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THE DASYCLADACEAN ALGA SAROSIELLA IN THE WEST CARPATHIANS

(Fig. 1, Pls. 2)

Abstract: The northernmost occurrence of the markedly mediterranean dasycladacean alga *Sarosiella* has been proved in Campanian—Maastrichtian limestone blocks of Považie and Malé Karpaty Mts. (West Carpathians). A paleontological description of the species *Sarosiella feremollis* SEGONZAC, known up to now only from Cuba, France and Sardinia, is presented in the paper.

Резюме: В блоках кампанско-мастрихтских известняков Поважья и Малых Карпат (Западные Карпаты) было доказано доныне самое северное появление ярко средиземноморской водоросли *Sarosiella* порядка *Dasycladales*. Приводится палеонтологическое описание вида *Sarosiella feremollis* SEGONZAC, до сих пор известного только из Кубы, Франции и Сардинии.

When — in the course of the preparation of their monography on Cretaceous and Paleogene sediments of Middle Považie (1972) — Samuel, Borza and Köhler were looking in literature for forms comparable with sections of dasycladaceans from their material (comp. their Tab. CXVIII, Figs. 1—3 and Tab. CXIX, Figs. 1—2) and then with some hesitation denoted these forms as *Dasycladacea* (cf. *Neomeris cretacea* ELLIOTT, 1955), they could not know that approximately in the same time this problem was being solved by Segonzac (1972) by the creation of a new genus — *Sarosiella*.

Segonzac (1972) says that this alga was already mentioned earlier, but it was necessary to wait for better preserved specimens to make a definition possible. Such specimens have been found in "Sparnacien" of South France (in départements Haute-Garonne, Ariége and Aude), i.e. undoubtedly in sediments of Tertiary (Paleogene) age. Samuel—Borza—Köhler (1972) found this form in a block of reef limestone on the locality Ovčiarsko (Považie, West Carpathians) and they determined its age to be Campanian—Maastrichtian. Dieni—Massari—Radoičić (1985) encountered the genus *Sarosiella* in pebbles of Paleocene (probably Danian—Montian) limestones occuring in Post-Anisian continental conglomerates near Orosea (east Sardinia). These authors point to a great similarity of the Paleocene limestones described by them and limestones of Middle Považie in West Carpathians. In the paleontological part they point out that the genus *Sarosiella* is closely related to the genus *Trinocladus* and in a footnote on p. 24 they admit that the genus *Sarosiella* could be a younger synonym of the genus *Trinocladus*, but well preserved material would be necessary for a clarification of relationships between these two taxons.

As this is a case of a rare dasycladacean genus and its occurrences in Slovakia are the northernmost ones known in the world up to now, as well as because

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in between further material has been found in Slovakia, we consider it useful to present a paleontological description of specimens from West Carpathians, even though intensive recrystallization destroyed many details of their internal structure. Nevertheless, specimens hitherto mentioned in literature were also affected by recrystallization.

Dasycladales

Family *Dasycladaceae* KÜTZING, 1843 oth. mut. STIZENBERGER, 1860
Tribus *Triploporelleae* PIA, 1920, emend. BASSOULLET et al., 1979
Subtribus *Triploporellinae* PIA, 1920, emend. BASSOULLET et al., 1979
Genus *Sarosiella* SEGONZAC, 1972
Sarosiella feremollis SEGONZAC, 1972
(Pl. 1, Figs. 1—5, Pl. II, Figs. 1—7)

1966 *Trinocladus* (?) sp. indet. A – J. P. Beckmann – R. Beckmann, p. 37, Tab. 11, Fig. 160, 161.
1972 *Sarosiella feremollis* n.gen., n.sp. – Segonzac, pp. 394–396, Tab. 19, Figs. 1–6.
1972 *Dasycladacea* (cf. *Neomeris cretacea* ELLIOTT, 1955, non STEINMANN, 1899) – Samuel – Borza – Köhler, Tab. 108, Figs. 1–3, Tab. 109, Figs. 1–2.
1982 *Sarosiella feremollis* SEG. – Deloffre – Génot, p. 168, Tab. 17, Fig. 5.
1985 *Sarosiella feremollis* SEGONZAC, 1972 – Dieni – Massari – Radočić, p. 24, Tab. 18, Figs. 9–15.

Material: *Sarosiella feremollis* is documented in material from West Carpathians by transversal sections (Pl. II, Figs. 4—7) allowing the identification of the species, and by numerous oblique, longitudinal and tangential sections (Pl. I, Figs. 1—5, Pl. II, Figs. 1—3). 12 thin sections from the locality Vápenková skala and 9 thin sections from the locality Ovčiarsko have been used for the identification. The material from the locality Vápenková skala (Malé Karpaty Mts.) is better preserved than material from the locality Ovčiarsko (Považie), but it is also significantly recrystallized. The studied thin sections are deposited in the collections of the Geological Institute of the Centre of Geoscience Research of the Slovak Academy of Sciences in Bratislava.

