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KILKA NOWYCH GATUNKÓW OTWORNIC Z MIOCENU POLSKI

(Tabl. VIII, IX i 7 fig.)

Some new species of Foraminifera from the Miocene of Poland

(Pl. VIII, IX and 7 Figs)

STRESZCZENIE

Autorka opisała 5 nowych gatunków otwornic znalezionych w osadach miocenu na obszarze między Tarnobrzegiem a Chmielnikiem na południe od Gór Świętokrzyskich i występujących również na innych obszarach w przybrzeżnych osadach miocenu Polski południowej. Gatunki te były cytowane w pracach autorki (1964, 1966) jako nomina nuda i nie zostały dotychczas dokładnie opisane. Ich położenie stratygraficzne jest podane na załączonej tabelce (fig. 1). Dwa gatunki można uważać za charakterystyczne dla miocenu Polski: *Anomalinoides dividens* dla dolnego sarmatu w facji ilastej i *Textulariella lithothamnica* dla dolnego tortonu w facji litotamniowej. Użyta w cytowanych pracach autorki nazwa *Textulariella tortonica* została obecnie zmieniona na właściwszą *T. lithothamnica*.

Abstract. Five new species of Foraminifera, found in the Miocene sediments south of the Holy-Cross Mountains are described, i.e. *Textulariella lithothamnica*, *Bulimina angusta*, *Bulimina micra*, *Glabratella plana* and *Anomalinoides dividens*. They were cited in author's papers (Łuczowska 1964, 1966) as nomina nuda.

INTRODUCTION

Five species of Foraminifera are described, found in the Miocene sediments of Tarnobrzeg and Chmielnik region, south of the Holy-Cross Mountains and distributed in other areas of near-shore sediments of Miocene of Poland. These species are cited in author's papers (1964, 1966) as nomina nuda and hitherto were not in detail described.

The stratigraphical position of the described species is shown in Table 1. Two of them can be considered as index fossils in the Polish Miocene: *Anomalinoides dividens* in the lower Sarmatian clays and *Textulariella lithothamnica* in the lower Tortonian Lithothamnium-limestones. The name *Textulariella tortonica* used in the papers quoted above is changed to *T. lithothamnica* as the latter name is considered to have more significance for the species.

Table 1

Age	Zone	Subzone	Species
Lower Sarmatian	<i>Elphidium hauerinum</i>		
	<i>Quinqueloculina sarmatica</i>		<i>Glabratella plana</i> <i>Bulimina micra</i>
	<i>Quinqueloculina karreri ovata</i>		
	<i>Anomalinoides dividens</i>		<i>Anomalinoides dividens</i>
Upper Tortonian	<i>Cibicides crassiseptatus</i>		
	<i>Neobulimina longa</i>	<i>Spirialis</i>	
Lower Tortonian	<i>Uvigerina costai</i>		
	<i>Candorbulina universa</i>	<i>Amphistegina lessonii</i>	<i>Textulariella lithothamnica</i>
			<i>Bulimina angusta</i>

SYSTEMATIC DESCRIPTIONS

Superfamily Lituolacea de Blainville, 1825

Family Pavonitinae Loeblich & Tappan, 1961

Subfamily Pavonitinae Loeblich & Tappan, 1961

Textulariella Cushman, 1927

Textulariella lithothamnica n. sp.

(Pl. VIII, fig. 1—5, Pl. IX, fig. 7 text-figs 1, 2)

Holotypus: Pl. VIII, fig. 1, No F 601.

Locus typicus: Grzybów near Staszów.

Stratum typicum: Lower Tortonian, Lithothamnium-limestones south of the Holy-Cross Mountains, subzone with *Amphistegina lessonii*.

Derivatio nominis: from the Lithothamnium-beds.

Material: above 50 specimens.

Dimensions: holotypus 2,5 mm, paratypes 0,75—3,00 mm.

