

# MICROPALAEONTOLOGICAL STUDY OF THE GURA BELIEI RED MARLS FORMATION FROM THE PIETROȘIȚA AREA (TURONIAN – MAASTRICHTIAN). PART III CAMPANIAN-MAASTRICHTIAN PLANKTONIC FORAMINIFERA

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**Abstract** The present paper represents the third part of an extensive study concerning the microbiostratigraphy of the foraminiferal assemblages from the Gura Beliei Red Marls Formation (Southern Carpathians, Romania). This part is dedicated to the study of the planktonic foraminifera, and from those, only the group of the Rugoglobigerinaceae and of the Abatomphalidae from the Globotruncanacea superfamily is presented.

**Keywords:** Foraminifera, Upper Cretaceous, Romania

## INTRODUCTION

The Gura Beliei Red-Marls Formation stratigraphy is extended from the lower Turonian up to the uppermost Maastrichtian, typical epicontinental formation, containing very rich planktonic and benthic foraminiferal assemblages. Neagu (2012, 2014) studied the lower and middle part of this biostratigraphical unit [Lower Turonian-Lower Senonian (Coniacian-Santonian)]. All planktonic biozones were recognized, starting with *Whiteinella cretacea* till Coniacian-Santonian with *Dicarinella excavata*. The present paper presents the results of the study of foraminiferal assemblages from the Upper Senonian (Campanian-Maastrichtian) interval.

Upper Senonian-Maastrichtian- the last part of the Mesozoic Era, when took place the biggest biological crisis of the Life on the Land it's proved by the disappearing of the dinosaurs. In the Sea waters this phenomenon affected also the evolution of the planktonic foraminiferas starting with the last part of the Lower Cretaceous all the boundary with the Neozoic (Dano-Paleocene). During this time-interval the group of planktonic foraminifera (especially) presents a spectacular evolution. This process starts with the rotaliporids group and coming up to the peak of the evolution with the group of globotruncanids represented by Globotruncanidaceae, Rugoglobigerinidaceae and Abatomphalidae. All the taxon of these groups disappeared suddenly at the boundary with the Danian.

We try to follow this phenomenon beginning with the Rugoglobigerinids and Abatomphalids (Campanian - Maastrichtian).

From taxonomic point of view this evolutionary explosion reflected in the test morphology bring about some micropaleontologists to use a "ternary nomenclature"(sp, ssp) to emphasize the fast changes of the morphology and possible phylogenetic evolution among different taxa. Brönnimann and Brown (1955) and Gandolfi (1955) proposed evolutionary and phylogenetic trees of these groups. The planktonic foraminifera from the upper part of the Gura Beliei Red Marls support the presence of the Campanian and Maastrichtian ages granted by macro fossil as: *Belemnitella carpathica*, *Inoceramus salisburgensis*, *Alectrionia*. Following the evolution of the

"Globotruncanacea" group was possible to recognise all the biozones presented by Caron (1985, p.34) starting with *Globotruncana elevata* (lower Campanian), *Globotruncana ventricosa* (upper Campanian), *Globotruncanella calcarata* (uppermost Campanian with *Belemnitella carpathica*), *Globotruncanella havanensis* (lower Maastrichtian), *Gansseria gansseri* (lowermost Maastrichtian) and *Abatomphalus mayaroensis* (uppermost Maastrichtian). The red clays which follow the clays with *Abatomphalus mayaroensis*, belong by its planktonic foraminiferas to the Dano-Paleocene (biozone with the smallest Globigerina).

## SYSTEMATIC PALEONTOLOGY

Class Foraminifera Lee 1990

Order Globigerinida Delage & Herouard 1896

Family Globigerinididae Cushman & ten Dam 1948

Subfamily Globigerinelloidinae Cushman & ten Dam 1948

Genus *Globigerinella* Cushman 1927

*Globigerinella glaessneri* (Gandolfi 1955)

Figs. 15: 1-3, Figs. 8: 4-6

1955 *Rugoglobigerina glaessneri glaessneri* Gandolfi, p.55, pl.3, figs.10 a-c

Dimensions: D=0,26-0,21 mm; d=0,24-0,12 mm; g=0,14-0,09 mm

Remarks: Gandolfi (1955, p.50) show for this taxon "...loosely arranged chambers on both sides.....test without keel". From *G. messinae* Brönnimann (1952) this species differ very clear by the globulous spherical chambers and not laterally compressed as *G. messinae* Brönnimann (1952) to with are resembles.

Occurrence: Țâța Valley, Pietroșița-Fieni area

Stratigraphic distribution: Upper Senonian

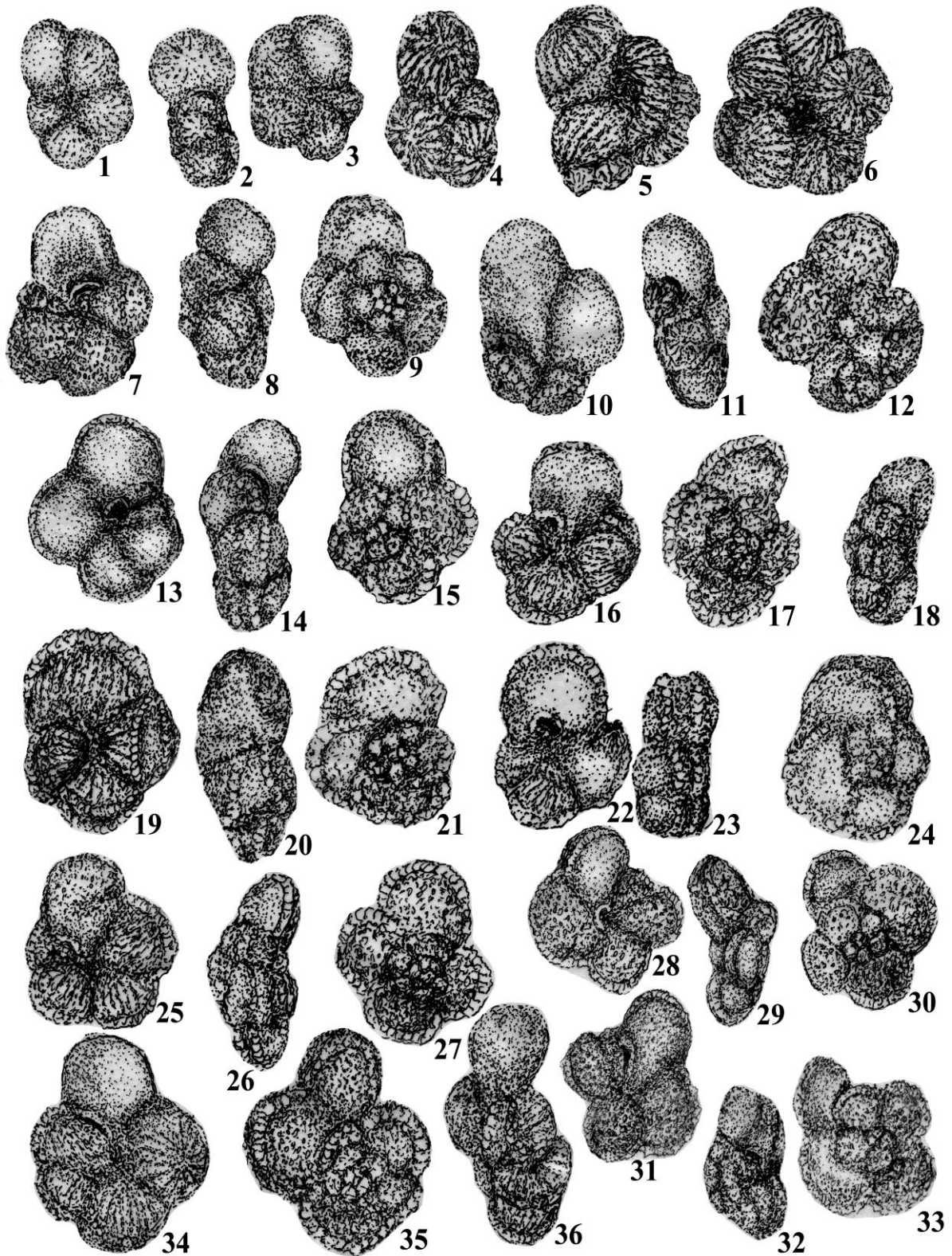
Specimens: L.P.B.IV; 12445 (Laboratory of Palaeontology University of Bucharest)

Family Schackoinidae Pokorny 1958

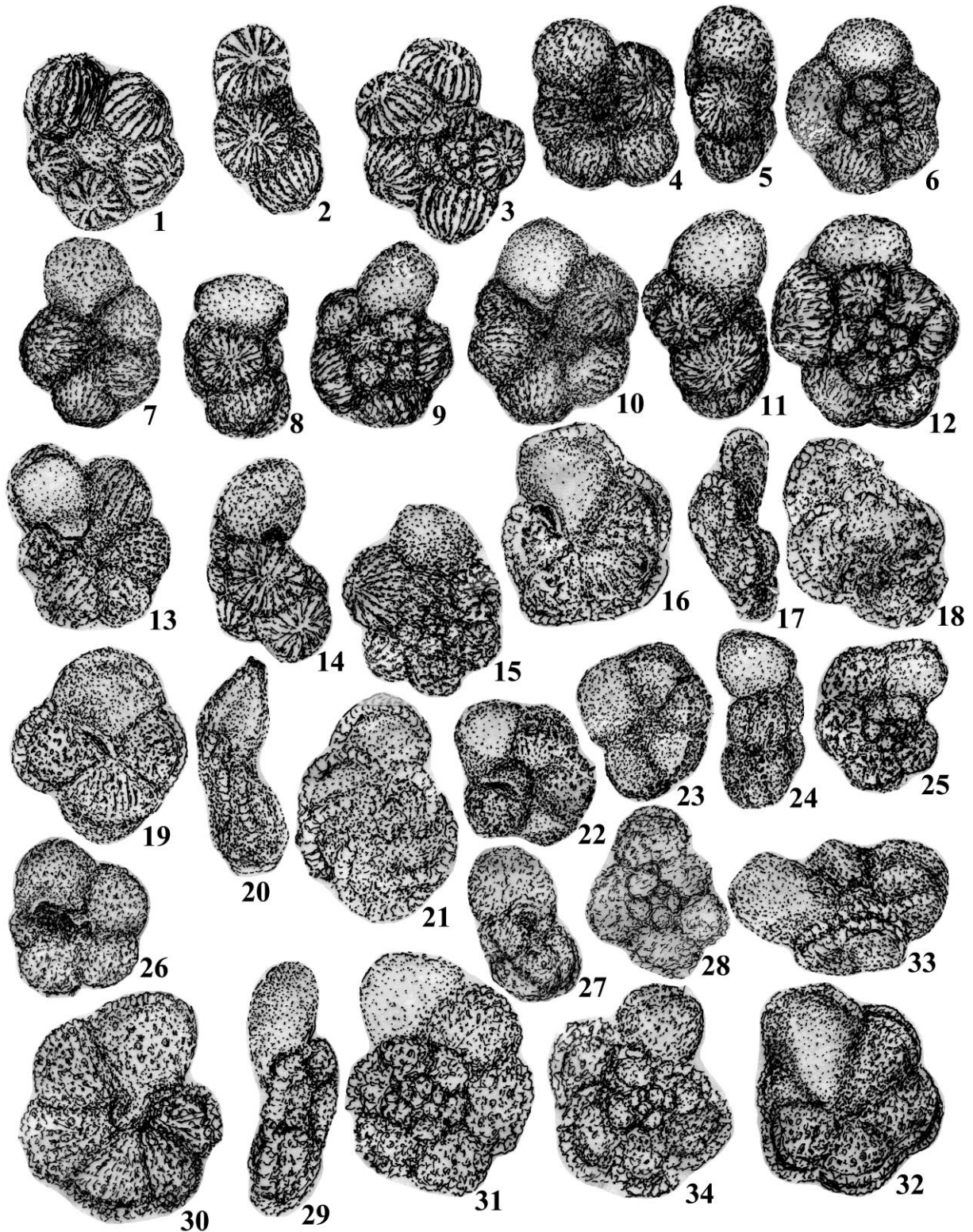
Genus *Schackoina* Thalman 1932

*Schackoina multispinata* (Cushman & Wickenden 1940)