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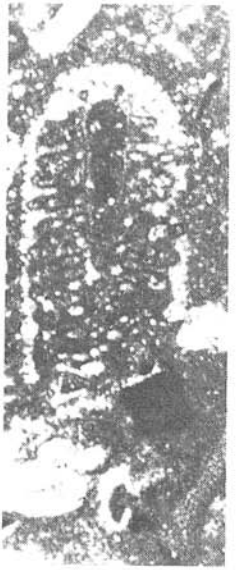
Plate 1

Sarosiella feremollis SEGONZAC, enlarg. 30 ×, Campanian–Maastrichtian
Fig. 1. – Longitudinal oblique section. Numerous arrangement of branches perpendicular to the principal axis. Vápenková skala, thin sect. No. I/5. Fig. 2. – Longitudinal-oblique section. Thinned apex with preserved narrow axial cell. Certain thickening of primary branches in their distal part can be observed. Vápenková skala, thin sect. No. I/1. Fig. 3. – Longitudinal-oblique section. Oblique arrangement of branches in the apex part of thalus and a well visible cortex formed by tertiary branches. Vápenková skala, thin sect. No. I/8. Fig. 4. – Oblique tangential section. Vápenková skala, thin sect. No. I 5. Fig. 5. – On left – tangential section of primary branches; the branches look as though they were arranged in vertical rows. On right – well visible border forming a cortex. Vápenková skala, thin sect. No. I/12. Photo: H. Brodnianska.



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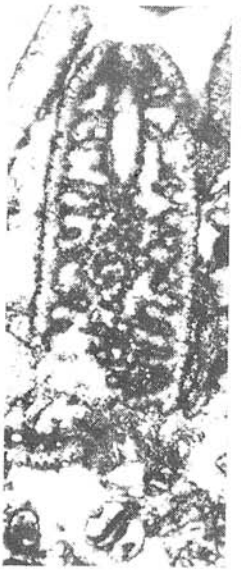

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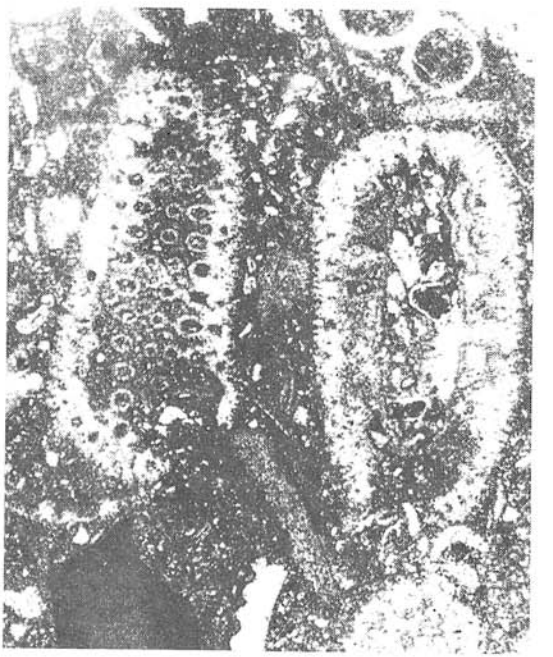

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Description of the species

On longitudinal sections it is visible that thalus is straight, long, cylindrical; it is thinner on the apex, with preserved narrow apical cell (Pl. I, Fig. 2). Whorls are numerous (Pl. I, Figs. 1, 5), primary branches of the whorls are perpendicular to the principal axis (Pl. I, Figs. 1, 3, 5).

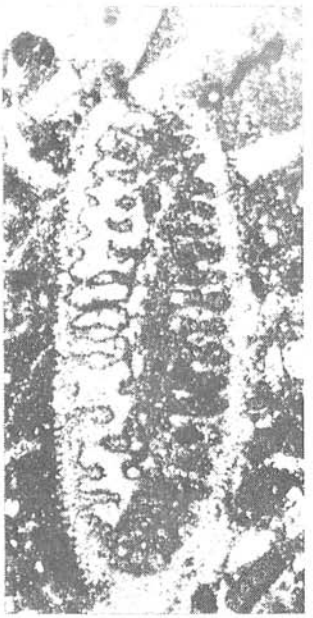
The more intensively calcified axial cavity is narrow and it becomes thinner towards the apex. Numerous whorls are directed perpedicularly towards the axial cavity (except the apex — Pl. I, Fig. 3) along the principal axis; they are formed by maximally 9 branches (Pl. II, Fig. 6).

