IV.12171. Figs. 15–18 *Whiteinella paradubia brittonensis* (LOEBLICH & TAPPAN) 1961, Turonian–Lower Coniacian, Voivozii Valley, Pietroșița area, L.P.B.IV.12172. Figs. 35–36 *Heterohelix globulosa* (EHRENBERG) 1838, Upper Turonian, Voivozii Valley, Pietroșița area.





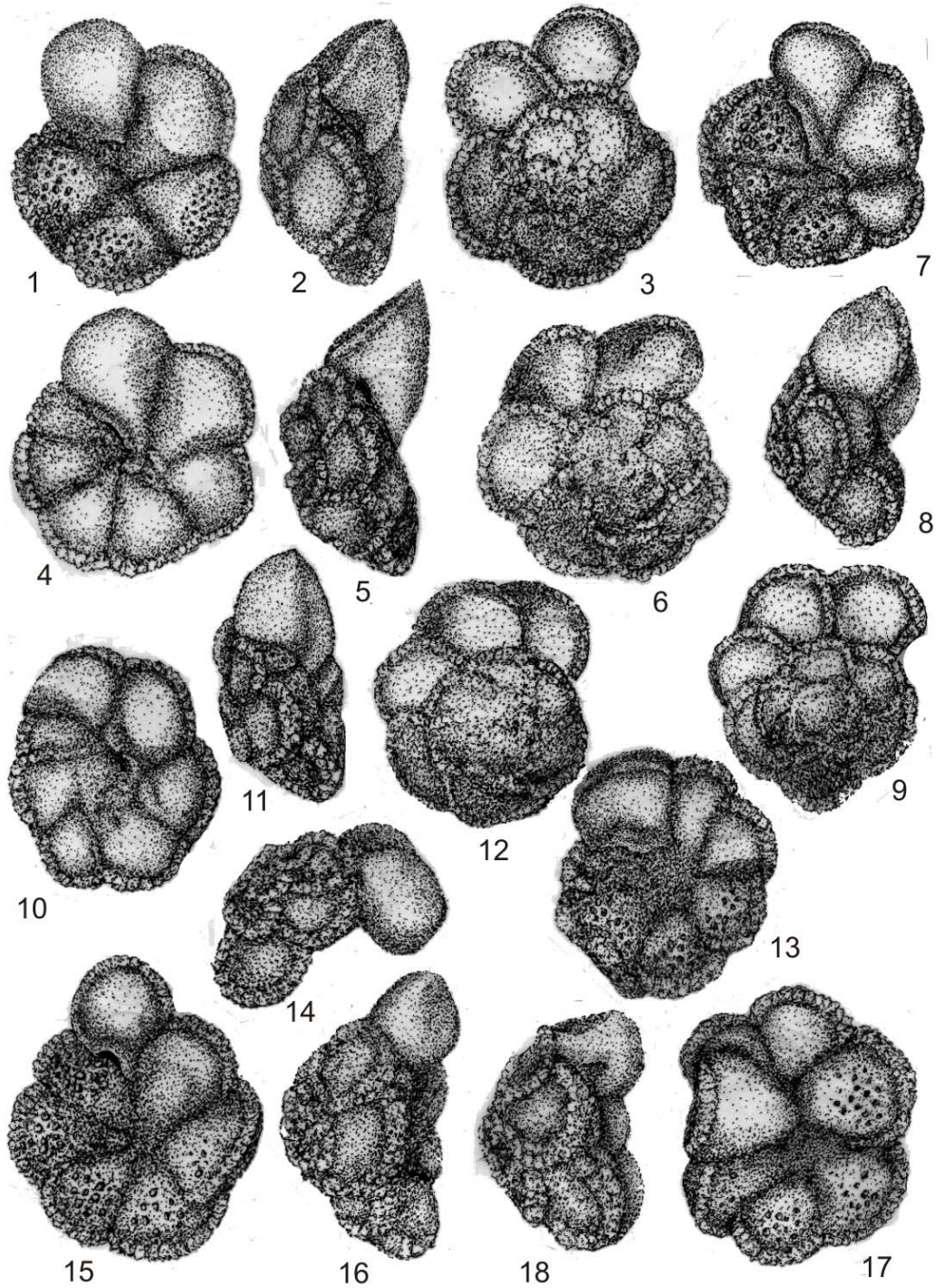
**PLATE 4.** Figs. 1–15 *Whiteinella aprica* (LOEBLICH & TAPPAN) 1961, Turonian–Coniacian, Siliștea Valley, Pietroșița area, L.P.B.IV. 12179–12176. Figs. 16–19 *Whiteinella napolisensis* NEAGU *n.sp.*, paratype L.P.B.IV.12117, Voivozii Valley, Pietroșița area. Figs. 20–22 *Marginotruncana globigerinoides* (BROTZEN) 1936, Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12152. Figs. 23–25 “*Rosalina marginata*” REUSS 1845–1854 copy from original pl. 26, fig. 1–1854.





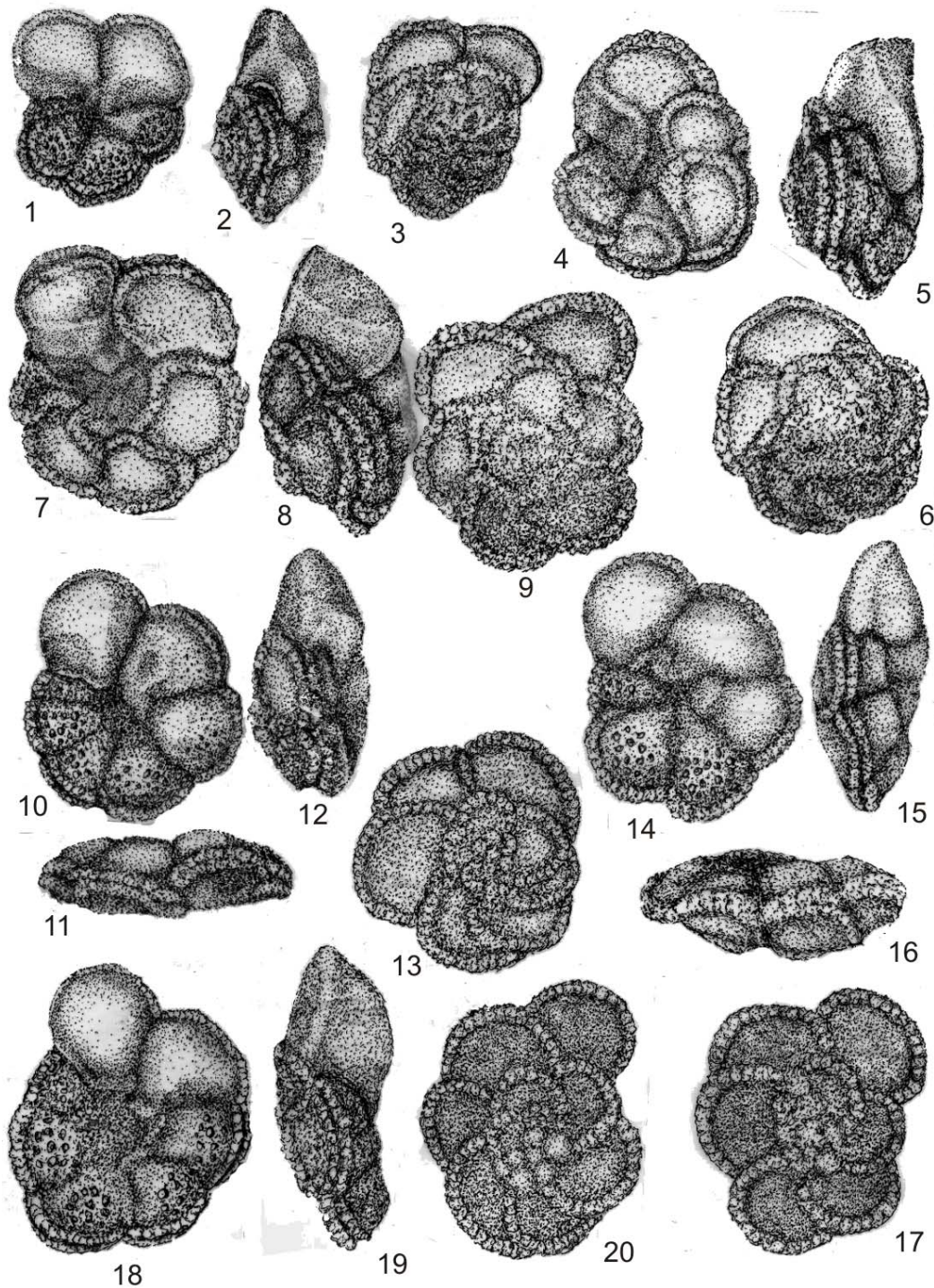
**PLATE 5.** Figs. 1–6 *Helvetoglobotruncana praehelvetica* (TRUJILLO) 1960, Lower Turonian, Siliștea Valley, Pietroșița area, L.P.B.IV.12123. Figs. 7–14 *Helvetoglobotruncana helvetica* (BOLLI) 1945, Lower Turonian, Siliștea Valley Pietroșița area, L.P.B.IV.12120. Figs. 15–23 *Praeglobotruncana barbui* NEAGU 1969, Lower Turonian, Siliștea Valley, Pietroșița area, L.P.B.IV.12128.