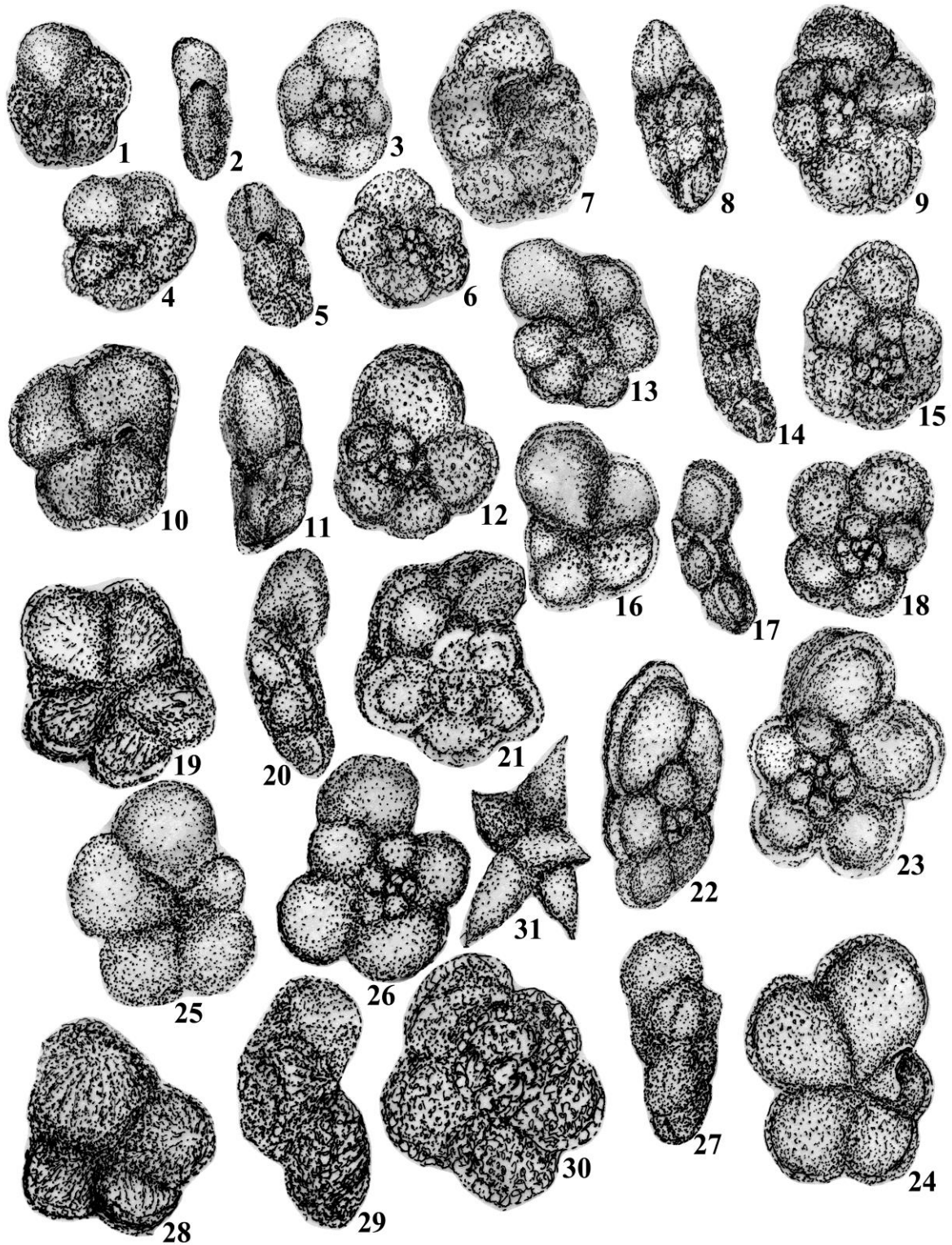
Fig. 3: 31



**Fig. 1:** 1-3 *Rugoglobigerina subbotinae* Maslakova 1978, Maastrichtian, Țâța Valley, Pietrosița, LPB.IV. 12446; 4 *Rugoglobigerina macrocephalla* Brönnimann 1952, Maastrichtian, Tata Valley-Pietrosița, LPB.IV. 12413; 5-6 *Rugoglobigerina rotundata* Brönnimann, 1952, Maastrichtian, Țâța Valley, Pietrosița, LPB.IV.12416; 7-15 *Rugoglobigerina subbotinae* Maslakova 1978, Maastrichtian, Țâța Valley, Pietrosița, LPB.IV.12419; 16-27 *Rugotruncana subrugosa* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietrosița, LPB.IV.12420; 28-33 *Globotruncanella subpetaloidea* (Gandolfi 1955), Maastrichtian, Țâța Valley, LPB.IV. 12442; 34-36 *Rugotruncana subcircumnodifer* (Gandolfi 1955), Maastrichtian, Țâța Valley, LPB.IV. 12439 (All specimens x 90).



**Fig. 2:** 1-3 *Rugoglobigerina pennyi* Brönnimann 1952, Maastrichtian, Țâța Valley, Pietrosița, LPB.IV. 12417; 4-9 *Rugoglobigerina subbotinae* Maslakova 1978, Maastrichtian, Țâța Valley, LPB.IV. 12411; 10-12 *Rugoglobigerina kingi* Trujillo 1960 Maastrichtian, Țâța Valley, L.P.B.IV. 12450; 13- 15 *Rugoglobigerina ordinaria* (Subbotina 1953), Maastrichtian, Țâța Valley, LPB.IV.12446; 16-21 *Rugotruncana subglæssneri* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietrosița, LPB.IV.12421, 22-25 *Rugotruncana subornata* (Gandolfi 1955), Maastrichtian, Țâța Valley, LPB.IV.12440; 26-28 *Rugotruncana subrugosa* (Gandolfi 1955), Țâța Valley, LPB.IV. 12436; 29-31 *Rugotruncana subhexacamerata* (Gandolfi 1955), Maastrichtian, Țâța Valley, LPB.IV.12426; 32-34 *Rugotruncana subcircummodifer* (Gandolfi 1955), Maastrichtian, Țâța Valley, LPB.IV.12431 (All specimens x 90).



**Fig. 3:** 1-9 *Globotruncanella coarctata* (Bolli 1957), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV. 12427; 10-17 *Globotruncanella pshadae* (Keller 1946), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12427; 18-20 *Globotruncanella petaloidea* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12428; 21-24 *Globotruncanella havanensis* (Voorwijk 1937), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12329; 25-27 *Globotruncanella saratogensis* (Applin 1920), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV. 12441; 28-30 *Rugotruncana subrugosa* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12420; 31 *Schschokina multispinata* (Cush.Wick 1940), Maastrichtian, Țâța Valley, Pietroșița-Fieni (All specimens x 90).



1946 *Schackoina multispinata* (Cushman & Wickenden)  
Cushman, p.148, pl.61, figs.11-12  
Dimensions: D = 0,24 mm; d = 0,096 mm  
Remarks: Specimens from the Upper Maastrichtian differs from the Cushman's species by the more elongated chambers.  
Occurrence: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Maastrichtian  
Specimen: L.P.B.IV.12430

Superfamily Globotruncanacea Brotzen 1942  
Family Gobotruncanidae Brotzen 1942  
Subfamily Globotruncanellinae Maslakova 1978

Taxonomic remarks: In the magazine "Problem Micropaleontologii, Maslakova published the paper "*Systematic and phylogeny of the Globotruncanida*" where she described a new Subfamily Gobotruncanellinae with *Globotruncanella* Reiss 1957 as genotype. Unfortunately she does not respect the obligations of ICZN to give, for a new taxon, a description in English or French language. Because of this negligence, the translations from Russian language led to different opinions. From here all description in The Loeblich & Tappan (1988) remained only "Test with single keel (lobate periphery with one or two keels in the original" = Maslakova description). Robaszynski & All (1984, pg. 265) from the type genus *Globotruncanella* of this subfamily they distinguished four morphotypes: the first one with one globular chambers till the last one (4) with compressed chambers and a single keel (taking care of Maslakova description, to two keels).

Intending to clear up the misunderstanding of the initial description of this taxon we try to present (as much as possible) an English translation of the Maslakova's original description:

"*Biconvex till lenticular test with truncate to oval chambers; umbilical chambers have a round triangle aspect; on the spiral side these one have a rounded aspect, oval till semirounded (petaloid?); umbilical sutures are a little straight radial and depressionary; on the spiral side these ones are a little actuated; the test periphery is lobate with a simple keel or tow; umbilicus is narrow and the aperture is interim-umbilical with a near lip, the secondary aperture's are under umbilic. Chambers surface is finely rugger or pronounced strong sometime withy costellae. The exterior wall of chambers presents a secondary lay.*" (Maslakova, 1978)

Genus *Globotruncanella* Reiss 1957  
*Globotruncanella havanensis* (Voorwijk 1937) emend.  
Brönnimann & Brown 1955  
Figs. 9: 1-6; Figs. 10: 1-15; Figs. 12: 17-19

1937 *Gobotruncana havanensis* Voorwijk, p.195, pl.1, figs. 25-26, 29  
1955 *Rugotruncana havanensis* (Voorwijk) emend.  
Brönnimann & Brown, p.552, pl.22, figs. 4-6  
Dimensions: D = 0,34 mm – 0,31mm; d = 0,29mm; g = 0,14mm.  
Remarks: In the Voorwijk's paper (1937) this species is presented and figured in a rudimentary manner, being difficult to recognise it (Fig. 17: 7-9 in the present paper).

Brönnimann & Brown (1955) have the merit to clear up from taxonomic point of view this taxon (p.552) using the holotype from the Collection of the Mineralogical-Geological Institute, State University Utrecht, to give a correct and clear description and figuration for it. From taxonomical and rules of the ICZN, preserving the initial name they are doing an emendation of Voorwijk species which by this, way become valid.

Occurrence: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Maastrichtian  
Specimens: LPB.IV.12429

*Globotruncanella petaloidea* (Gandolfi 1955)  
Figs. 3: 18-20; Figs. 4: 22-24, 31-36; Figs. 9: 7-9

1955 *Globotruncana (Rugoglobigerina) petaloidea ssp. petaloidea* Gandolfi, p.52, pl.3, fig.13 a-c

1985 *Globotruncanella petaloidea* (Gandolfi 1955) Caron, p.51, pl.21, fig.5-6

Dimensions: D = 0,36-0,29 mm; d = 0,21-0,14mm.

Remarks: The distinctive features of this species are (after Gandolfi's *specialy*) 1955, p.52: "*the pronounce petaloid periphery (out-line). Chambers subpetaloid.... where presents frequent tubercles*".

The subglobular aspect spiral and umbilical of chambers make the differences from *Globotruncanella citae* Bolli 1951. The presence of the tubercles along the margins of the chambers or finely beaded keel (Figs. XIV:22-24) represents individual features.

Occurrence: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Maastrichtian.  
Specimens: LPB.VI. 12428

*Globotruncanella pshadae* (Keller 1946)  
Figs. 3: 10-17, Figs 4: 16-21; Figs. 9: 10-12; Figs. 13: 13-15

1946 *Globorotalia pshadae* Keller (from Subbotina 1953)  
p. 204, pl.16, fig.1-6 (fig.2a-c holotype)

Dimensions: D = 0,31-0,34 mm; d = 0,29-0,31mm ; g = 0,34 mm - 0,29 mm

Remarks: The Keller's original specimens are restudied and figured by Subbotina 1953, p.204, pl.16, fig.1-6; fig.1=holotype; fig.2 = paratype of Keller 1946. In the requirement of the ICZN Keller's species has priority and Bolli's *Globotruncana citae* 1951 plate 35, fig.4-6 become junior synonymous.

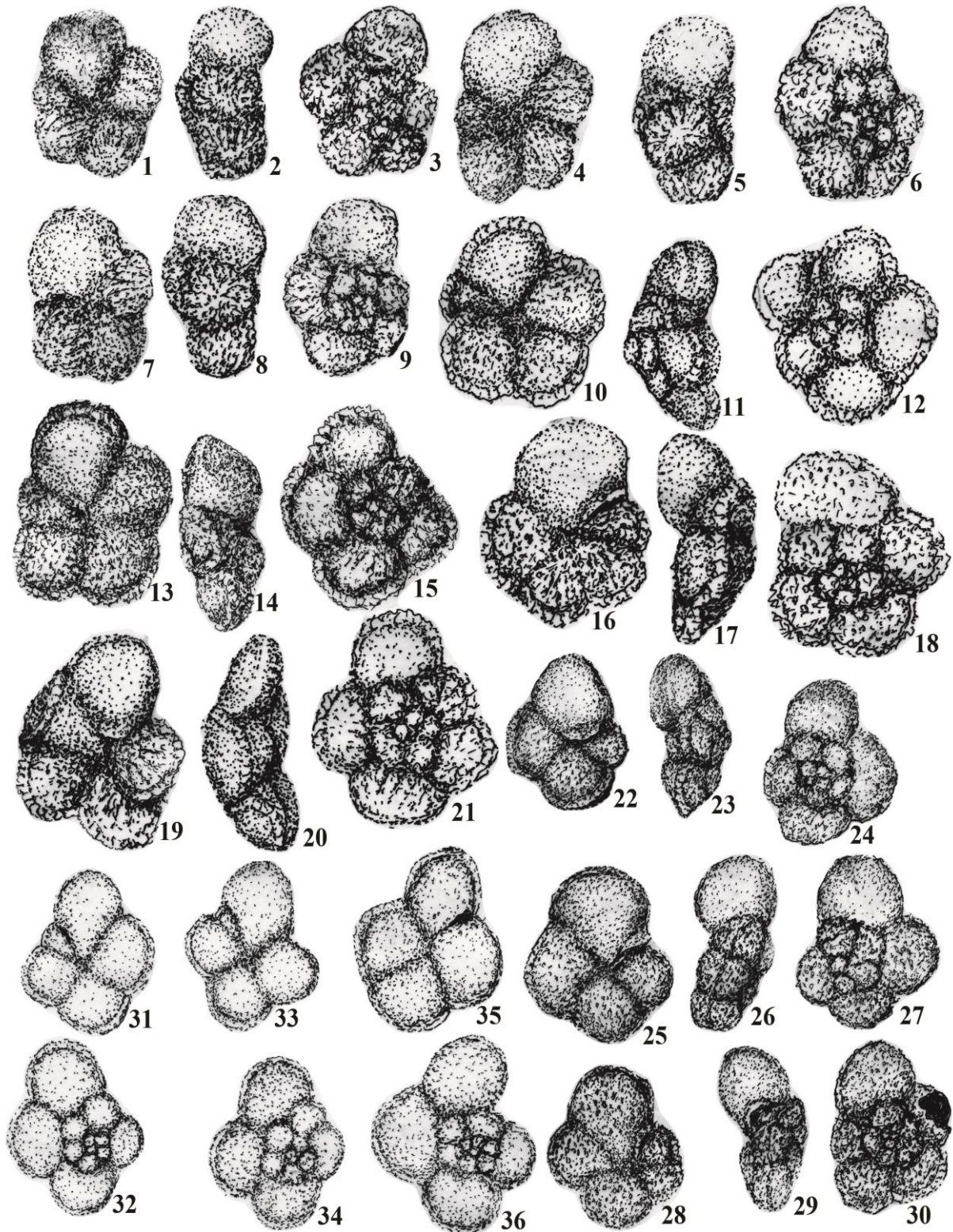
Occurrence: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Maastrichtian  
Specimens: LPB.IV. 12427

