GEOLOGICKÝ ZBORNÍK — GEOLOGICA CARPATHICA, 38, 6, BRATISLAVA, DECEMBER 1987, Pp. 695—703

JAN ŘEHÁNEK*

BERRIASIAN STOMIOSPHAERINA PROXIMA N. SP. (STOMIOSPHAERIDAE) FROM THE CENTRAL WEST CARPATHIAN PALEOGENE BASAL BRECCIAS

(Figs. 4, Tab. 1, Pls. 2)

Abstract: A new species of a unilocular planktonic microorganism incertae sedis, in the presented paper named *Stomiosphaerina proxima* n.sp., has been described with the help of thin-section method in limestone fragment of the Central West Carpathian Paleogene basal breccias. The new species occurs sporadically in pelagic lime mudstones of Lower Berriasian *(Calpionella* zone).

Резюме: Новый вид однокамерного планктонного микроорганизма incertae sedis, в настоящей статье названный *Stomiosphaerina proxima* n.sp. был описан шлифовым методом из известняковых фрагментов брекчий палеогена Центральных Западных Карпат. Новый вид встречается спорадически в грязных пелагических известняках нижнего берриаса (зона Calpionella).

Introduction

A continuing sedimentological — biostratigraphical investigation of clastic components of carbonate breccias from Central Carpathian Paleogene basal strata brought in the bore profile Lipany 5 a finding of a so far not mentioned *Stomiosphaerid* microorganism with uniocular calcite test with a combined structure of two-layer wall. Structure elements and micrometric characteristics of individual test sections distinguished by the thin-section method rank the here described microfossils with the genus *Stomiosphaerina* NOWAK, 1974 *(Stomiosphaeridae* WANNER, 1940, emend. NOWAK, 1968). In the view of specific diagnostic characteristics we present these findings under the new species name — *Stomiosphaerina proxima* n.sp.

Stomiosphaerina proxima n. sp. forms in the bore Lipany 5 (Fig. 1) a not very abundant component of the microfossil association from Lower Berriasian marly lime mudstones. Stratigraphic age determination of these findings is based above all on calpionellid association identified by the author and on the application of earlier published results of Lower Cretaceous chronostratigraphy and biozoning (Colom, 1948; Bonet, 1956; Remane, 1964; Borza — Köhler — Samuel, 1978; Borza, 1984).

In our case it is already the second, but so far stratigraphically the oldest published finding of a *Stomiosphaerina* NOWAK genus representative.

* RNDr. J. Řehánek, Moravian Oil Field, Concern enterprise, Sadová 4, 695 30 Hodonín.

Fig. 1. Localization of the bore profile Lipany 5 (Li.-5) in the studied region.

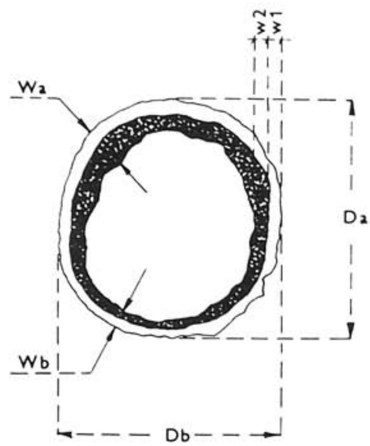


Fig. 2. Schematic sketch and the mode of measurement of principal parameters of thin section of the test of *Stomiosphaerina proxima* n.sp.
Explanations: Da — height of the test; Db — width of the test; Wa — maximum total wall thickness; Wb — minimum total wall thickness; W1 — outer wall layer; W2 — inner wall layer.

Paleontological description

Incertae sedis
Stomiosphaeridae WANNER, 1940, emend. NOWAK 1968
Stomiosphaerina NOWAK, 1974

G e n u s t y p e: *Stomiosphaerina biedai* NOWAK.

D i a g n o s i s: two-layer test wall. The outer layer has spherulitic texture — type *Stomiosphaera moluccana* WANNER; the inner layer has chaotic, "porcellaneous" texture — type *Cadosina fusca* WANNER.

Stomiosphaerina proxima n.sp.
Pl.I, Figs. 1—8

H o l o t y p e: the specimen depicted on Pl. I, Figs. 1, 3, 5; deposited in the thin-section archives of the Moravian Oil Field, conc. ent., Hodonín. Thin section No. 905/84-1, coordinates x = 54.3, y = 20.0.

D e r i v a t i o n o m i n i s: after latin proximus = closely related, very similar.