Diagnosis: Shape subcylindrical, the initial part with inflate chambers increasing rapidly in size as added, above a quarter of the height of the test chambers low, flat, of the same shape, the number of internal partitions ranging from two in the initial part to six in the last chambers. Wall agglutinated, with two layers.

Description: Test large, subcylindrical, elongated, the initial end acute, the proximal end oblique. Number of chambers 8—15 on each side. The first whorl composed of three globular chambers undivided inside, they are visible outside as a swelling at the acute end of the test. Next chambers up to a quarter of the height of the test distinct, inflated, increasing rapidly in size as added, arranged in two horizontal series, the internal

partitions marked at the surface of the test as small cavities on the chambers, the remaining chambers of the same shape, flat, low and smooth. Chambers internally subdivided by radial partitions near the periphery, the number of which increased from two in the initial part to six in the last chambers (Fig. 3). Wall agglutinated, composed of two

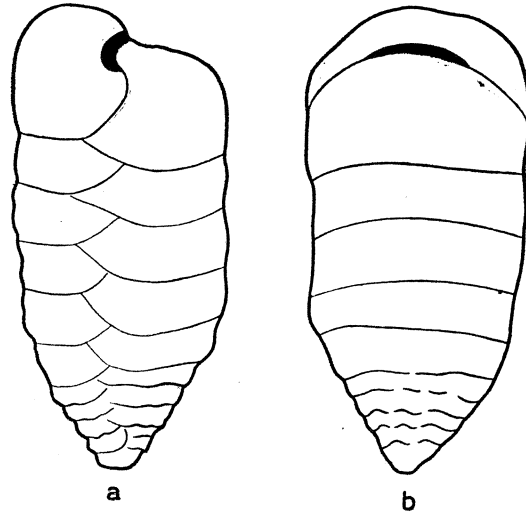


Fig. 1. *Textulariella lithothamnica*, a — front view, b — side view; Grzybów 27, depth 235—238 m.

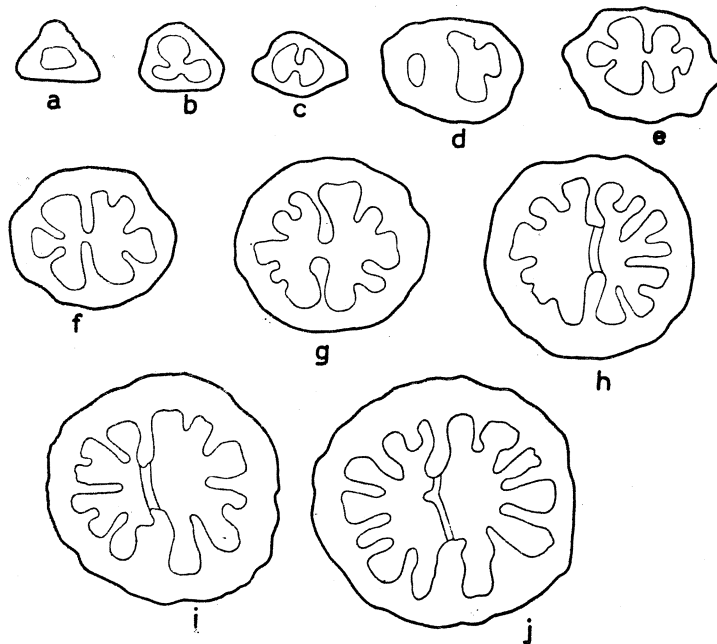


Fig. 2 a—j. *Textulariella lithothamnica*, development of internal partitions (serial section of one specimen); l. c., depth 235—238 m.

layers, the inner calcareous, smooth, perforated, well visible in broken specimens, and the outer agglutinated with thin sand grains and much calcareous cement (P. II fig. 6). Within the chambers the pseudochitineous lining. Aperture as a low arch at the inner margin of final chamber.

Remarks: Shape of the test resembles *Textularia recta* Cushman, but the characteristic wall of this species is agglutinated from thick calcareous grains. *Textularia barretti* Parker et Jones differs in

having the aperture surrounded by the serrate border and the test compressed in opposite direction than in other species of *Textularia*. The initial part of *Textulariella lithothamnica* resembles *Textularia pseudorugosa* Lacroix, but the latter differs in lacking the internal partitions within the chambers.