*Globotruncanella subpetaloidea* (Gandolfi 1955)  
Figs. 1: 28-33

1955 *Globotruncana (Rugoglobigerina) petaloidea subpetaloidea* Gandolfi, p.52, text-fig. 8, pl.3, fig.12 a-c

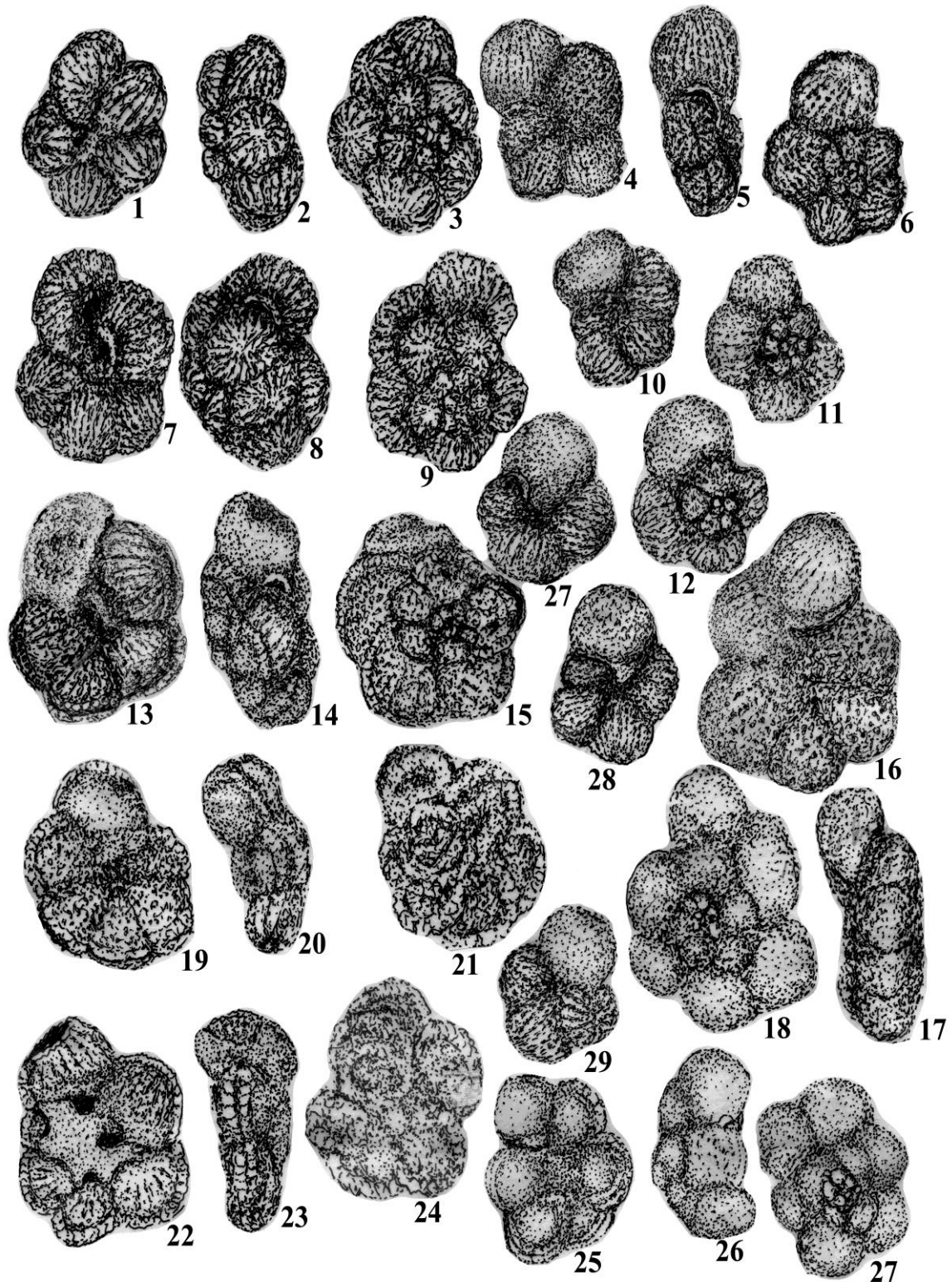
Dimensions: D = 0,24-0,26 mm; d=0,21mm.

Remarks: By its aspect of the chambers on spiral side and umbilical sides and by evident rough or spinose test on the umbilical and spiral sides of chambers thus species differs from *Globotruncanella pshadae* Keller.



**Fig. 4:** 1-9 *Rugoglobigerina subbotinae* Maslakova 1978, Maastrichtian, Țâța Valley, Pietroșița, LPB.IV. 12446; 10-15 *Globotruncanella havanensis* (Voorwijk 1937), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV. 12429; 16-21 *Globotruncanella pshadae* (Keller 1946), Maastrichtian, Țâța Valley, Pietroșița, L.P.B.IV.12427; 22-24, 31-36 *Globotruncanella petaloidea* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12428; 25-30 *Archaeoglobigerina blowi* Pessagno 1967, Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12449 (All specimens x 90).





**Fig. 5:** 1-3 *Rugoglobigerina pennyi* Brönnimann 1952, Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12417; 4-6 *Rugoglobigerina pustulata* Brönnimann 1952, Maastrichtian, Țâța Valley, Pietroșița, L.P.B.IV.12415; 7-9 *Rugoglobigerina kelleri* (Subbotina 1953), Maastrichtian, Țâța Valley, Pietroșița, L.P.B.IV.12451; 10-12, 27-29 *Rugoglobigerina macrocephala* Brönnimann, Maastrichtian, Țâța Valley, Pietroșița, L.P.B.IV.12413; 13-15, 19-24 *Rugotruncana ellissi* Brönnimann & Brown 1955, Maastrichtian, Țâța Valley, Pietroșița, L.P.B.IV.12426; 16-18 *Rugoglobigerina loetterli* (Nauss 1947), Maastrichtian, Maastrichtian, Țâța Valley, Pietroșița, L.P.B.IV.12443; 15-27 *Globotruncanella sarmientoi* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietroșița LPB.12448 (All specimens x 90).

Occurrence: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Maastrichtian  
Specimens: LPB.IV. 124542

*Globotruncanella coarctata* (Bolli 1957)  
Figs. 3:1-9; Figs. 8:1-3

1957 *Praeglobotruncana coarctata* Bolli, p.53, pl.12, fig. 2-3.

1978 *Globotruncanella coarctata* (Bolli) Maslakova, p.106, pl.24, fig.4

Dimensions: D = 0,36 - 0,29 mm; d = 0,31-0,26 mm

Remarks: Ours specimens differs from the Bolli's 1957 species by the more inflated chambers on the spiral side. The very faint keel and the minute spines of the umbilical chambers are typical to the Bolli's species.

Occurrence: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Maastrichtian (*Abatomphalus mayaroensis* biozone)  
Specimens: LPB.IV. 12437

*Globotruncanella saratogensis* (Applin 1920)  
Figs 3: 25-27; Figs. 7: 16-18

1920 *Globigerina cretacea* d'Orbigny var. *saratogensis* Applin, p. 98, pl.3, fig.8.

Dimensions: D = 0,43-0,46 mm ; d = 0,36-0,36 mm ; g = 0,19 mm

Remarks: In the paper of Applin et al. (1925) in the last part of this article were described few species of foraminifera. Some of these species belong to the Paleogen, but there are also two species from the Upper Cretaceous: *Globigerina marginata* d'Orbigny and a new taxon *Globigerina cretacea* var. *saratogensis* (Fig. 17:1-6 in the present paper). In the description of this new subspecies, Applin et al. (1925, p. 98) pointed out the following features: "chambers increasing gradually in size, sometime slightly carinated at the periphery (which is frail represented on the figure) wall smoothing. The regularity of coiling and the tendency for the form to develop a carinated rim.".....Taking in consideration all the presented features, our specimens (Fig. 3: 25-27) corresponds with the Applin taxon.

By the inflated character of the chambers, spiral and umbilical, this species differs from Bolli's *Praeglobotruncana coarctata* 1957.

Occurrences: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Upper Maastrichtian.  
Specimens: LPB.IV. 12441

*Globotruncanella sarmientoi* (Gandolfi 1955)  
Figs. 5: 15-27; Figs. 13: 19-26; Figs. 14: 1-3; Figs. 15: 13-24

1955 *Globotruncana caliciformis* ssp. *sarmientoi* Gandolfi, p.47, pl.3, fig.3 a-c

Dimensions: D = 0,53-0,43 mm; d = 0,40-0,36 mm; g = 0,19-0,17 mm

Remarks: The general aspect of the shell is specific to the genus *Globotruncanella*. Gandolfi (1955, p. 48) mention: "This species is morphologically related to *Globorotalia pshadae* Keller 1946". In contrast with Kellerr's species, *G. sarmientoi* differs by the large size; the presence of a

double keel from the peripheral margins of the early chambers (the peripheral keel) is represented by a row of muricae. The last chamber or the last two chambers present only one keel smooth not rugose as there are on the early chambers. Ordinary on the umbilical side the early chambers a strong to weak rouged aspect. From the Gandolfi's species ours specimens differs by the aspect of the spiral side, where the chambers have a moderate inflated and smooth aspect. From *Globotruncanella havanensis* (Vootwijk 1937) emend. Brönnimann & Brown 1955, ours specimens differs by the presence of a double peripheral keel on the early chambers, the presence of a single smooth keel on the last two chambers and the moderate convex but not flat aspect of the spiral size.

Occurrences: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Upper Maastrichtian  
Specimens: LPB.IV.12448

Subfamily Abatomphalinae Bolli, Loeblich, Tappan 1957  
Genus *Abatomphalus* Bolli, Loeblich & Tappan 1957  
*Abatomphalus mayaroensis* (BOLLI) 1951  
Figs. 12: 10-16

1951 *Globotruncana mayaroensis* Bolli, p.198, pl.35, figs.10-12

1955 *Rugotruncana mayaroensis* (Bolli) Brönnimann & Brown, p.553, pl.22, figs.10-12

1957 *Abatomphalus mayaroensis* (Bolli) Bolli, p.53, pl.1, fig.1

Dimensions: D = 0,62-0,53 mm ; d = 0,60-0,43 mm ; g = 0,21-0,14 mm

Remarks: By its particularly features of the test, this species (among the last planktonic species before the biggest biologic crisis between the Mesozoic and Neozoic times, represented in Oceanic Seas life in parallel of the Land. After the biozone with *A. mayaroensis* start the new life of the Neozoic planktonic foraminifera with the smallest "*Globigerina*".

Occurrences: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Upper Maastrichtian  
Specimens: LPB.IV. 12433

*Abatomphalus pessagnoii* (Longoria 1973)  
Figs. 8: 22-27; Figs. 16:1-17

1973 *Globotruncana pessagnoii* Longoria, p.97, pl.1, figs.1-9

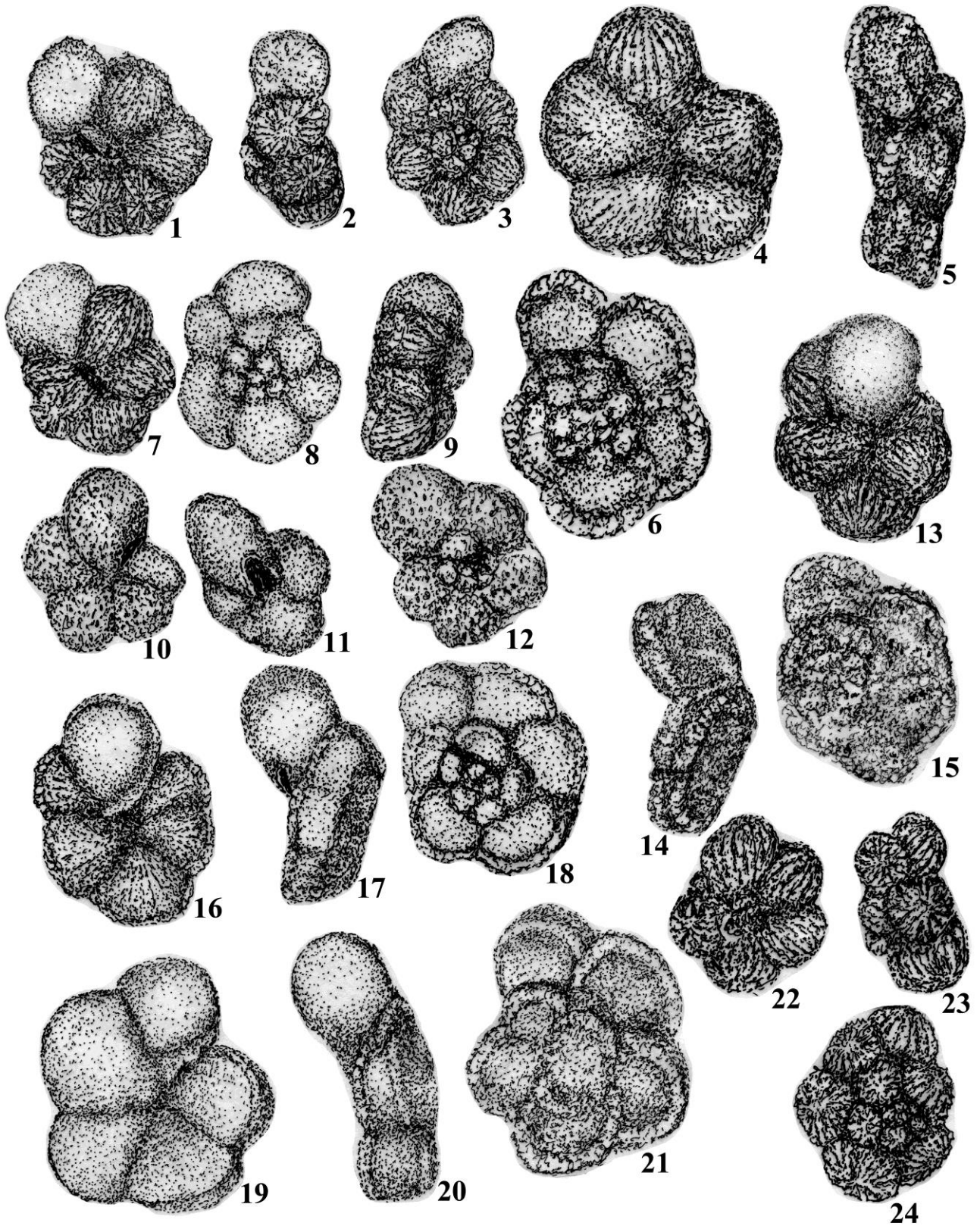
Dimensions: D = 0,48-0,34 mm ; d = 0,40-0,26 mm; g = 0,17-0,14 mm

Remarks: Longoria (1973, p. 98) presenting his new species, showed that this one is similar to *A. intermedius* Bolli from which its differ in the less globular nature of the chambers (both spiral and umbilical). Also the shell is smooth without typical kind of ornamentation; keel as a finely beaded (Fig.8:23) or simple real keel (Fig. 8: 26).

