

PRIABONIAN (LATE EOCENE) CYCLOSTOMATA BRYOZOA FROM THE WESTERN CARPATHIANS (CZECHO-SLOVAKIA)

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Abstract: During the investigation of sediments of the Paleogene basal Borové Formation in the Liptov Basin and of the flysch Zuberec Formation in the Rajec Basin, the author found rich associations of bryozoans belonging to *Cyclostomata*. Among them two new species have been distinguished: *Exidmonea crisiiforma* and *Nematifera susannae*. The other species are briefly described.

Key words: systematic zoopaleontology, Bryozoa *Cyclostomata*, new species, Eocene sediments, Western Carpathians, Liptov and Rajec Basins.

Introduction

The Eocene sediments of the Western Carpathians can be divided into four Formations (Gross et al. 1984, see Tab. 1). I have studied cyclostomatous bryozoans in the basal Borové Formation in the Liptov Basin and in the Zuberec Formation in the Rajec Basin. The Borové Formation of the Liptov Basin has a very variegated facies (Gross et al. 1980). It can be formed by thin-bedded light-grey to brown bryozoan limestones (locality Hybica), by fine-grained compact calcarenites (locality Východná), or by yellowish-brown organodetrital clayey limestones (locality Partizánska Ľupča).

The locality Hybica (see Fig. 1,1) is situated on the right bank of the river Hybica, about 3.4 km north of the village of Východná. More than 45 wt. % of the bryozoan limestone is composed of bryozoan zoaria. In all, 49 species of bryozoans have been found here, among them 19 are cyclostomatous.

The locality Východná (see Fig. 1,2) lies east of the village Východná, in a road-cut towards the railway station. 27 bryozoan species have been found here, among them 7 were representatives of *Cyclostomata*.

The locality Partizánska Ľupča (see Fig. 3,4) is represented by an abandoned quarry lying about 1.6 km south of a village of the same name. Foraminiferal tests of discocyclinas (e.g. *Discocyclina prattii*) are predominant in the sediment. 36 bryozoan species have been found at the locality, among them 14 *Cyclostomata*.

The Zuberec Formation has a flysch character in the Rajec Basin, with a predominance of clastic members (Gross 1983).

At the locality Rajecké Teplice (see Fig. 2,3), bryozoans occur in a medium-grained calcarenite, exposed above the Bys trička stream - south of the village. In all, the remnants of 41 species of bryozoans have been found here, from them 16 belonged to *Cyclostomata*.

Systematics

Phylum: *Bryozoa* Ehrenberg, 1831
Subphylum: *Ectoprocta* Nitsche, 1869

Class: *Stenolaemata* Borg, 1926
Order: *Cyclostomata* Busk, 1852
Suborder: *Articulata* Busk, 1859
Family: *Crisiidae* Johnston, 1847
Genus: *Crisia* Lamouroux, 1812
Crisia elongata Milne Edwards, 1838

1980 *Crisia elongata* Milne Edwards, Braga, p. 35, Fig. 17

Comparison: The frontal sides of these specimens are more porous than those found by Braga.

Occurrence: Hybica locality.

Crisia hoernesii Reuss, 1848
(Pl. I. Fig. 1)

1974 *Crisia hoernesii* Reuss, Debourle, p. 42, Pl. 1, Fig. 5

Comparison: The zooecia are more lapped over the margin of zoaria than in the Debourle's specimens.

Occurrence: Hybica locality.

Suborder: *Tubuliporina* Milne & Edwards, 1838
Family: *Tubuliporidae* Johnston, 1838
Genus: *Tubulipora* Lamarck, 1816

Tubulipora dimidiata (Reuss, 1848)
(Pl. I. Fig. 2)

1974 *Tubulipora dimidiata* (Reuss), Vávra, p. 349, Pl. 1, Figs. 3, 4

Comparison: These specimens have longer peristome and more adjacent zooecia (2 to 3) than in Vávra's specimens.

Occurrence: Rajecké Teplice locality.

Genus: *Exidmonea* Mongereau, 1969
Exidmonea crisiiforma n. sp.
(Pl. II. Figs. 1 to 6)

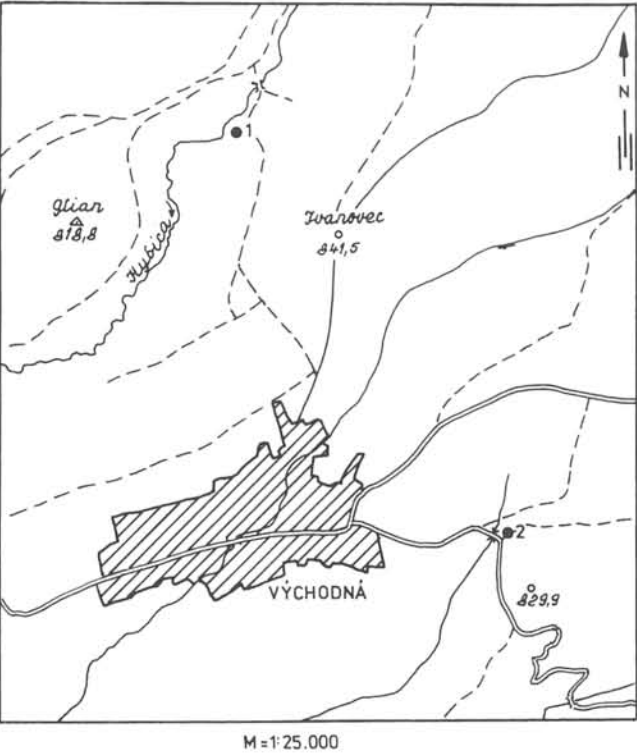


Fig. 1. Geographical position of locality Hybica and Východná.
● 1 = locality Hybica
● 2 = locality Východná

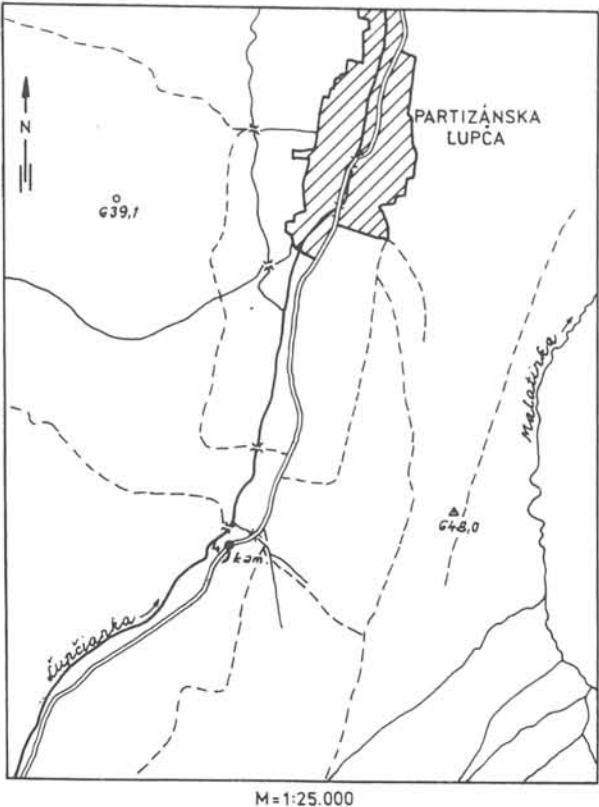


Fig. 3. Geographical position of locality Partizánska Lupča.
● 4 - locality Partizánska Lupča
kam. = quarry