S t r a t u m t y p i c u m: Lower Berriasian (*Calpionella* zone), fragments of greenish-grey marly microorganogenic lime mudstone.

L o c u s t y p i c u s: borehole Lipany 5, core No. 8, depth 2500—2504 m.

M a t e r i a l: 7 specimens in thin sections from the mentioned locality.

D i a g n o s i s: slightly oval uniocular test with inhomogeneous texture of the two-layer wall. The outer, light-coloured layer has finely spherulitic texture, with crossed nicols always containing axial cross. The inner, dark layer is microcrystalline having no axial extinction between crossed nicols.

D e s c r i p t i o n: single-chambered, slightly oval, in transversal thin sections also spheroidal calcite test with two-layer wall. The outer layer has a very fine-spherulitic texture with difficultly distinguishable fine porosity. In transmitted light it is light-coloured, in reflected light vitreous, with crossed nicols it is possible to observe a marked dark axial cross. The inner, aphanitic layer is light-brown in transmitted light, in reflected light milky white, with crossed nicols dark with no axial extinction. The outer as well as the inner edge of the wall is slightly uneven, the contact line of both layers is always marked, slightly uneven. Both wall layers can attain minimum and maximum thickness on different not opposite places along the perimeter of the sections. The variability of the outer wall thickness (Tab. 1) is caused by less diagenetic strengthtening of the perimeter, otherwhere, on the contrary, by very slight corrosion of structural elements by the surrounding sediment. An aperture of the test could not be observed on any of the so far studied spesimen. The mode of microscopic measurement of principal test-section parameters is presented in Fig. 2.

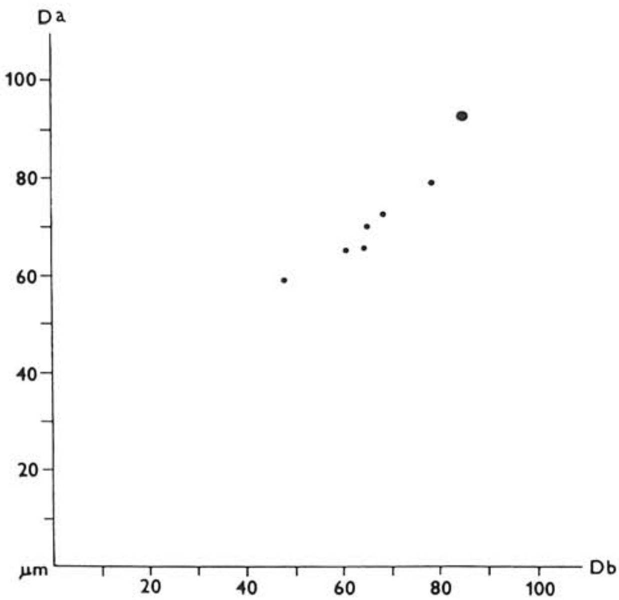


Fig. 3. Diagram of relationships of evaluated parameters of height (Da) and width (Db) of *Stomiosphaerina proxima* n.sp. tests.
Explanation: projection point of holotype in circle.

The larger diameters (height) of the slightly oval sections (Da) are 58—92 μm long, the smaller diameters (width) 48—85.5 μm (Db), the height of the chambers (CHa) varies between 31—65 μm, the width of the chambers (CHb) 30.5—54.5 μm; maximum total wall thickness (Wa) varies between 10—20.5 μm, minimum total wall thickness (Wb) between 5—10 μm; maximum outer layer thickness (Wla) is 2—10 μm, minimum outer layer thickness (Wlb) is 1.5—6.5 μm; maximum inner layer thickness (W2a) is 5—13.5 μm, minimum inner layer thickness (W2b) 1.5—7 μm; the additional micrometric characteristic of the species Da/Wa varies in the studied thin-section specimens between 3.83 6.50; the additional characteristic W1a/W2a between 0.24—1.54. The ratio W1a/W2a is a reliable indicator of the rate of secondary alterations of the primary character and of the structural ratio of both wall layers, above all of diagenetic thickening of the outer layer. Specimens with the coefficient W1a/W2a ≧ 1 have in accordance with the character of the outer edge of the thin section a moderate thickening outer structural layer. The relationships between the parameters Da, Db and Da, Wa are presented in Figs. 3, 4.

