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NEW ANISIAN (MIDDLE TRIASSIC) BRYOZOA (TREPOSTOMATA) FROM THE VYSOKÁ FORMATION (MALÉ KARPATY MTS., WESTERN CARPATHIANS) SLOVAKIA

KAMIL ZÁGORŠEK

Department of Geology and Paleontology, Faculty of Sciences, Mlynská dolina, 842 15 Bratislava, Slovak Republic

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Abstract: Three new bryozoans, *Dyscritella? anisica* sp. n., *Vysokella glabra* gen. nov. et sp. n. and *Vysokella acanthostylica* gen. nov. et sp. n. are described from the Anisian (Pelsonian to Illyrian according to conodonts) Vysoká Formation. *Leioclema sugyiamai* Sakagami 1979 is attributed to *Zozariella* Schafer & Fois 1987. The new family *Zozariellidae* is proposed.

Key words: Bryozoa, Anisian (Middle Triassic), Western Carpathians (Vysoká Formation), systematics, new species, genera and family.

Introduction

This paper examines bryozoans from the Vysoká Formation (Malé Karpaty Mts.) from the localities Bartalová and Vysoká.

The Bartalová section (Fig. 1/1) is situated on the south slope of Bartalová Hill (518), about 3.2 km east of the village of Kuchyňa. The bryozoans were collected only from layer No. 23 in this locality.

Three sections were studied from the locality Vysoká (Fig. 1/2) on the south-eastern slope of Vysoká Hill (754), about 5.5 km north-east of the village Kuchyňa. Bryozoans were collected from layer No. 16 (section Vysoká I and section Vysoká II) and from layer No. 2 (section Vysoká III) both of the Pelsonian age, and in layer No. 36 (section Vysoká I, section Vysoká II and section Vysoká III) of the Illyrian age (according to conodonts in Michalík et al. 1992).

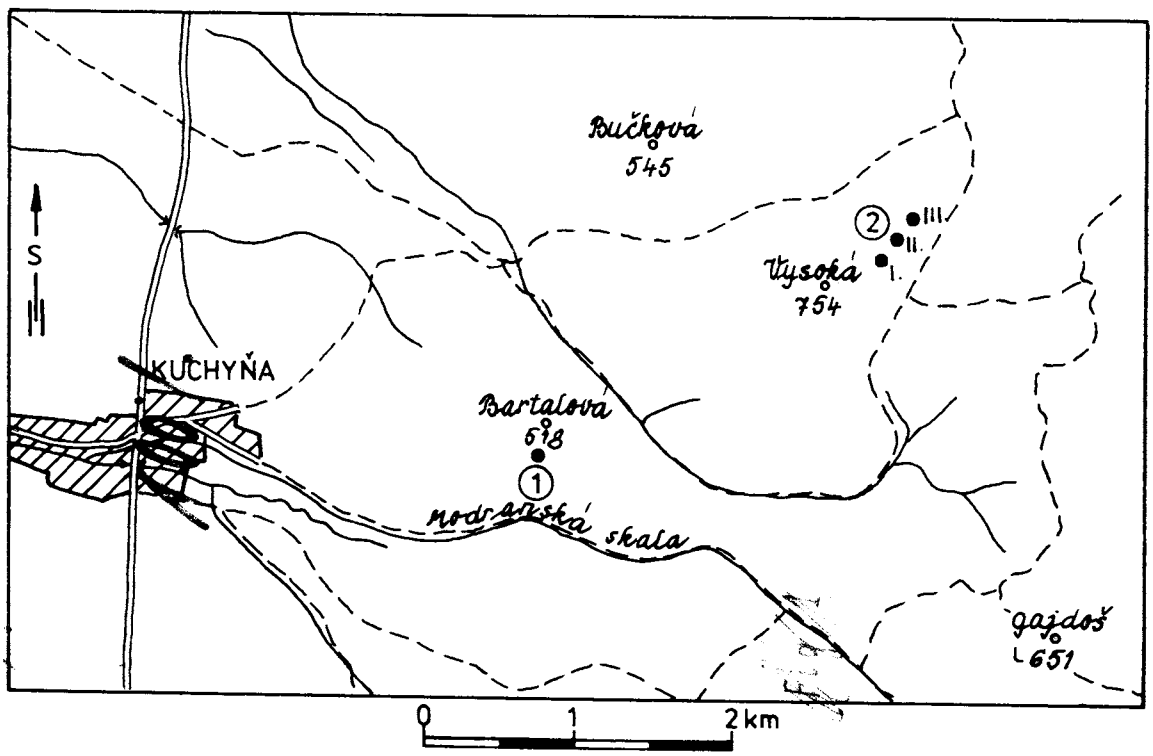

Fig. 1. Sketch of Bartalová and Vysoká localities.
Legend: 1 - Bartalová locality, 2 - Vysoká locality; I. - section Vysoká I; II. - section Vysoká II; III. - section Vysoká III. Drawing by V. Matláková.

Michalík et al. 1992 recognize three members in the Vysoká Formation: the basal Geldek Member, the middle Ramsau Member and the upper Parna Member. Bryozoans occur in biomicrite wackestone-packstone in the middle to upper part of the Geldek Member only. This biomicrite also contains brachiopods, bivalves, gastropods, and fragments of sponges.

Bryozoans occur in thanatocenosis. Their remains are concentrated in almost monospecific accumulations so that, for example, the zoaria of *Vysokella* occur separately from those of *Dyscritella* and *Dyscritella?*.

Internal structures were observed from acetate peels because the zooecial diaphragms were usually damaged in thin sections.

The Geographical and stratigraphical distribution of all of the species described and mentioned in this paper are shown in Tab. 1.

Taxonomic description

Order *Trepostomata* Ulrich 1882
Family *Dyscritellidae* Dunaeva & Morozova 1967
Genus *Dyscritella* Girty 1911
Dyscritella? anisica sp. n.
Pl. I., Figs. 1 to 8

D i a g n o s i s: zoaria ramose, rarely branching, small, and with poor distinction between endozone and exozone. Autozooecia pentagonal to oval, exilazooecia small, rare, one between 3 to 5 autozooecia; diaphragms in the endozone rare, in the exozone abundant both in autozooecia and in exilazooecia, thin, straight; acanthostyles small, rare, 1 to 3 around each autozooecium.

H o l o t y p e : specimen illustrated in Pl. I., Fig. 5 deposited in the Slovak National Museum in Bratislava (SNM-B), under number SNM Z-21034.

P a r a t y p e : 14 rock specimens and 1 specimen in thin section from the Bartalová Hill, deposited in the SNM-B, under numbers SNM Z-21035 to SNM Z-21049.