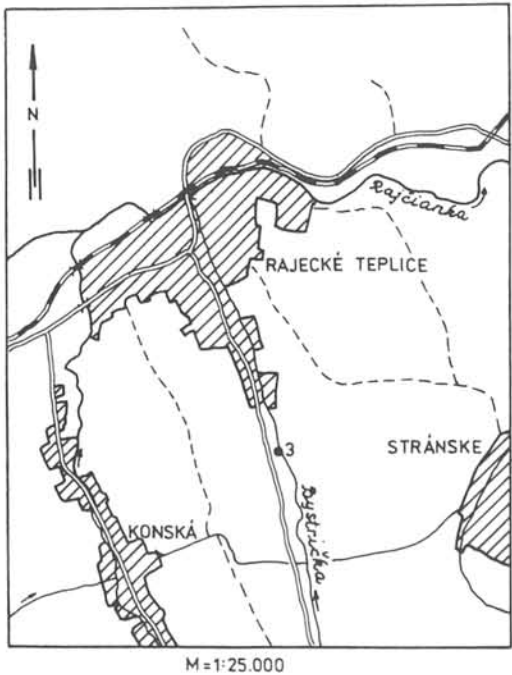


Fig. 2. Geographical position of locality Rajecké Teplice.
● 3 - locality Rajecké Teplice

D i a g n o s i s: The zoaria are very large, flat, unilamellar, with zooecia situated on the lateral part of the zoarium. Zooecia are in groups of two, with long peristome in lateral direction. The frontal wall is markedly porous with visible lateral walls.

H o l o t y p e: The specimen depicted on Pl. II, 1, from the locality Hybica, deposited in the Slovak National Museum in Bratislava (SNM-B), under number SNM Z-20958.

P a r a t y p e: 9 specimens from the locality Hybica, deposited in the SNM-B under number SNM Z-20959 to SNM Z-20967.

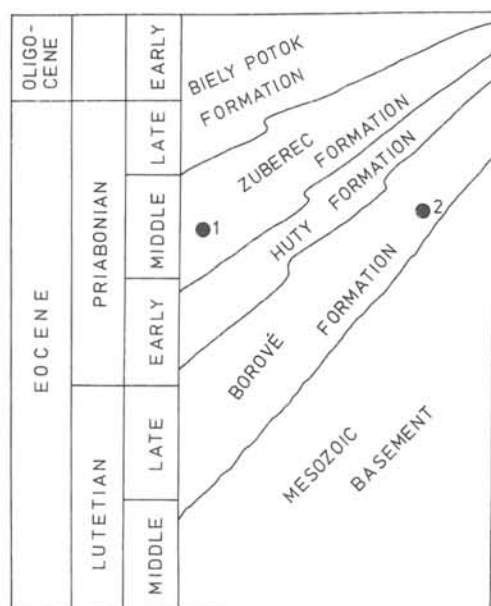
Dimensions: (in μm):	LZ	lz	Lz	Da	da
LZ = transversal width of zoarium	287	105	930	69	512
lz = width of zooecium		107	895	77	692
Lz = length of zooecium					
Da = diameter of aperture					
da = distance between apertures	712	180	742	84	717
		120	620	61	804

L o c u s t y p i c u s: Hybica - bryozoan limestones.

S t r a t u m t y p i c u m: Eocene - Priabonian.

D e r i v a t i o n o m i n i s: This species looks like the largest Crisia.

D e s c r i p t i o n: The zoarium is very large, cylindrical, unilamellar, and frequently dichotomous. The ventral side is flat or has a slightly convex bend. Lateral walls of zooecia are visible due to their dark colouring. Terminal apertures are oval to circular, with a narrow peristomie. The zooecia are long, tubular, in two groups above each other. The groups lie on the lateral part of the zoarium. The frontal wall of the proximal zooecia (lies nearer the front of the zoarium) forms a ventral side of the zoarium and their long peristomes are laterally directed. The dorsal wall of distal zooecia (lies behind the proximal zooecia) forms the dorsal side of the zoarium. Their apertures are situated on the margin of the dorsal side, on the ends of the shorter peristomes. The dorsal side of the zoarium is flat, without pores, and strongly axially grooved by fine ribs.

Table 1: Eocene lithostratigraphy of the northern part of Central Western Carpathian Basins (according Gross, Köhler & Samuel 1984).

● 1 RAJEC BASIN

● 2 LIPTOV BASIN

Some parts are slightly inflated in the zoarium and these parts have very long peristomes. These parts might have served as ovicell (Pl. II, Fig. 6.).

Comparison: Certain parts of the *Idmonea atlantica* Johnston, 1847 zoarium depicted in Canu & Bassler (1920) Pl. 140, Fig. 3 resemble *Exidmonea crisiiforma* sp. n., but differ in measurement, in the very long peristomes and in lacking the ribs on the dorsal side. *Exidmonea crisiiforma* sp. n. differs from all other known species belonging to *Exidmonea* in position of apertures on the dorsal side of zoarium.

Geographical and stratigraphical distribution: Hybica locality, Priabonian.

Exidmonea villaltae (Reguant, 1961)
(Pl. I. Fig. 3)

1969 *Exidmonea villaltae* (Reg.), Mongereau, p. 252, Pl. 21, Figs. 4, 5, 10, 13

Comparison: Mongereau's specimens have longer zooecia with longer peristome and their dorsal side are slightly more ribbed than the ones I found.

Occurrence: Partizánska Ľupča, Hybica, Východná, Ražské Teplice localities.

Exidmonea hörnesi Stoliczka, 1862
(Pl. I. Fig. 4)

Table 2: Geographic distribution of taxa found in the Liptov and Rajec Basins and elsewhere in the world.

Name of taxon	PL	H	V	RT	E	Az	Am	R
<i>Crisia elongata</i> Milne & Edwards		r			+		+	+
<i>Crisia hoernesii</i> Reuss		c			+		+	+
<i>Tubulipora dimidiata</i> (Reuss)				r	+			+
<i>Exidmonea crisiiforma</i> n.sp.		c						
<i>Exidmonea villaltae</i> (Reguant)	r	c	c	r	+			
<i>Exidmonea hörnesi</i> Stoliczka	r			c	+			
<i>Exidmonea atlantica</i> Forbes	a	r			+	+	+	+
<i>Exidmonea giebeli</i> (Stoliczka)			r		+	+		
<i>Platonea pluma</i> (Reuss)		c	+					
<i>Filispara cuvillieri</i> Debourle	a	r	r	r	+			
<i>Mecynoecia iranensis</i> Furon & Balavoine	c					+		
<i>Mecynoecia proboscidea</i> (Milne & Edwards)	a	a	c	c	+	+	+	+
<i>Exochoecia compressa</i> (Reuss)		r		r	+			+
<i>Nematifera susannae</i> n.sp.	r	a	r	r				
<i>Nematifera reticuloides</i> Canu & Bassler	c				+			
<i>Homera asperula</i> Reuss		r	r		+			
<i>Homera concatenata</i> Reuss		c			+			
<i>Homera cf. frondiculata</i> Auct.	a			r	+	+		+
<i>Homera seriatopora</i> Reuss		r		r	+			
<i>Homera subannulata</i> Philippi	a	c	r	c	+			
<i>Reteporidae coronopus</i> (Canu & Bassler)	a	c			+			
<i>Heteropora subreticulata</i> Reuss	r	c	r	r	+			
<i>Lichenopora beyrichii</i> (Reuss)	r	c	r	r	+			
<i>Lichenopora coronula</i> (Reuss)	r				+			
<i>Lichenopora grignonensis</i> Milne & Edwards	a	c		r	+		+	
<i>Defranciopora cf. cochloidea</i> (v.Hagenow)	r				+		+	