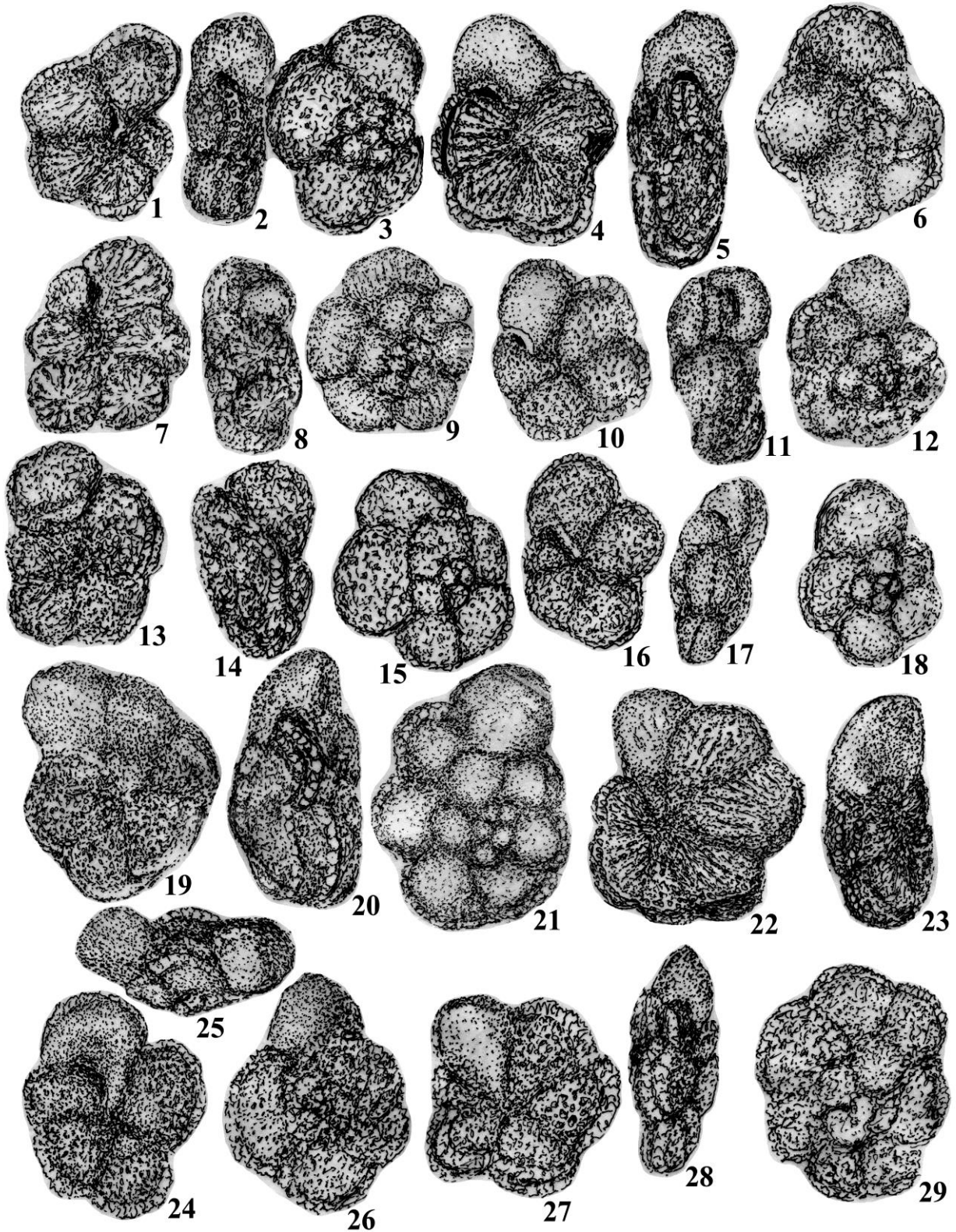
Occurrences: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Upper Maastrichtian  
Specimens: LPB.IV.12434

*Abatomphalus* sp. cf. *A.intermedius* (Bolli 1951)  
Figs. 10: 16-21; Figs. 11: 1-15

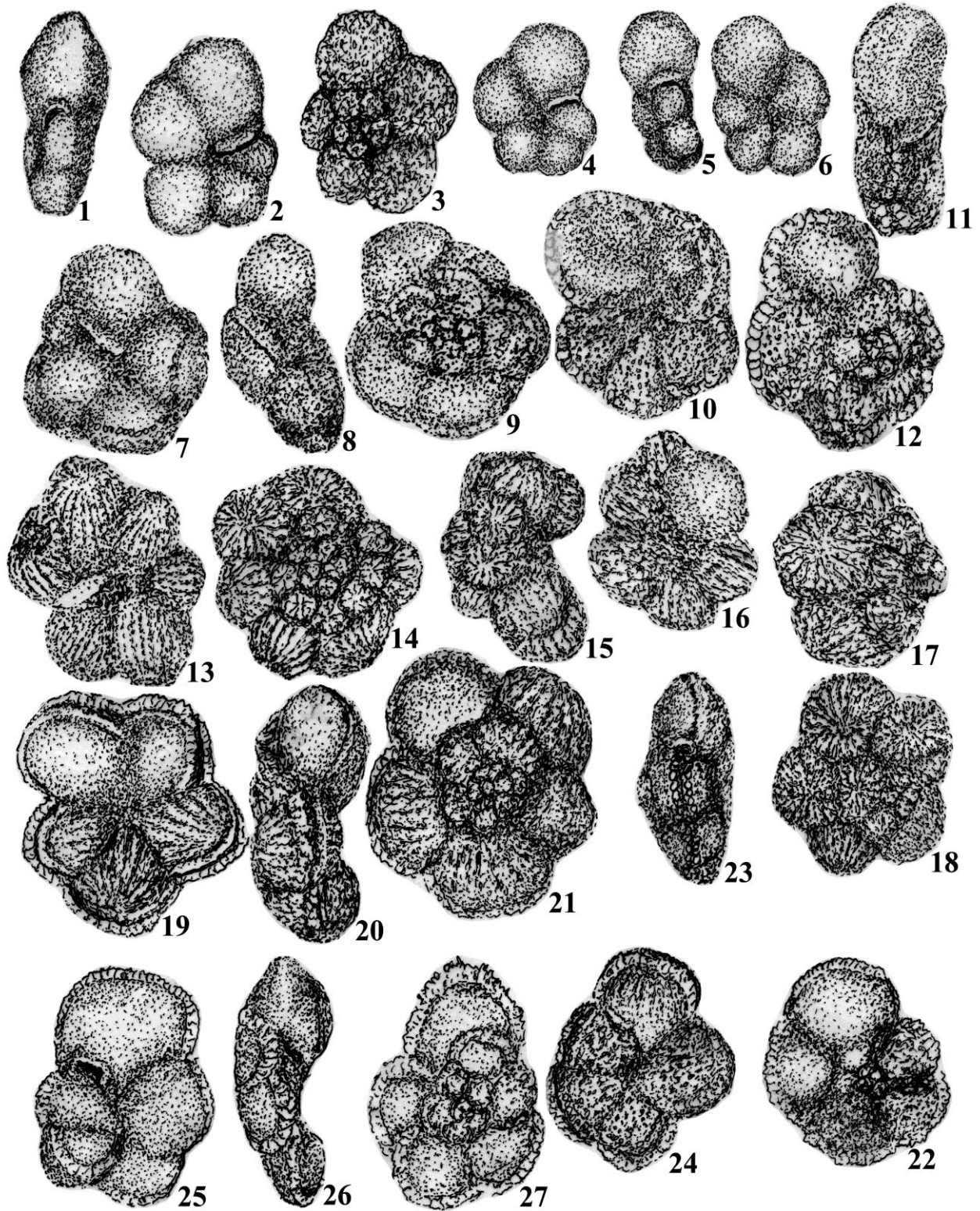




**Fig. 6:** 1-3 *Rugoglobigerina ordinaria* (Subbotina 1953), Maastrichtian, Țâta Valley, Pietroșița, LPB.IV.12446; 4-6, 13-15 *Rugotruncana subpennyi* (Gandolfi 1955), Maastrichtian, Țâta Valley, Pietroșița, L.P.B.IV.12426; 7-9 *Rugotruncana subrugosa* (Gandolfi 1955), Maastrichtian, Țâta Valley, Pietroșița, L.P.B.IV.12420; 10-12 *Rugoglobigerina beldingi* Gandolfi 1955 Maastrichtian, Țâta Valley, Pietroșița, LPB.IV.12419; 16-21 *Rugotruncana subloetterli* (Gandolfi 1955), Maastrichtian, Țâta Valley, Pietroșița, LPB.IV.12423; 22-24 *Rugoglobigerina kelleri* (Subbotina 1953), Maastrichtian, Țâta Valley, Pietroșița, LPB.IV.12451 (All specimens x 90).



**Fig. 7:** 1-6, 10-15, 22-27 *Rugotruncana subpennyi* (Gandolfi 1955), Maastrichtian, Țâta Valley, Pietroșița, LPB.IV.12446; 7-9 *Rugoglobigerina rugosa* (Plummer 1926), Maastrichtian, Țâta Valley, Pietroșița, LPB.IV.12411; 16-18 *Globotruncanella saratogensis* (Applin, 1920), Maastrichtian, Țâta Valley, Pietroșița, LPB.IV.12441; 19-21, 24-29 *Rugotruncana subglæssneri* (Gandolfi 1955), Maastrichtian, Țâta Valley, Pietroșița, LPB.IV. 12421 (All specimens x 90).



**Fig. 8 :** 1-3 *Globotruncanella coarctata* (Bolli 1957), Maastrichtian, Țâța Valley, Pietroșița, L.P.B.IV.12437; 4-6 *Globigerinella glaessneri* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12418; 7-9 *Archaeoglobigerina blowi* Pessagno 1967, Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12449; 10-12 *Rugotruncana subpemyi* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietroșița, L.P.B.IV.12426; 13-18 *Rugoglobigerina kelleri* (Subbotina 1953), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12451; 19-21 *Rugotruncana tilevi* Brönnimann & Brown 1955, Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12436; 22-27 *Abatomphalus pessagnoii* (Longoria 1973), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12434 (All specimens x 90).

## Dimensions:

Morpha A : D = 0,39-0,50 mm; d = 0,31-0,48 mm; g = 0,09-0,14 mm

Morpha B: D = 0,40-0,65 mm ; d=0,34-0,58mm ; g=0,7-0,12 mm

Remarks: Specimens from the Upper Maastrichtian (*A. mayaroensis* biozone) differs by shell's morphology from the Bolli's species *A. intermedius* by the following features: the shell is smooth without any kind of ornamentation; a peripheral double keel: one on the spiral side well developed and the second one on the umbilical side is slender.

From the phylogenetic point of view these specimens represent a stage between *Globotruncanella* (possible *G. havanensis*) and *A. mayaroensis*. In the biozone with *A. mayaroensis* these morphotypes have a good frequency.

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Upper Maastrichtian.

Specimens: LPB.IV. 12435

## Family Rugoglobigerinidae Subbotina 1959

## Subfamily Rugoglobigerininae Subbotina 1959

Genus *Archaeoglobigerina* Pessagno 1967*Archaeoglobigerina blowi* Pessagno 1967

Figs. 4: 25-30; Figs. 8: 7-9; Figs. 13: 7-12; Figs. 14: 4-12

1967 *Archaeoglobigerina blowi* Pessagno, pl. 316, pl. 59, figs. 1-10

Dimensions: D = 0,39-0,34 mm; d = 0,29-0,24 mm; g = 0,17-0,14 mm

Remarks: Specimens from the Maastrichtian of Țâța Valley correspond with Pessagno's species: "*Test trochoid, lobulat peripherally; chambers spheroidal.....umbilicus medium sized....periphery occasionally with weakly double keel....the surface smooth through or somewhat rugose on the early chambers.... A.blowi is closely related to A. cretacea (d'Orbigny). It differs from the latter species by possessing a more spherical and inflated chambers and by having a markedly lobulated periphery....*" in the Pessagno's opinion this taxon gave rise to *Rugoglobigerina rugosa*.

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Maastrichtian

Specimens: L.P.B.IV. 12449

Genus *Rugoglobigerina* Brönnimann 1952*Rugoglobigerina rugosa* (Plummer 1926)

Figs. 7: 7-9

1926 *Globotruncana rugosa* Plummer, p.38, pl.12, fig.10

1952 *Rugoglobigerina rugosa rugosa* (Plummer) Brönnimann, p. 28, text-figs.11, 12, 13

1955 *Globotruncana (Rugoglobigerina) rugosa rugosa* (Plummer) Gandolfi, p. 72, Fig.6, text-fig.11c

Dimensions: D = 0,43-0,39-0,31 mm; d = 0,40-0,31-0,29 mm; g = 0,24-0,21-0,09 mm

Remarks: By their features our specimens correspond very well with the Broniman's specimens.