L o c u s t y p i c u s : Bartalová Hill, layer No. 23.

S t r a t u m t y p i c u m : Middle Triassic, Anisian, Pelsonian (according to conodonts, Papšová in Michalík, 1992).

M a t e r i a l : 17 acetate peels of 29 rock specimens from Bartalová Hill, and 7 acetate peels of 11 rock specimens from locality Vysoká.

M e a s u r e m e n t :

Endozone	
autozooecia	0.147 to 0.174, average 0.169 mm
acanthostyles	0.016 to 0.025, average 0.019 mm
zooecial walls thickness	0.011 to 0.024, average 0.016 mm
distance of diaphragms	0.141 to 0.165, average 0.156 mm
diaphragm thickness	average 0.0038 mm
Exozone	
autozooecia	0.182 to 0.241, average 0.202 mm
exilazooecia	0.067 to 0.097, average 0.083 mm
acanthostyles	0.036 to 0.049, average 0.039 mm
zooecial walls thickness	0.047 to 0.098, average 0.076 mm
distance of diaphragms:	
in autozooecia	0.108 to 0.061, average 0.074 mm
in exilazooecia	0.148 to 0.074, average 0.128 mm
diaphragm thickness	average 0.0078 mm

D e s c r i p t i o n : zoaria small, ramose, branching rarely. Budding pattern cyclic, budding from zooecial corners. The boundary between endozone and exozone indistinct.

Endozone: autozooecia pentagonal to polygonal, thin-walled in transverse section; acanthostyles absent or one between 3 to 4 autozooecia. In longitudinal section autozooecia gradually bending outward in the exozone, diaphragms thin, straight, scarce, commonly only one in each zooecial tube.

Exozone: in tangential section autozooecia oval, exilazooecia rare, one between 4 to 5 autozooecia, small, oval; acanthostyles small, scarce, 1 to 3 around each autozooecium or exilazooecium. Zooecial walls gradually thickenning from endozone to exozone in longitudinal section, autozooecia make a 60 to 70 degree angle with the colony surface, diaphragms thin, straight, complete, abundant both in autozooecia (3 to 5 in each one) and in exilazooecia (2 to 3 in each one). Microstructure of zooecial walls lamellar.

C o m p a r i s o n : the investigated specimens are the most similar to the description of *Dyscritella dagysi* (Morozova 1969) given by Schäfer & Fois (1987, p. 182, Pl. 5, Figs. 1 and 3), based on the globular zoarial habit, rare exilazooecia, and acanthostyles, and scattered diaphragms in the endozone. However, the number of diaphragms in the autozooecia, the presence of diaphragms in the exilazooecia, and the larger angles of the zooecia to the zoarial surface make *Dyscritella dagysi* different from *Dyscritella? anisica*.

Zooecial dimensions also resemble *Paralioclema dagysi* Morozova 1969. However this species differs because it has denser diaphragms in the autozooecia in the exozone and rarer exilazooecia and acanthostyles.

This new species is distinguished from *Dyscritella* sp. Sakagami 1979, and *Dyscritella tumulensis* Morozova 1984, by its abundant diaphragms, both in the autozooecia in the exozone and in the exilazooecia, and by the rare exilazooecia.

Leioclema sp. Sakagami 1979, differs in having small and abundant exilazooecia and rare diaphragms in the autozooecia in the exozone.

D i s c u s s i o n : I do not agree with Schäfer & Fois (1987), who designated their specimens as *Paralioclema dagysi* Morozova 1969 and attributed this species to *Dyscritella*. Morozova (1969, p. 53), stated that *Paralioclema dagysi* has in each exilazooecium (mesozooecium) 3 to 4 diaphragms, that exilazooecia are abundant (6 to 10 around each autozooecium), and that 5 to 6 big acanthostyles are located around each autozooecium, thus deforming the oval form of the autozooecial apertures. Schäfer & Fois 1987 (p. 182) stated that diaphragms are rare in autozooecia and lacking in exilazooecia, while mesozooecia are common, and irregularly spaced between the autozooecia, and the acanthostyles are of one size, small, and mainly located in the corners of the zooecial walls. These differences prevent inclusion of the Schäfer & Fois (1987) specimens in *Paralioclema dagysi* Morozova 1969 and place this species in *Dyscritella*.

R e m a r k s : the differences, mainly in the occurrence of diaphragms in the endozone, between *Dyscritella? anisica* sp. n. and known species could be sufficient for determining a new genus. The other differences between *Dyscritella* and *Dyscritella?* are shown in Tab. 2. Bassler (1953, p. G102) and Morozova (1960, p. 67) suggested that *Dyscritella* has no diaphragms. According to Dunaeva & Morozova (1967, p. 91), diaphragms are absent or very rare in the *Dyscritellidae* and, according to Astrova (1978, p. 139) *Dyscritella* has no diaphragms or only one per autozooecium. The number of diaphragms in *Dyscritella? anisica* sp. n. (2 to 4 in one autozooecium), cannot be considered "rare". Nevertheless, according to Schäfer & Fois's (1987) conception of the genus *Dyscritella* (p. 184) and according to the Taylor's and to Sakagami's remarks (personal corresp.) this species could belong to *Dyscritella*.

Observation: the Illyrian specimens (localities Vysoká II layer No. 36 and Vysoká III layer No. 36) also lack acanthostyles in the exozone.

Occurrence: Vysoká Formation, locality Bartalová layer No. 23, Vysoká II: layer No. 16 and Vysoká I: layer No. 2, Anisian, Pelsonian and locality Vysoká II: layer No. 36 and Vysoká III: layer No. 36, Anisian, Illyrian.

Family *Zozariellidae* fam. nov.

Diagnosis: zoaria large, massive, nodular to columnar rarely ramose. Zooecial walls gradually thickened from endozone to exozone, the boundary between these two regions indistinct. Endozone consists of thin-walled autozooecia, large, oval mesozooecia and common acanthostyles. In longitudinal section autozooecia and mesozooecia with abundant, straight, complete diaphragms, zooecial walls gradually bend outward in exozone. Autozooecia, mesozooecia and acanthostyles in exozone are larger and diaphragms denser than in endozone. Cystiphragms missing. Microstructure of zooecial walls probably lamellar.

Included genera : Type genus *Zozariella* Schäfer & Fois 1987; *Vysokella* gen. nov.

