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INAEQUALINA N. GEN. (FORAMINIFERIDA, MILIOLINA)
AND ITS STRATIGRAPHIC DISTRIBUTION

(Pl. XXVIII)

*Nowy rodzaj Inaequalina (Foraminifera, Miliolina) i jego zasięg
stratygraficzny*
(Tabl. XXVIII)

Abstract: A new genus *Inaequalina* in the Badenian (Tortonian) sediments of Poland is distinguished. The genus is related to *Ophthalmidium* in having similar character of the aperture and at the same time related to *Spiroloculina* in having similar chamber arrangement. It differs from both two in the plano-convex test with chambers arrangement in two planes of coiling 140—170° apart.

INTRODUCTION

Several specimens of porcellaneous Foraminifera, resembling *Spiroloculina*, but with unequal tests flattened on one side and raised on the other one were found in the Lower Badenian (Tortonian) sediments of Poland. Possibly they were attached to the bottom by the flattened part of the test. Similar specimens were described from the Pliocene and Recent sediments by Schlumberger, Terquem, Brady and Cushman as:

Spiroloculina advena Cushman, 1921, Recent
„ *inaequilateralis* Schlumberger, 1893, Recent
„ *affixa* Terquem, 1878, Pliocene
„ *disparilis* Terquem, 1878, Pliocene
„ *acutimargo* Brady, 1884, Recent
„ *tenuimargo* Cushman, 1917, Recent

The species mentioned above, except for the last two, show common features: unequal tests, not planispirally coiled, aperture at the extend, flattened end of the last chamber, lacking tooth (except for *S. disparilis* which has a simple tooth) and a spiroloculine arrangement of chambers. The two last species show flattened, planispirally coiled tests, but apertures without tooth, like specimens described below. The before last, *S. acutimargo*, has loosely coiled chambers arrangement and is classified as *Ophthalmidium*, whereas the last one, *S. tenuimargo*, differs from *S. acutimargo* by having chambers closely adjacent one to another, not separated by flat plate-like portions of previous convolutions, as it is in *Spiroculina* and in our specimens.

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It is beyond of the author's intention to discuss further if *S. acutimargo* was justly included to the genus *Ophthalmidium*, which is probably confined to the Jurassic sediments only, and if *S. tenuimargo* has really planispirally coiled chambers. The author observed in Recent materials from Indian Ocean specimens similar to *S. tenuimargo*, but with one distinctly flattened side of the test. Before the problem of these two species will be studied, the species with unequal tests, not planispirally coiled, and with small elongate apertures without tooth would be considered as belonging to a new genus *Inaequalina*, closely related to the genus *Ophthalmidium* in having the same character of the aperture and at the same time related to the genus *Spiroloculina* in having similar chamber arrangement.

STRATIGRAPHIC DISTRIBUTION

The genus *Inaequalina* appears in Miocene sediments of Paratethys, is known from Pliocene and Recent sediments of the Mediterranean and probably from Recent sediments of the Atlantic and the Pacific.

SYSTEMATIC DESCRIPTION

Class: Rhizopoda
Order: Foraminiferida
Suborder: Miliolina
Superfamily: Miliolacea
Family: Nubeculariidae
Subfamily: Ophthalmidiinae

Inaequalina gen. n.

Type species: *Spiroloculina inaequilateralis* Schlumberger, 1893.

Type reference: Schlumberger, C., Monographie des Miliolides du golfe de Marseille. Soc. Zool. France, Mém., Paris, France, 1893, tome 6, p. 60, tf. 3, pl. 4, figs. 84—86.

Name derivation: from the Latin word *inaequalis* = unequal, uneven.

Diagnosis: Chambers arranged as in *Spiroloculina*, but in two planes of coiling 140—170° apart, aperture slitlike to rectangular, without tooth.