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Upper Campanian (calcarata biozone) - Maastrichtian

Specimens: LPB.IV.12411

*Rugoglobigerina ornata* Brönnimann 1952

1952 *Rugoglobigerina macrocephala ornata* Brönnimann, p. 27, pl. 2, fig. 4-6

1955 *Rugoglobigerina ornata ornata* (Brönnimann) Gandolfi, p. 49, pl. 3, figs. 7 a-c

Dimensions: D = 0,29 mm; d = 0,21mm; g = 0,12 mm

Remarks: The specimens from: Țâța Valley by the typical ornamentation represented by well-developed costellae corresponds with Brönnimann's species.

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Upper Maastrichtian

Specimens: LPB.IV.12413

*Rugoglobigerina pennyi* Brönnimann 1952

Figs. 2: 1-3; Figs. 5:1-3

1952 *Rugoglobigerina rugosa pennyi* Brönnimann, p. 34, pl. 4, figs.1-3, text-fig. 16

1955 *Globotruncana (Rugoglobigerina) pennyi pennyi* (Brönnimann) Gandolfi, p. 73, pl. 7, fig.8

Dimensions: D = 0,34 mm; d = 0,19 mm; g = 0,12 mm

Remarks: By the typical ornamentation with radial costellae and a low trochospiral test, this species is well delimited.

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Maastrichtian

Specimens: LPB.IV.12

*Rugoglobigerina hexacamerata* Brönnimann 1952

1952 *Rugoglobigerina reicheli hexacamerata* Brönnimann, p.23, pl.2, figs. 10-12

1955 *Rugoglobigerina hexacamerata hexacamerata* (Brönnimann) Gandolfi, p.33, pl.1, fig.12

Dimensions: D = 0,39-0,36 mm; d = 0,31-0,34 mm; g = 0,19-0,24 mm

Remarks: Test with a constantly six chambers on the last whorl, radial disposition of the ornamentation (rows of small costellae, ribs or muricae) a low trochospiral whorl and a large umbilicus, delimited very well this species.

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Maastrichtian

Specimens: LPB.IV.12412

*Rugoglobigerina rotundata* Brönnimann 1952

Figs. 1: 5-6; Figs. 14: 30-31

1952 *Rugoglobigerina rugosa rotundata* Brönnimann, p.34, text-figs.15-16, pl.4, fig.7

1955 *Globotruncana (Rugoglobigerina) rotundata rotundata* (Brönnimann) Gandolfi, p.70, pl.7, fig. 2

Dimensions: D = 0,26 mm; d = 0,21mm; g = 0,20 mm

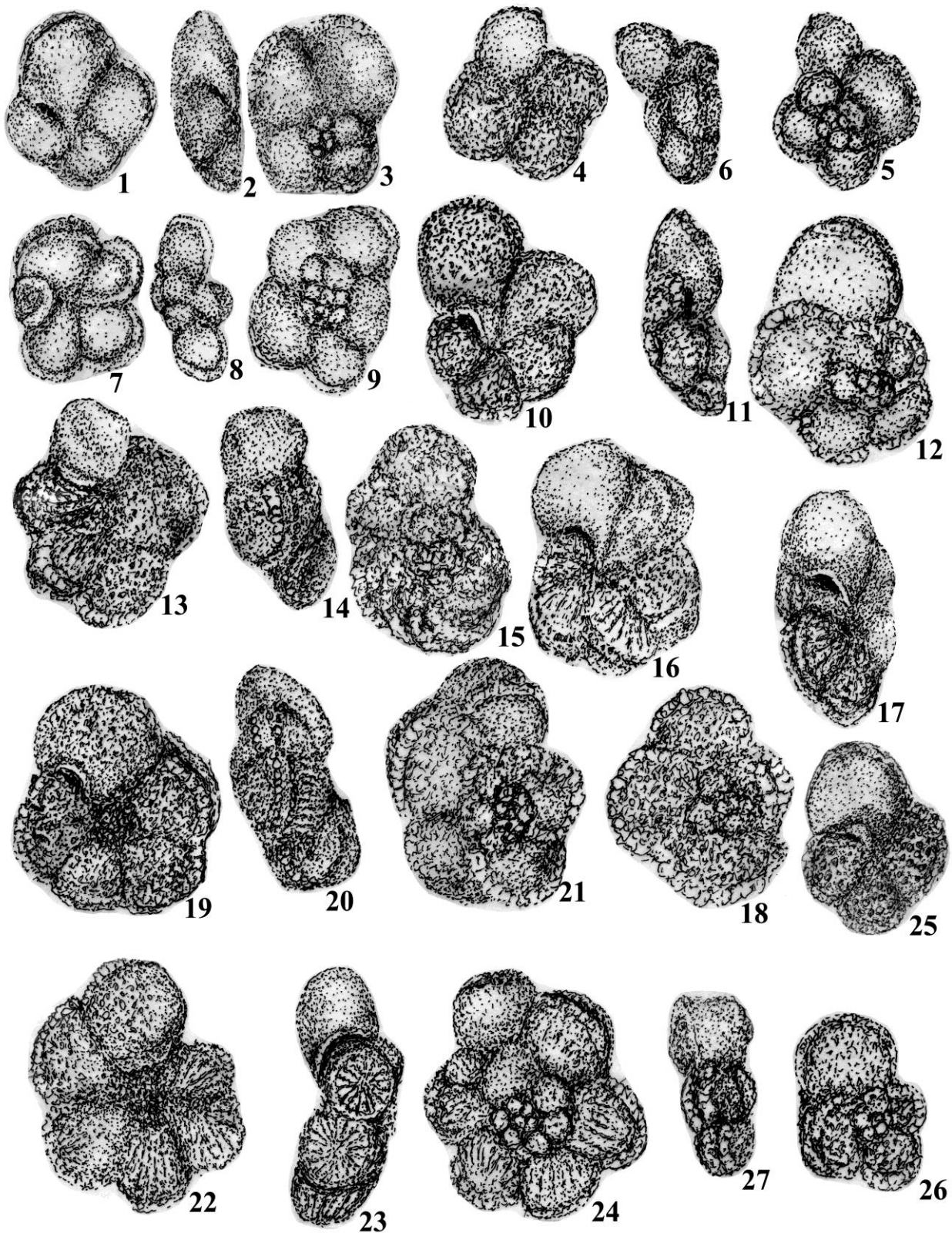
Remarks: By the ball aspect of the test with globular chambers, ornate by radial costellae, this species is obviously delimited.

Occurrences: Țâța Valley, Pietrosița-Fieni area

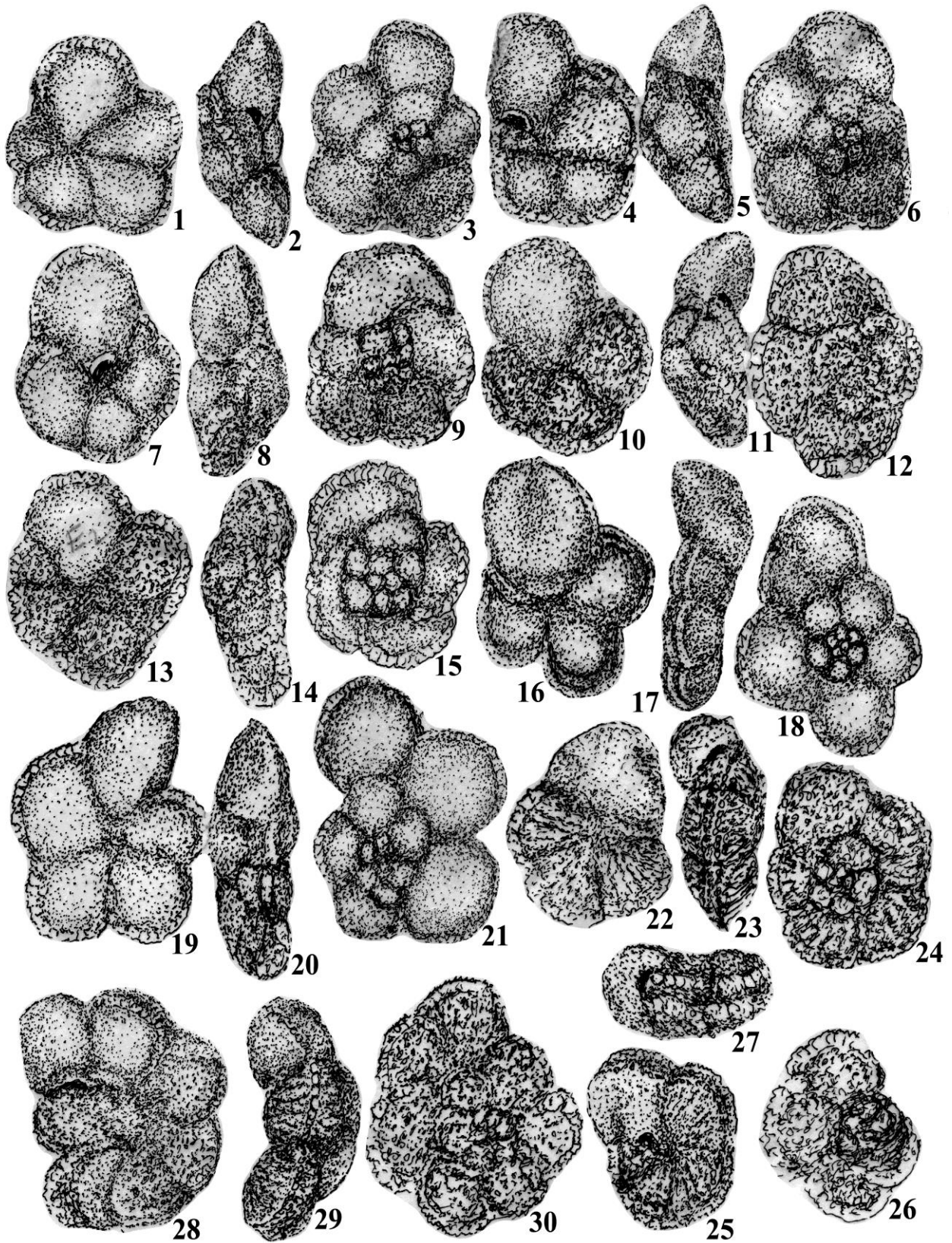
Stratigraphic distribution: Maastrichtian

Specimens: LPB.IV.12416

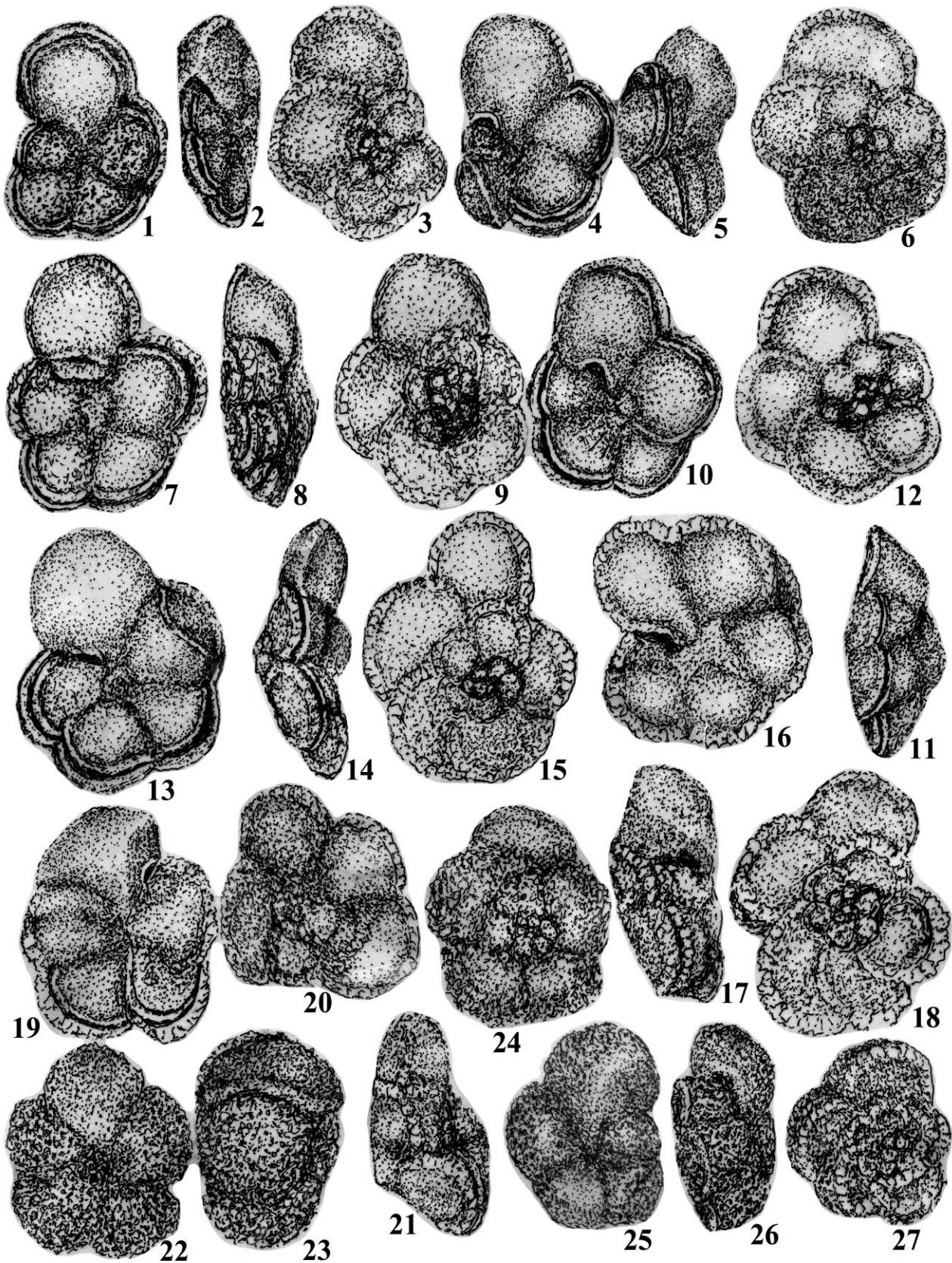




**Fig. 9:** 1-6 *Globotruncanella havanensis* (Voorwjk 1937) emend. Brönnimann & Brown 1955, Maastrichtian, Țâta Valley, Pietroșița, LPB.IV.12429; 7-9 *Globotruncanella petaloidea* (Gandolfi 1955), Maastrichtian, Țâta Valley, Pietroșița, L.P.B.IV.12428; 10-12 *Globotruncanella pshadae* (Keller 1946), Maastrichtian, Țâta Valley, Pietroșița, L.P.B.IV.12427; 13-21 *Rugotruncana subpenny* (Gandolfi, 1955), Maastrichtian, Țâta Valley, Pietroșița, L.P.B.IV.12426; 22-24 *Rugotruncana subloetterli* (Gandolfi 1955), Maastrichtian, Țâta Valley, Pietroșița, L.P.B.IV.12423; 25-27 *Rugotruncana subcircummodifer* (Gandolfi 1955), Maastrichtian, Țâta Valley, Pietroșița, L.P.B.IV.12439 (All specimens x 90).