Comparison: because the endozone and exozone are poorly distinguished, and the diaphragms both in the autozooecia and in the mesozooecia are abundant, this new family is different from other families of *Trepostomata*. This family differs from the *Heterotrypidae* Ulrich 1890, in the density of its diaphragms, especially in the mesozooecia, and in its abundance of acanthostyles in the exozone. It resembles the *Stenoporidae* Waagen & Wentzel 1889, in its abundant diaphragms but differs because it has complete diaphragms and smaller acanthostyles.

Discussion: this new family has a typical Triassic morphology. Zooecial walls in the exozones of all Triassic trepostomes are thinner than those of Palaeozoic species and the boundary between the endozone and the exozone is not clear. These characteristics make the trepostome bryozoans similar to the cyclostomes which replaced them during the Jurassic.

Observation: *"Ceriopora" montispeciei* Bizzarini & Braga 1978, could belong to the *Zozariellidae* too. This species is similar to *Zozariellidae* in its poor distinction between the endozone and the exozone, in its abundant, complete, straight diaphragms and presence of acanthostyles, but differs in the microstructure and composition of its zooecial walls (*"Ceriopora"* has fibrous microstructure) and in the absence of mesozooecia. Dr. Bizzarini does not agree with this opinion. Other authors (Boardman 1984; Schäfer & Fois 1987; Engeser & Taylor 1989) have included this species in *Sclerospongia* (Phylum *Porifera*).

Genus *Zozariella* Schäfer & Fois 1987

Diagnosis: (from Schäfer & Fois 1987, p. 87 - 188, abridged) zoaria large, massive, nodular to columnar, poor distinction between endozone and exozone, budding pattern cyclic, autozooecia polygonal to subcircular, thin-walled, mesozooecia abundant, polygonal to oval, much smaller in diameter than autozooecia, zooecial walls slightly thickened, diaphragms common,numerous in autozooecia and in mesozooecia, acanthostyles common, thick.

Included species: Type species *Zozariella stellata* Schäfer & Fois 1987; *Zozariella sugiyamai* (Sakagami 1979).

Observation: Schäfer & Fois (1987) argue that the mesozooecia of *Zozariella* are arranged in a starlike pattern around the acanthostyles. I regard this as the only specific character of *Zozariella stellata* Schäfer & Fois 1987. If this presumption is correct, *Leioclema sugiyamai* Sakagami 1979, may also be referred to *Zozariella*

Occurrence: Carnian Zozar Formation (West Himalaya, Nort-India) and Hidaka Group (Hokkaido, Japan)

Zozariella sugiyamai (Sakagami 1979)

1979 *Leioclema sugyiamai* Sakagami, p. 81 - 82, Pl. 12, Figs. 1 - 5

Description: (from Sakagami 1979, p. 81 - 82, abridged): zoaria ramose, diameter ranging from 2 to 5 mm. In longitudinal section zooecial tubes making a right angle with surface. Zooecial wall becomes thicker gradually from endozone to exozone and the boundary between these two regions is indistinct. Thin, complete and straight diaphragms occur abundantly in autozooecia and in mesozooecia. Zooecial tubes are rather small, circular to subcircular, irregularly arranged in tangential section. Usually, 7 autozooecia occur in 2 mm length. Mesozooecia circular to subcircular. Acanthostyles also well developed, usually 4 to 5 surrounding each autozooecium.

Discussion: according to Morozova (1960) the boundary between the endozone and the exozone of *Leioclema* is distinct because the zooecial walls in the exozone are irregularly and hypertrophically thickened, and because the diaphragms are denser in the mesozooecia and more conspicuous in the exozone than in the autozooecia. Sakagami's specimens have a poor distinction between the endozone and the exozone, and the diaphragms are well developed both in the autozooecia and in the mesozooecia, both in the endozone and in the exozone. These marks, as well as the development of the acanthostyles, are characteristic of the genus *Zozariella*.

Occurrence: Carnian, Hidaka Group, Hokkaido, Japan.

Genus *Vysokella* gen. nov

Diagnosis: zoaria large, massive, nodular to columnar, poor distinction between endozone and exozone, budding pattern stellar, autozooecia polygonal to subcircular, walls thin and only little thickened from endozone to exozone, mesozooecia rare, large polygonal to oval, diaphragms common, numerous in autozooecia and in mesozooecia, complete, straight, acanthostyles common, zooecial wall microstructure probably lamellar(?).

Included species: Type species: *Vysokella acanthostylica* sp. n.; *Vysokella glabra* sp. n.

Comparison: this genus is most similar to *Zozariella* in the general shape of the zoaria, but differs in budding pattern, in zooecial walls thickness in the margin of the zoaria, in the amount of mesozooecia and in the amount and size of acanthostyles; the other differences between *Zozariella* and Vysokella are shown in Tab. 2.

Vysokella is distinguished from *Paralioclema* Morozova 1960 by its indistinct boundary between the endozone and the exozone (in *Paralioclema*, according to Morozova (1960); the zooecial walls in the exozone are 4 to 5 times thicker than in the endozone) and its less variable measurements of acanthostyles.

Paralioclema sp. cf. *mariaholmensis* Nakrem & Mork 1991 is most similar to this genus. In my opinion this problematic specimen could probably belong to *Vysokella*, because the boundary between the endozone and the exozone is indistinct. However, according to Nakrem's remarks (personal correspondence), the boundary of *Paralioclema* may also be indistinct. Since I had no possibility to study this specimen directly, I cannot judge its systematic position.

Table 1: Geographical and atratigraphical distribution of species described and mentioned in this paper.

P E R M I A N	T R I A S S I C																		
			Griesbachian	Nammalian	Spathian	A n i s i a n								Ladinian	Carnian		
							Pelsonian				Illyrian						
								locality Vysoká			locality Vysoká						
	FS	HC		TF			B23	I/2	II/16	III/16	I/36	II/36	III/36	VR	HG	CF	ZF
Zozariella sugiyamai (Sakagami)															a		
Paralioclema cf. *mariaholmensis* (Nakrem et Mork)				r													
Zozariella stelata Schäfer et Fois																	r
Dyscritella? anisica sp.n.							a	c	c	a	r	c	c				
Dyscritella nevadensis Schäfer et Fois		c							r					r			
D. zardinii Schäfer et Fois							r		c							c	
D. robusta Girty	r										r	r	r				
Vysokella glabra gen.n.sp.n.											c	r	c				
V. acanthostylica gen.n.sp.n.							a	a	c	a							

Legend: FS - Fayetteville shale, Oklahoma, USA; HC - Hall Creek Quadrangle, Nevada, USA; TF - Tvillingodden Formation at Bjornskardet, Spitsbergen; B23 - Bartalová layer No.23, Vysoká Formation; VR - Veterlín Formation, Vajarská by Rohožník, Malé Karpaty Mts.; HG - Hidaka Group in Hokkaido, Japan; CF - San Cassiano Formation, Dolomites, Italy; ZF - Zozar Formation, Western Himalaya, North India.
a - abundant, more than 20 specimens; c - common, more than 8 specimens; r - rare, fewer than 8 specimens.