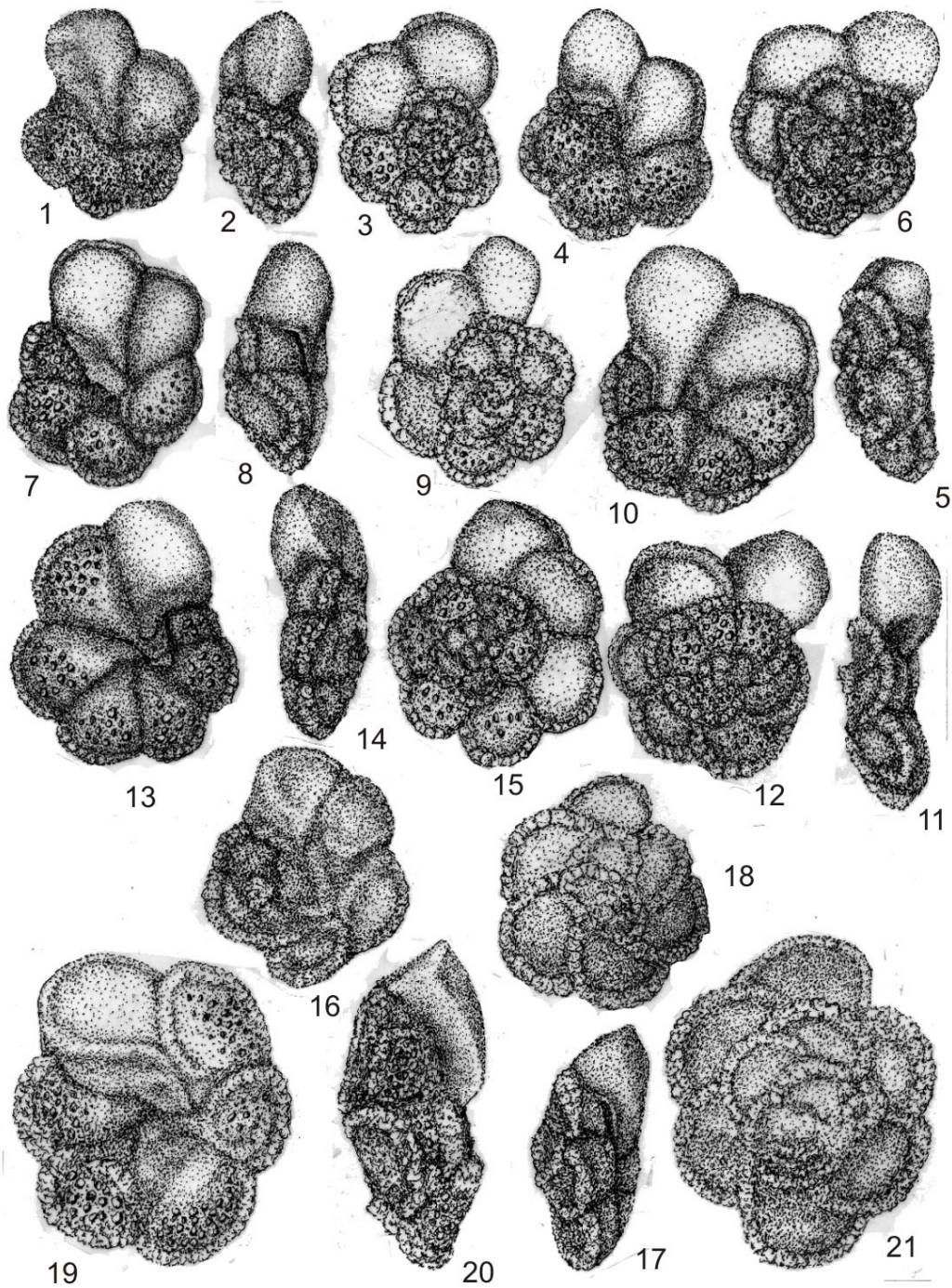
**PLATE 6.** Figs. 1-3 *Praeglobotruncana barbui* NEAGU 1969, Lower Turonian, Siliștea Valley, Pietroșița area, L.P.B.IV.12128. Figs. 4-18 *Praeglobotruncana prahovae* NEAGU 1969, Lower Turonian, Siliștea Valley, L.P.B.IV.12125.





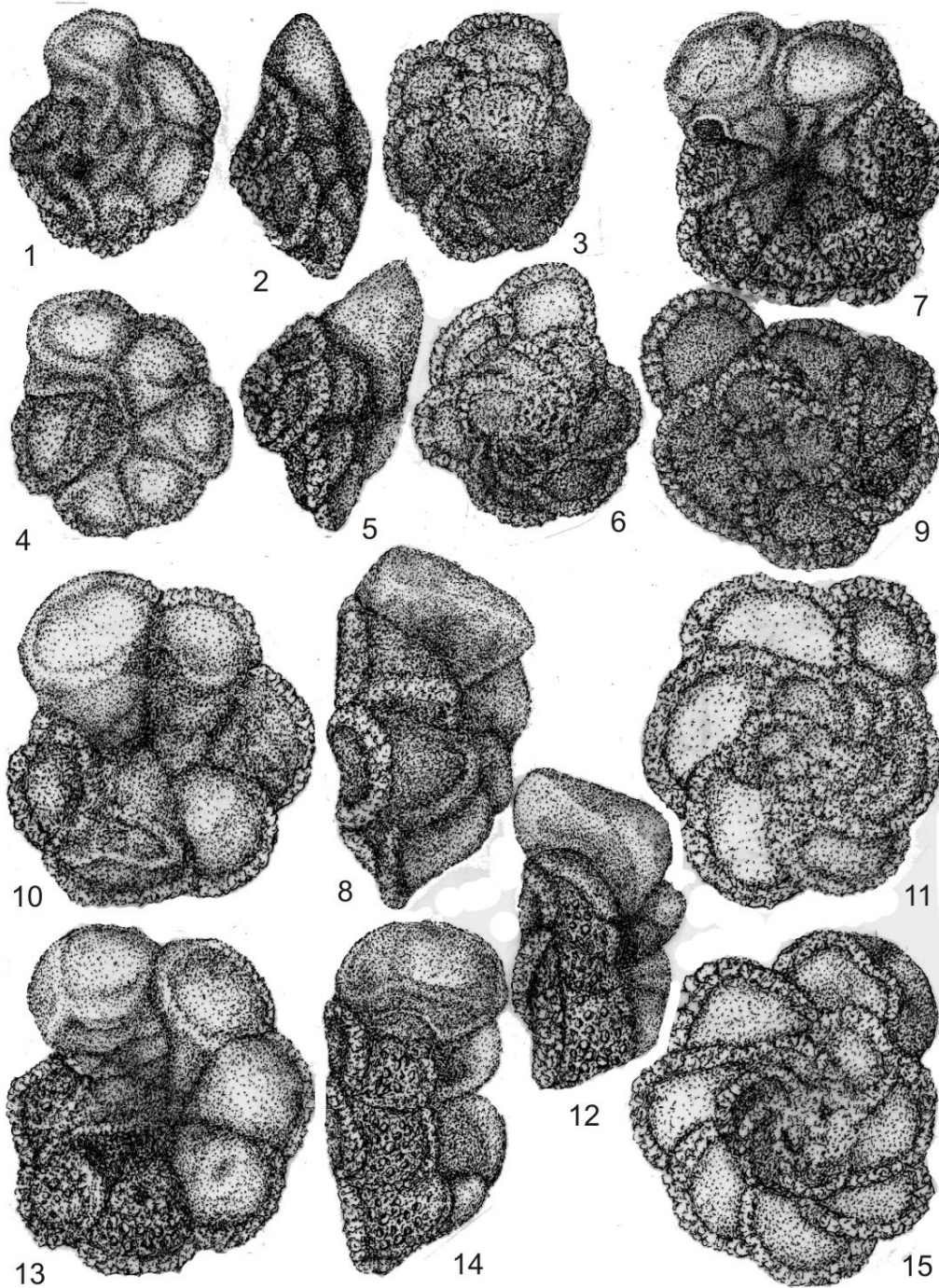
**PLATE 7.** Figs. 1–9 *Dicarinella algeriana* (CARON) 1966, Turonian, Ialomița Valley, L.P.B.IV.12130. Figs. 10–13 *Dicarinella marginata rodai* (MARIANOS & ZINGULA) 1960, Turonian, Voivozii Valley, Pietroșița area L.P.B.IV.12189. Figs. 14–20 *Dicarinella marginata marginata* (REUSS) 1845–1854 Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12183.