Explanations: + presence without quantification; r - rare (1 to 5 specimens); c - current (6 to 25 specimens); a - abundant (over 25 specimens); PL - Partizánska Ľupča; H - Hybica; V - Východná; RT - Ražské Teplice; E - rest of Europe; Az - Asia; Am - Northern America; R - recent seas.

Table 3: List of stratigraphical distribution of species described in this paper.

Name of taxon	S	P	E	O	N	R
<i>Crisia elongata</i> Milne Edwards						
<i>Crisia hoernesii</i> Reuss						
<i>Tubulipora dimidiata</i> (Reuss)						
<i>Exidmonea crisiiforma</i> n.sp.			.			
<i>Exidmonea villaltae</i> (Reguant)						
<i>Exidmonea hörnesii</i> Stoliczka						
<i>Exidmonea atlantica</i> Forbes						
<i>Exidmonea giebeli</i> (Stoliczka)						
<i>Platonea pluma</i> (Reuss)			.			
<i>Filisparsa cuvillieri</i> Debourle			-			
<i>Mecynoecia iranensis</i> Furon & Balavoine						
<i>Mecynoecia proboscidea</i> (Milne Edwards)						
<i>Exochoecia compressa</i> (Reuss)						
<i>Nematifera susannae</i> n.sp.			.			
<i>Nematifera reticuloides</i> Canu & Bassler						
<i>Hornera asperula</i> Reuss			-			
<i>Hornera concatenata</i> Reuss						
<i>Hornera cf. frondiculata</i> Auct.						
<i>Hornera seriatopora</i> Reuss						
<i>Hornera subannulata</i> Philippi						
<i>Reteporidae coronopus</i> (Canu & Bassler)						
<i>Heteropora subreticulata</i> Reuss						
<i>Lichenopora beyrichii</i> (Reuss)						
<i>Lichenopora coronula</i> (Reuss)						
<i>Lichenopora grignonensis</i> Milne Edwards						
<i>Defranciopora cf. cochloidea</i> (v.Hagenow)						

Explanations: S - Senonian; P - Paleocene; E - Eocene; O - Oligocene; N - Neogene; R - Recent.

1969 *Exidmonea hörnesii* Stol., Mongereau, p. 235, Pl. 18, Figs. 8, 9

Comparison: These specimens have triangular transverse sections, while Mongereau's specimens have circular sections.

Occurrence: Partizánska Ľupča and Rajecké Teplice localities.

Exidmonea atlantica Forbes in Johnston, 1847
(Pl. II. Fig. 7)

1969 *Exidmonea atlantica* For., Mongereau, p. 216, Pl. 16, Figs. 6, 10, 11

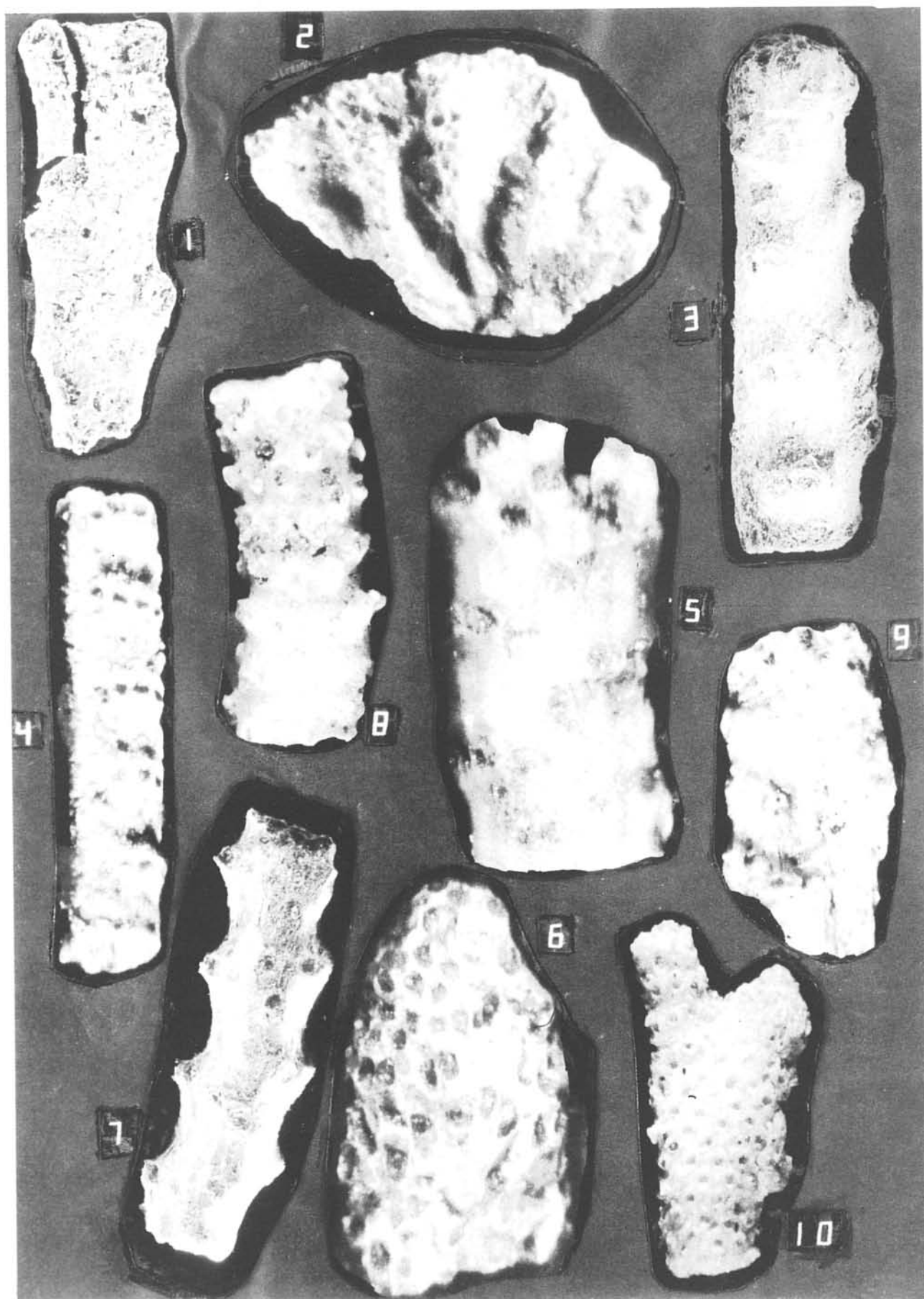
Comparison: These specimens are slightly more ribbed on their dorsal side and their peristomes are more laterally directed than Mongereau's specimens. According to Mongereau (1969) *E. atlantica* is a widely varied taxon and so these features are not specific.