Pores corresponding to primary branches are clearly observable in transversal as well as longitudinal sections. No typical section of the narrow proximal part of a primary branch (comp. Segonzac, 1972, Tab. 19, Fig. 4) can be observed, as a result of an intensively developed calcification. Secondary enlargement of of the pores gives a distorted impression of the form of primary branches. Tertiary branches are enlarged toward the external parts and they form cortex (Pl. I, Fig. 3, Pl. II, Figs. 2, 3 bottom).

Notes: On the basis of the bellow mentioned measurements the Slovak specimens correspond to the specimens from France and Sardinia. Samuel—Borza—Köhler (1972, Tab. 107, Figs. 5—6) depicted under the name *Trinocladus tripolitanus* RAINERI two sections from Santonian—Campanian sediments of Považie which could, according to Dieni—Massari—Radoičić (1982, p. 23), belong as well to the genus *Sarosiella*. Strong calcification of these sections make a confirmation of this opinion impossible.

Plate 2

Sarosiella feremollis SEGONZAC, enlarg. 30 ×, Campanian–Maastrichtian
Fig. 1. – Longitudinal section of "fertile capsules" of the primary branches, Ovčiarsko, thin sect. No. 4. Fig. 2. – Longitudinal-oblique section, Vápenková skala, thin sect. No. I 1. Fig. 3. – Longitudinal section of a considerably corroded specimen. Preserved are sporadically only primary branches thickened in middle part of the branch, Ovčiarsko, thin sect. No. 5. Figs. 4, 5, 6, 7 – Transversal sections. Cortex formed by tertiary branches is well visible on Fig. 5. – The space of aragonite parts is filled by micrite, gaps are filled by sparite, cortex is from sparite (Fig. 5 bottom). Fig. 4. – Vápenková skala, thin sect. No. I 2. Fig. 5. – Vápenková skala, thin sect. No. I 2. Fig. 6. – Vápenková skala, thin sect. No. I 6. Fig. 7. – Vápenková skala, thin sect. No. I 6. Photo: H. Brodnianska.



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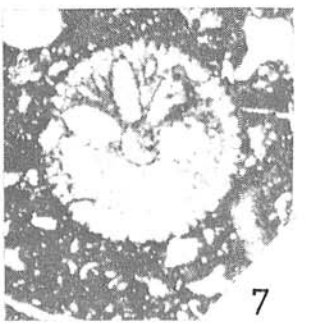

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Dimensions:

	material from West Carpathians	Deloffre—Génot 1982
L (mm) max.[1]	3.85	2.743
D	0.64—2.21	0.34—1
d	0.138—0.236	0.083—0.150
w	7—9	7—10
h	0.037—0.102	0.035—0.100
l	0.119—0.192	0.140
w′	2	1—3
p′	0.027—0.038	0.030—0.050
l″	0.027—0.044	0.030—0.035
p″	0.019—0.030	0.020—0.030

From the above mentioned facts it follows that the Carpathian specimens display a greater variability of dimensions than it was known from literature up to now. This is the case especially of the values of maximal thalus length (L), external thalus diameter (D); higher are the values of inner axial cavity diameter (d), primary branches length (l); other values are more or less similar. Higher values of some parameters (e.g.d) are caused by extensive calcification and they are not a reason to add a new species to the up to now only one of the genus *Sarosiella* — *Sarosiella feremollis.*

Description of rocks and assemblages from West Carpathians

a) Samuel—Borza—Köhler (1972) described in Lutetian conglomerates near a field path from the village Ovčiarsko to Žilina (Middle Považie, 4.5 km westwards from Žilina) a block of reef limestone in which they determined algae *?Lithophyllum* sp., *Mesophyllum* sp., *Archaeolithothamnium* sp., *Lithothamnium* cf. *cuvillieri* POIGNANT-CHAFFAUT, *Ethelia alba* (PFENDER), *Peyssonelia antiqua* JOHNSON, rare corals, fragments of bivalvia, bryozoans, serpulids and *Acicularia sp. Large* foraminifers are represented by a single form, determined by these authors as *Miscellanea* cf. *miscella* (ARCHIAC et HAIME). From small foraminifers are present *Quinqueloculina* sp., *Triloculina* sp., *Anomalina* sp., *Nummofallotia* sp., *Rugoglobigerina* cf. *rugosa* (PLUMMER), *Marsonella oxycona* (MARSSON), *Mississipina binkhorsti* (REUSS) and a sessile form *Planorbulina cretae* (MARSSON). The Cretaceous (Campanian—Maastrichtian) age of the block is proved by the microorganisms *Pithonella ovalis* (KAUFMANN), *Calcisphaerula* cf. *innominata* BONET, *Bonetocardiella* cf. *cardiiformis* (AYALA — CASTANARES — SEIGLIE), *Cadosina undosa* BORZA and *Cadosina spinosa* BORZA.