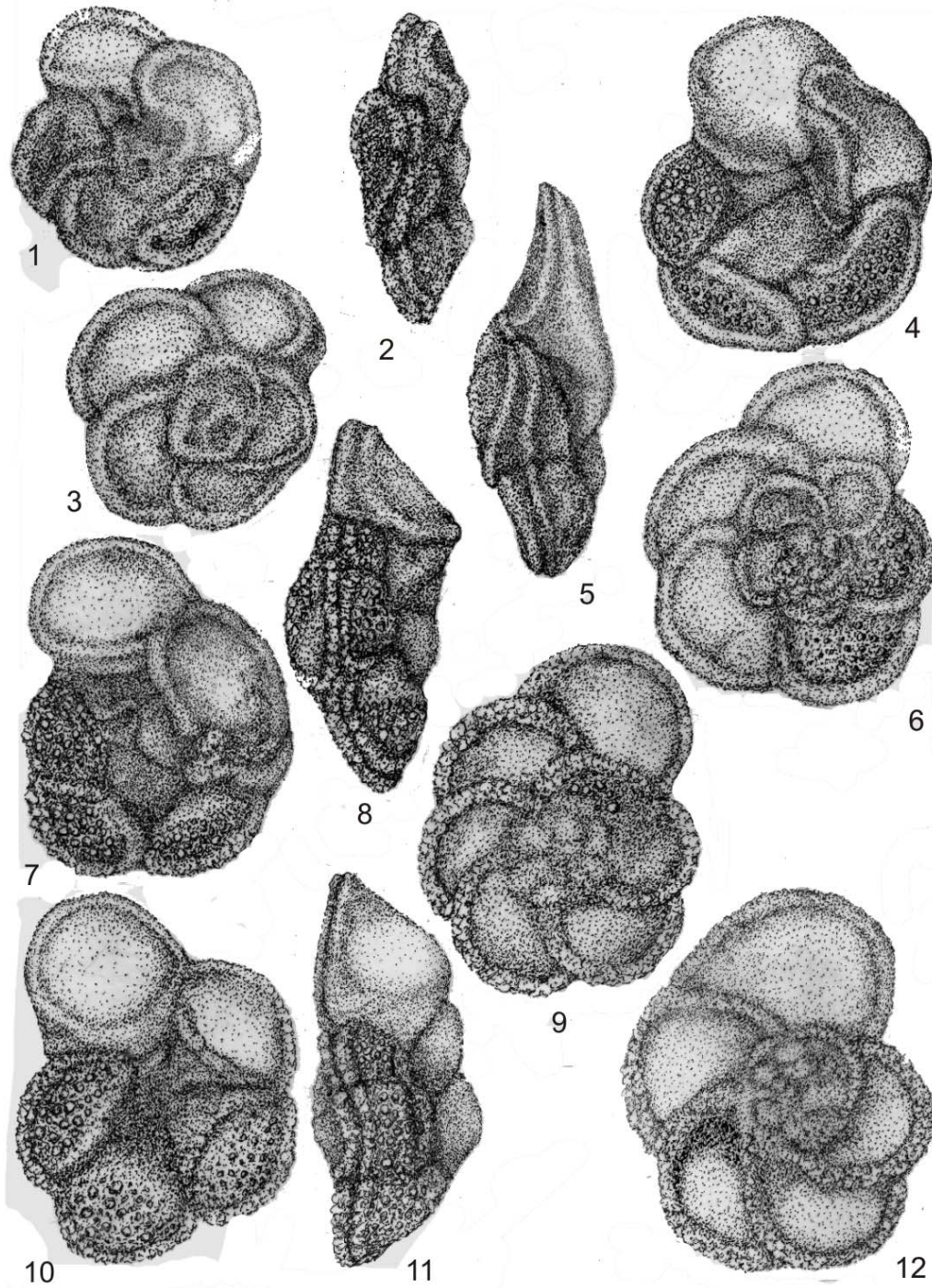
**PLATE 8.** Figs. 1–15 *Sigalitrucana mihailescui* NEAGU n. sp., figs. 10–12 holotype, L.P.B.IV.12169, Middle–Upper Turonian, Voivozii Valley, Pietroșița area, figs. 1–9, 13–15, paratypes Middle–Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12170. Figs. 16–21 *Sigalitrucana sigali* (REICHEL) 1950, Middle–Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12158.





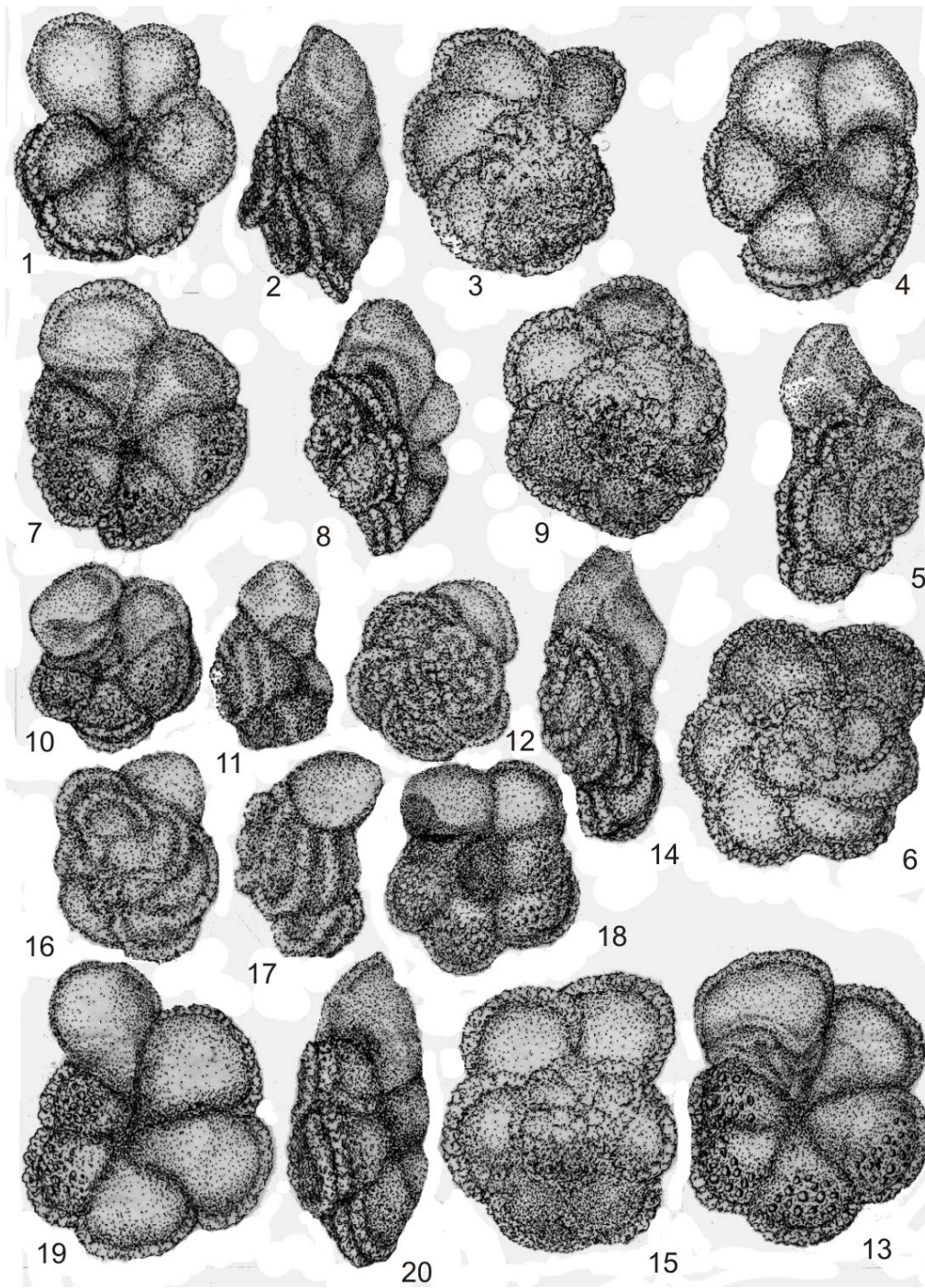
**PLATE 9.** Figs. 1–6 *Sigalitruncana sigali* (REICHEL)1950, Middle–Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12158. Figs. 7–15 *Sigalitruncana marianosi* (DOUGLASS) 1969, MiddleTuronian, Voivozii Valley, Pietroșița area, L.P.B.IV.12161.





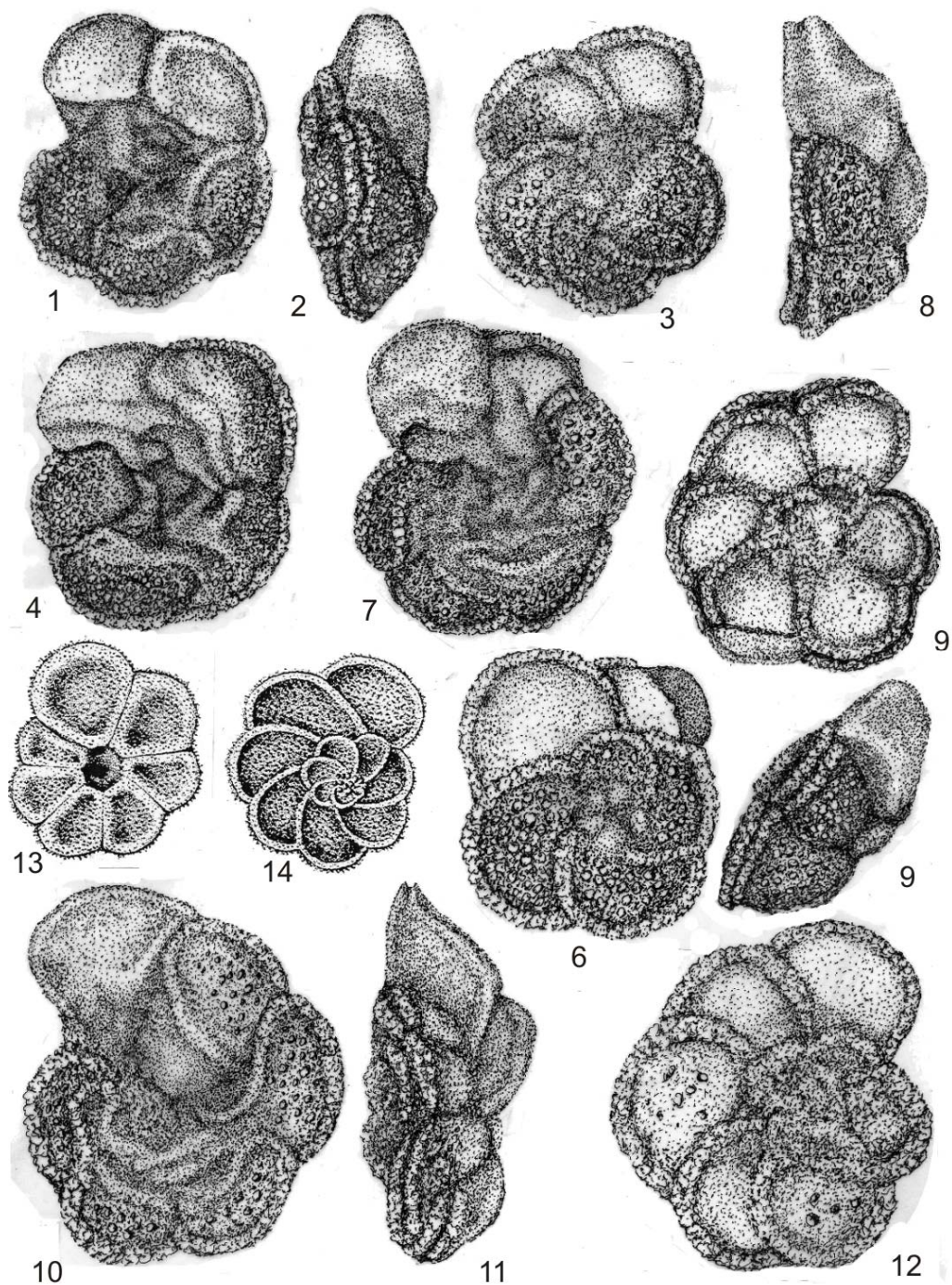
**PLATE 10.** Figs. 1–6 *Marginotruncana tarfayaensis* (LEHMAN) 1963, Upper Turonian–Lower Coniacian, Voivozii Valley, Pietroșița area, L.P.B.IV. 12147. Figs. 7–12 *Sigalitruncana schneegansi* (SIGAL)1952, Upper Turonian–Lower Coniacian, Tzatzá Vally, Pietroșița area, L.P.B.IV. 12164.