Occurrence: Partizánska Ľupča and Hybica localities.

Plate I

Fig. 1. - *Crisia hoernesii* Reuss, frontal side, general view S.E.M. 105 x; Fig. 2. - *Tubulipora dimidiata* (Reuss) fragment of zoarium, frontal side 30 x; Fig. 3. - *Exidmonea villaltae* (Reguant) lateral view of zoarium, S.E.M. 47 x; Fig. 4. - *Exidmonea hörnesii* Stoliczka lateral view of zoarium, 35 x; Fig. 5. - *Exidmonea giebeli* (Stoliczka) view of frontal side of zoarium, 35 x, colloring; Fig. 6. - *Platonea pluma* (Reuss) fragment of zoarium, frontal side 35 x, colloring; Fig. 7. - *Hornera seriatopora* Reuss general view, S.E.M. 45 x; Fig. 8. - *Mecynoecia iranensis* (Furon & Balavoine) fragment of zoarium, general view 37 x; Fig. 9. - *Exochoecia compressa* (Reuss) frontal view of fragment of zoarium 45 x; Fig. 10. - *Nematifera reticuloides* Canu & Bassler general view of dichotomous zoarium 20 x.

Figs. 1, 3, 7 photo by J. Kulich; Fig. 2 photo by L. Osvald, the other Figs. photo by author.



Exidmonea giebeli (Stoliczka, 1862)
(Pl. I. Fig. 5)

1969 *Exidmonea giebeli* (Stol.), Mongereau, p. 232, Pl. 20, Figs. 1-3, 9, 11

C o m p a r i s o n: These specimens have smaller apertures than Mongereau's specimens.

O c c u r r e n c e: Rajecké Teplice locality.

Genus: *Platonea* Canu & Bassler, 1920

Platonea pluma (Reuss, 1848)
(Pl. I. Fig. 6)

1988 *Platonea pluma* (Reu.), Braga & Barbin, p. 507, Pl. 1, Fig. 6

C o m p a r i s o n: Braga's specimens have more circular apertures than these.

O c c u r r e n c e: Rajecké Teplice locality.

Family: *Oncousoeciidae* Canu, 1918
Genus: *Filisarsa* d'Orbigny, 1853

Filisarsa cuvierii Debourle, 1974
(Pl. IV. Figs. 4 and 5)

1974 *Filisarsa cuvierii*, Debourle, p. 51, Pl. 2, Figs. 5, 6

C o m p a r i s o n: These zoaria have more zooecia around the perimeter, (there are 5 - 6 zooecia next to each other), but in Debourle's specimens there are only 3 - 5 adjacent zooecia.

O c c u r r e n c e: Partizánska Ľupča, Hybica, Východná and Rajecké Teplice localities.

Family: *Entalophoridae* Reuss, 1863
Genus: *Mecynoecia* Canu, 1918

Mecynoecia iranensis (Furon & Balavoine, 1959)
(Pl. I. Fig. 8)

1959 *Entalophora iranensis*, Furon & Balavoine, p. 295, Pl. 12, Fig. 1

O b s e r v a t i o n: Ancestrozoecium was found in one of these specimens. It is conical, small, and has slight axial ribs.

O c c u r r e n c e: Partizánska Ľupča locality.

Mecynoecia proboscidea (Milne Edwards, 1838)
(Pl. II., Fig. 8; Pl. V., Fig. 3)

1988 *Mecynoecia proboscidea* (Milne & Edw.), Braga & Barbin p. 232, Pl. 2, Fig. 5

C o m p a r i s o n: The zoecia are much longer and their frontal walls are more convex and strongly porous than Braga's specimens.

O b s e r v a t i o n: I believe that these specimens could be a new species of this genus. But according to Braga, these taxa are a variation of *Mecynoecia proboscidea* only.

O c c u r r e n c e: Partizánska Ľupča, Hybica, Východná and Rajecké Teplice localities.

Genus: *Exochoecia* Canu & Bassler, 1920

Exochoecia compressa (Reuss, 1848)
(Pl. I. Fig. 9)

1988 *Exochoecia compressa* (Reuss), Braga & Barbin, p. 509, Pl. 3, Figs. 1, 2

C o m p a r i s o n: These specimens have less zooecia next to each other on their frontal side (from 7 to 9) than Braga's specimens.

O c c u r r e n c e: Hybica and Rajecké Teplice localities.

Genus: *Nematifera* Canu & Bassler, 1922

Nematifera susannae n.sp.
(Pl. III. Figs. 1 - 7)

D i a g n o s i s: The zoaria are multilamellar. Zooecia are very long, and have large orifices. The lateral walls are marked and the frontal wall is strongly perforated by tremopores.

H o l o t y p e: The specimen depicted on Pl. III, 1., from the locality Hybica, deposited in the SNM-B under number SNM Z-20996.

P a r a t y p e: 10 specimens from the locality Hybica, deposited in the SNM-B under number SNM Z-20997 to SNM Z-21006.

Dimensions: (in μm):	LZ	lz	Lz	Da
	1643	228	877	166
		246	702	171
	786	175	877	212
gonozoecium		-175	1123	158

L o c u s t y p i c u s: Hybica - bryozoan limestones.