Superfamily Buliminacea Jones, 1875

Family Buliminidae Jones, 1875

Subfamily Bulimininae Jones, 1875

Bulimina d'Orbigny, 1826

Bulimina angusta n. sp.

(Pl. VIII, fig. 6—9, text-fig. 3)

Holotypus: Pl. VIII, fig. 6, No F 606.

Locus typicus: Grabki Duże near Staszów.

Stratum typicum: Lower Tortonian shales and clays, zone with *Candorbulina universa*.

Derivatio nominis: from the word angustus = narrow.

Material: about 50 specimens.

Dimensions: holotypus 0,35 mm., paratypes 0,35—0,55 mm.

Diagnosis: Shape elongated, the inflated chambers of initial part arranged in three series, later chambers being more elongate with tendency to be uncoiled. The last chamber narrow.

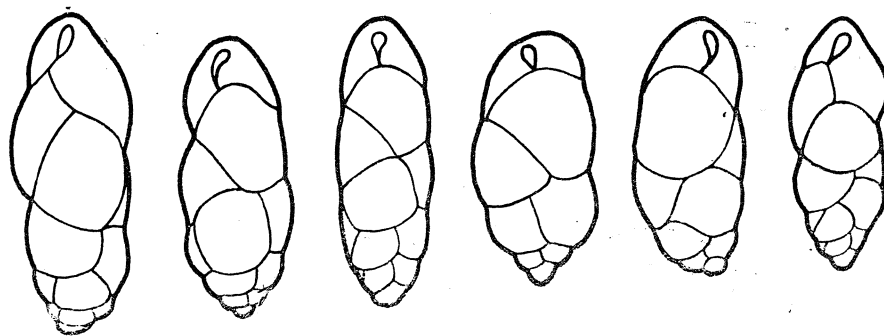


Fig. 3. *Bulimina angusta*, chambers outline; Grabki Duże N 8, depth 189—191 m.

Description: Test elongated, tapering at both ends. The initial part triserial with small inflated chambers and depressed sutures, above the half of the height of the test chambers strongly increasing in size as added, elongate and with tendency to become uncoiled and nearly biserial. The last chamber elongated, narrow. Surface smooth, polished, fine perforated. Aperture elongate, loop-shaped below the top of the last chamber.

Remarks: The species remind *Bulimina elongata* d'Orbigny figured by Cushman (1947, pl. 25, fig. 16a, 16b), but differs considerably from *B. elongata* d'Orbigny. J. A. Cushman does not mention the origin of the figured specimens. From *B. elongata* d'Orbigny it differs in having more inflated chambers, more elongated last few chambers and the shape of the test more fusiform, not broadest near the apertural end.

Bulimina micra n. sp.
(Pl. VIII, fig. 10—13, text-fig. 4)

Holotypus: Pl. VIII, fig. 10, No F 610.

Locus typicus: Rytwiany near Staszów.

Stratum typicum: Lower Sarmatian, Krakowiec-clays south of the Holy-Cross Mountains, zone with *Quinqueloculina sarmatica*.

Derivatio nominis: from the word micros = small.

Material: 30 specimens.

Dimensions: holotypus 0,38 mm, paratypes 0,28—0,58 mm.

Diagnosis: Shape cylindrical, chambers subcircular, flat, compact, slightly increasing in size as added, sutures flat, in the upper part somewhat depressed.

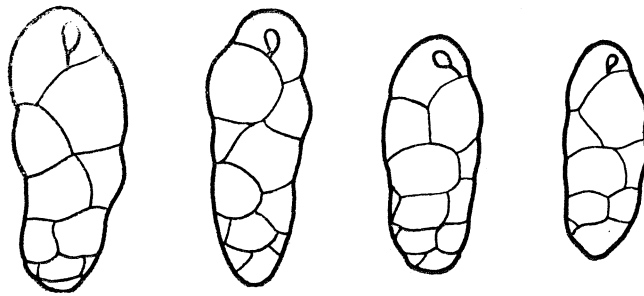


Fig. 4. *Bulimina micra*, chambers outline; Rytwiany 1, depth 66—67 m.