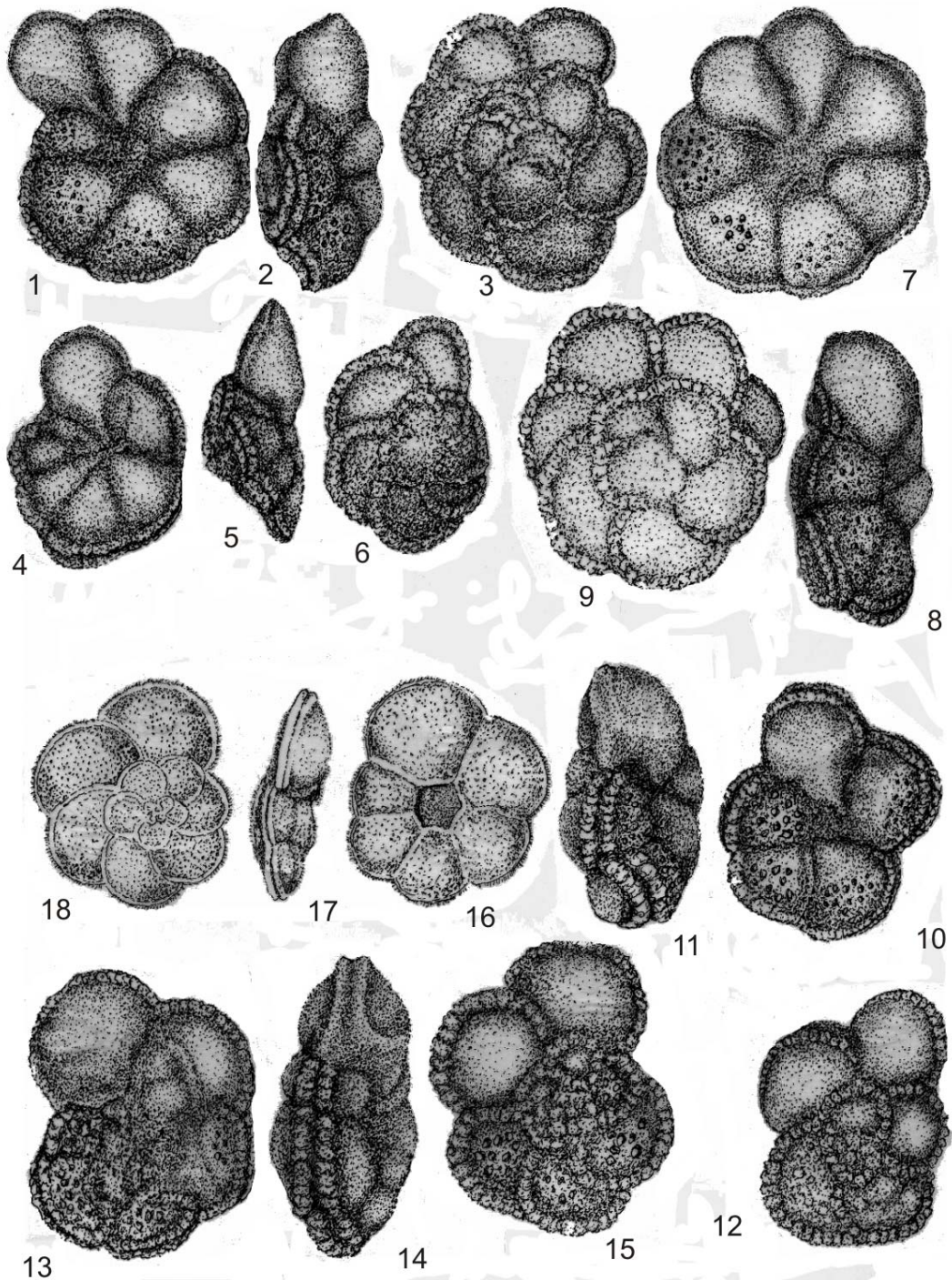
**PLATE 11.** Figs. 1–20 *Dicarinella imbricate* (MORNOD)1950, Middle Turonian, Siliștea Valley, Pietroșița area, L.P.B.IV. 12133.





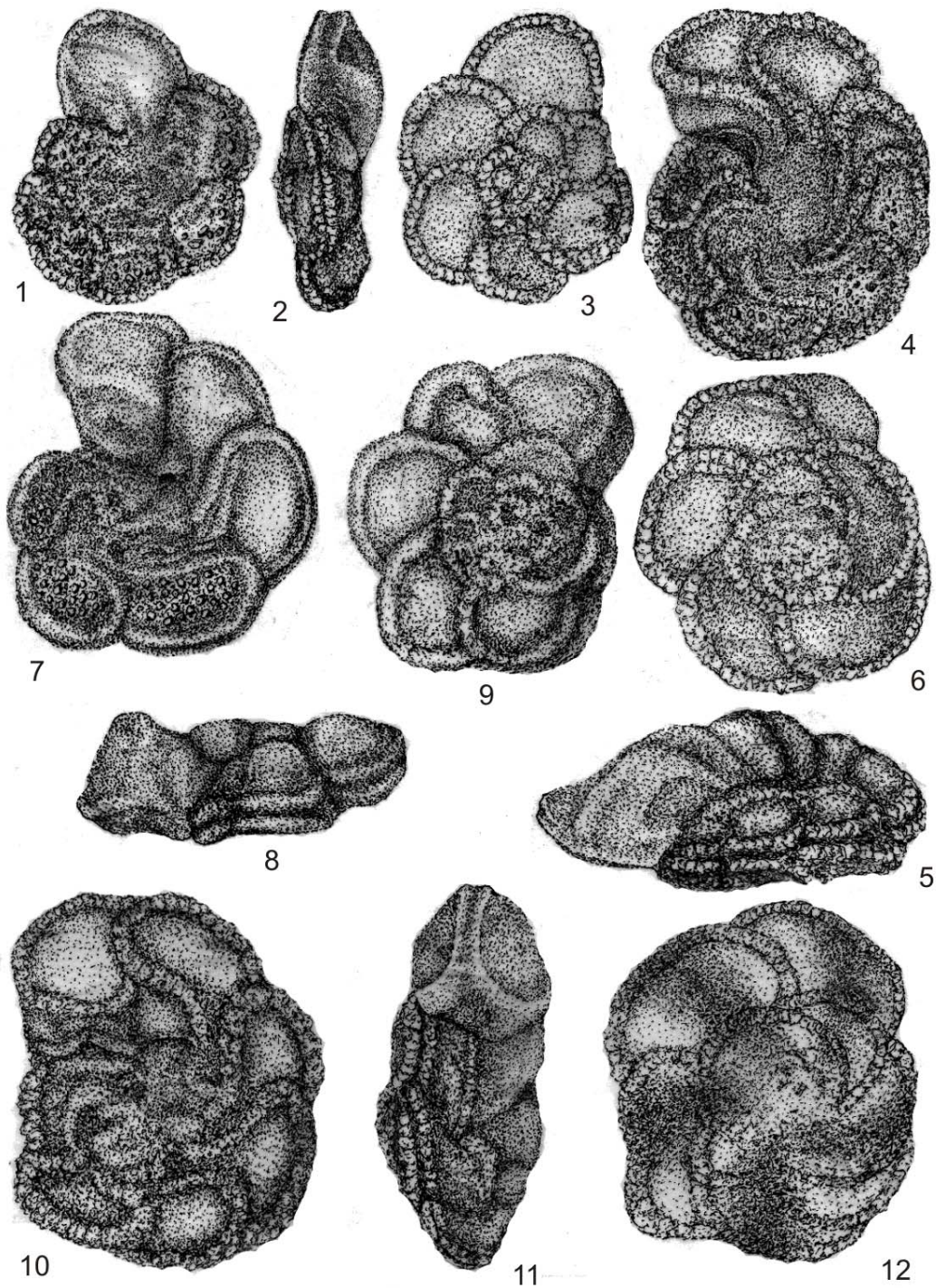
**PLATE 12.** Figs. 1–6 *Marginotruncana paraconcavata* PORTHAULT 1970, Upper Turonian–Coniacian, Voivozii Valley, Pietroșița area, L.P.B.IV. 12140. Figs. 7–12 *Dicarinella primitiva* (DALBIEZ) 1953, Coniacian, Țâța Valley, Pietroșița area, L.P.B.IV.12136. Figs. 13–14 “*Rosalina canaliculata*” REUSS 1854, copy from Reuss’s original pl. 26, fig. 4a–b.