Vysokella acanthostylica sp. n.
Pl. II, Figs. 1 to 8

D i a g n o s i s : zoaria large, massive, nodular to columnar; poor distinction between endozone and exozone; budding pattern stellar; autozooecia pentagonal to polygonal, with thin walls which gradually thicken from endozone to exozone; mesozooecia rare, large polygonal to oval; diaphragms common, numerous in autozooecia and in mesozooecia, complete, straight; acanthostyles large, abundant; zooecial wall microstructure probably lamellar.

H o l o t y p e : specimen illustrated in Pl. II, Fig. 1, deposited in the Slovak National Museum in Bratislava (SNM-B) under number SNM Z-21050.

P a r a t y p e : 18 rock specimens from Bartalová, deposited in the SNM-B under number SNM Z-21051 to SNM Z-21068.

L o c u s t y p i c u s : Vysoká Formation, locality Bartalová layer No. 23.

S t r a t u m t y p i c u m : Anisian, Pelsonian.

D e r i v a t i o n o m i n i s : due to the abundant and large acanthostyles.

M a t e r i a l : this species is identified in 38 rock specimens from locality Bartalová layer No. 23, 25 rock specimens from locality Vysoká III layer No. 16, 31 rock specimens from locality Vysoká II layer No. 16 and 42 rock specimens from locality Vysoká I layer No. 2. The identification is based on 125 acetate peels and thin sections.

M e a s u r e m e n t :

Endozone

autozooecia	0.176 to 0.250, average 0.203 mm
mesozooecia	0.064 to 0.119, average 0.108 mm
acanthostyles	0.040 to 0.059, average 0.055 mm
zooecial wall thickness	0.029 to 0.051, average 0.034 mm
distance of diaphragms	0.101 to 0.145, average 0.136 mm
diaphragm thickness	average 0.0067 mm

number of apertures per 2 mm: 9 to 12, average 11

Exozone

autozooecia	0.182 to 0.242, average 0.212 mm
mesozooecia	0.107 to 0.127, average 0.108 mm
acanthostyles	0.074 to 0.087, average 0.081 mm
zooecial wall thickness	0.068 to 0.155, average 0.101 mm
distance of diaphragms	0.078 to 0.220, average 0.153 mm
diaphragm thickness	average 0.0012 mm

number of apertures per 2 mm: 8 to 10, average 9

D e s c r i p t i o n : zoaria large, massive, nodular to columnar, rarely erect and ramose. The ratio between endozone and exozone in transverse section is nearly 1 : 1.5. The boundary between these two zones is indistinct.

Endozone: the endozone is circular in transverse section; budding pattern of autozooecia is stellar, budding from zooecial corners. Autozooecia thin-walled, pentagonal to hexagonal. Mesozooecia polygonal, large, as much as 1/2 to 1/3 the average diameter of autozooecia, rare, one mesozooecium for 4 to 6 autozooecia. Acanthostyles large, 4 to 5 around each autozooecium. In longitudinal section, the divergence of autozooecial tubes from zoarial growth direction is 0 to 20 degrees. Diaphragms abundant, both in autozooecia and in mesozooecia, straight, thin, complete. Zooecial walls thin and gradually increasing in thickness towards the exozone.

Exozone: the autozooecial tubes gradually bend outward in exozone in longitudinal section and meet the colony surface at 70 to 90 degrees. Exozonal walls are thick (nearly 2 times thicker than in the endozone). Diaphragms very abundant, their spacing is the same as the distance between zooecial walls resulting in a typically square pattern in the marginal parts of zoaria. In tangential section, mesozooecia are oval, larger than in the endozone, rare, about one per 3 to 5 autozooecia. Acanthostyles with dark broad cortex and light core, 4 to 6 around each autozooecium, 3 to 5 around each mesozooecium, larger than in the endozone, they may deform the cyclic pattern of the autozooecia. Microstructure of zooecial walls probably laminar.

Table 2: Diagnostic characters distinguishing the new genera from established genera.

diag. char. /genus	*Zozariella*	*Vysokella*	*Dyscritella*	*Dyscritella?*
boundary between endozone and exozone	poor	poor	clear or poor	indistinct
budding pattern	cyclic	stellar	noncyclic	cyclic
angle between colony surface and autozootecia	80 to 90 degree	70 to90 degree	50 to 80 degree	60 to 70 degree
form of a. in endozone	triangular polygonal	pentagonal polygonal	polygonal oval	pentagonal polygonal
form of a. in exozone	subcircular	subcircular	subcircular	oval or cyclic
mesozooecia or exilazooecia	very abundant	rare	rare, one per 2-4 a.	rare, one per 4-5 a.
diaphragms in endozone	common	abundant	absent	rare, one in a.
diaphragms in exozone	common	very abundant	very rare	abundant,3-5 in a.
acanthostyles in endozone	rare	rare or common	rare or lacking	absent or very rare
acanthostyles in exozone	abundant	rare or abundant	abundant	rare, one per 1-3 a.
microstructure	lamellar	lamellar?	lamellar	lamellar

Note: a. - autozooecium.

Comparison: this species resembles *Vysokella glabra* sp. n. in the general form of the zoaria and zooecia, but differs in that it has larger and more abundant acanthostyles, and thicker zooecial walls,in the exozone.

Observation: the rock specimens from locality Vysoká III, layer No. 16 have thicker zooecial walls in their exozones and are generally larger than the paratypes. The specimens from Vysoká II, layer No. 16 are generally larger, and have thicker zooecial walls in their endozones and more abundant mesozooecia in their exozone (one mesozooecium per 2 to 4 autozooecia), than the paratypes. The specimens from Vysoká I, layer No. 2 are generally smaller and their zooecial walls are thinner than those of the paratypes. These differences are regarded as nothing more than intraspecific variations.

Occurrence: Pelsonian Vysoká Formation (locality Bartalová No. 23, Vysoká I No. 2, Vysoká II No. 16, Vysoká III No. 16).