Description: Test small, elongated, cylindrical, at both ends rounded. Chambers subcircular, not inflated, compact, gradually increasing in size as added, sutures flat, in the upper part of the test somewhat depressed. Last chamber small, rounded. Surface smooth, polished, with fine and dense pores. Aperture small, loop-shaped, below the top of the last chamber.

Remarks: Large specimens resembles *Bulimina gracilis* Cushman, but differs in having less inflated chambers and the aperture placed below the top, rather than toward the center of the face.

Superfamily Discorbacea Ehrenberg, 1838

Family Glabratellidae Loeblich & Tappan, 1964

Glabratella Dorreen, 1948

Glabratella plana n. sp.
(Pl. VIII, fig. 14—17, text-fig. 5)

Holotypus: Pl. VIII, fig. 14 a, b, No F 614.

Locus typicus: Zrecze near Chmielnik.

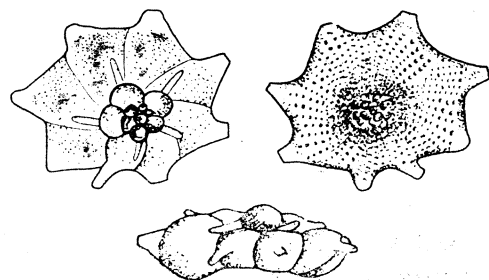


Fig. 5. *Glabratella plana*, chambers outline; Zrecze 3, depth 59,3—59,4 m.

Stratum typicum: Lower Sarmatian, Krakowiec-clays south of the Holy-Cross Mountains, zone with *Quinqueloculina sarmatica*.

Derivatio nominis: from the word planus = flat.

Material: above 50 specimens.

Dimensions: holotype 0,32 mm, paratypes 0,20—0,35 mm.

Diagnosis: Shape lenticular, stellate, chambers of the last whorl radially elongate and tubulospinate.

Description: Test trochospiral, small, lenticular, central part of the spiral side slightly convex, opposite side umbilicate. Chambers of the last whorl strongly increasing in size, radially elongate and tubulospinate, making the stellate outline of the test. The spines of previous chambers nearly horizontal, sometimes attached to the chambers wall of the last whorl and slightly visible. Number of chambers 5 in the early part, 6—8 in the last whorl. Sutures somewhat depressed. Surface of the spiral side smooth, polished, distinct perforate, opposite side covered with radial tuberculate striae, umbilical depression often with pustules. Aperture a small umbilical slit, open to the central depression and sometimes slightly visible.

Remarks: From *Glabratella imperatoria* (d'Orbigny) it differs in having the more flat test of stellate outline, radially elongate chambers and horizontal spines, whereas *G. imperatoria* has a conical test, globular chambers and spines raised upwards.

According to Loeblich & Tappan (1964) schizont forms of this genus are „generally larger and flatter, gamont more highspired”. It seems however, that *G. plana* cannot represent the schizont forms of *G. imperatoria* on account of different shape of chambers and different horizontal spines.

Superfamily Cassidulinacea d'Orbigny, 1839

Family Anomalinidae Cushman, 1927

Subfamily Anomalininae Cushman, 1927

Anomalinoides Brotzen, 1942

Anomalinoides dividens nom. nov.

(Pl. IX fig 1—6, text-figs 6, 7)

1884 *Anomalina grosserugosa* Gümbel, sp.; Brady H.B., 1884, Pl. 94, fig. 4, 5

1933 *Anomalina* n. sp. aff. *grosserugosa* Brady (non Gümbel) (n. sp. aff. Thalmann); Thalmann H.E., 1933, p. 252

Holotypus: Pl. IX fig. 1 a—c, No F 618.