Description: Test more or less planoconvex, ovate to fusiform in outline, consisting of ovate proloculus followed by spirally wound second chamber of complete whorl in length, enlarging toward the apertural end, later chambers one-half coil in length, being regularly added on alternate sides in two planes of coiling 140—170° apart, so that one side of the test is flattened and the opposite side is more or less raised; all chambers, except proloculus, quadrangular in section and closely adjacent one to another, not separated, each of them equipped with apertural enlarging as those of *Ophthalmidium*; proloculus visible on both sides of the test; wall calcareous, porcelaneous, imperforate; aperture at the extend, flattened end of final chamber, slit-like to rectangular, without tooth.

Remarks: It differs from *Ophthalmidium* and *Spirophthalmidium* in the planoconvex test, in the stability and symmetry in the arrangement of chambers, and in lacking loosely coiled chambers and flattened plates

between whorls; the ovate proloculus is encircled by a second chamber of complete whorl in length (as in *Spiroloculina*), quadrangular in section and enlarging to the end, whereas *Ophthalmidium* has the spherical or slightly elliptical proloculus, the second chamber one half to one whorl in length, the third one of the complete whorl and only the next chambers gradually reduced in length to half a turn or longer than half a turn; from *Spiroloculina* it differs in the planoconvex test and the slit-like aperture without tooth.

O c c u r r e n c e: Miocene — Recent, cosmopolitan.

Inaequalina jadwigae sp. n.

(Pl. XXVIII figs. 1—11)

H o l o t y p e: Pl. I fig. 1 a—c.

T y p e l e v e l: Miocene, Lower Badenian (Tortonian).

T y p e l o c a l i t y: Korytnica near Jędrzejów, outcrop.

T y p e s p e c i m e n: Holotype Nr. F-V/185 stored in the Department of Paleontology and Stratigraphy of the Academy of Mining and Metallurgy in Cracow, Poland.

N a m e d e r i v a t i o n: from the first name of author's daughter.

M a t e r i a l: 26 specimens well preserved.

D i m e n s i o n s:

	breadth mm	height mm
Holotype	0,67	1,35
Paratypes	0,17—0,72	0,31—1,25

D i a g n o s i s: Test slender, ovate in outline, tapering to the both ends; proloculus ovate; the second chamber primarily tubular, beginning from 1/3 of length quadrangular in section, encircling the proloculus; later chambers regularly added on both sides of the long axis of the test; each chamber with two sharp keels: one on the edge and the other one along the middle of the chamber wall on the raised side; chamber walls primarily flattened and concave in the adult.

D e s c r i p t i o n: Test planoconvex, ovate in outline, tapering slightly to the both ends, the apertural end flattened and extend, periphery sharply keeled; on the flat side of the test all chambers visible, increasing rapidly in size, with a well visible ovate proloculus raised a little up and the second chamber encircling the proloculus; the second chamber primarily tubular, from 1/3 of length enlarging and becoming quadrangular in section; later chambers regularly added on both sides of the long axis of the test, not tapering to the end; sutures flat, with a thickened keel of the previous chamber visible along each suture; on the convex side the same chambers are visible, but each one with a raised keel along the middle of the chamber; sutures flat, defined only by raised carines of previous chambers; chamber walls flat in the young stage and concave in the adult; all chambers adjacent very loosely one to another and get easily separated whereas only the proloculus with the second chamber stick together; surface smooth; wall structure cryptocrystalline, homogeneous, without exact crystal orientation in the middle layer of the wall observed in the thin-section, but with a certain orientation of tiny crystals perpendicular to the surface at the outer and inner margin of the wall; wall colour brownish in transmitted light; aperture slit-like, without tooth, at the extend, flattened end of the last chamber.

Dimorphism: With the studied specimens only megalospheric forms were observed. The dimensions of proloculus: breadth — 0,02—0,04, height — 0,05—0,08 mm.

Variability: The variability of the shape of the test is observed, being slender and less carinate in young stage and becoming broader and sharply carinate in the adult.