Vysokella glabra sp. n.
Pl. III, Figs. 1 to 7

Diagnosis: zoaria large, massive, nodular to columnar; poor distinction between endozone and exozone, exozone narrow; budding pattern stellar; autozooecia pentagonal to polygonal, with thin walls which become irregularly thickened from the endozone to the exozone; mesozooecia rare, large polygonal to oval; diaphragms thick, numerous in autozooecia and in mesozooecia, complete, straight; acanthostyles in endozone very scarce , in exozone rare, small; zooecial wall microstructure probably lamellar.

Holotype: specimen depicted in Pl. III, Fig. 1, deposited in the SNM-B under number SNM Z-21069.

Paratype: 9 rock specimens from locality Vysoká III layer No. 36, specimen deposited in the SNM-B under number SNM Z-21070 to SNM Z-21078.

Locus typicus: Vysoká Formation, locality Vysoká III layer No. 36 - Symbolical cemetery (Symbolický cintorín).

Stratum typicum: Anisian, Illyrian.

Derivatio nominis: due to the very rare and small acanthostyles, smooth in contrast to *Vysokella acanthostylica* sp. n.

Material: this species is represented by 15 rock specimens from locality Vysoká III layer No. 36 - Symbolical cemetery, 11 rock specimens from locality Vysoká II layer No. 36 and 22 rock specimens from locality Vysoká I layer No. 36. The identification is based on 55 acetate peels and thin sections.

Measurement:

Endozone

autozooecia	0.176 to 0.260, average 0.233 mm
mesozooecia	0.074 to 0.129, average 0.100 mm
acanthostyles	0.018 to 0.029, average 0.021 mm
zooecial wall thickness	0.024 to 0.041, average 0.024 mm
distance of diaphragms	0.101 to 0.195, average 0.156 mm
diaphragm thickness	0.021 to 0.034, average 0.024 mm

number of apertures per 2 mm: 8 to 11, average

Exozone

autozooecia	0.202 to 0.312, average 0.275 mm
mesozooecia	0.091 to 0.132, average 0.113 mm
acanthostyles	0.034 to 0.054 average 0.041 mm
zooecial wall thickness	0.033 to 0.091, average 0.054 mm
distance of diaphragms	0.132 to 0.207, average 0.183 mm
diaphragm thickness	0.021 to 0.043, average 0.033 mm

number of apertures per 2 mm: 7 to 10, average 8

Description: zoaria large, massive, nodular to columnar. The ratio between endozone and exozone in transverse section is nearly 2-3 :1, the boundary between these two zones is indistinct.

Endozone: endozone is circular to oval in transverse section, budding pattern of autozooecia is stellar, budding from zooecial corners. Autozooecia thin-walled, pentagonal to polygonal. Mesozooecia circular to oval, as much as 1/2 to 1/3 of average autozooecial diameters, rare, one mesozooecium per 4 to 5 autozooecia. Acanthostyles small, absent, or very rare, a maximum of 2 around each autozooecium. In longitudinal section the autozooecial divergence from zoarial growth direction is 10 to 30 degrees. Diaphragms abundant, both in autozooecia and mesozooecia, straight, thick, complete. Zooecial walls thin and gradually thickening in to the exozone.

Exozone: in longitudinal section the autozooecial tubes gradually bend outward in the exozone and meet the colony surface at 60 to 70 degrees. Exozonal walls are only a very little thicker than endozonal walls. Diaphragms very abundant, straight and thick. Mesozooecia are oval in tangential section, larger than in the endozone, rare, one per 3 to 4 autozooecia. Acanthostyles very small, rare,

commonly 2 to 3 around each autozooecium, a maximum of 4 to 5. Microstructure of zooecial walls probably laminar.

C o m p a r i s o n : this species resembles *Vysokella acanthostylica* sp. n. in the general form of the zoaria and zooecia, but differs in having scarcer and smaller acanthostyles, thinner zooecial walls in the exozone, and a larger exozone.

O b s e r v a t i o n : some rock specimens from layer No. 36 of locality Vysoká III have very thin zooecial walls in their endozones, and the endozone may be filled with calcite. These specimens have 9 to 11 apertures per 2 mm. Some smaller specimens from layer No. 36 of the section Vysoká II look like the largest specimens of *Dyscritella? anisica*, but the autozooecia and mesozooecia are larger than in *Dyscritella?*.

O c c u r r e n c e : Anisian, Illyrian Vysoká Formation (sections Vysoká I bed 36, Vysoká II bed 36, Vysoká III bed 36).

Conclusion

1 - the Triassic trepostome bryozoans described in this paper resemble some post-Triassic cyclostomes in:
a - poor distinction between the endozone and the exozone
b - rare development of mesozooecia
c - thin-walled autozooecia
d - large zoarial dimensions

2 - the Anisian - Pelsonian *Vysokella acanthostylica* gen. nov. sp. n. has abundant acanthostyles but in the species *Dyscritella? anisica* gen. nov. sp. n., specimens of the same age have rare acanthostyles. The Anisian - Illyrian *Vysokella glabra* gen. nov. sp. n. has rare acanthostyles and the *Dyscritella? anisica* specimens of this age lack acanthostyles. Thus the reduction of acanthostyles seems to be a progressive characteristic from the phylogenetical point of view.

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Plate I: *Dyscritella? anisica* sp. n.
Fig. 1 - the paratype, weathered tangential section of zoarium, SEM BS-600; x 30. Fig. 2 - oblique section of exozone showing gradually thickening zooecial wall, acetate peel; x 45. Fig. 3 - longitudinal section showing margin of zoarium with exilazooecia and diaphragms, acetate peel; x 50. Fig. 4 - longitudinal section showing exilazooecia between two autozooecia, acetate peel; x 50. Fig. 5 - the holotype; oblique section, thin section; x 33. Fig. 6 - transverse section of exozone showing autozooecia with acanthostyles and rare mesozooecia, acetate peel; x 100. Fig. 7 - transverse section of endozone showing thin zooecial walls, acetate peel; x 98. Fig. 8 - longitudinal section; detail showing distance between diaphragms, acetate peel; x 140. (Fig. 1 photo by I. Holický, Figs. 2 and 3 photo by J. Váňa, Figs. 4 to 8 photo by author).

Plate II: *Vysokella acanthostylica* gen. nov. sp. n.
Fig. 1 - the holotype; oblique section showing endozone and exozone, acetate peel; x 8. Fig. 2 - longitudinal section of outer exozone showing diaphragms, acetate peel; x 47. Fig. 3 - transverse section; detail of acanthostyles located around autozooecium, weathered surface, SEM - BS 600; x 200. Fig. 4 - detail of zooecial wall and diaphragm showing lamellar microstructure, thin section; x 280. Fig. 5 - transverse section of exozone showing acanthostyles with dark cortex and light core, thin section; x 100. Fig. 6 - longitudinal section; detail of diaphragms, acetate peel; x 130 Fig. 7 - transverse section; detail of exozone showing autozooecia, mesozooecia with acanthostyles around each, acetate peel; x 95. Fig. 8 - transverse section of endozone, acetate peel; x 40. (Fig. 1 photo by L. Osvald, , Fig. 8 photo by J. Váňa, Fig. 3 photo by I. Holický, Figs. 2, 4 to 7 photo by author).