Locus typicus: Żrecze near Chmielnik.

Stratum typicum: Lower Sarmatian, Krakowiec-clays south of the Holy-Cross Mountains, zone with *Anomalinoides dividens*.

Derivatio nominis: from the word divido = divide (it divides the Sarmatian microfauna from the Tortonian one).

Material: above 1000 specimens.

Dimensions: Holotype 0,46 mm, paratypes 0,21—0,70 mm.

Diagnosis: Shape circular, lobulate, periphery rounded, central part of the spiral side often depressed, chambers of the last whorl enlarging rapidly as added, few last chambers inflated.

Description: Test low trochospiral, circular, lobulate, periphery broadly rounded, especially in the last part of the whorl. Spiral side convex with the slightly depressed central part, last whorl broad with

7—10 inflated chambers, enlarging rapidly as added, earlier whorls small and slightly visible in the middle of the depressed part, often covered with thickened shell material, sutures oblique, arcuate. Opposite side involute, umbilicate, few last chambers strongly inflated, triangular, sutures radial. Wall thin, transparent, smooth, densely perforated, espe-

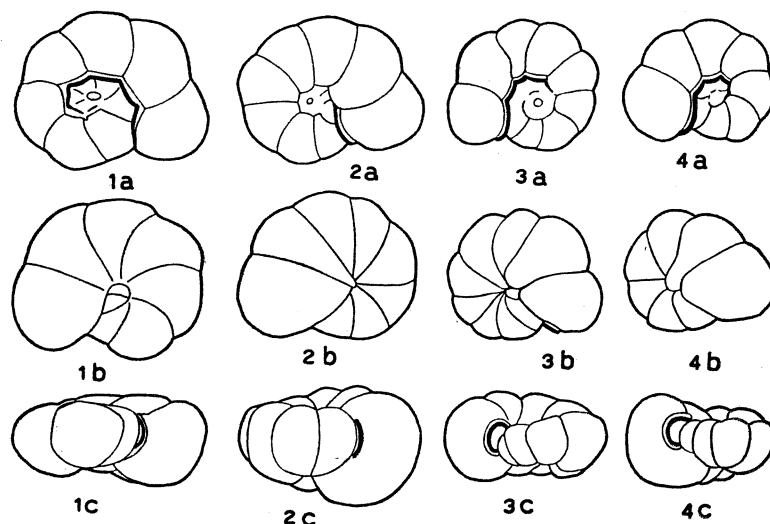


Fig. 6. Comparison of chambers outline: 1, 2 a—c — *Anomalina grosserugosa* Gümbel, sp. (in Brady's work), 3, 4 a—c — *Anomalinoides dividens*; a — spiral side, b — umbilical side, c — side view

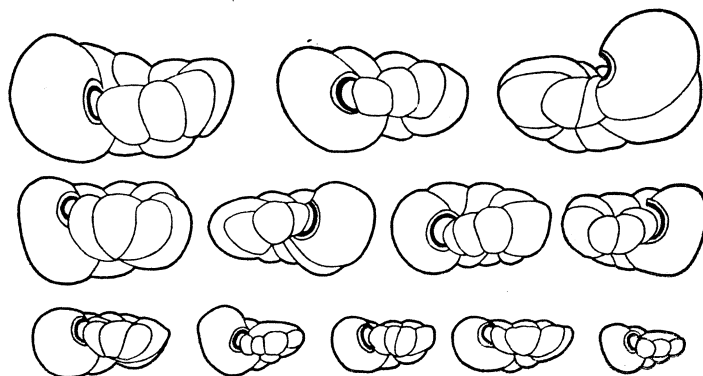


Fig. 7. *Anomalinoides dividens*, variability of last chambers outline; Zrecze 3, depth 72,7—72,8 m.

cially on the spiral side, the umbilical side with the earlier part more sparsely perforated or nearly devoid of pores, granular in structure (Pl. II fig. 7). Aperture peripheral, large, semicircular, with slightly thickened lip, extending onto the spiral side.