**Fig. 10:** 1-15 *Globotruncanella havanensis* (Voorwijk 1937) emend. Brönnimann & Brown 1955, Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12429; 16-21 *Abatomphalus* sp.cf. *A.intermedius*, Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12434; 22-27 *Rugotruncana subglaessneri* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietroșița, LPB. IV. 12421; 28-30 *Rugotruncana subhexacamerata* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietroșița, L.P.B. IV. 12422 (All specimens x 90).



**Fig. 11:** 1-15 *Abatomphalus* sp.cf. *A.intermedius*, Maastrichtian, Țăța Valley, Pietroșița, LPB. IV. 12434; 16-21 *Reugotruncana ellissi* Brönnimann & Brown 1955), Maastrichtian, Țăța Valley, Pietroșița, LPB. IV. 12426; 22-27 *Gansseria gansseri* (Bolli 1951), Maastrichtian, Țăța Valley, Pietroșița, LPB. IV. 12442 (All specimens x 90).



*Rugoglobigerina macrocephala* Brönnimann 1952

Fig. 1: 4; Figs. 5: 10-12, 27-29

1952 *Rugoglobigerina macrocephala macrocephala* Brönnimann, p. 25, text-fig.9, pl.2, figs.1-31955 *Globotruncana (Rugoglobigerina) macrocephala macrocephala* (Brönnimann) Gandolfi, p.45, pl.2, fig.12

Dimensions: D = 0,31-0,26 mm; d = 0,4-0,26 mm; g = 0,17 mm.

Remarks: The 4-5 globular chambers in the last whorl ornate by delicate rugosities or numerous fine continuous and discontinuous ridges or costellae, this species are well characterized.

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Maastrichtian

Specimens: LPB.IV. 12413

*Rugoglobigerina pustulata* Brönnimann 1952

Figs.5: 4-6; Figs. 14: 13-15

1952 *Rugoglobigerina reicheli pustulata* Brönnimann, p.20, text-figs.6, 7, pl.2, figs.7-9

Dimensions: D = 0,34-0,31mm; d = 0,26-0,21 mm; g = 0,19 mm

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Maastrichtian

Specimens: LPB.IV. 12415

*Rugoglobigerina beldingi* Gandolfi 1955

Figs. 6: 10-12

1955 *Globotruncana (Rugoglobigerina) beldingi* Gandolfi, p.31, text-fig. 4 a-c, pl.1, fig.8

Dimensions: D = 0,24-0,31mm; d = 0,22-0,31mm; g = 0,14 mm

Remarks: Gandolfi's description of this taxon is clear: "Test nearly plan spiral, become somewhat involute on the dorsal (spiral) side.....five to six chambers in the last whorl, inflated.....test smooth somewhat rough by tubercles, papillae are more frequent along the margin of the shell, on the early chambers along appear in two approximately parallel lines" Our specimens corresponds to the Gandolfi's description.

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Maastrichtian

Specimens: LPB.IV. 12419

*Rugoglobigerina loetterli* (Nauss 1947)

Figs. 5: 16-18

1947 *Globigerina loetterli* Nauss, p.336, pl.49, fig.111955 *Globotruncana (Rugoglobigerina) loetterli loetterli* (Nauss) Gandolfi, p.35, pl.1, figs.15 a-c

Dimensions: D = 0,31mm; d = 0,24 mm; g = 0,12 mm

Remarks: Specimens from Țâța Valley differs from Nauss's species by the ornamentations of the shell, represented by fine discontinuous costellae or trace of those and the absence of the peripheral keel.

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Maastrichtian

Specimens: LPB.IV. 12443

*Rugoglobigerina kingi* Trujillo 1960

Figs. 2: 10-12; Figs. 15: 25-27

1978 *Rugoglobigerina kingi* Trujillo, Maslakova, p.111, pl.26, fig. 3

Dimensions: D = 0,34-0,38 mm; d = 0,31-0,36 mm; g = 0,20-0,21mm

Remarks: Specimens from the Țâța Valley with very low trochospiral aspect close to planispiral of the spiral side, by the globular chambers with a radial disposition of the costellae, differs from Maslakova's specimens; from the Marianos &amp; Zingula specimens pl.38, fig.6 differs also by the ornamentation.

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Upper Maastrichtian

Specimens: LPB.IV. 12450

*Rugoglobigerina kelleri* (Subbotina 1953)

Figs. 5: 7-9; Figs. 6: 22-24; Figs. 8:13-18; Figs. 13:16-18; Figs. 14: 25-29

1953 *Globigerina kelleri* Subbotina, p.54, pl.1, fig.161978 *Rugoglobigerina kelleri* (Subbotina) Maslakova, p.112, pl.26, fig.5

Dimensions: D = 0,26-0,42 mm; d = 0,24-0,36 mm; g = 0,16-0,28 mm

Remarks: The high trochospiral side with globular 5 to 6 chambers, a large umbilical-axial area and the typical ornamentation-especial radial costellae - this species differs from *Rugoglobigerina rugosa rugosa* Brönnimann text-figs.12-13.

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Upper Maastrichtian

Specimens: LPB.IV.12451

*Rugoglobigerina ordinaria* (Subbotina 1953)

Figs. 2: 13-15; Figs. 6: 1-3; Figs. 14: 16-24

1953 *Rotundina ordinaria* Subbotina, p.166, pl.3, fig.3, pl.4, figs. 1, 61978 *Rugoglobigerina ordinaria* (Subbotina) Maslakova, p.111, pl.26, fig.4

Dimensions: D = 0,36-0,42 mm; d = 0,24-0,38 mm; g = 0,19-0,21mm

Remarks: With a moderate to low trochospiral side, with globular chambers, 4 to 5 on the last whorl this species differs from *R. kelleri*.

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Upper Maastrichtian

Specimens: LPB.IV.12446

*Rugoglobigerina subbotinae* Maslakova 1978

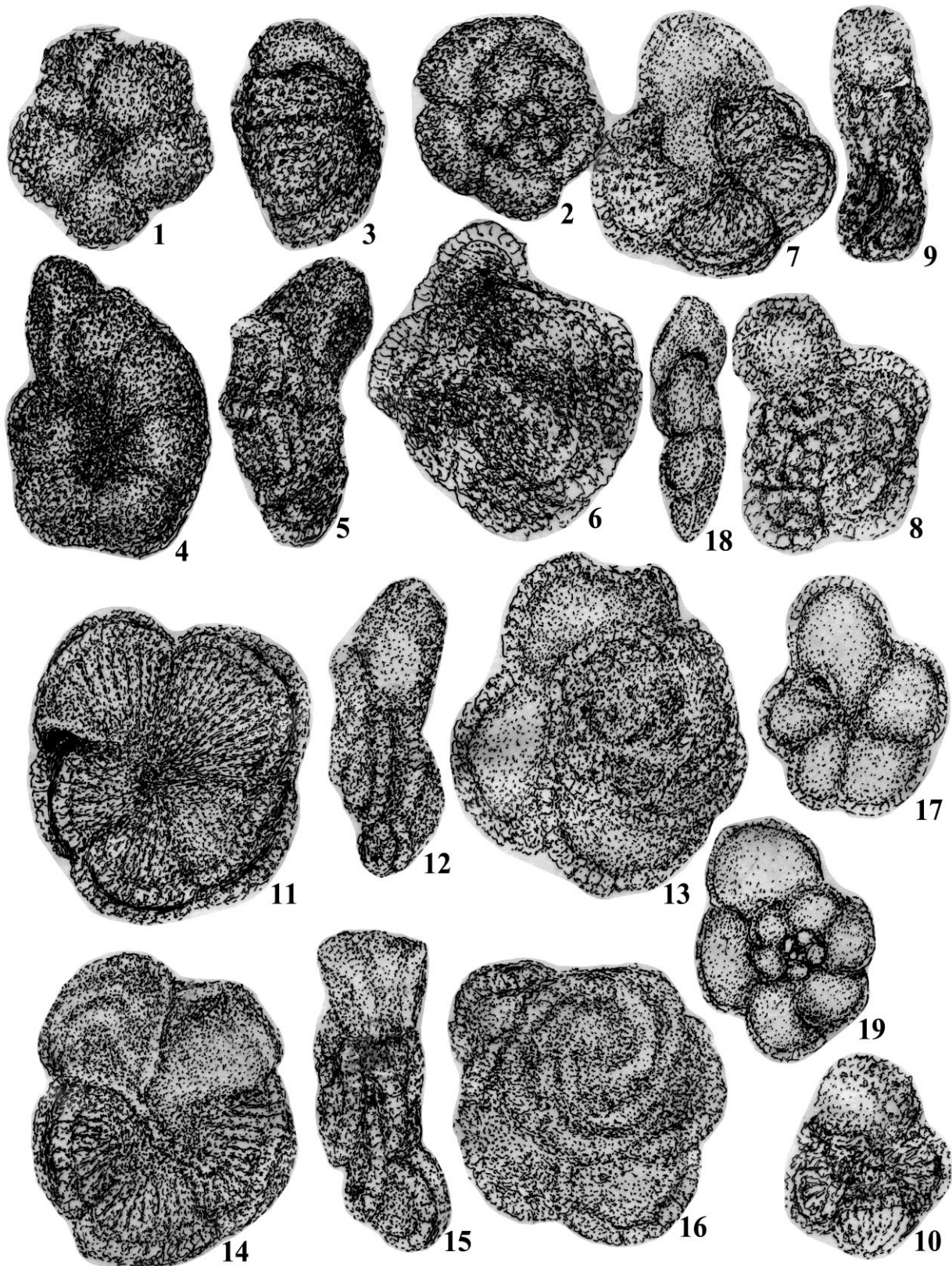
Figs. 1: 1-3, 7-15; Figs. 2: 4-9; Figs. 4: 1-9

1953 *Rotundina ordinaria* Subbotina, p.116, pl.3, fig.61978 *Rugoglobigerina subbotinae* Maslakova, p.110, pl.26, fig.2

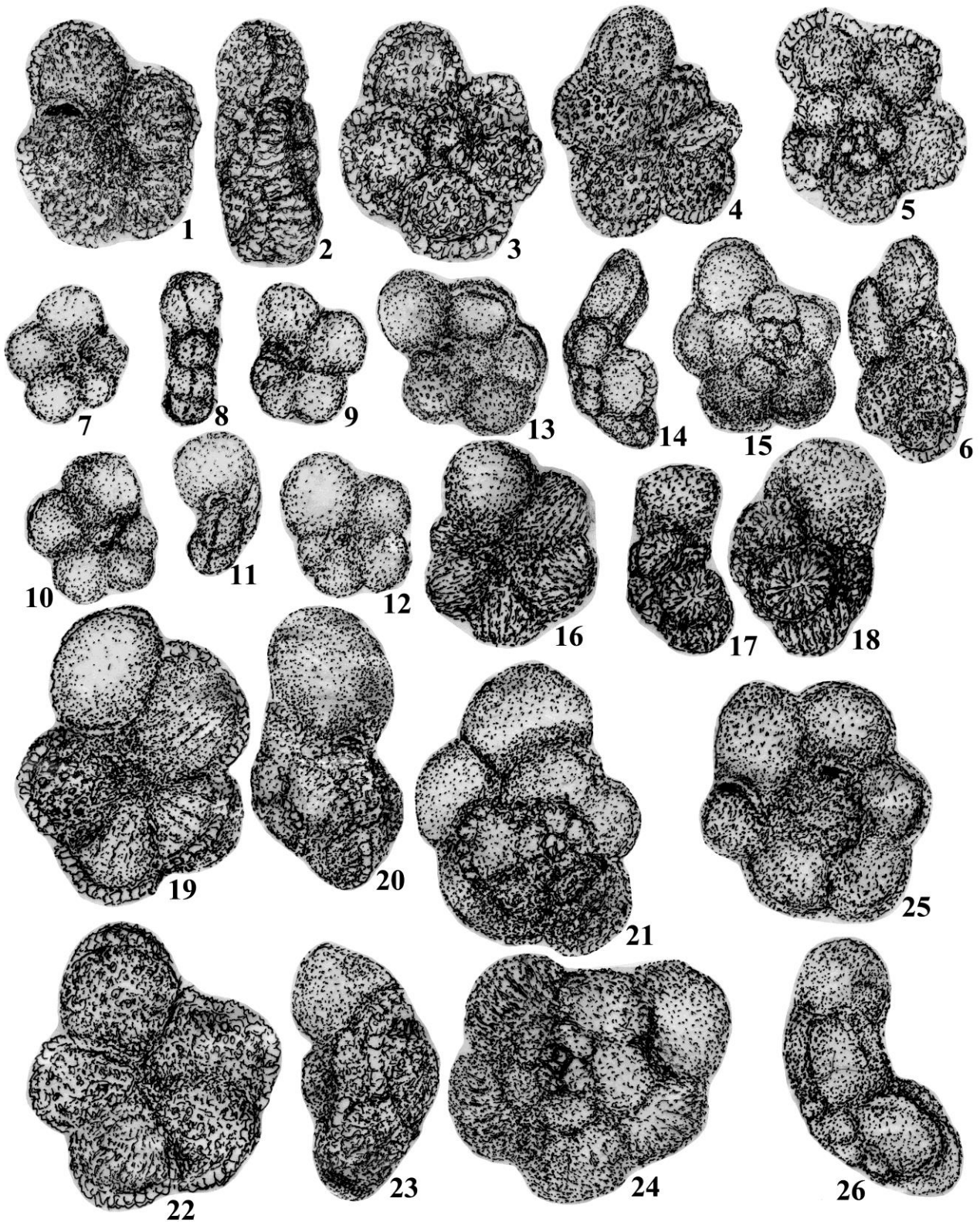
Dimensions: D = 0,36-0,29 mm; d = 0,31-0,24 mm; g = 0,17-0,15 mm

Remarks: By the globular chambers well compressed with a low trochospire, the shell come out planspiral; by this aspect the species is well delimited as Maslakova show in the pl. 26, fig.2.

