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Upper Eocene Bryozoa from Waschberg Zone (Austria)

by

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Contents

Abstract

Upper Eocene (Priabonian) Bryozoa from the Waschberg Zone (Austria) are described. Localities at Reingruberhöhe and Haselbach yielded 153 species by a new method of dissolving bryozoan marl in concentrated acetic acid. Among them, twelve are new: *Tayloripora ovicellata* sp.n., *Idmidronea uniporica* sp.n., *Trochiliopora planiformis* sp.n., *Aviculiera austriensis* sp.n., *Otiochmella discoida* sp.n., *Steginoporella reingruberhohensis* sp. n., *Babickella janensis* sp.n., *Gordoniella longituda* sp. n., *Costatimorpha algella* sp.n., *Adeonellopsis triporica* sp.n., *Chlidoniopsis vavrai* sp.n. and *Batopora haselbachensis* sp.n. All species are described and documented by SEM photos.
The fauna originally probably lived in a shallow environment and has been redeposited in more deepwater sequences. The bryozoan assemblage is very similar to those from Hungary (Transdanubian Central Ridge) and Austria (Molasse Zone), but also similar to those from Romania, Slovakia and Italy.
Keywords: Eocene, Priabonian, Bryozoa, systematic, Molasse Zone.

1. Introduction

The present investigation of the Upper Eocene Bryozoa of the Waschberg Zone is a part of my overall study of the Alpine Carpathians Upper Eocene Bryozoa (ZÁGORŠEK, 1992, 1994, 1997).
Bryozoa are among those groups of microfossils from the Austrian Eocene, which have not yet been studied to a sufficient degree. Only a few short remarks in the literature and tentative determinations with the frequent use of question marks represents all the knowledge of Eocene Bryozoa from Austria.
The first who mentioned Bryozoa from the Waschberg zone was RZEHAK (1891). He mentioned Bryozoa from the Reingruberhöhe, but did not determine any of them. The first who determine some of the Upper Eocene Bryozoa form Waschberg zone was VÁVRA (in SEIFERT, 1980). He listed and illustrated all together 25 taxa in SEIFERT's thesis, still unpublished. Unfortunately, this study has never been published.
One main reason for this rather insufficient state of knowledge of bryozoan faunas (and other microfossils as well) from the Austrian Eocene is the fact that they occur mostly in hard rocks like calcareous sandstone, lithified marls, or claystone. Thus, the most difficult problem for any taxonomical study is caused by the preservation of bryozoan colonies in these sediments. We (ZÁGORŠEK & VÁVRA, 2000) developed a chemical method for dissolving these rocks and for collecting significant material for taxonomical study.

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2. Locality descriptions

2.1. Geological overview of the Waschbergzone

The Waschberg zone is the area northeast from Vienna bordered on the west by Molasse zone and on the east by the Vienna basin. The precise description of the localities situated within the Waschberg zone is given in HOFMAN et al. (1991).

This separated unit is strongly folded, imbricated and thrust-faulted. It is probably a tectonic slide with Upper Jurassic to Miocene sequences in very complicated tectonic position (THENIUS, 1974). Formerly it was regarded as a part of the Molasse Zone with complicated tectonic position (GRILL, 1953), however later a separated tectonic unit was established (THENIUS, 1974).

The Eocene sequences are represented by Waschberg Limestone, Haidhof Beds (Lower to middle Eocene) and by Reingruber Beds (Upper Eocene) (GRILL, 1953).

The schematic profile of Reingruber Beds is given by TOLLMANN (1985). The lower part of the profile is formed by glauconitic sand with abundant fragments of molluscs, larger foraminifers and large diversified planktonic foraminifers of the Globigerina type. Then follows Discocyclina limestone with the so-called Bryozoa beds. The thickest part of the profile is formed by the main sandstone "Hauptsandstein" (zone NP 19 according to SEIFERT, 1980), which is calcareous fine-grained sandstone with a large organic content. The profile is terminated locally by thin algal layers.