b) On the locality Vápenková skala (Malé Karpaty Mts., above a field path SW of the village Rozbehy) occur Cretaceous sandstones of Campanian age covered by coarse-grained Neogene (Carpathian) conglomerates. In a slope SE

[1] Explanation of the used abbreviations in Deloffre – Génot (1982, pp. 11–12)

of an abandoned quarry occurs a block of organogenous limestone, probably fallen out of the Neogene conglomerate. The block contains abundant coralline algae, corals, bryozoans, bivalvian, fragments, crinoid segments, ostracods, agglutinated and sessile foraminifers [including *Planorbulinella cretacea* (MARSSON)] as well as microorganisms *Colomisphaera* sp., *Cadosina* sp., *Bonetocardiella conoidea* (BONET), *Acicularia* sp., *Sarosiella feremollis* is frequent in some parts of the limestone (3—5 sections per 1 cm^2). Köhler—Borza (1984) assumed as well Campanian—Maastrichtian age of the block.

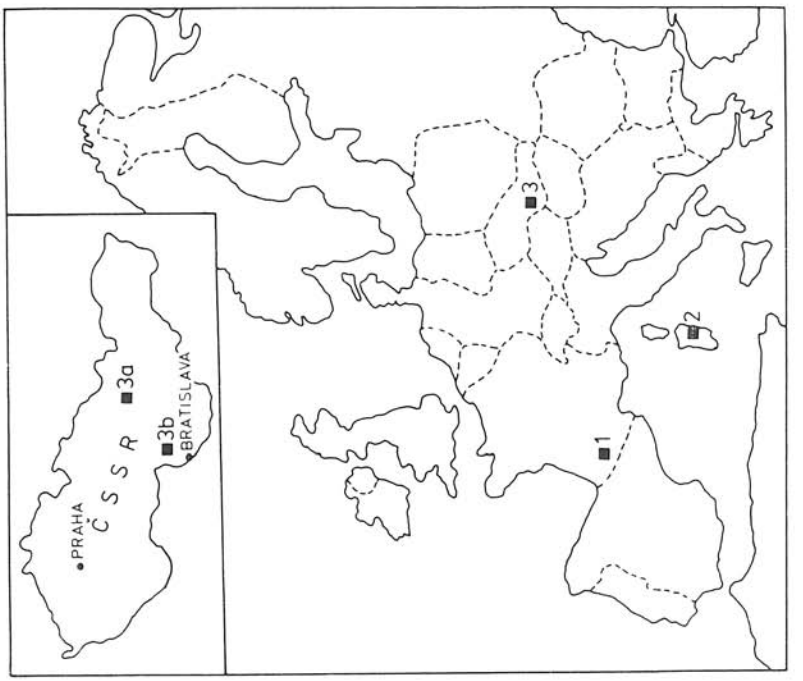

Fig. 1. Occurrences of the genus *Sarosiella* in Europe.
Explanations: 1 — Southwest France; 2 — Sardinia; 3 — West Carpathians (3a — Ovčiarsko, 3b — Vápenková skala).

Geographical and stratigraphical occurence

Beckmann—Beckmann (1966) described and depicted the genus *Sarosiella* under the name *Trinocladus* (?) sp. indet. A from Upper Cretaceous (Campanian or Maastrichtian) of the province Las Villas in Cuba, 19 km eastwards from Cienfuegos. Data of the author of the genus and species, Segonzac (1972), on the occurence of the genus in "Sparnacien" sediments of SW France were specified by Deloffre—Génot (1982) who limited the age span of the species to Upper Thanetian to Lower Ypresian. Type niveau of the species (and genus) is situated in Southwest France near Montlaur (département

Aude) and it is of Lower Ilerdian age. The third occurence outside Carpathians is on Sardinia, where the species was identified together with other dasycladaceans in limestones of Danian—Montian age. Both occurrences in West Carpathians are recently considered — on the basis of microfossils — to be of Upper Cretaceous (Campanian—Maastrichtian), although the compositons of the limestone from Vápenková skala deos not exclude Danian—Montian age.

According to the recent knowledge, *Sarosiella feremollis* SEGONZAC was found in sediments of Campanian—Maastrichtian (Cuba, West Carpathians) and Paleogene (France, Sardinia) age. It was limited to very warm mediterranean shallow sea environment in reef-forming zones. Usually it was accompanied by sessile foraminifer *Planorbulinella cretae* (MARSSON) which has similar stratigraphical span (N e u m a n n, 1987). Paleontological study of material from West Carpathians gave no reason to doubt the individual position of the genus *Sarosiella*.

Translated by K. Janáková

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