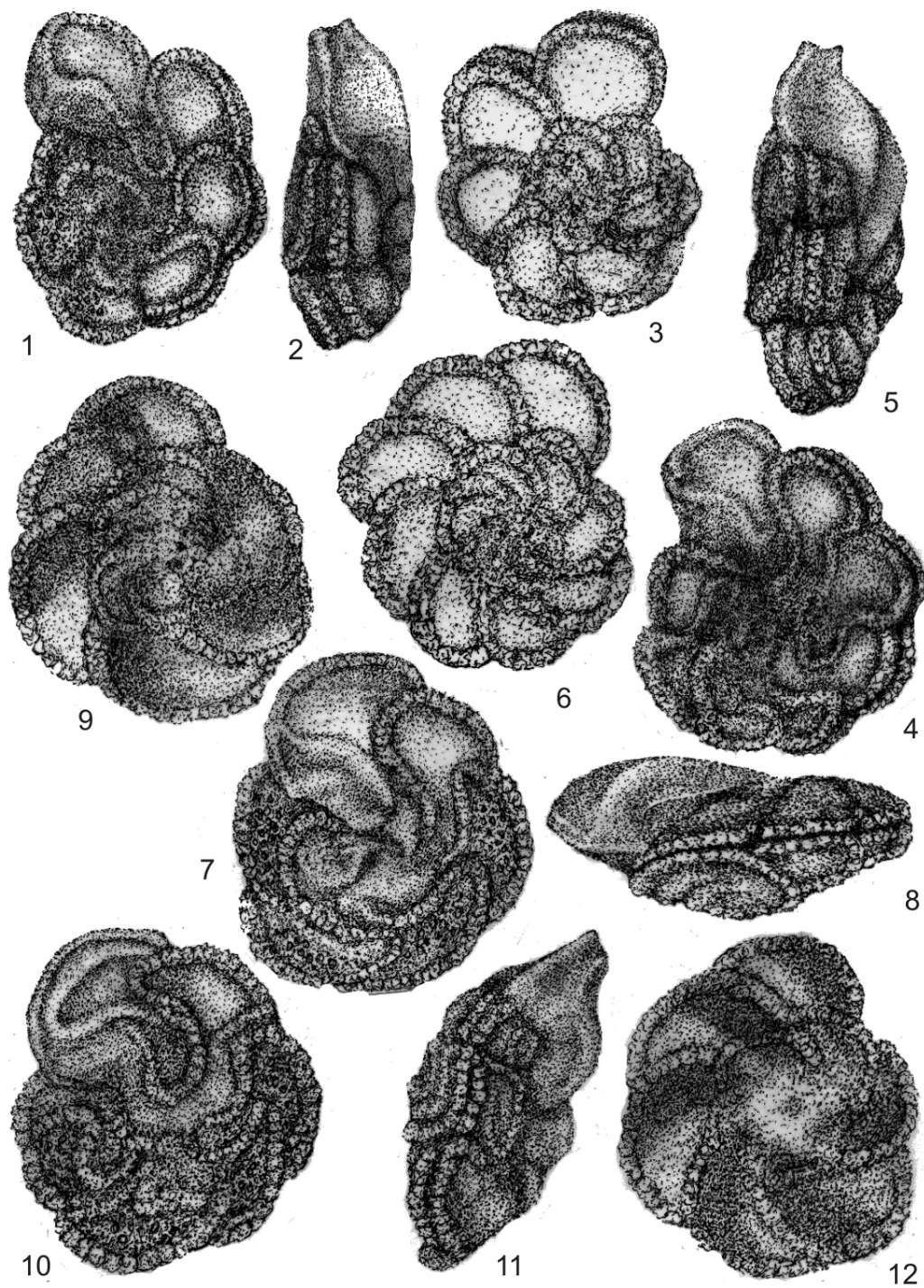
**PLATE 13.** Figs. 1–3, 7–9 *Dicarinella marginata marginata* (REUSS) 1845–1854, Turonian, Siliștea Valley, Pietroșița area, L.P.B.IV.12185. Figs. 4–6 *Dicarinella marginata hagni* (SCHEIBNERROVA) 1962, Turonian, Siliștea Valley, L.P.B.IV.12184. Figs. 10–15 *Marginotruncana pseudomarginata* NEAGU nom. nov., Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12155. Figs.16–18 “*Rosalina marginata*” REUSS 1954, copy from the Reuss’s original pl. 26, fig. 1.





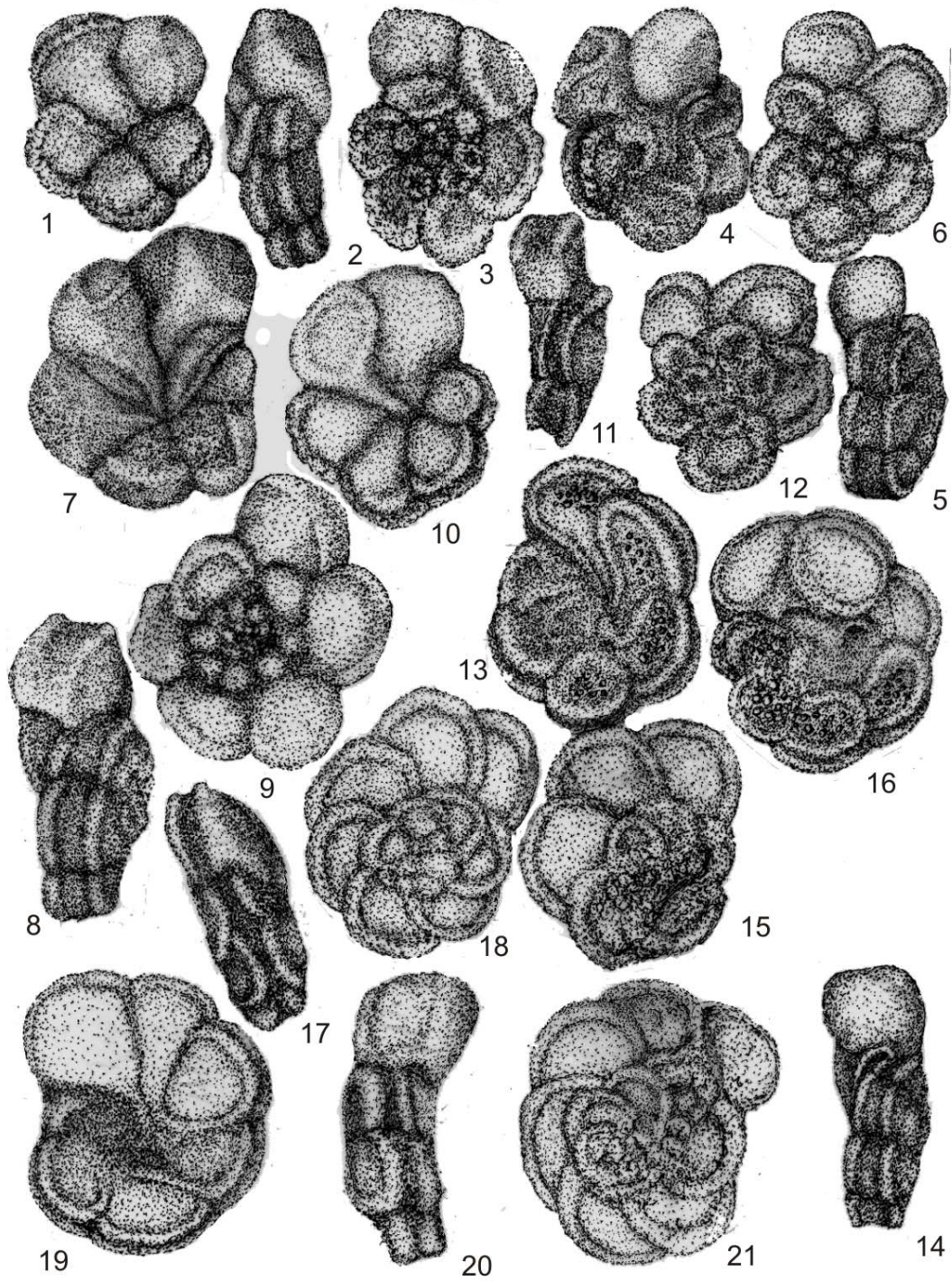
**PLATE 14.** Figs. 1-9 *Marginotruncana angustimarginata* (GANDOLFI) 1942, Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12144. Figs. 10-12 *Sigalitruncana undulata* (LEHMAN) 1963, Upper Turonian, Voivoda Valley, Pietroșița area, L.P.B.IV.12168.