Plate III: *Vysokella glabra* gen. nov. sp. n.
Fig. 1 - the holotype, oblique section, acetate peel; x 10. Fig. 2 - longitudinal section, detail of margin of zoarium, acetate peel; x 40. Fig. 3 - transverse section of exozone showing acanthostyles, acetate peel; x 95. Fig. 4 - transverse section of endozone, acetate peel; x 140. Fig. 5 - longitudinal section showing thickness of diaphragm, acetate peel; x 130. Fig. 6 - longitudinal section; detail showing distance and thickness of diaphragms, acetate peel; x 130. Fig. 7 - longitudinal section showing margin of zoarium, acetate peel; x 40. (Fig. 1 photo by L. Osvald, the other Figs. photo by author).


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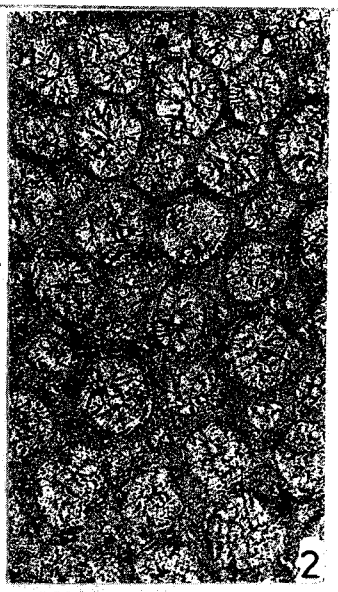
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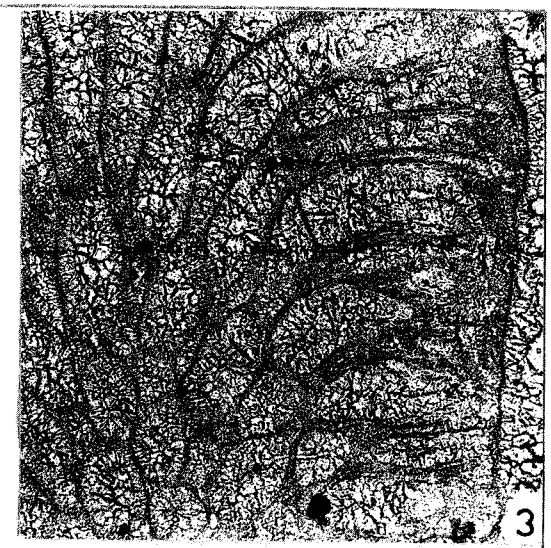
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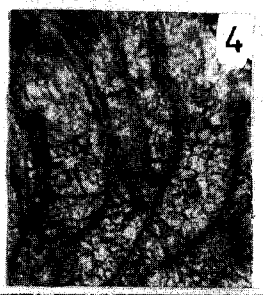