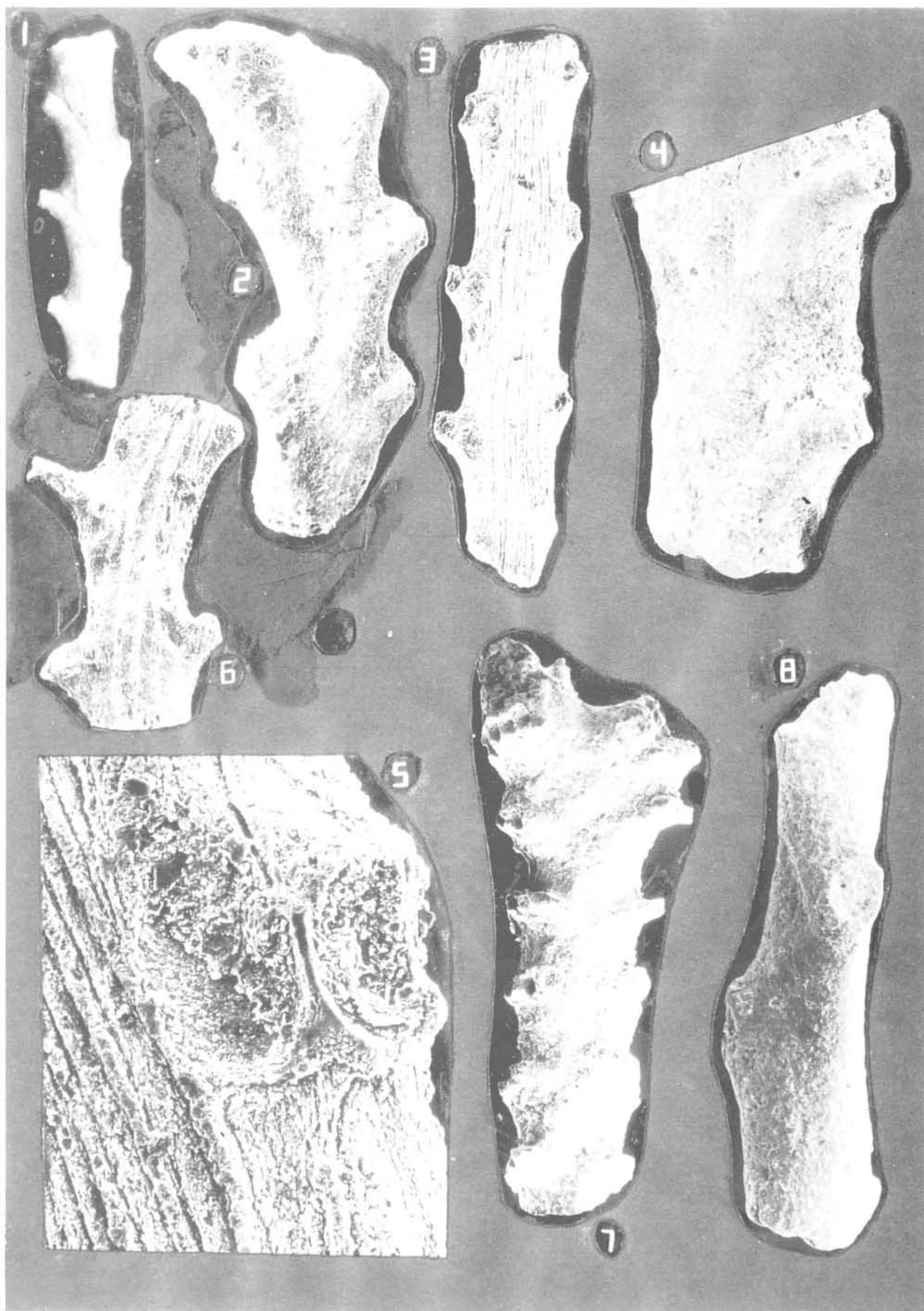
S t r a t u m t y p i c u m: Eocene - Priabonian.

D e r i v a t i o n o m i n i s: after the name Susanna.

D e s c r i p t i o n: Zoaria are bilamellar or multilamellar, cylindrical, with circular or oval cross-section, rarely dichotomous. Zooecia are long and narrow, and can have 10 - 12 adjacent zooecia along the perimeter. The shape of each zoecium is not necessarily the same, and it is often deformed due to growth of a neighboring zoecium. The frontal wall has a slightly convex bend and is densely perforated by small pores. Lateral walls are not elevated above the surface of zoecium, but in spite of this they are easily visible, as are the small pores, because their color is darker than their surroundings. The orifice is very large, and is circular or oval. It is on the proximal side, and is usually slightly flattened. Gonozoecia (Pl. III, 5) are longer than auto-

Plate II

Fig. 1. - *Exidmonea crisiiforma* n.sp. - holotype frontal side - general view with visible lateral walls and zoarium growth form 20 x; Fig. 2. - *Exidmonea crisiiforma* n.sp. frontal side - general view with visible form of zooecia, S.E.M. BS-600, 45 x; Fig. 3. - *Exidmonea crisiiforma* n.sp. dorsal side - general view with visible axial grooving and the position of apertures of proximal zooecia, S.E.M. BS-600, 35 x; Fig. 4. - *Exidmonea crisiiforma* n.sp. frontal side - detail of the form of zooecia with peristomes, S.E.M. BS-600, 80 x; Fig. 5. - *Exidmonea crisiiforma* n.sp. dorsal side - detail of apertures with peristomie, S.E.M. BS-600, 260 x; Fig. 6. - *Exidmonea crisiiforma* n.sp. dorsal side of zoarium with ovicell, which has a long poristome, S.E.M. BS-600, 50 x; Fig. 7. - *Exidmonea atlantica* Forbes general view of frontal side with visible position of zooecia; S.E.M. BS-600, 16 x; Fig. 8. - *Mecynoecia proboscidea* (Milne & Edwards) general view; S.E.M. BS-600, 40 x. Fig. 1 photo by author. The other Figs. photo by I. Holický.



zoecia, but have about the same width. They have a long oeciostome, with wider peristomie than autozoecia. The oeciopore is approximately as small as the orifices of the autozoecia, and in its distal part the gonozoecium is usually slightly swollen.

C o m p a r i s o n: The described species differs from all known representatives of the *Nematifera* by the length of its zoecia and the size of its orifice. A majority of known species of *Nematifera* have very thick lateral walls that are elevated above the surface of zoarium and that have wide peristomes.

O b s e r v a t i o n: The gonozoecia have not been described as much as all the known *Nematifera*.

G e o g r a p h i c a l a n d s t r a t i g r a p h i c a l d i s t r i b u t i o n: Partizánska Ľupča, Hybica, Východná and Rajecké Teplice localities, Priabonian.

Nematifera reticuloides Canu & Bassler, 1926
(Pl. I. Fig. 10; Pl. III. Fig. 8)

1926 *Nematifera reticuloides*, Canu & Bassler p. 47, Pl. 4, Figs. 8 - 11

C o m p a r i s o n: These specimens have slightly porous frontal sides, but Canu & Bassler's specimens have smoother frontal sides.

O c c u r r e n c e: Partizánska Ľupča locality.

Suborder: *Cancellata* Gregory, 1899
Family: *Horneridae* Gregory, 1899
Genus: *Hornera* Lamouroux, 1821

Hornera asperula Reuss, 1869
(Pl. IV. Fig. 1)

1972 *Hornera asperula* Reu., Mongereau p. 321, Pl. 2, Figs. 1 - 3. 5

C o m p a r i s o n: These zoaria are transversally ribbed with wide ribs on their dorsal sides and have oval transversal sections. Mongereau's specimens are slightly more ribbed and have circular sections.

O c c u r r e n c e: Hybica and Rajecké Teplice localities.

Hornera-concatenata Reuss, 1869
(Pl. IV. Fig. 2)

1988 *Hornera concatenata* Reu., Braga & Barbin, p. 511, Pl. 2, Figs. 8, 9

C o m p a r i s o n: Braga's specimens have shorter zoecia and slightly protruding lateral walls, compared to these specimens.

O c c u r r e n c e: Hybica locality.

Hornera cf. frondiculata Auct.
(Pl. IV. Figs. 3, 6 - 8)

1972 *Hornera frondiculata* Auct., Mongereau, p. 329, Pl. V, Fig. 5; Pl. VI, Fig. 7; Pl. VII, Figs. 6 - 8

C o m p a r i s o n: The frontal sides of the zoaria depicted in Pl. IV. Figs 3. and 7 are similar to *H. frondiculata* forma *frondiculata* (Mongereau's Pl. VI, Fig. 7) but differ in that they have larger and more circular apertures. The dorsal side is most similar to Mongereau's specimen depicted in Pl. V, Fig. 6 but they differ in that they have thicker transversal ribs and lack vacuoles

between nervi. Specimens depicted in Pl. IV. Figs. 6 and 8 are similar to *H. frondiculata* forma *striata* (Mongereau's Pl. 7, Figs. 6 - 8), but differ in that they have larger apertures.