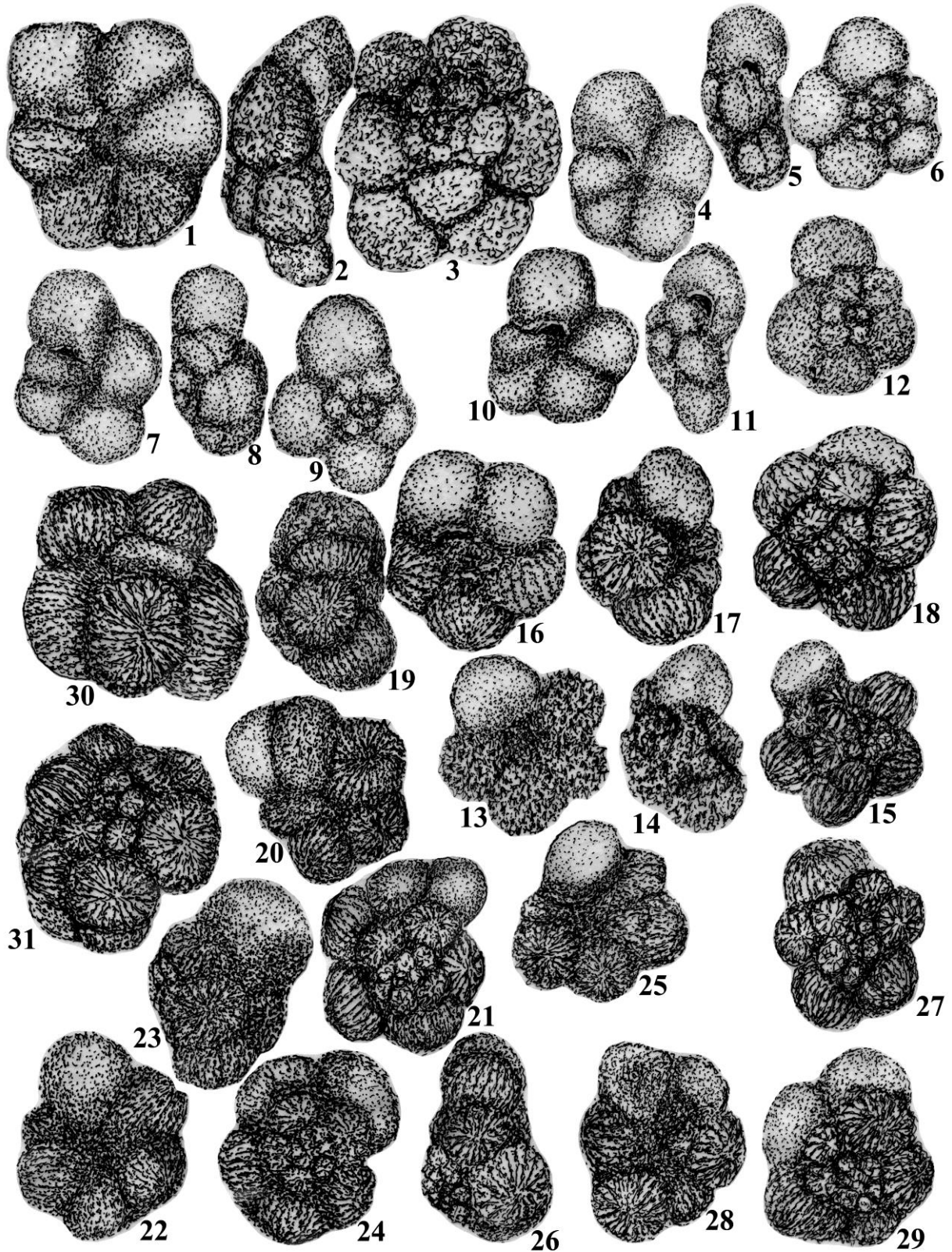




**Fig. 12:** 1-3 *Gansserina gansseri* (Bolli 1951), Maastrichtian, Țâța Valley, Pietroșița, LPB. IV. 12442; 4-6 *Gansserina wiedenmayeri* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietroșița, LPB. IV. 12431; 7-9 *Rugotruncana subglaessneri* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietroșița, LPB. IV. 12421; 10-16 *Abatomphalus mayaroensis* (Bolli 1951), Maastrichtian, Țâța Valley, Pietroșița, LPB. IV. 12433; 17-19 *Globotruncanella havanensis* (VOORWJIK 1937) emend. Brönnimann & Brown 1955, Maastrichtian, Țâța Valley, Pietroșița, L.P.B. VI. 12429 (All specimens x 90).



**Fig. 13:** 1-3 *Rugotruncana subpennyi* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12426; 4-6 *Rugotruncana subhexacamerata* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12422; 7-12 *Archaeoglobigerina blowi* Pessagno 1967, Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12441; 13-15 *Globotruncanella pshadae* (KELLER 1946), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12427; 16-18 *Rugoglobigerina kelleri* (Subbotina 1953), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12451; 19-26 *Globotruncanella sarmientoi* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12448 (All specimens x 90).



**Fig. 14:** 1-3 *Globotruncanella sarmientoi* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12448; 4-12 *Archaeoglobigerina blowi* (Pessagno 1967), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12449; 13-15 *Rugoglobigerina pustulata* Brönnimann 1952, Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12415; 16-24 *Rugoglobigerina ordinaria* (Subbotina 1953), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12446; 25-29 *Rugoglobigerina kelleri* (Subbotina 1953) Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12451; 30-31 *Rugoglobigerina rotundata* Brönnimann 1952 Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12416 (All specimens x 90).



Occurrences: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Upper Maastrichtian  
Specimens: LPB.IV. 12446, 12419, 12411

Genus *Rugotruncana* Brönnimann & Brown 1955  
*Rugotruncana tilevi* Brönnimann & Brown 1955  
Figs. 8: 19-21

1955 *Rugotruncana tilevi* Brönnimann & Brown, p.547,  
pl.22, figs.1-3

Dimensions: D = 0,40 - 0,36 mm; d = 0,36 mm; g = 0,14 mm

Remarks: Presence of a double keel and the radial disposition of the costellae particularly on the umbilical side are the features which make the difference from the *Rugotruncana subrugosa* Gandolfi.

Occurrences: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Upper Maastrichtian  
Specimens: LP B.IV. 12436

*Rugotruncana ellisi* Brönnimann & Brown 1955  
Figs. 5: 13-15, 19-24; Figs. 11:16-21

1955 *Rugotruncana ellisi* Brönnimann & Brown, p.547,  
pl.22, figs.7-9

Dimensions: D = 0,39-0,39 mm ; d = 0,29-0,36 mm; g = 0,19 mm

Remarks: The authors characterized very conclusive this species: "Some or all chambers exhibit a very weak double keeled peripheral band. The two keels are very faint and may be missing from a few or last chambers, the costellae which are barely discernible give the surface a roughened appearance".

Occurrences: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Maastrichtian  
Specimens: LPB.IV. 12426

*Rugotruncana subrugosa* (Gandolfi 1955)  
Figs. 1: 16-27; Figs. 2: 26-28; Figs. 3: 28-30; Figs. 6: 7-9

1955 *Globotruncana (Rugoglobigerina) rugosa subrugosa* Gandolfi, figs.5a-c

Dimensions: D = 0,32-0,40 mm; d = 0,24-0,36 mm; g = 0,17-0,19 mm

Remarks: By the presence of two peripheral keels this species differs from *Rugoglobigerina rugosa*, even if the chambers on the umbilical side present ordinary a *Rugoglobigerina rugosa* radial costellae.

Occurrences: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Upper Maastrichtian  
Specimens: LPB.IV.12420

*Rugotruncana subornata* (Gandolfi 1955)  
Figs. 2: 22-25

1955 *Globotruncana (Rugoglobigerina) ornata subornata* Gandolfi, p.50, pl.3, fig.6 a-c

Dimensions: D = 0,22 mm; d = 0,20 mm; g = 0,12 mm

Remarks: By the presence of two finely beaded keels this species differs from *Rugoglobigerina ornata* Brönnimann 1952.

Occurrences: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Upper Maastrichtian

Specimens: LPB.IV. 12440

*Rugotruncana subcircumnodifer* (Gandolfi 1955)  
Figs. 1: 34-36; Figs. 2: 32-34; Figs. 9: 25-27; Figs. 15: 4-12

1955 *Globotruncana (Rugoglobigerina) circumnodifer subcircumnodifer* Gandolfi, p.44, pl.2, fig.8

1967 *Rugotruncana subcircumnodifer* (Gandolfi) Pessagno, p.369, pl.62, fig.14 16, pl.74, fig.1-3

Dimensions: D = 0,32-0,36 mm; d = 0,27-0,32 mm;

Remarks: Gandolfi (1955) shows: "the test is slightly convex, chambers are inflated more pronounced in the umbilical side the faintly beaded double keel is not exactly in the middle of the chambers.....test is rough especially in the early stage". All these features defined clear this taxon.

Occurrences: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Maastrichtian  
Specimens: LPB.IV. 12439

*Rugotruncana subhexacamerata* Gandolfi 1955  
Figs. 2: 29-31; Figs. 10: 28-30; Figs. 13: 4-6

1955 *Globotruncana (Rugoglobigerina) hexacamerata subhexacamerata* Gandolfi, p.34, pl.1, fig.11

Dimensions: D = 0,34-0,32 mm; d = 0,34-0,34 mm; g = 0,19 mm

Remarks: Gandolfi (1955, p.34) characterized this taxon: "its flat to slightly convex dorsal(spiral) side, double keeled in the early stages, keels finely beaded, often not continuous way: chambers five to six on the last whorl.....Test rough in the early stage". On our specimens on the periphery of the last chambers the keel is exactly a finely beaded often not continuous (Figs. 10: 28-30)

Occurrences: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Maastrichtian  
Specimens: LPB.IV.12422; L.P.B.IV.12444

*Rugotruncana subloetterli* (Gandolfi 1955)  
Figs. 6: 16-21; Figs. 9: 22-24; Figs. 16: 21-26

1955 *Globotruncana (Rugoglobigerina) loetterli subloetterli* Gandolfi, p. 36, pl.1, fig.14

Dimensions: D = 0,36-0,38 mm ; d = 0,40-0,36 mm

Remarks: By its low trochospiral test, the presence of two peripheral keels and the moderate inflated chambers, smooth or with a weak ornamentation (small tubercles of fine costellae) this species is well delimited.

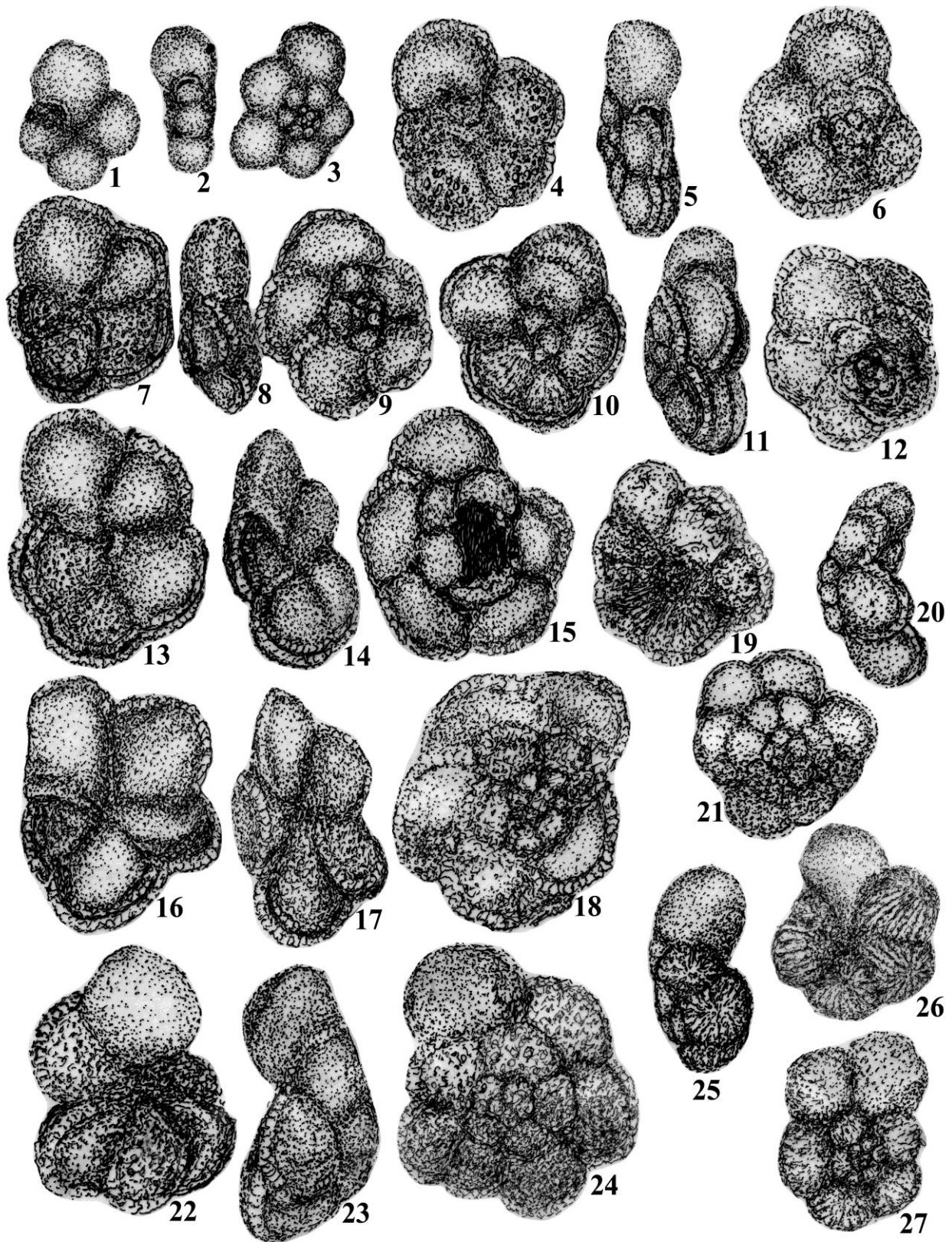
Occurrences: Țâța Valley, Pietrosița-Fieni area  
Stratigraphic distribution: Upper Maastrichtian  
Specimens: LPB.IV. 12423