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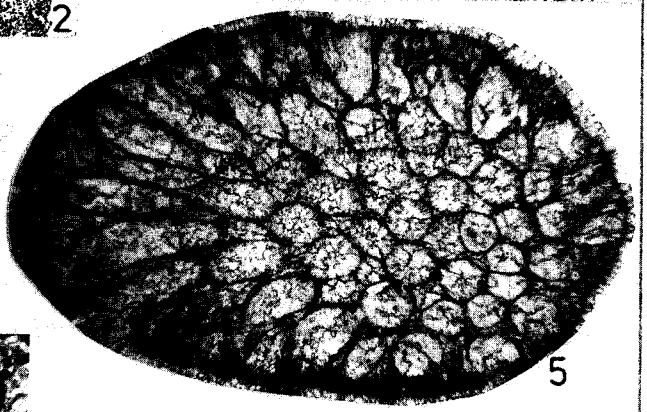
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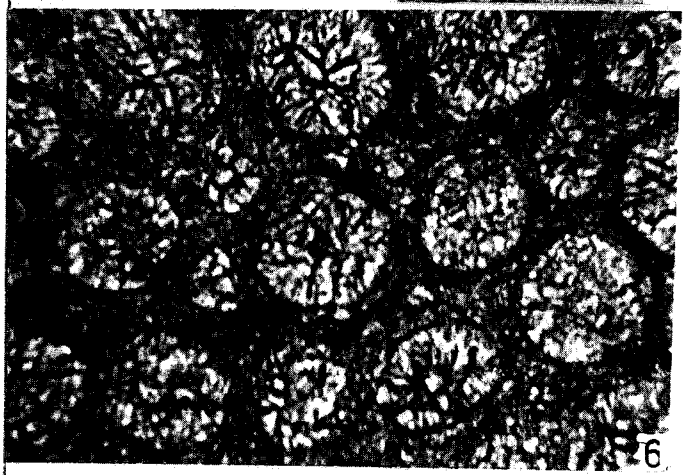
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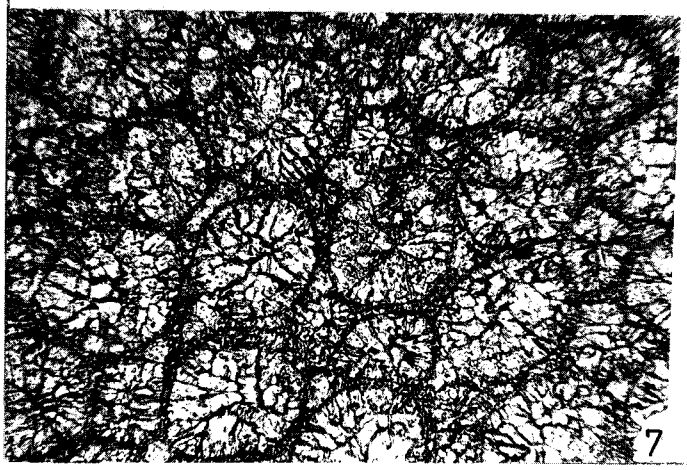
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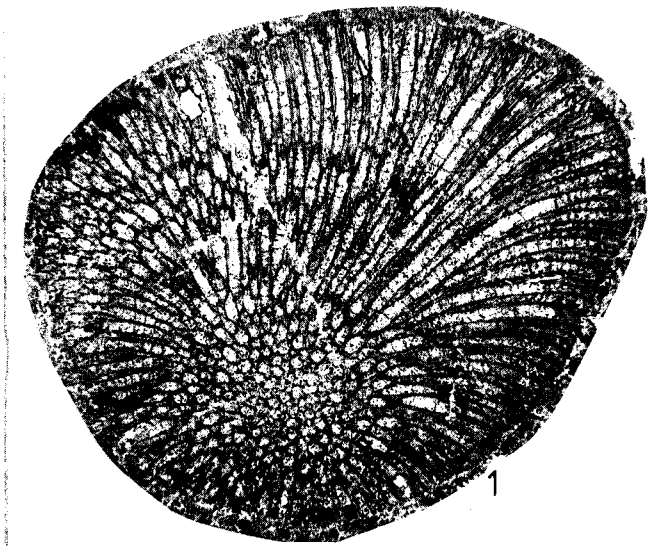
PLATE II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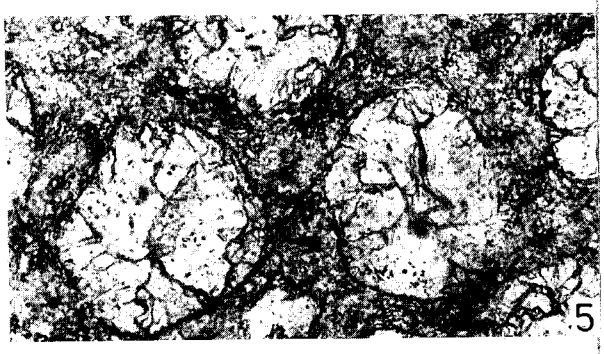
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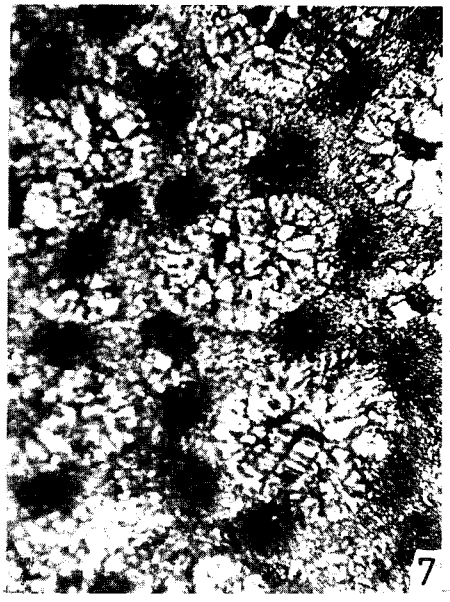
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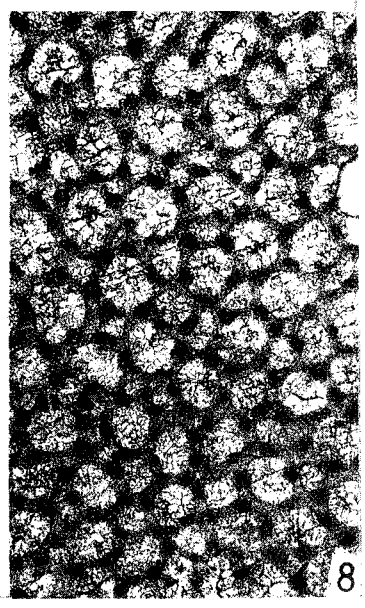
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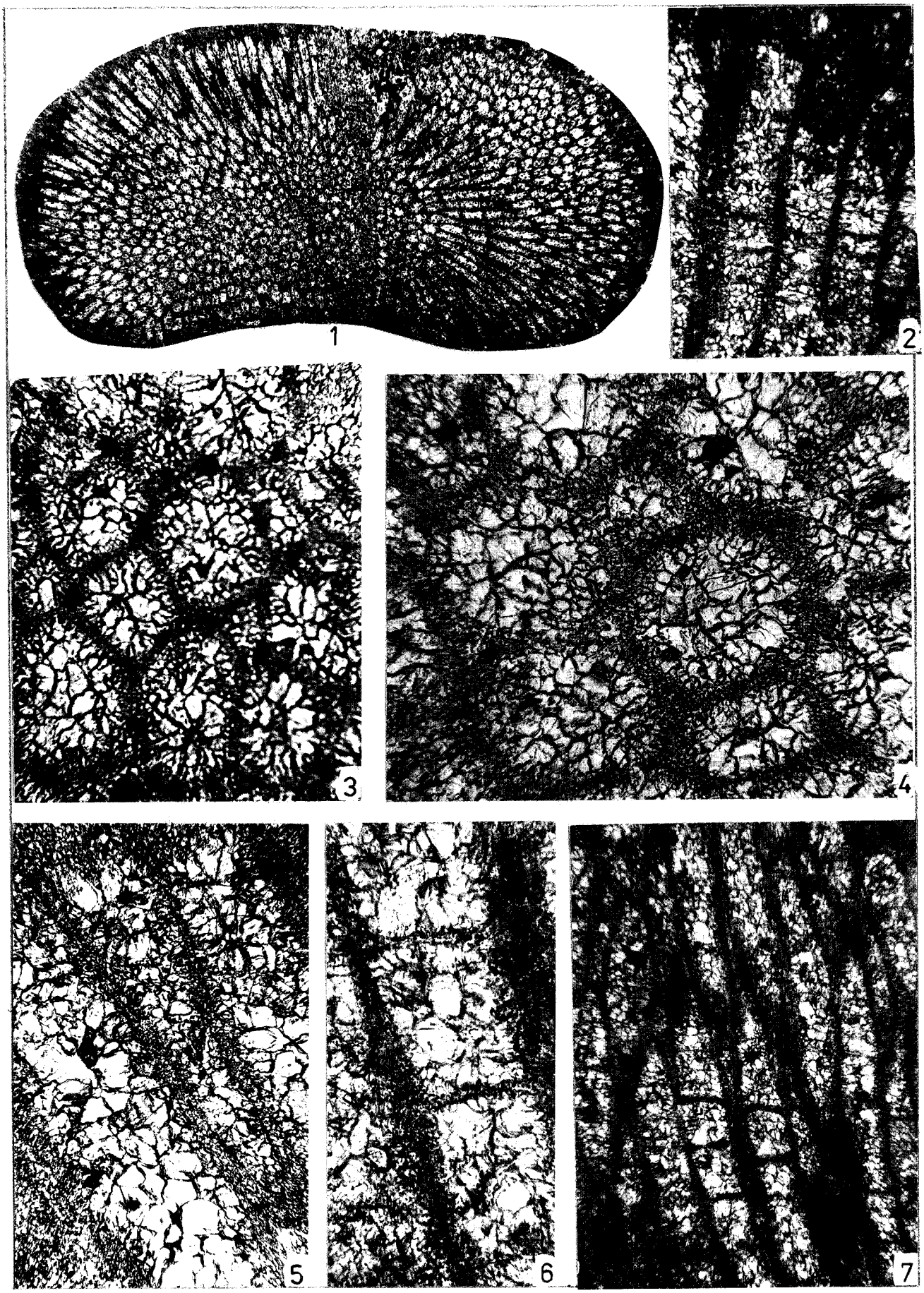
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References

Astrova G.G., 1978: Evolutionary history, system and phylogeny of bryozoans. *Trudy Paleont. Inst. Ak. Nauk SSSR* (Moscow), 169, 1 - 240 (in Russian).