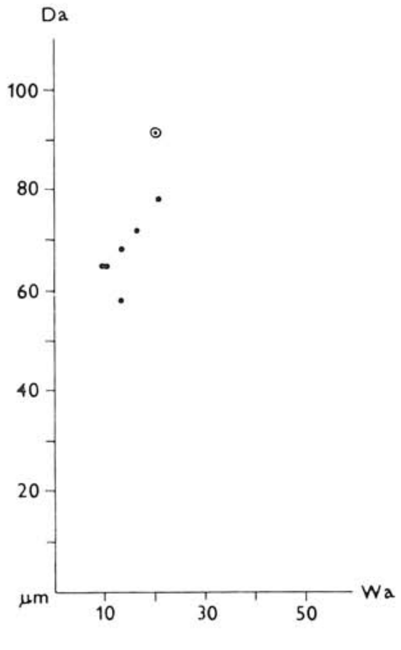


Fig. 4. Diagram of relationships of evaluated parameters of height (Da) and maximum total wall thickness (Wa) of *Stomiosphaerina* proxima n.sp. tests. *Explanation:* projection point of holotype in circle.

H o l o t y p e p a r a m e t e r s: Da = 92 μm, Db = 85.5 μm, Wa = 20 μm, Wb = 10 μm, W1a = 10 μm, W1b = 6.5 μm, W2a = 10 μm, W2b = 3.5 μm, CHa = 65 μm, CHb = 51 μm, Da Wa = 4.60, W1a/W2a = 1.00 (Tab. 1, serial No. 1).

D i a g n o s i s d i f f e r e n t i a l i s: *Stomiosphaerina biedai* NOWAK and *Stomiosphaerina* sp. NOWAK differ unambiguously from the newly described species by their smaller test-section parameters, by their markedly oval form by relatively coarsegrained outer wall-layer structure and its marked

Table 1
Test parameters and additional micrometric characteristics of the studied *Stomiosphaerina proxima* n.sp. specimes (in μm) from the bore Lipany 5

No.	Da	Db	CHa	CHb	Wa	Wb	W1a	W1b	W2a	W2b	Da/Wa	W1a/W2a	Da/Db
1	92.0	85.5	65.0	51.0	20.0	10.0	10.0	6.5	10.0	3.5	4.60	1.00	1.07
2	78.5	78.5	58.0	54.5	20.5	10.0	7.0	6.5	13.5	3.5	3.83	0.52	1.00
3	72.0	68.5	44.5	44.5	17.0	10.0	10.0	3.5	6.5	3.5	4.24	1.54	1.05
4	68.5	65.0	44.5	44.5	13.5	10.0	3.5	1.5	10.0	7.0	5.07	0.35	1.05
5	65.0	61.5	44.5	44.0	10.5	6.5	2.0	1.5	8.5	5.0	6.19	0.24	1.05
6	58.0	48.0	31.0	30.5	13.5	6.5	10.0	2.0	8.5	3.5	4.30	1.18	1.20
7	65.0	65.0	48.0	48.0	10.0	5.0	7.0	3.5	5.0	1.5	6.50	1.40	1.00

porosity. Stratigraphic position if these species is different as well. For a differentiation with the help of diagrams of the ratios Da Dd (or L/1) — compare Fig. 3 in the presented paper and Fig. 3 in the paper by Nowak (1974, p. 54).

Pithonella multicava BORZA differs by the morphology of its test and its parameters, by two opposite apertures and stratigraphic position of the species.

Cadosina callosa KNAUER differs by the microstructure of the outer crystalline wall layer as well as by its optical charcteristics between crossed nicols, by the general morphology of its sections and stratigraphic position of the species.

Association: *Stomiosphaerina proxima* n.sp., *Colomisphaera minutissima* (COLOM), *Colomisphaera carpathica* (BORZA) (Pl. II 14), *Colomisphaera lapidosa* (VOGLER) (Pl. II 1)3, *Stomiosphaera moluccana* WANNER (Pl. II 15.) *Stomiosphaera* sp. (Pl. II 16), *Cadosina* cf. *fusca* WANNER, *Globochaete alpina* LOMBARD, *Calpionella alpina* LORENZ (Pl. II 1—2), *Calpionella elliptica* CADISCH (Pl. II 3—4), *Crassicollaria parvula* REMANE (Pl. II 5—6), *Crassicollaria colomi* DOBEN (Pl. II 7), *Tintinnopsella carpathica* (MURGEANU et FILIPESCU) (Pl. II/9), *Tintinnopsella longa* (COLOM), *Tintinnopsella doliphormis* (COLOM) (Pl. II 8), *Remaniella cadischiana* (COLOM) (Pl. II 10—11), *Calpionellites darderi* (COLOM) (Pl. II/12), *Nannoconus* sp., calcified radiolarians *(Spumellaria)*, juvenile ostracod shells, small echinoderm segments, aptych fragments.