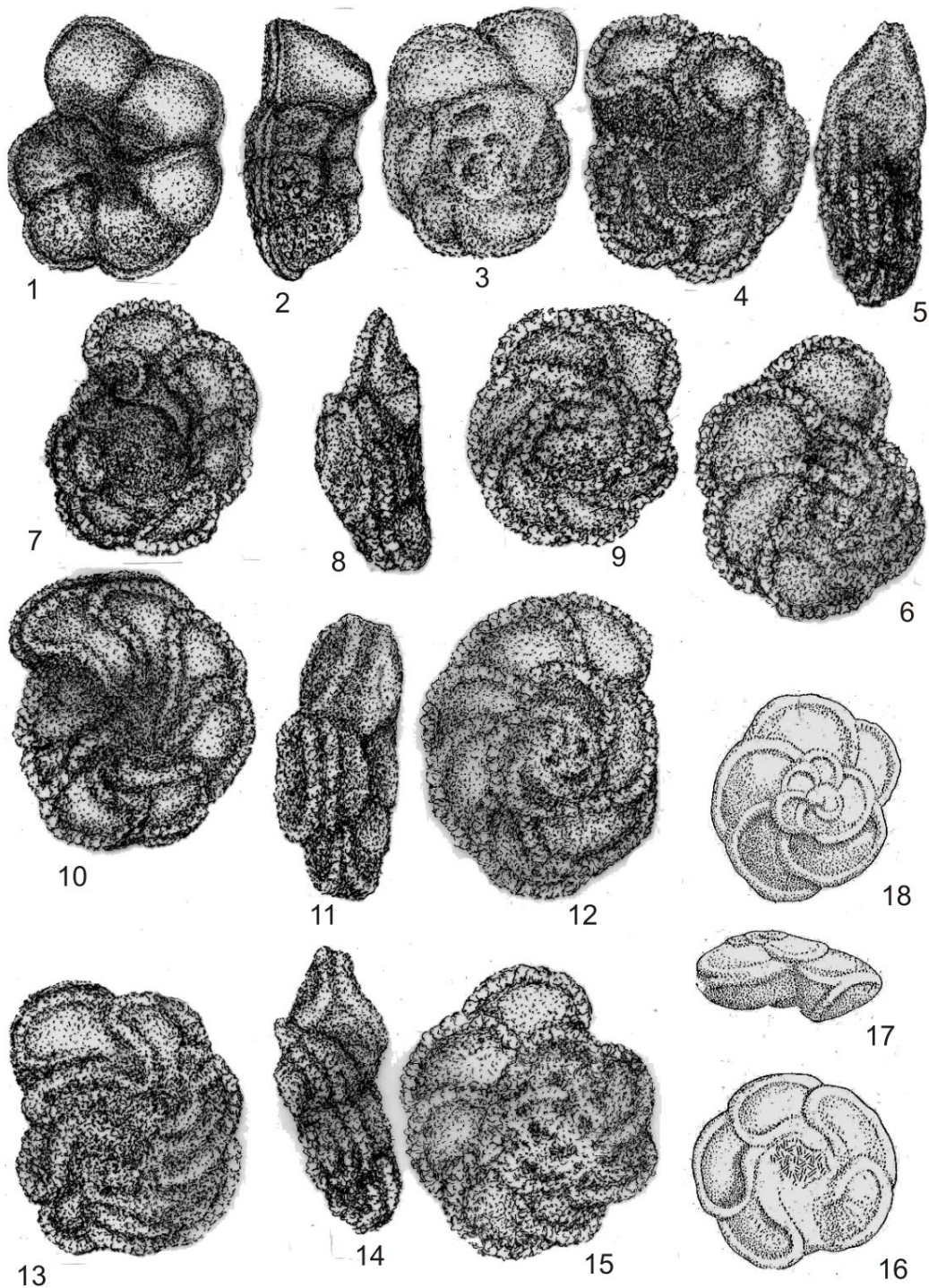
**PLATE 15.** Figs. 1–6 *Marginotruncana pseudolinneiana* PESSAGNO 1967, Upper Turonian, Țâța Valley, Pietroșița area, L.P.B.IV.12142. Figs. 7–12 *Sigalitruncana undulata* (LEHMAN) 1963, Upper Turonian, Țâța Valley, Pietroșița area, L.P.B.IV.12167.





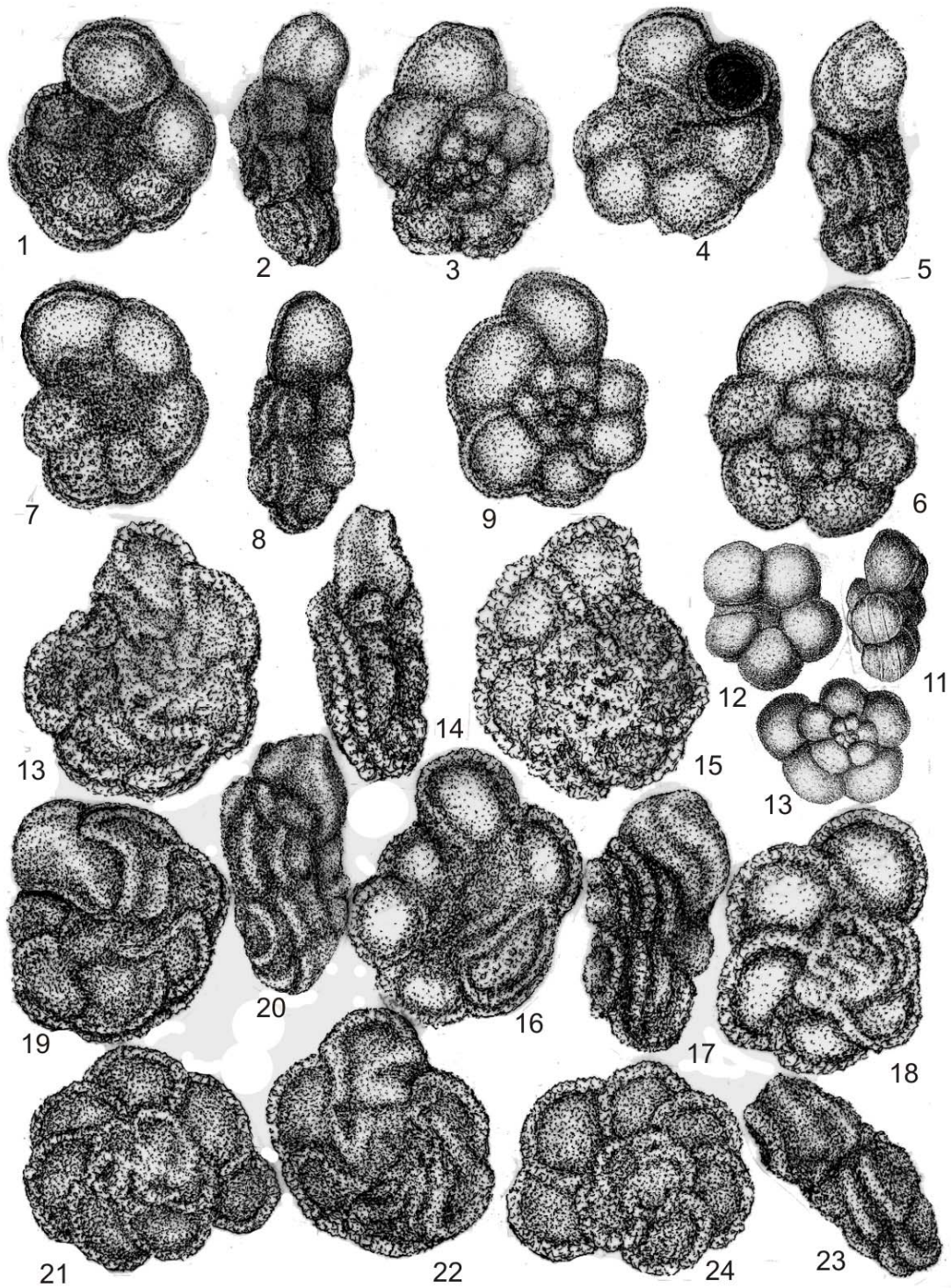
**PLATE 16.** Figs. 1–12 *Dicarinella canaliculata* (REUSS) 1845, Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12132. Figs. 13–21 *Marginotruncana pseudolinneiana* PESSAGNO 1967, Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12142.





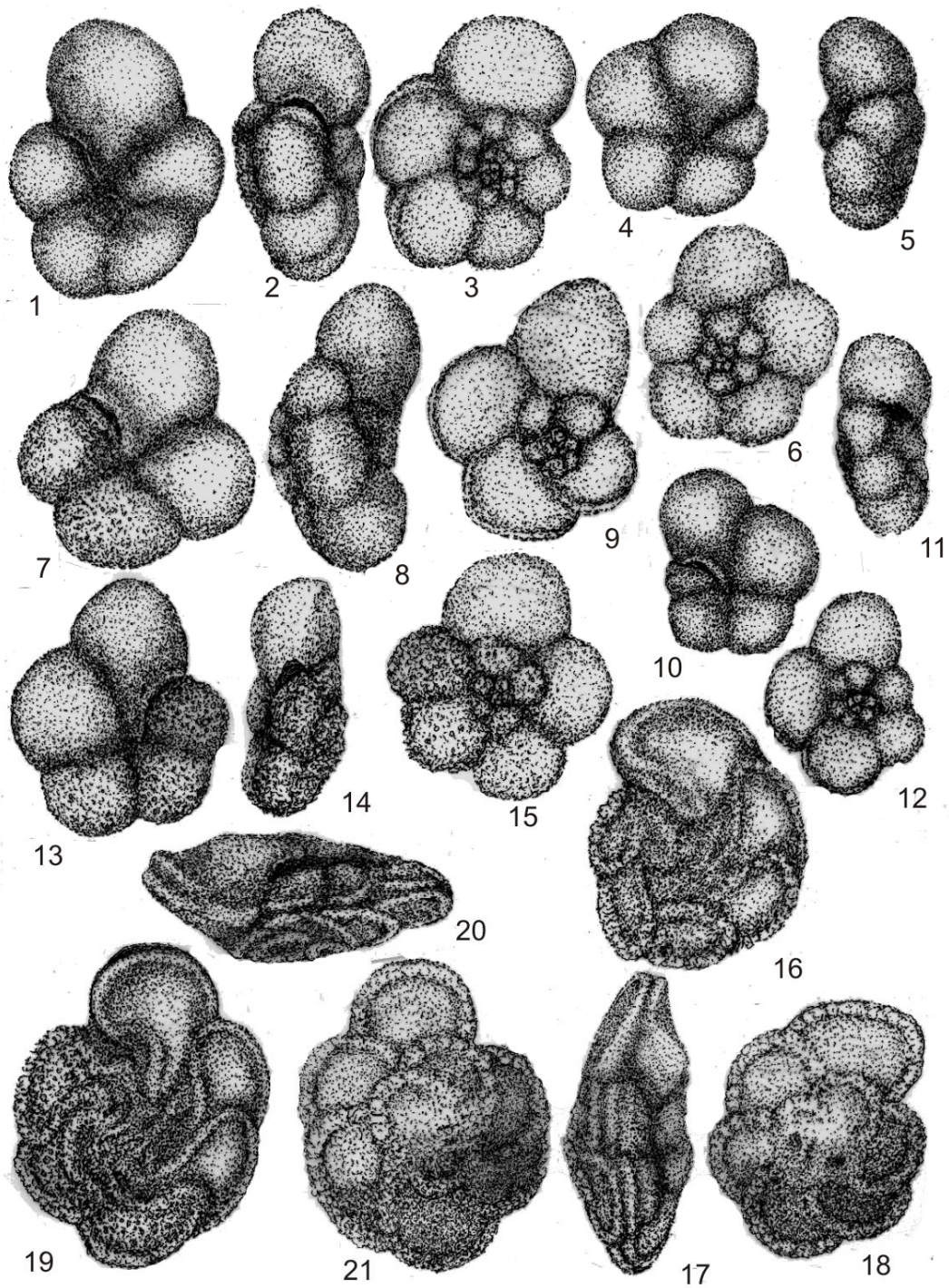
**PLATE 17.** Figs. 1–3 *Dicarinella concavata* (BROTZEN) 1934, Coniacian, Țâța Valley, L.P.B.IV.12139. Figs. 4–12 *Marginotruncana renzi* (GANDOLFI) 1942, Turonian, Siliștea Valley, Pietroșița area, L.P.B.IV.12151. Figs. 13–15 *Marginotruncana coronata* (BOLLI) 1945, Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12148. Figs. 16–18 “*Globotruncana linnei renzi*” GANDOLFI 1942, pl. II, fig. 1 a–c, copy after Gandolfi’s original.