Bassler R. S. (Eds.), 1953: Treatise on Invertebrate Paleontology, Part G. Bryozoa. *Univ. Kansas,* 1 - 253.

Bizzarini F. & Braga G., 1976: I Bryozoi del Trias Superiore Formazione di San Cassiano /dell Alpe di Specie (Prov. di Bolzano). *Atti e Mem. dell Accademia Patavina di Scienze, Let. ed Arti. parte 2 Classe di Sc. Mat. e Naturali,* (Padova), 88, 55 - 68.

Bizzarini F. & Braga G., 1978: Upper Triassic new genera and species of fair and questionable Bryozoa and Chaetetida from the S. Cassiano Formation of the Dolomites (Eastern Alps). *Boll del. Soc. Pal. It.* (Modena), 17, 1, 28 - 48.

Bizzarini F. & Braga G., 1979: Revisione di alcuni olotipi di Munster (1841) della Formatione di S. Cassiano (Trias - Cordevolico) ed attribuiti da autori successivi al Phylum Bryozoa. *Stud. Trentini Sci. Natur., Geol.* (Trento), 56, 113 - 123.

Bizzarini F. & Braga G., 1981: Prima segnalazione del genere Stomatopora (Bryozoa, Cyclostomata) nel Trias superiore della Dolomiti orientali (Italia). *Lavori - soc. Ven. Sci. Nat.* (Venecia), 6, 135 - 144.

Bizzarini F. & Braga G., 1982: The Triassic Bryozoa of the Western Tethydian basin. *Boll. Soc. Paleont. Ital.* (Modena), 21, 2-3, 223 - 234.

Bizzarini F. & Braga G., 1985: Braiesopora voigtii n. gen. n. sp. (Cycloslome Bryozoan) in the S. Cassiano Formation in the Eastern Alp (Italy). In: Nielsen C. & Larwood G. P. (Eds.): *Bryozoa: Ordovician to Recent.* Denmark, 25 - 33.

Boardman R.S., 1984: Origin of the post-Triassic Stenolaemata (Bryozoa): a taxonomic oversight. *J. Paleont.* (Kansas), 58, 1, 19 - 39.

Dunayeva N. N. & Morozova I. P., 1967: Pecularites of development and systematic position of some late Paleozoic Trepostomata. *Paleont. zhurnal* (Moscow), 4, 86 - 94 (in Russian).

Engeser T. S. & Taylor P. D., 1989: Supposed Triassic bryozoans in the Klipstein collection from the Italian Dolomites redescribed es calcified demosponges. *Bull. Br. Mus. Nat. Hist., Geol.* (London), 45, 1, 39 - 55.

Flugel E., 1963: Revision der triadischen Bryozoen and Tabulaten. *Sitz. Österr. Akad. Wiss., Mathem-natur. Klasse* (Wien), 1, 1 - 172.

Lazutkina O. F., 1963: Finding of bryozoans Batostomella in Triassic. *Paleont. zhurnal* (Moscow), 2, 49 - 57 (in Russian).

Michalík J., Masaryk P., Lintnerová O., Papšová J., Jendrejáková O. & Reháková D., 1992: Sedimentology and facies of a storm-dominated Middle Triassic carbonate ramp (Vysoká Formation), Malé Karpaty Mts., Western Carpathians). *Geol. Carpathica* (Bratislava), 43, 4, 213 -230.

Morozova I. P., 1960: The genus Dyscritella. In: *Fundamentals of Paleontology, Bryozoa & Brachiopoda. Nauka*, Moscow, 67 (in Russian).

Morozova I. P., 1969: On systematic composition and distribution of bryozoans in Triassic. *Paleont. zhurnal* (Moscow), 2, 49 - 57 (in Russian).

Morozova I. P. & Zhapnikova N. K., 1984: On new Triassic bryozoans. *Paleont. zhurnal* (Moscow), 4, 73 - 79 (in Russian).

Nakrem H. A. & Mork A., 1991: New early Triassic Bryozoa (Trepostomata) from Spitsbergen, with some remarks on the stratigraphy of the investigated horizons. *Geol. Mag.* (Cambridge), 128, 2, 129 - 140.

Nechoroshev V. P., 1949: The first finding of Triassic bryozoans in USSR. *Dok. Acad. Nauk SSSR* (Moscow), 66, 2, 459 - 461 (in Russian).

Prantl F., 1938: Erster fund von Bryozoa in der karpatische Rhät. *Zbl. Mineral. Geol. Paläont., part B, Geol. Paläont.* (Stuttgart), 262 - 264.

Sakagami S., 1972: The Triassic Bryozoa from Kusaka, Sakawa basin, Shikoku, Japan. *Trans. Proc. Paleont. Soc. Japan, N.S.* (Tokyo), 85, 275 - 279.

Sakagami S. & Sakai A., 1979: Triassic Bryozoans from Hidaka Group in Hokkaido, Japan. *Trans. Proc. Paleont. Soc. Japan, N.S.* (Tokyo), 114, 77 - 86.

Schäfer P. & Fois E., 1987: Systematics and evolution of Triassic Bryozoa. *Geol. et Paleont.* (Marburg), 21, 173 - 225.

Taylor P. D. & Michalík J., 1991: Cyclostome bryozoans from late Triassic (Rhaetian) of the West Carpathians, Czechoslovakia. *Neu Jb. Geol. Paläont. Abh.* (Stuttgart), 182, 3, 285 - 302.

Vinassa de Regny P., 1901: Trias - Tabulaten, Bryozoen und Hydrozoen aus dem Bakony. *Result. Wissen. Erfor. des Balatonsee* (Budapest), 1, 1, 1 - 2.