Plate 1

Stomiosphaerina proxima n.sp. from the bore Lipany 5, core No. 8, depth 2500—2504 m.

Explanations: Figs. 1, 3, 5 — holotype; Figs. 2, 4, 6, 7, 8 — paratypes; 1, 3, 5, 7 from thin section No. 905 84 — 1; 2, 4, 6, 8 — from thin section No. 905 84 — 3; 1 — 2 enlarg. 189x, 3 — 8 enlarg. 378x; 1—4, 7, 8, //N, 5, 6 XN.

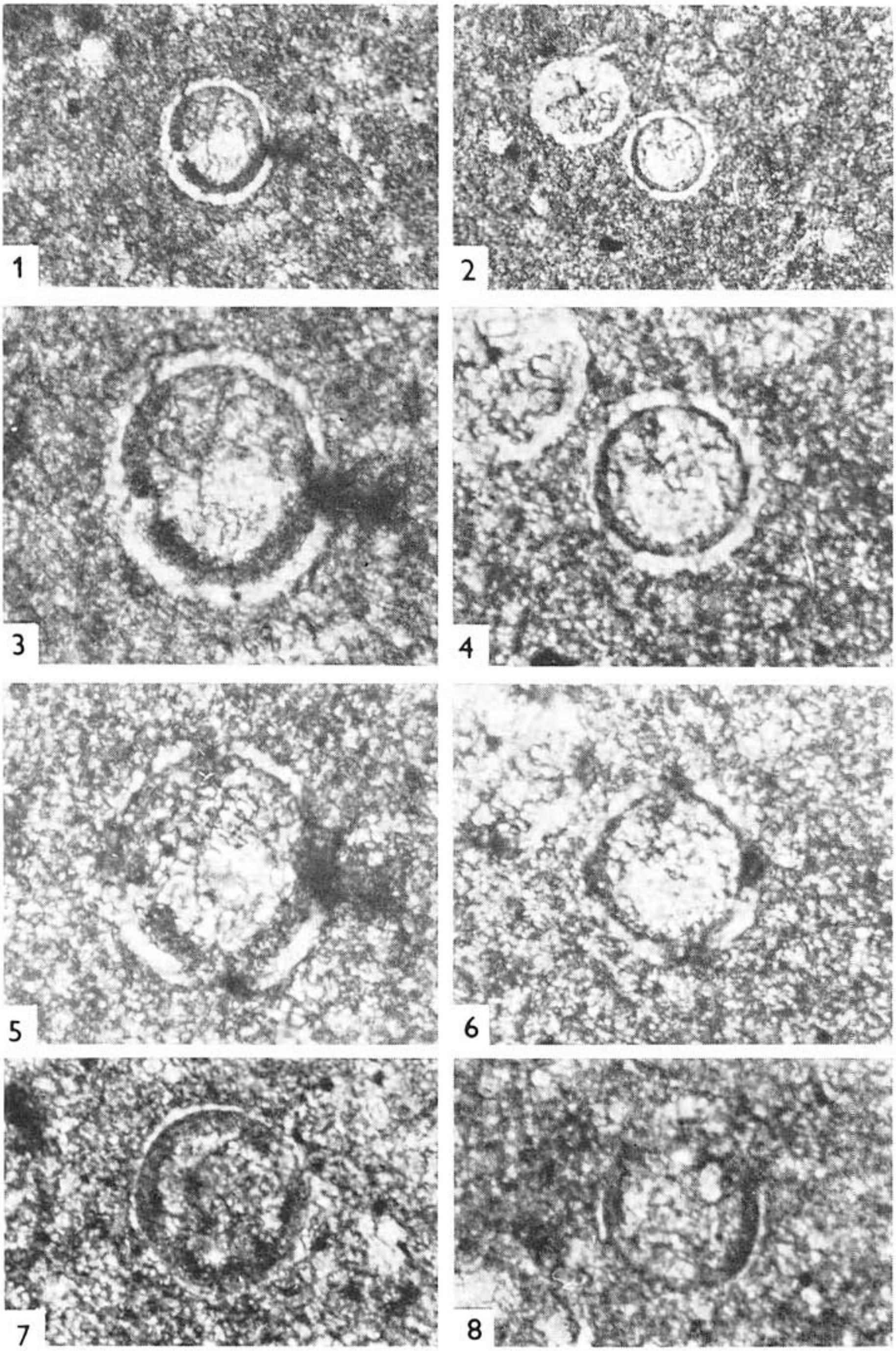
Photo: author

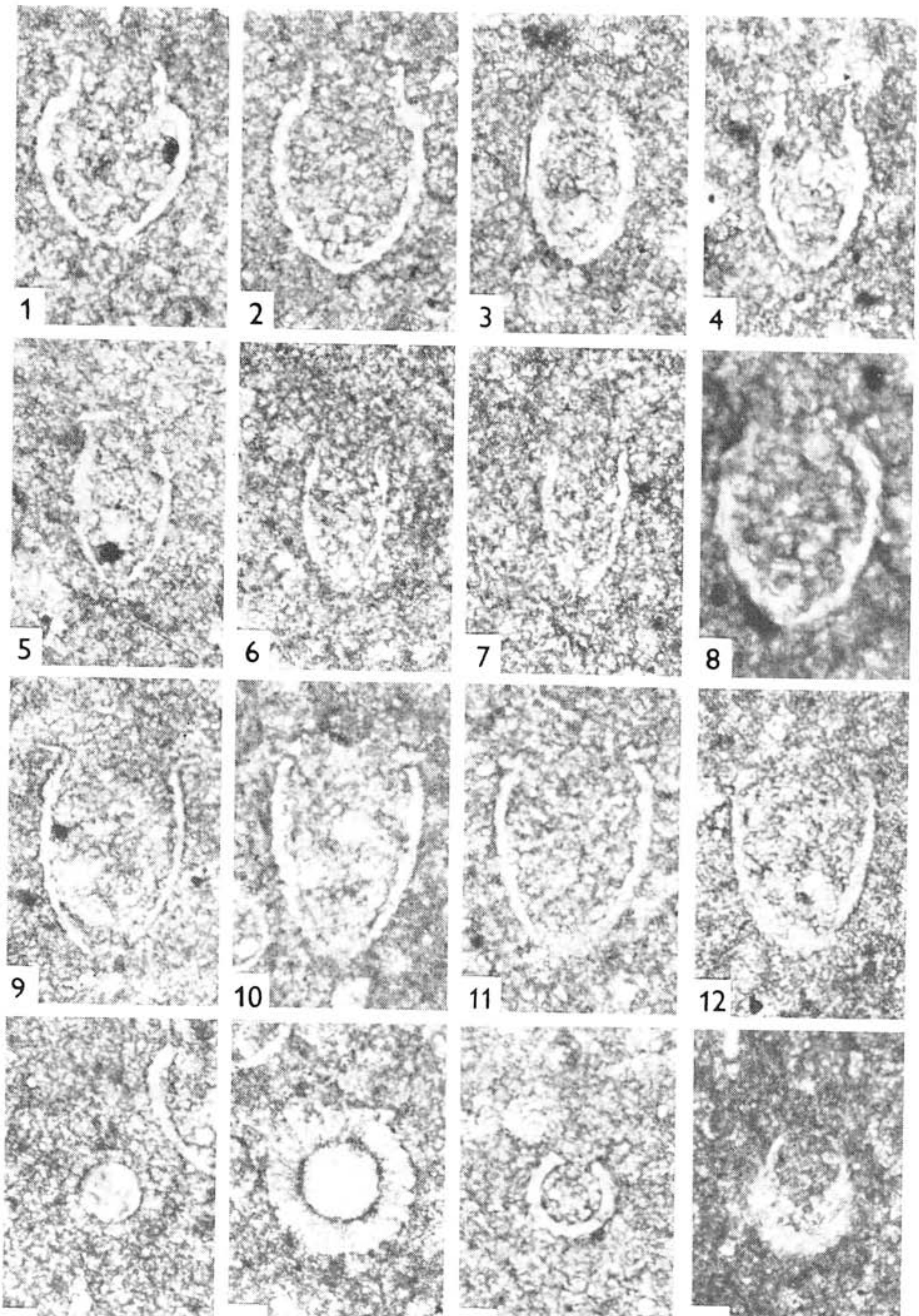
Plate 2

Some microfossil species from the association of pelagic Lower Berriasian lime mudstones on the bore Lipany 5, core No. 8, depth 2500—2504 m.