O b s e r v a t i o n: According to Mongereau (1972) there is a large variation of *Hornera frondiculata*. These different features are not specific to the species.

O c c u r r e n c e: Hybica and Rajecké Teplice localities.

Hornera seriatozona Reuss, 1847
(Pl. I. Fig. 7)

1963 *Tervia irregularis* (Meneg., 1845), Malecki, p. 71, Pl. III, Fig. 11

1972 *Hornera seriatozona* R., Mongereau, p. 342, Pl. IX, Fig. 9

C o m p a r i s o n: These specimens have more protrusive lateral walls on their frontal sides than Malecki's specimens.

O b s e r v a t i o n: These specimens are more similar to *Tervia irregularis* (Meneghini, 1845) according to Malecki (1963), but according to Mongereau (1972) this species is synonymous with *Hornera seriatozona*.

O c c u r r e n c e: Hybica and Rajecké Teplice localities.

Hornera subannulata Philippi, 1843
(Pl. V. Figs. 1, 2)

1972 *Hornera subannulata* Ph., Mongereau, p. 350, Pl. 10, Figs. 2, 8

1974 *Tervia sculpturata* sp.n., Debourle, p. 84, Pl. 7, Figs. 11, 12

O b s e r v a t i o n: Debourle's species have irregularly placed apertures on the frontal side of the zoarium. I believe, that it is a variation in this species only. Debourle did not compare his specimens with *Hornera subannulata*.

O c c u r r e n c e: Partizánska Ľupča, Hybica, Východná and Rajecké Teplice localities.

Family: *Petaloporidae* Gregory, 1899
Genus: *Reteporidea* d'Orbigny, 1849

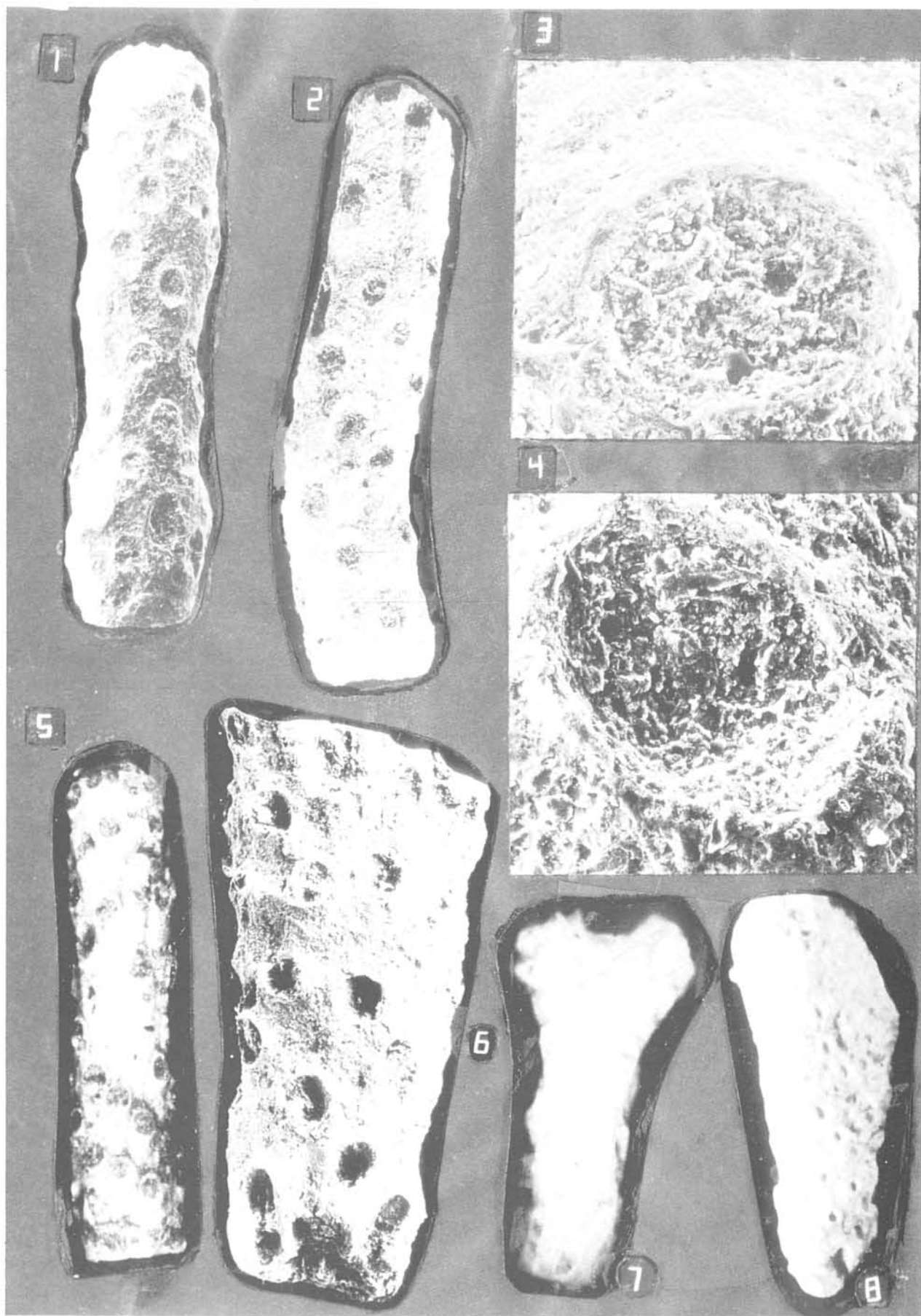
Reteporidea coronopus (Canu & Bassler, 1922)
(Pl. V. Figs. 4 - 6)