Variability: The morphological variability concerns the following features: a) various size and convexity of the last chamber, b) various perforation of the few last chambers, particularly on the umbilical side, c) size of the test. There exist small specimens with nearly nonperforate umbilical side and somewhat inflated chambers, besides the larger forms with dense pores on the whole surface and strongly inflated last chamber. After breaking of few last chambers appear the sparsely perforated hyaline wall of the initial part of the test. The periphery of this discovered part is more flattened similarly as in small specimens of this species. It seems that the variability described above is connected with ontogeny.

The small flattened specimens with sparse perforation are juvenile forms and the formation of globular chambers and dense perforation is corresponding with the final phase of chamber formation.

Remarks: *Anomalinoides dividens* is most approaching to the recent form described by H. B. Brady (1884) from the Atlantic and Pacific Ocean, namely *Anomalina grosserugosa* G ü m b e l, sp.; H. E. Th al m a n n (1933) in the new nomenclature to Brady's work stresses upon that it is quite distinct from *A. grosserugosa* G ü m b e l, but he does not give the other name for this new species. In Brady's work the fully description is absent except the notice (p. 673), that „the walls are coarsely perforated, but have fewer pores on the superior than on the inferior side” and that *Anomalina badenensis* d'Orbigny is a very similar variety. This notice as well as the illustrations given by Brady correspond to our specimens.

Anomalina badenensis d'Orbigny differs in having evolute arrangement of chambers on the both sides, thick and nontransparent wall, more coarse perforation and small peripheral aperture.

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EXPLANATION OF PLATES VIII—IX

Plate VIII

- Fig. 1 a, b. *Textulariella lithothamnica* n. sp.; holotype, a) front view, b) side view; Grzybów 27, depth 235—238 m, $\times 25$.
- Fig. 2—3. *Textulariella lithothamnica* n. sp., paratypes; l. c., depth 235—238 m, 2 — $\times 24$, 3 — $\times 19$.

- Fig. 4. *Textulariella lithothamnica* n.sp., top view showing early coil; Grabki Duże N 8, depth 186—187 m, $\times 32$.
- Fig. 5. *Textulariella lithothamnica* n.sp., front view, the agglutinate layer destroyed, perforation of the inner layer visible; l. c., depth 186—187 m, $\times 25$.
- Fig. 6 a, b. *Bulimina angusta* n.sp., holotype; Grabki Duże N 8, depth 189—191 m, $\times 104$.
- Fig. 7—8 a, b. *Bulimina angusta* n.sp., paratypes; l. c., depth 189—191 m, $\times 104$.
- Fig. 9. *Bulimina micra* n.sp., holotype; Rytwiany 1, depth 66—67 m, $\times 84$.
- Fig. 10—12. *Bulimina micra* n.sp., paratypes; l. c., depth 66—67 m, $\times 84$.
- Fig. 13 a, b. *Glabratella plana* n.sp., holotype; a — spiral side, b — umbilical side; Zrecze 3, depth 59,3—59,4 m, $\times 114$.
- Fig. 14—15 a, b. *Glabratella plana* n.sp., paratypes; a — spiral side, b — umbilical side; l. c., depth 59,3—59,4, $\times 114$.

Plate IX

- Fig. 1 a—c. *Anomalinoides dividens* nom. nov.; holotype; a — spiral side, b — umbilical side, c — side view, $\times 70$.
- Fig. 2—5 a—c. *Anomalinoides dividens* nom. nov., paratypes; a — spiral side, b — umbilical side, c — side view, 4—5 juvenile forms, umbilical side with sparsely perforated wall, $\times 70$.
- Fig. 6—7. *Textulariella lithothamnica*, thin sections showing two layers, $\times 40$
- Fig. 8—9. *Anomalinoides dividens*, thin sections, granular structure of test visible; 8 — $\times 110$, 9 — $\times 168$
- All specimens of *Anomalinoides dividens* from the bore-hole Zrecze 3, depth 72,7—72,8 m.