Remarks: It differs from *Spiroloculina advena* Cushman and *Spiroloculina inaequilateralis* Schlumberger in its more slender shape with tapering ends and sharply keeled chambers with concave walls in the adult. From *Spiroloculina affixa* Terquem it differs in having all chambers regularly added as well as in the concave wall chambers and the presence of sharply keels. From *Spiroloculina disparilis* Terquem it differs in lacking the simple tooth in the aperture and in more ovate shape of the test. It shows a great similarity to *Spiroloculina acutimargo* Brady, but differs in having a planoconvex test and in lacking separation of chambers by the intervening wing of the previous convolution and a tubular extension with small aperture on the final chamber. From *Spiroloculina tenuimargo* Cushman it differs in lacking the compressed test and a round aperture.

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STRESZCZENIE

W osadach dolnego badenianu (tortonu s.l.) na obszarze Polski znaleziono okazy otwornic o „porcelanowych” skorupkach, przypominające *Spiroloculina*, lecz o niesymetrycznym, płasko-wypukłym układzie komór. Podobne okazy były opisywane przez Schlumbergera, Terquema, Brady'ego i Cushmana z pliocenu i osadów współczesnych Morza Śródziemnego, Atlantyku i Pacyfiku. Budowa ich wykazuje pokrewieństwo z rodzajem *Ophthalmidium* ze względu na szparowate ujście

bez zęba, oraz z rodzajem *Spiroloculina* ze względu na podobny układ komór. Od obu tych rodzajów różnią się jednak ułożeniem komór w dwu płaszczyznach zwojowych pod kątem $140-170^\circ$; poza tym od rodzaju *Ophthalmidium* różnią się budową części embrionalnej oraz brakiem luźno zwiniętych komór i płytek międzykomorowych, a od rodzaju *Spiroloculina* odmiennym ujściem bez zęba. Ich zasięg stratygraficzny obejmuje osady miocenu Paratetydy, pliocenu i osadów współczesnych Morza Śródziemnego oraz prawdopodobnie osadów współczesnych Atlantyku i Pacyfiku.

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EXPLANATION OF PLATE XXVIII
OBJAŚNIENIE TABLICY XXVIII

Inaequalina jadwigae, n. sp.

- Fig. 1. Holotype. Korytnica near Jędrzejów. a—c — opposite sides and apertural view, $\times 90$
Fig. 1. Holotyp. Korytnica koło Jędrzejowa. a—c — widok z obu stron i od strony ujścia, $\times 90$
Fig. 2—4. Schematical drawings of the internal structure of the test in transmitted light. 2 — the arrangement of chambers, $\times 90$; 3 — proloculus with the second chamber, $\times 150$; 4 — cross section of the test showing the chamber coiling, $\times 150$
Fig. 2—4. Schematyczne rysunki budowy wewnętrznej w świetle przechodzącym. 2 — układ komór, $\times 90$; 3 — proloculus i druga komora, $\times 150$; 4 — przekrój przez skorupkę w płaszczyźnie równikowej ukazujący sposób zwinięcia komór, $\times 150$
Fig. 5—6. One chamber separated from the test. a — inner wall; b — outer wall; c, d — side walls, $\times 90$
Fig. 5—6. Jedna komora oddzielona od skorupki. a — ściana wewnętrzna; b — ściana zewnętrzna; c, d — ściany boczne, $\times 90$
Fig. 9. Apertural view of the proloculus and the second chamber, showing the enlarging of the second chamber and its change of shape to quadrangular, $\times 375$
Fig. 9. Widok proloculus i drugiej komory od strony ujścia, ukazujący czworoboczne rozszerzenie drugiej komory, $\times 375$
Fig. 7, 8, 10, 11. Thin sections of chambers showing the cryptocrystalline structure of the walls. 7 — longitudinal section; 8 — cross section of the keel; 10, 11 — cross sections of chambers, $\times 500$
Fig. 7, 8, 10, 11. Szlify cienkie ukazujące kryptokrystaliczną budowę ścian. 7 — przekrój podłużny; 8 — przekrój poprzeczny kila; 10, 11 — przekroje poprzeczne dwu komór, $\times 500$