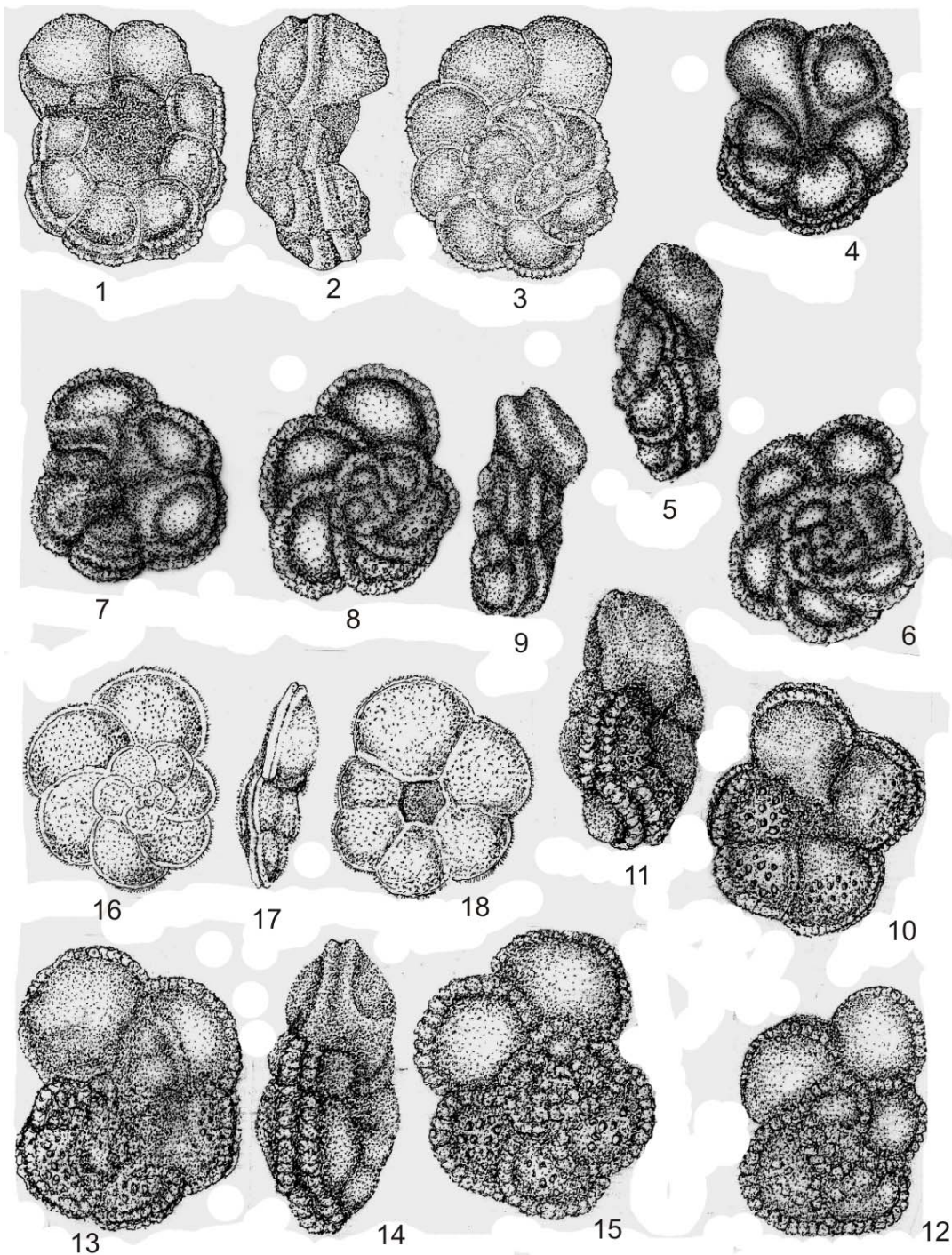
**PLATE 18.** Figs. 1–9 *Marginotruncana globigerinoides* BROTZEN 1936, Turonian, Lupului Valley, Pietroșița area, L.P.B.IV.12154. Figs. 10–12 “*Globotruncana globigerinoides*” BROTZEN 1936, pl. 12, fig. 3a–c, copy after original. Figs. 13–15 *Marginotruncana coronata* (BOLLINI) 1945, Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12152. Figs. 16–24 *Marginotruncana pseudomarginata* NEAGU 2011, Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12155.





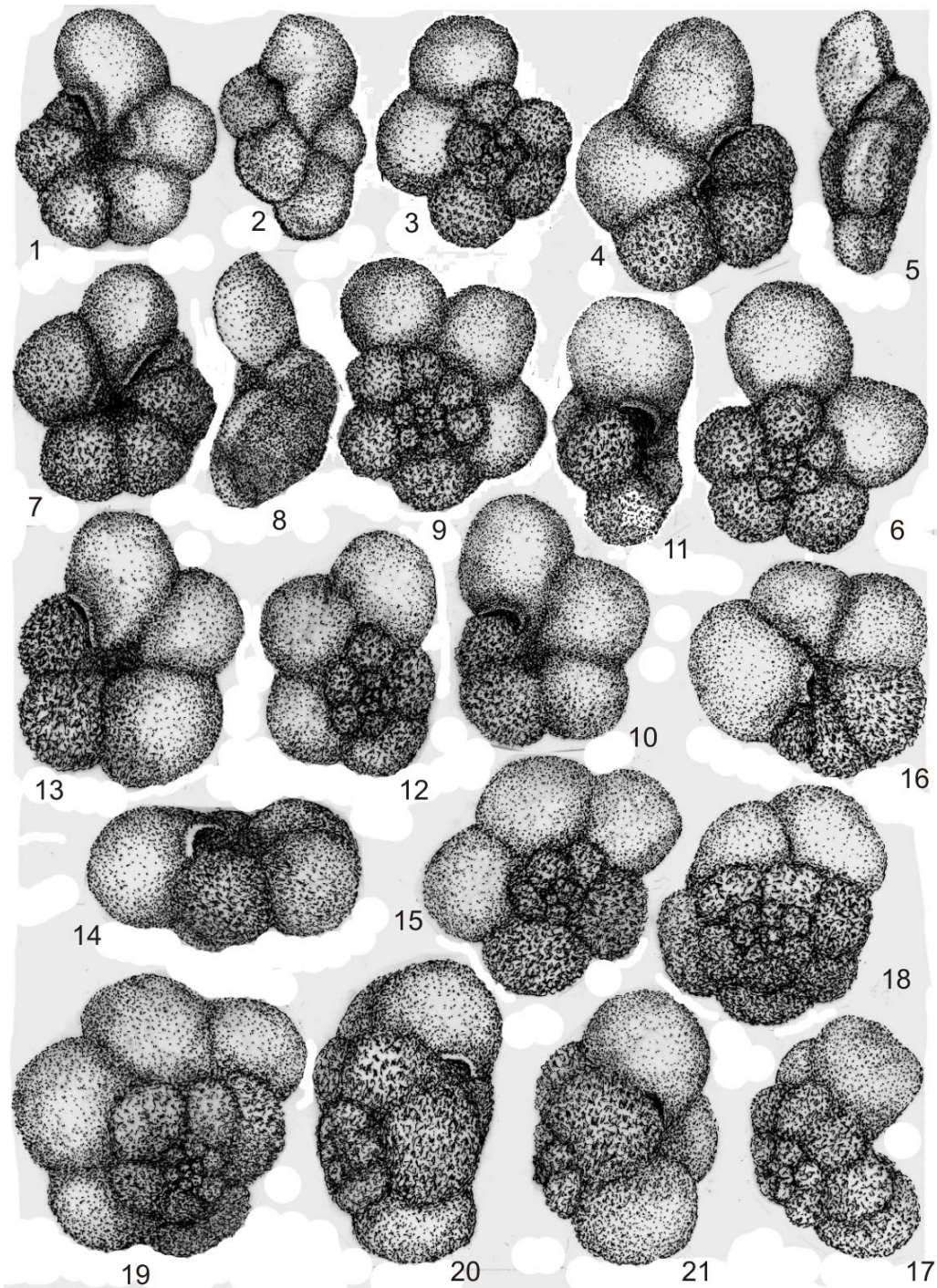
**PLATE 19.** Figs. 1–12 *Whiteinella inornata* (BOLLI) 1957, Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12186. Figs. 13–15 *Sigalitrucana mihailescui* NEAGU n. sp., paratypes, Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12171. Figs. 16–21 *Marginotruncana sinuosa* (LEHMAN) 1963, Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12187.