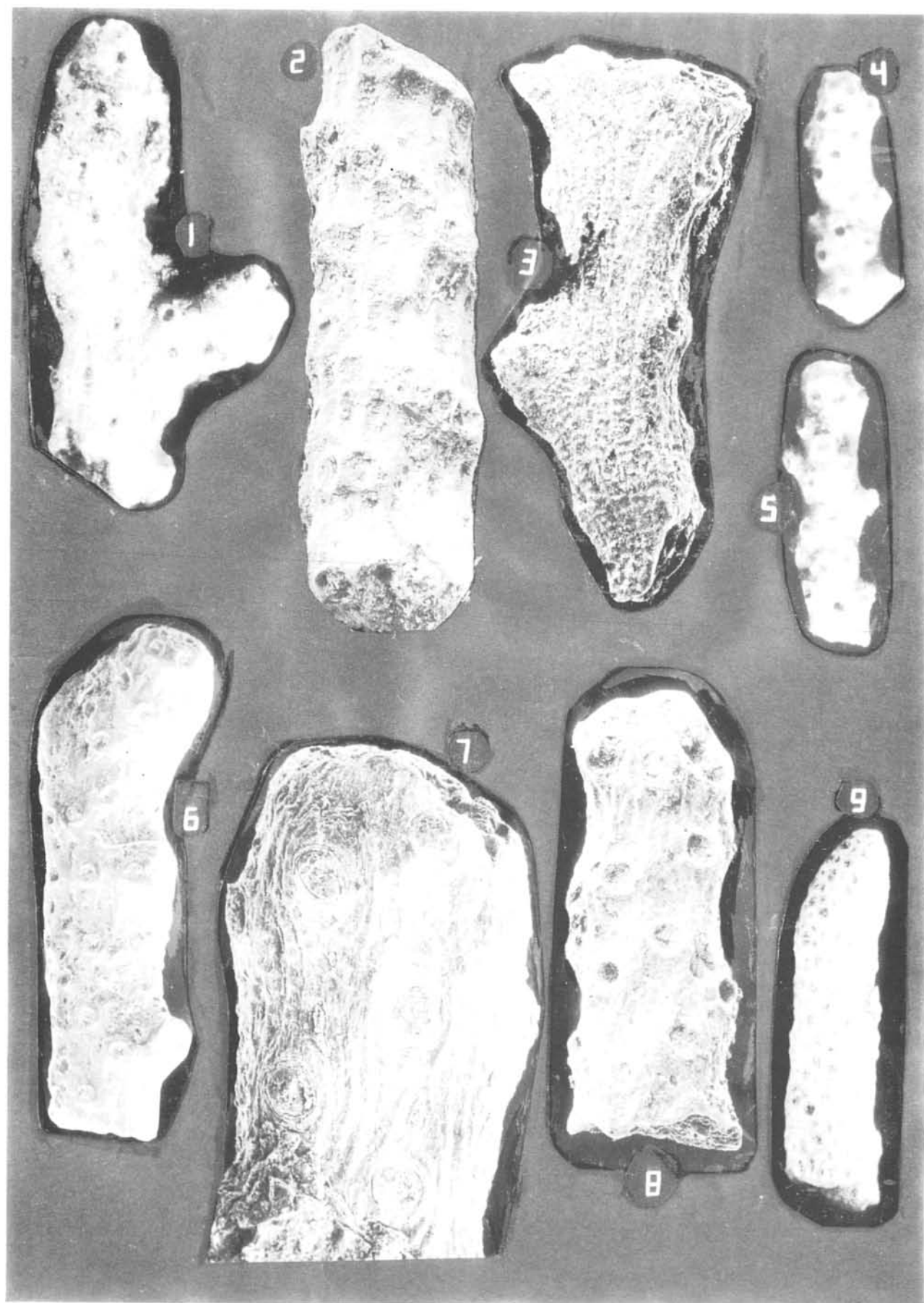
1969 *Reteporidea coronopus* (C & B), Mongereau, p. 240, pl. 17, Figs. 4, 6

Plate III

Fig. 1. - *Nematifera susannae* n.sp. - holotype general view, S.E.M. BS-600, 30 x; Fig. 2. - *Nematifera susannae* n.sp. general view - visible are porous frontal walls, S.E.M. BS-600, 30 x; Fig. 3. - *Nematifera susannae* n.sp. detail of oeciopore - distally there are visible slightly swollen zoaria; S.E.M. BS-600, 270 x; Fig. 4. - *Nematifera susannae* n.sp. detail of orifice with visible flattening on its proximal margin; S.E.M. BS-600, 270 x; Fig. 5. - *Nematifera susannae* n.sp. general view with visible lateral walls of zoecia and porosity of the frontal wall. The gonozoecium has a characteristic length 25 x, colloring; Fig. 6. - *Nematifera susannae* n.sp. general view; S.E.M. 50 x; Fig. 7. - *Nematifera susannae* n.sp. general view of dichotomous zoarium 20 x; Fig. 8. - *Nematifera reticuloides* Canu & Bassler general view 30 x.

Figs. 5, 7 photo by author, Fig. 6 photo by J. Kulich, Fig. 8 photo by L. Osvald and the other Figs. photo by I. Holický.





Comparison: These specimens are not dichotomous, the frontal side of the zoaria is flat and the mesopores are large, the zooecia are relatively long and peristomes are longer and larger than those of Mongereau's specimens.

Observation: According to Braga's & Barbin's (1988) and Mongereau's (1969), *Reteporidea coronopus* has many variations, so these different features are not specific to the species.

Occurrence: Partizánska Ľupča and Hybica localities.

Suborder: *Ceriporina* Hagenow, 1851

Family: *Heteroporidae* Waters, 1880

Genus: *Heteropora* Blainville, 1830

Heteropora subreticulata Reuss, 1869

(Pl. IV. Fig. 9)

1988 *Heteropora subreticulata* R., Braga & Barbin, p. 513, Pl. 4, Fig. 2

Observation: These specimens are identical to Braga's determinations.

Occurrence: Partizánska Ľupča, Hybica, Východná and Rajecké Teplce localities.

Suborder: *Rectangulata* Waters, 1887

Family: *Lichenoporidae* Smitt, 1866

Genus: *Lichenopora* Defrance, 1823

Lichenopora beyrichii (Reuss, 1851)

(Pl. V. Fig. 9)

1963 *Lichenopora beyrichii* (R.), Malecki, p. 88, Pl. 7, Figs. 8, 9

Comparison: These specimens have shorter lines on the dorsal side and have zooecia with larger apertures, than the Malecki's specimens.

Occurrence: Partizánska Ľupča, Hybica, Východná and Rajecké Teplce localities.

Lichenopora coronula (Reuss, 1848)

(Pl. V. Fig. 8)

1963 *Lichenopora coronula* (R.), Malecki, p. 91, Pl. 8, Fig. 4

Comparison: These specimens have long peduncles and are slightly ribbed on the dorsal side of the zoarium.

Occurrence: Partizánska Ľupča locality.

Lichenopora grignonensis Milne Edwards, 1838

(Pl. V. Fig. 7)

1980 *Lichenopora grignonensis* M. E., Braga, p. 44, Figs. 25 - 26

Comparison: These specimens have very long peduncles, ribbed by slightly axial ribs on the dorsal side while Braga's specimens have shorter peduncles.

Occurrence: Partizánska Ľupča, Hybica, Rajecké Teplce localities.

Family: *inc. sedis*

Genus: *Defranciopora* Hamm, 1881

Defranciopora cf. *cochloidea* (v. Hagenow, 1851)

(Pl. V. Figs. 10, 11)

1987 *Defranciopora cochloidea* v. Hag., Voigt, p. 25, Pl. 8, Figs. 13, 14

Comparison: This specimen has only three subcolonies which are narrower, and its apertures are larger, than on Vávra's ones.

Occurrence: Hybica locality.