Upper Eocene is represented in the Waschberg zone represented also by marl with a high content of foraminiferal tests, however no bryozoans have been found in this sedimentary facies. SEIFERT (1980) gives, in his PhD thesis, the best and the most detailed description of the Waschberg zone and surrounding areas. His age determinations and microfacial analysis will be used here.

During the years 1997-1999 I collected (with Prof. VÁVRA) samples in the Waschberg zone area, about 20 to 30 km north to north-west from the Vienna at two different localities: Reingruberhöhe and Haselbach. Both localities are regarded as Upper Eocene, according to SEIFERT (1980). I have include in this study also the old material donated by SEIFERT to the Institute of Paleontology, Vienna University.

2. 2. Description of the localities

2.2.1. Locality Haselbach

The village Haselbach is situated about 8 km northeast from the city of Stockerau (Lower Austria). The locality is represented by a very small road-cut of a narrow road

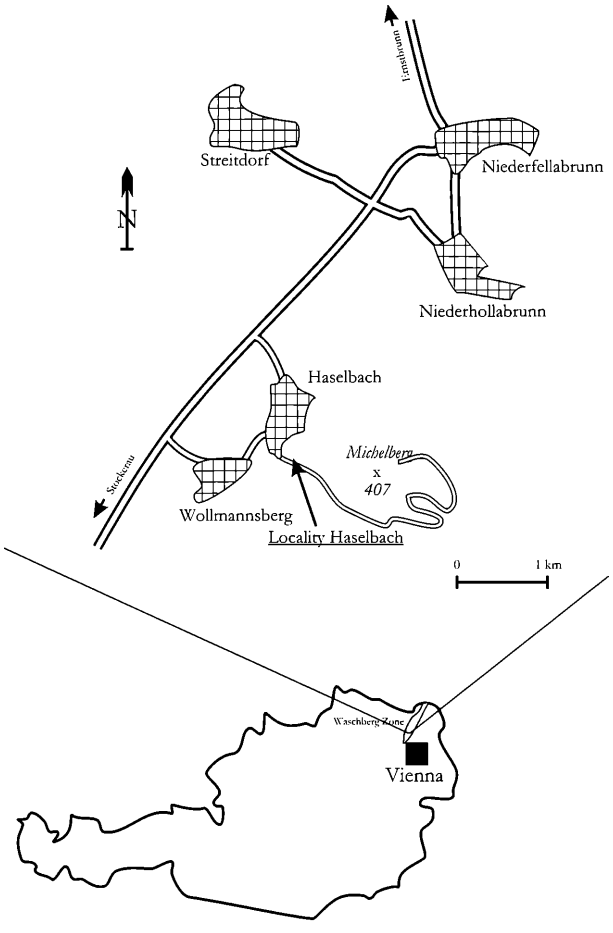

Figure 1: Geographical sketch of the locality Haselbach.

(path) from the foot of the hill Michelberg to its top. This place is situated at the left side of the path (north side), near the beginning of it, about 500 m south from the church of the village (fig. 1).

The locality has been known since 1962, when GRILL described the sediment for the first time and proposed the age as Upper Eocene. SEIFERT (1980) confirmed the age by finding nanoplankton characteristic for the zones NP 19 to NP 20.

The sediment is naturally disintegrated bioclastic marl with a high content of quartz (quartz-calcarenit according to SEIFERT, 1980) with fragments of Discocyclina, corallinacean algae, Echinoderms and Bryozoa. The layers belong to the Reingruber Formation. Bryozoans can form up to 30% of the whole fossil content in the sediment (SEIFERT, 1980).

SEIFERT (1980), described the profile of this short sequence. It can be divided into three parts (fig. 2). The lower part represents organodetritic calcareous marl, sandstone to limestone, with a high content of Bryozoa. Then follows the sandstone belonging to the so-called "Hauptsandstein", which is poor in organic remains. Soft lithified marls, marl sandstones or claystone with many fossils, form the upper part (fig. 2).