*Rugotruncana subpennyi* (Gandolfi 1955)  
Figs. 6: 13-15; Figs. 7: 1-6, 10-15, 22-27; Figs. 8: 10-12;  
Figs. 9: 13-21, Figs. 13: 1-3

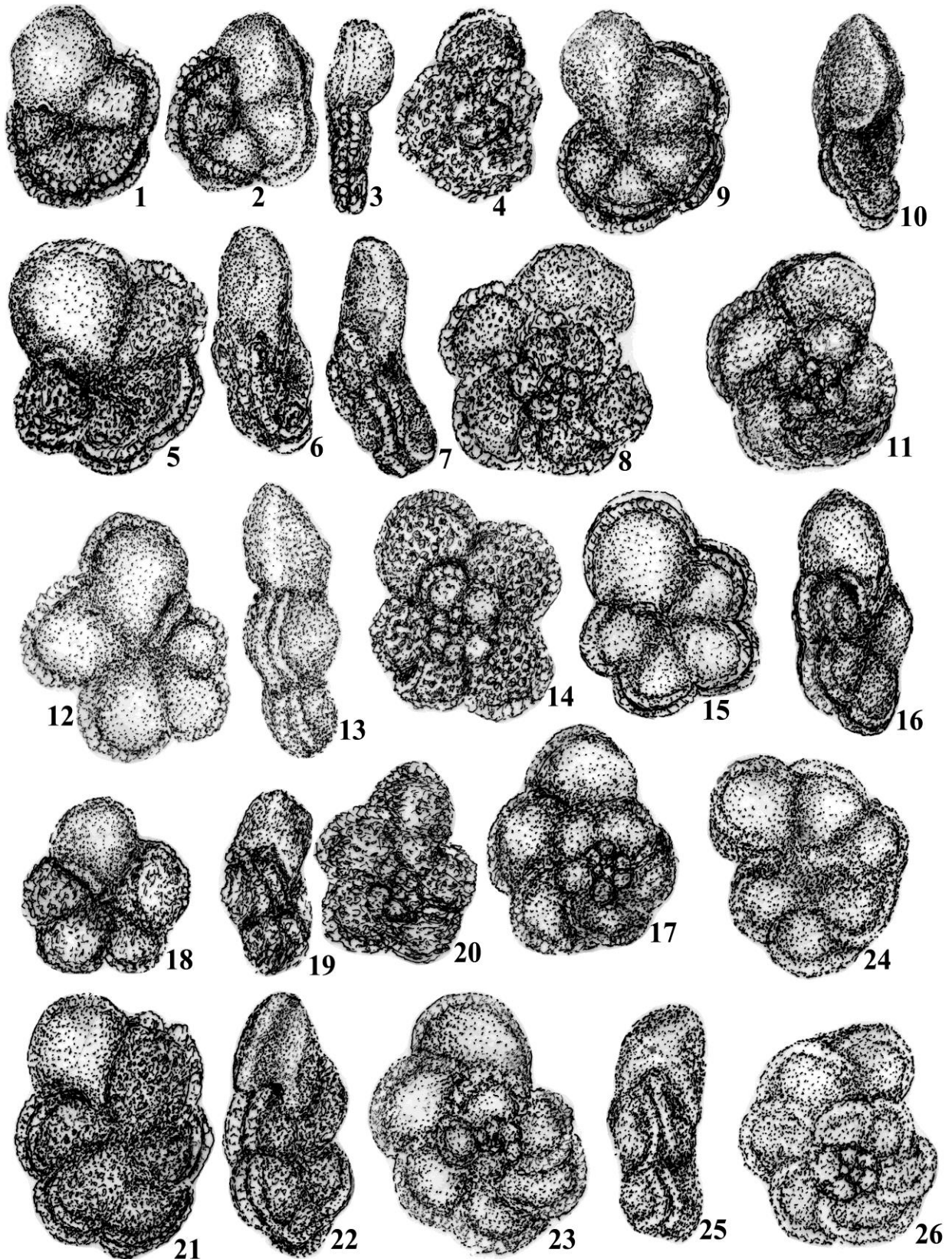
1955 *Globotruncana (Rugoglobigerina) pennyi subpennyi* Gandolfi, p.73, fig.7

1967 *Rugotruncana subpennyi* (Gandolfi) Pessagno, p. 370, pl.76, figs.12-14

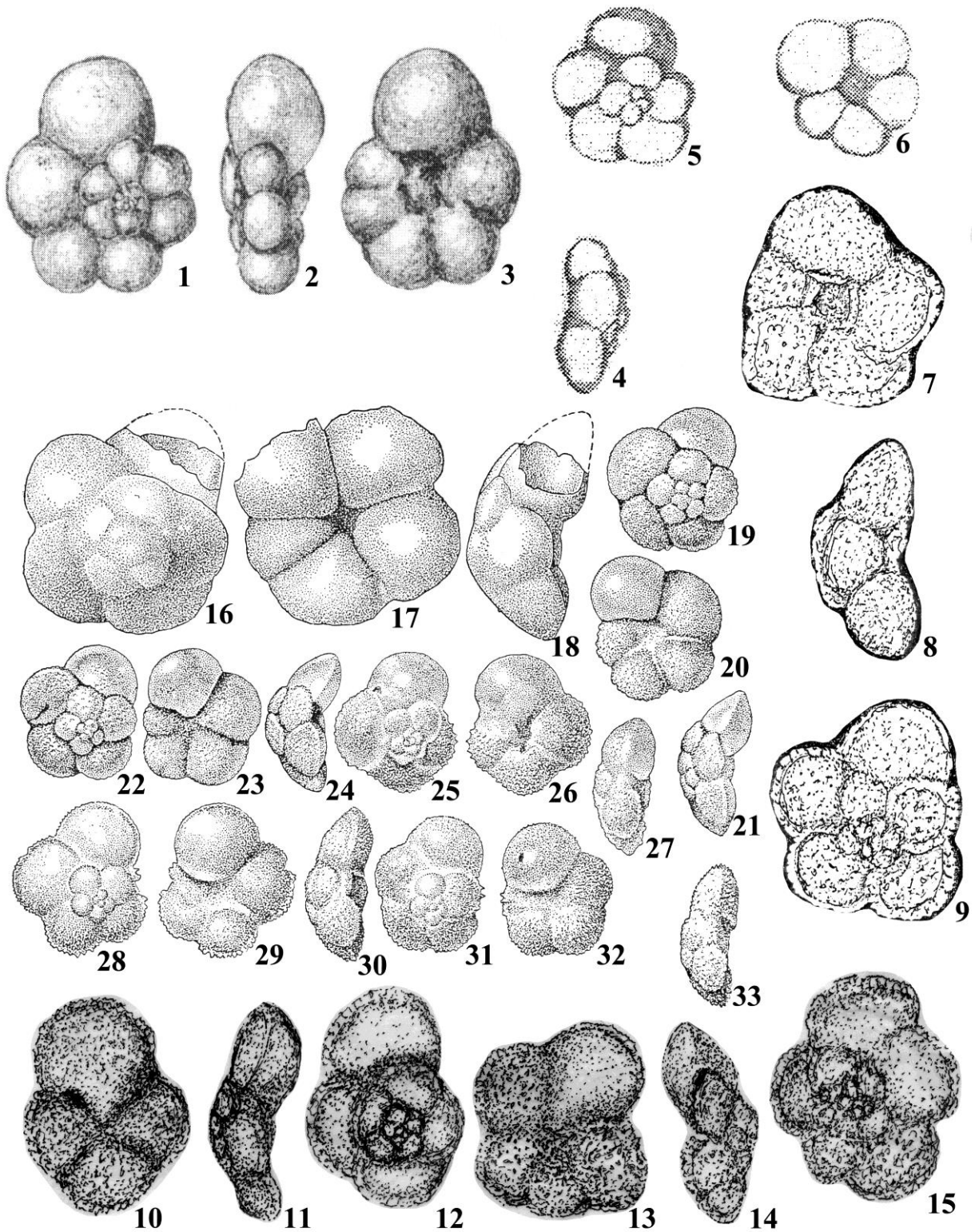




**Fig. 15:** 1-3 *Globigerinella glaessneri* (Gandolfi 1955), Maastrichtian, Țăța Valley, Pietroșița, LPB.IV.12418; 4-12 *Rugotruncana subcircumnodifer* (Gandolfi 1955), Maastrichtian, Țăța Valley, Pietroșița, LPB.IV.12439; 13-24 *Globotruncanella sarmientoi* (Gandolfi 1955), Maastrichtian, Țăța Valley, Pietroșița, LPB.IV.12448; 25-27 *Rugoglobigerina kingi* Trujillo 1960, Maastrichtian, Țăța Valley, Pietroșița, LPB.IV.12450 (All specimens x 90).



**Fig. 16:** 1-17 *Abatomphalus pessagnoii* (Longoria 1973), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12434; 18-20 *Rugotruncana subbeldigi* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12452; 21-26 *Rugotruncana subloetterli* (Gandolfi 1955), Maastrichtian, Țâța Valley, Pietroșița, LPB.IV.12423 (All specimens x 90).



**Fig. 17:** Reproductions of different *Globotruncanella* taxa from the original papers. **1-6** *Globigerina cretacea* var. *saratogensis* Applin 1920 (modified from Applin, 1920); **7-9** *Globotruncana havanensis* Voorwijk 1937 (modified from Voorwijk, 1937); **10-15** *Rugotruncana havanensis* (Voorwijk 1937) emend. Brönnimann & Brown 1955, LPB.IV. 12429 (specimens x 90, Neagu Collection); **16-33** *Globorotalia pshadae* Keller 1946 (modified from Subbotina, 1953).



Dimensions: D = 0,36-0,26 mm; d = 0,40-0,32 mm; g = 0,22 mm

Remarks: This species differs from *Rugotruncana subrugosa* by the presence of a double peripheral keel and the radial costellae on the umbilical side is flat or very low trochospiral without a typical ornamentation.

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Upper Maastrichtian

Specimens: LPB.IV. 12426

*Rugotruncana subglaessneri* (Gandolfi 1955)

Figs. 2: 16-21; Figs. 7: 19-21, 24-29; Figs. 10: 22-27;

Figs. 12: 7-9

1955 *Rugoglobigerina glaessneri subglaessneri* Gandolfi, p.51, pl.3, fig. 9 a-c

Dimensions: D = 0,26-0,15 mm; d = 0,24-0,15 mm

Remarks: specimens from the Țâța Valley has the general aspect (in all respect) with Gandolfi's species by four to five chambers in the last whorls, high protruding (in aspect) periphery fairly petaloid with a finely beading diverging double keel; the umbilical chambers moderate inflated and as usual, ornate by radial costellae or rough.

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Maastrichtian

Specimens: LPB.IV. 12421

Genus *Gansserina* Caron, Gonzales Donoso, Robaszynski, Wonders 1984

*Gansseria gansseri* (Bolli 1951)

Figs. 11: 22-27; Figs. 12: 1-3

1951 *Globotruncana gansseri* Bolli, p.196, pl.35, figs.1-3

1955 *Globotruncana gansseri gansseri* Bolli, Gandolfi, p.69, pl.6, fig.8 a-c, text-fig.11b

1984 *Gansseria gansseti* (Bolli) Caron, Gonzales Donoso, Robaszynski, Wonders, p. 294, pl.53, fig.5

Dimensions: D = 0,39-0,34 mm; d = 0,39-0,29 mm; g = 0,26-0,17 mm

Remarks: By the extremely rough test (small irregular tubers) together with one peripheral keel, this species is very near to *Rugotruncana*.

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Upper Maastrichtian

Specimens: LPB.IV. 12442

*Gansserina wiedenmayeri* (Gandolfi 1955)

Figs. 12: 4-6

1955 *Globotruncana wiedenmayeri wiedenmayeri* Gandolfi, p.71, pl.7, figs.4 a-c

1984 *Gansseria wiedenmayeri* (Gandolfi) Robaszynski, Caron, Gonzales Donoso, Wonders, p.298, pl.54, figs.3 a-c

Dimensions: D = 0,50 mm; d = 0,40 mm; g = 0,34 mm

Remarks: With its so high umbilical side (as *Globorotalites* from calcareous benthic species) the extremely rougher ornamentation, the spiral side low trochospiral near flat and a double keel on the periphery of the test, this species is very clear delimited.

Occurrences: Țâța Valley, Pietrosița-Fieni area

Stratigraphic distribution: Upper Maastrichtian

90

Specimens: LPB.IV. 12431

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