Explanations: Figs. 1—2 — *Calpionella alpina* LORENZ, enlarg. 240x; Figs. 3—4 — *Calpionella elliptica* CADISCH, enlarg. 240x; Figs. 5—6 — *Crassicollaria parvula* REMANE, enlarg. 240x; Fig. 7 — *Crassicollaria colomi* DOBEN, enlarg. 240x; Fig. 8 — *Tintinnopsella doliphormis* (COLOM), enlarg. 378x; Fig. 9 — *Tintinnopsella carpathica* (MURGEANU et FILIPESCU), enlarg. 240x; Figs. 10—11 — *Remaniella cadischiana* (COLOM), enlarg. 240x; Fig. 12 — *Calpionellites darderi* (COLOM), enlarg. 240x; Fig. 13 — *Colomisphaera lapidosa* (VOGLER), enlarg. 240x; Fig. 14 — *Colomisphaera carpathica* (BORZA), enlarg. 240x; Fig. 15 — *Stomiosphaera moluccana* WANNER, enlarg. 240x; Fig. 16 — *Stomiosphaera* sp., enlarg. 189x. 1, 3—5, 7, 12, 13 from thin section No. 904/84 — 1; 2, 6, 9—11, 14—16 from thin section No. 905/84 — 3, 8 — from thin section No. 905/84 — 1. All photos with //N.

Photo: author


1
2
3
4
5
6
7
8



N o t e: the variability of the outer, spherulitic layer of *Stomiosphaerina proxina* n.sp. is a further very clear example of secondary optically identic thickening of this wall structure element in some incertae sedis microfossils. From numerous observations of the author of the presented paper as well as from accessible literature it is obvious that the most affected ones by this phenomenon are the mentioned spherulitic structures with axial extinction of structural elements between crossed nicols. This phenomenon has been noted also in calcispherulid microorganism tests, in some pithonelomorphs etc. (compare with e.g. B o r z a, 1972, p. 146). The substance of the problem and the circumstances of the process have been successfully clarified above all by the use of electron-scanning microscope; from a number of works explaining the mechanism of the above mentioned diagenetic process we can recommend the study of V i l l a i n (1977). For these reasons it is thus necessary to reconsider carefully the correctness of a partial differentiation of varieties in some species, or even the distinguishing of independent species only on the basis of the variability of outer spherulitic wall-layer thickness.

Translated by K. Janáková

REFERENCES

BONET, F., 1956: Zonificatión microfaunística de la calizas Creatácicas del Este de México. Congr. Geol. Int., El. sistema Cretacico. Bol. Asoc. Mex. Geol. Petrol. (México), tome 3, 8, 7—8, pp. 389—488.

BORZA, K., 1972: Neue Arten der Gattungen *Cadosina* WANNER, *Pithonella* LORENZ und *Palinosphaera* REINSCH aus der Oberen Kreide. Geol. Zbor. Geol. carpath. (Bratislava), 23, 1, pp. 139—150.

BORZA, K., 1984: The Upper Jurassic—Lower Cretaceous parabiostratigraphic scale on the basis of *Tintinninae, Cadosinidae, Stomiosphaeridae, Calcisphaerulidae* and other microfossils from the West Carpathians. Geol. Zbor. Geol. carpath. (Bratislava), 35, 5, pp. 539—550.

BORZA, K. — KÖHLER, E. — SAMUEL, O., 1978: Chronostratigrafia spodnej kriedy a jej aplikácia na Západné Karpaty. Geol. Práce, Spr. (Bratislava), 71, pp. 123—156.

COLOM, G., 1948: Fossil Tintinnids: Loricated Infusoria of the order of the Oligotricha. J. Palaeont. (Tulsa), 22, 2, pp. 233—266.

NOWAK, W., 1968: Stomiosphaerids of the Cieszyn Beds (Kimmeridgian—Hauterivian) in the Polish Cieszyn Silesia and their stratigraphical value. Rocz. Pol. Tow. Geol. (Kraków), 38, 2—3, pp. 275—328.

NOWAK, W., 1974: Stomiosphaerina nov. gen. (incertae sedis) of the Upper Cretaceous in the Polish Flysch Carpathians. Rocz. Pol. Tow. Geol. (Kraków), 44, 1, pp. 51—63.

REMANE, J. 1964: Untersuchungen zur Systematik und Stratigraphie der Calpionellen in der Jura-Kreide Grenzschichten den Vocontischen Troges. Paleontographica, Abt. A. (Stuttgart), 123, pp. 1—57.

VILLAIN, J. M., 1977: Les Calcisphaerulidae: architectures, calcification de la paroi et phylogenése. Paleontographica, Abt. A. (Stuttgart), 159, pp. 139—177.

Manuscript received June 14, 1985.