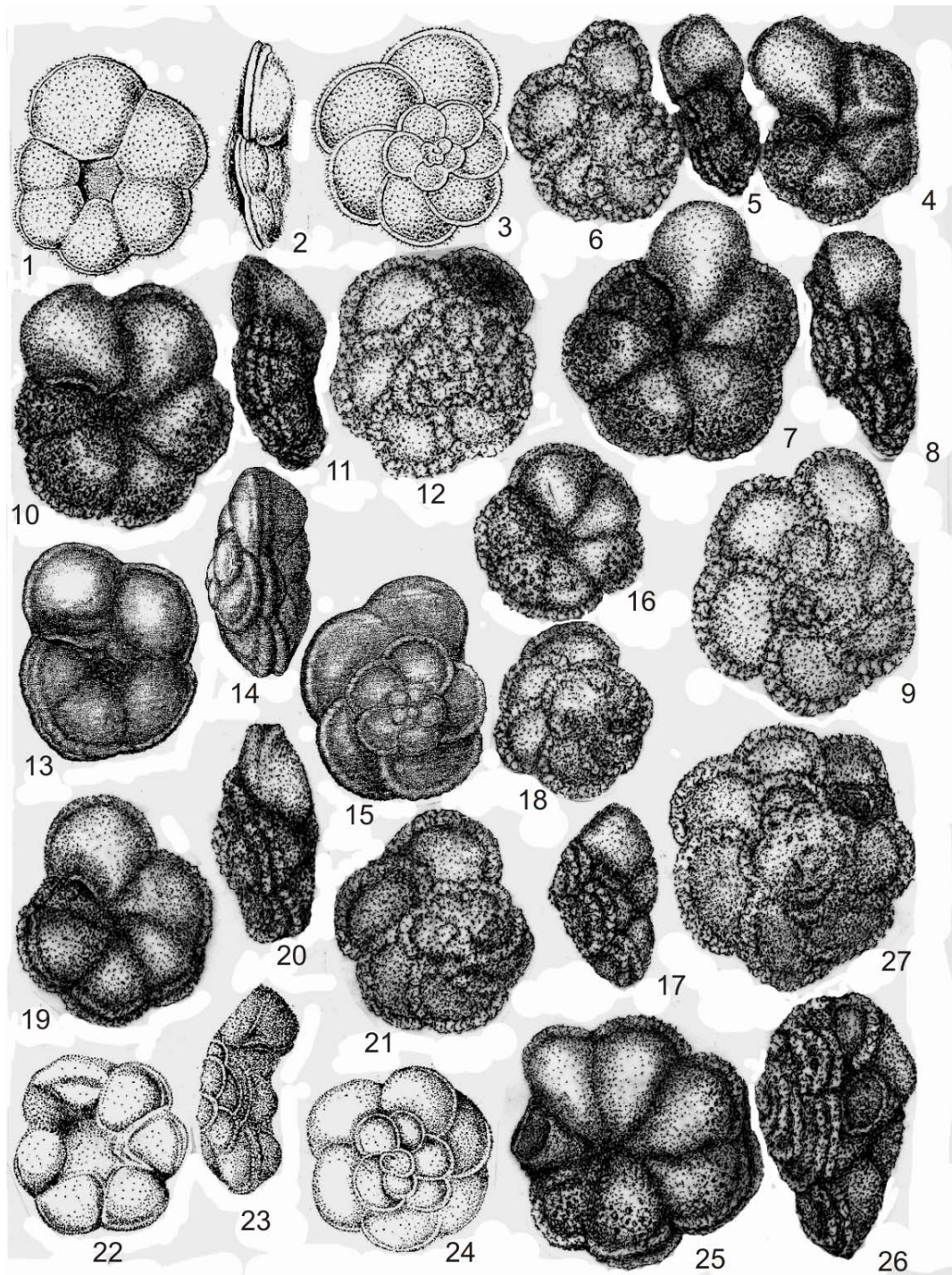
**PLATE 20.** Figs. 1–3 “*Globotruncana linneiana marginata*” JIROVA 1956, (not REUSS 1845 ) pl. 1, fig. 1 (copy after Jirova’s original) *Marginotruncana pseudolinneiana* NEAGU nom.nov. Figs. 4–9 *Marginotruncana pseudomarginata* NEAGU nom. nov., Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12155. Figs. 10–15 *Dicarinella marginata marginata* (REUSS) 1845 – 1854, Turonian, Silișteea Valley, L.P.B.IV.12185. Figs. 16–18 “*Rosalina marginata* REUSS 1845–1854 (copy after Reuss’s original pl. 26, fig. 1).





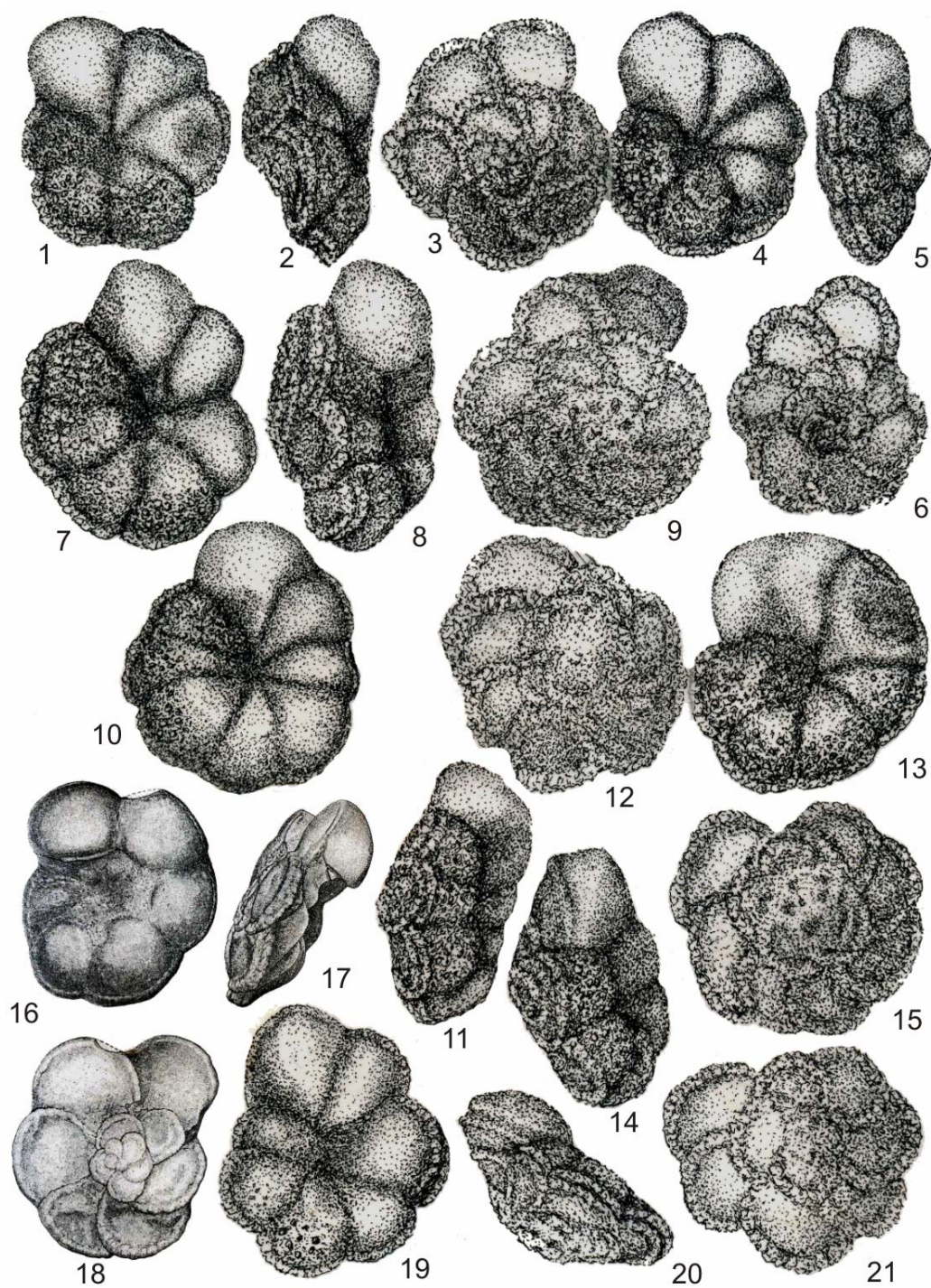
**PLATE 21.** Figs. 1–9 *Whiteinella flandrini* (POTHAULT) 1970, Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12192. Figs. 10–15 *Whiteinella baltica* (DOUGLAS & RANKIN) 1969, Middle Turonian, Siliștea Valley, Pietroșița area, L.P.B.IV.12176. Figs. 16–21 *Whiteinella paradubia paradubia* (SIGAL)1952, Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12182.





**PLATE 22.** Figs. 1–3 “*Rosalina marginata*” REUSS 1854, pl. 26, fig. 1 a–c (copy from Reuss’s original). Figs. 4–12 *Dicarinella marginata marginata* (REUSS) 1845–1854, Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12193. Figs. 13–15 “*Globotruncana rodai*” MARIANOS & ZINGULA 1966, pl. 39, fig. 5a–c (copy after original). Figs. 16–21 *Dicarinella marginata rodai* (MARIANOS & ZINGULA) 1966, Turonian, Tzatzza Valley, Pietroșița area, L.P.B.IV.12191. Figs. 22–24 “*Praeglobotruncana hagni*” SCHEIBNEROVA 1962, text fig. 6 (copy after original). Figs. 25–27 *Dicarinella marginata hagni* (SCHEIBNEROVA) 1962, Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12190.





**PLATE 23.** Figs. 1–15 *Sigalitruncana kueperi* (THALMANN) 1959, Middle Turonian, Țâța Valley, Pietroșița area, L.P.B.IV.12288. Figs. 16–18 “*Globotruncana kuepperi*” (THALMANN) 1959, (copy after MARIANOS & ZINGULA 1966 p. 340, pl. 39, fig. 6). Figs. 19–21 *Dicarinella marginata hagni* (SCHELBNEROVA) 1963, Upper Turonian, Voivozii Valley, Pietroșița area, L.P.B.IV.12190.