Plate IV

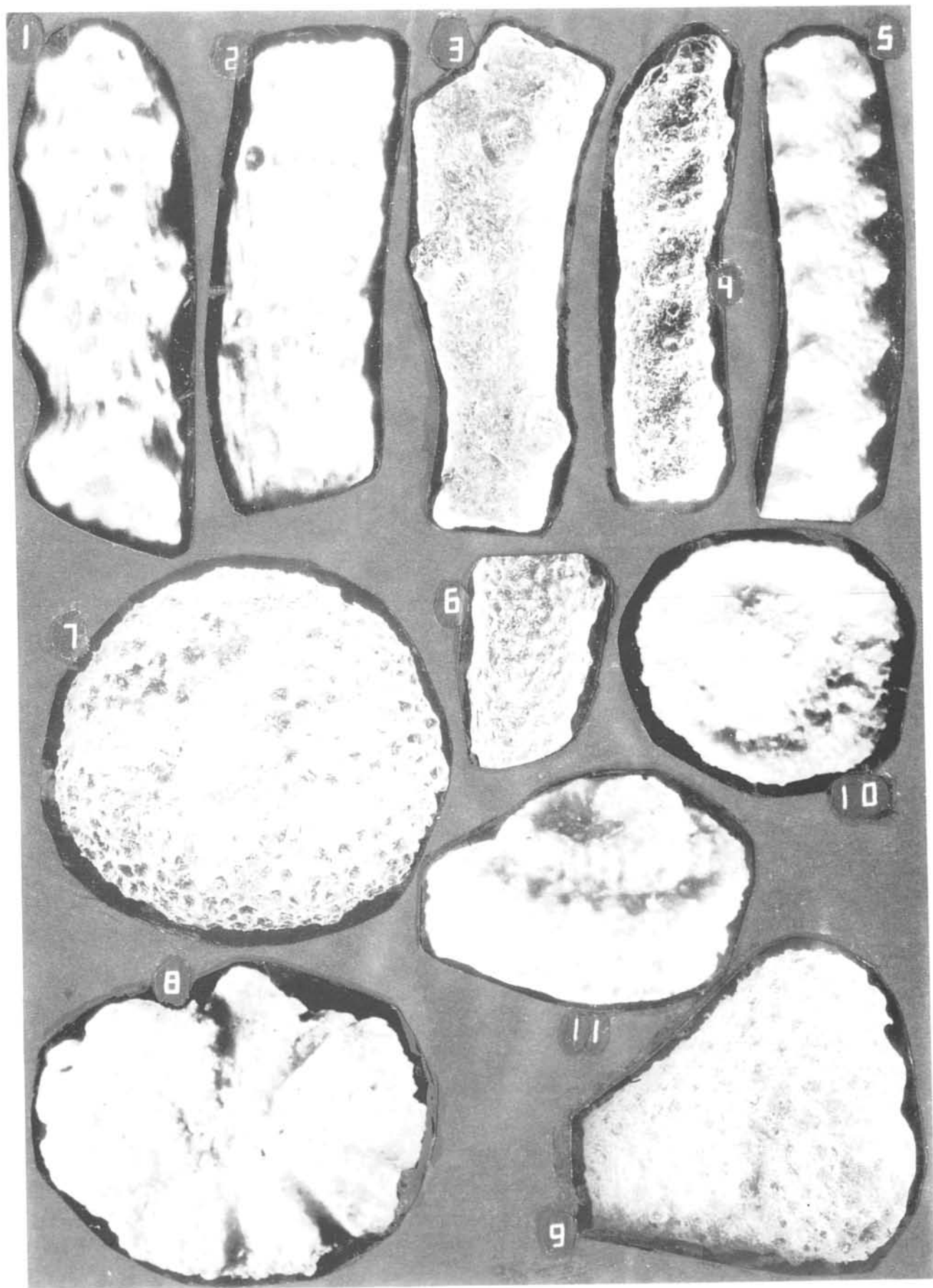
Fig. 1. - *Homera asperula* Reuss general view of frontal side of dichotomous zoarium 30 x; Fig. 2 - *Homera concatenata* Reuss general view with visible protrude lateral wall; S.E.M. 70 x; Fig. 3. - *Homera* cf. *frondiculata* Auct. (forma *frondiculata*) Mongereau, 1972 general view of dorsal side with visible transversal ribbed nervi; S.E.M. BS-600, 35 x; Fig. 4. - *Filisparsa cuvillieri* Debourle view to frontal side of zoarium 30 x; Fig. 5. - *Filisparsa cuvillieri* Debourle view to frontal side of zoarium 30 x; Fig. 6. - *Homera* cf. *frondiculata* Auct. (forma *striata*) Mongereau, 1972 general view of zoarium without nervi S.E.M. BS-600, 30 x; Fig. 7. - *Homera* cf. *frondiculata* Auct. (forma *frondiculata*) Mongereau, 1972 detail of frontal side of zoarium with visible nervus S.E.M. BS-600, 90 x; Fig. 8. - *Homera* cf. *frondiculata* Auct. (forma *striata*) Mongereau, 1972 detail of zoarium with nervi, there are visible strong peristome; S.E.M. BS-600, 50 x; Fig. 9. - *Heteropora subreticulata* Reuss general view of end of zoarium 30 x, colloring.

Figs. 1 and 8 photo by author; Fig. 2 photo by J. Kulich; Figs. 4, 5 and 9 photo by L. Osvald. The other Figs. photo by I. Holický.

Plate V

Fig. 1. - *Homera subannulata* Philippi lateral view of zoarium 45 x, colloring; Fig. 2 - *Homera subannulata* Philippi general view of frontal side of zoarium 45 x, colloring; Fig. 3. - *Mecynoeicia proboscidea* (Milne & Edwards) general view S.E.M., BS-600, 40 x; Fig. 4. - *Reteporidea coronopus* (Canu & Bassler) lateral view of zoarium with visible peristome, S.E.M. BS-600, 30 x; Fig. 5 - *Reteporidea coronopus* (Canu & Bassler) view of frontal side of zoarium with visible peristome 30 x; Fig. 6. - *Reteporidea coronopus* (Canu & Bassler) detail of dorsal side with visible mesopores, S.E.M. BS-600, 30 x; Fig. 7. - *Lichenopora grignonensis* Milne Edwards general view of frontal side of zoarium, S.E.M., 42 x; Fig. 8. - *Lichenopora coronula* (Reuss) general view of frontal side of zoarium 25 x; Fig. 9. - *Lichenopora beyrichii* (Reuss) lateral view of zoarium with visible short lines, S.E.M., 50 x; Fig. 10. - *Defranciopora* cf. *cochloidea* (v. Hagenow) general view of frontal side of zoarium with visible younger subcolonies 22 x; Fig. 11. - *Defranciopora* cf. *cochloidea* (v. Hagenow) lateral view of zoarium with visible younger subcolonies 30 x.

Figs. 3, 4, 6 photo by I. Holický; Figs. 5, 11 photo by L. Osvald; Figs. 7, 9 photo by J. Kulich and the other Figs. photo by author.



Conclusion

Of the 26 bryozoan species belonging to *Cyclostomata* that have been found, two are new: *Exidmonea crisiiforma*, *Nematifera susannae*.

Among cyclostomatous bryozoans, representatives of the family of *Tubuliporidae* and *Entalophoridae* are predominant. The representatives of other families are present only in small quantities.

Bryozoans are found either in biostromes (locality Hybica), or together with large foraminifers, in general they formed a substantial part of the fauna in these biocenoses.

Among previously known associations, the association of bryozoan fauna studied, is most similar to the Priabonian fauna studied by Reuss 1848 and 1869 (according to Braga's remarks).

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