Bryozoans have been studied from several samples collected in the years 1999 - 2000 and from the old collection donated to the Institute für Paläontologie by SEIFERT (his

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TAXA	Reingruberhöhe				Haselbach
	Seifert's samples	samples RH 1x	samples RH 2x	samples RH 3x	
Adeonella minor (REUSS)	#	#	#		#
Adeonella ornatissima (STOLICZKA)		#		#	
Adeonellopsis coscinophora (Reuss)	#	#	#	#	
Adeonellopsis giampietroi ZÁGORŠEK	#	#	#	#	#
Adeonellopsis porina (ROEMER)	#		#	#	#
Adeonellopsis sp.					#
Adeonellopsis triporica sp.n.	#	#	#		
Aimulosia manzonii (NEVIANI)	#	#	#		
Alderina subtilimargo (REUSS)	#	#	#	#	
Amphiblestrum appendiculata (REUSS)	#	#	#	#	
Arthropoma rugulosa (REUSS)	#	#			
Arthropoma sparsipora (REUSS)	#	#	#		
Aviculiera hungarii ZÁGORŠEK				#	
Aviculiera austriensis sp.n.	#	#	#		#
Aviculiera sp.		#			
Babickella janensis gen. nov. sp. n.	#		#		
Bactridium hagenowi REUSS		#			
Batopora haselbachensis sp.n.					#
Batopora multiradiata Reuss			#	#	#
Biflustra savartii texturata (REUSS)				#	#
Bobiesipora fasciculata (REUSS)	#	#		#	
Caberoides continua (WATERS)			#		
Calpensia gracilis (MUNSTER)	#	#		#	
Calpensia polysticha (REUSS)				#	
Castanopora megacephala (REUSS)				#	
Cellaria reussi d'ORBIGNY					#
Celleporaria conglomerata (GOLDFUSS)		#		#	
Celleporaria globularis (BRONN)				#	#
Chlidoniopsis vavrai sp. n.		#		#	
Chlidoniopsis vindobonensis (REUSS)	#	#	#		
Costatimorpha algella gen. nov. sp. n.		#	#		
Crassimarginatella macrostoma (REUSS)	#	#	#	#	#
Crisia eburnea (LINNAEUS)	#	#	#		
Crisia elongata MILNE EDWARDS	#				
Crisia hoernesii Reuss		#	#	#	#
Crisidmonea tripora (CANU & BASSLER)				#	
Cyclicopora laticella CANU & BASSLER				#	
Cystisella midwayanica CANU & BASSLER	#				
Diaperoecia sparsa (REUSS)		#			
Diastopora flabellum REUSS	#			#	#
Diplosolen brendolensis (WATERS)	#			#	
Disporella coronula (REUSS)		#	#	#	#
Disporella goldfussi (REUSS)				#	
Disporella grignonensis MILNE EDWARDS		#	#	#	
Disporella radiata (SAVIGNY-AUDOUIN)		#		#	
Disporella verrucosa PHILIPPI				#	
Ditaxiporina septentrionalis (WATERS)		#	#		
Escharella cheilopora (REUSS)				#	
Escharella grotriani (STOLICZKA)	#	#	#	#	
Escharella tenera (REUSS)	#	#	#	#	
Escharoides coccinea (ABILDGAARD)		#		#	
Escharoides crenilabris (REUSS)	#			#	
Escharoides mamillata (WOOD)		#			
Exidmonea atlantica D, M & P	#	#	#	#	
Exidmonea giebeli (STOLICZKA)	#	#	#	#	#
Exidmonea hoernesi (STOLICZKA)	#	#	#	#	#
Exochoecia compressa (REUSS)			#		
Filisparsa tenella STOLICZKA		#	#	#	#
Foveolaria vibracula ZÁGORŠEK	#				
Galeopsis cf. *subquadrangularis* (REUSS)			#	#	
Gephyrotes convexa CANU & BASSLER	#				
Gigantopora duplicata (REUSS)	#		#	#	#
Gigantopora lyratostoma (REUSS)		#			

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Taxa	RH SS	RH 1x	RH 2x	RH 3x	Haselbach
Gordoniella diporica Zágoršek			#		
Gordoniella longituda sp.n.		#			
Hemicyclicopora parajuncta Canu & Bassler	#				
Herentia hydmanii (Johnston)	#		#		
Heteropora subreticulata Reuss			#	#	#
Hippomenella bragai Zágoršek	#		#		
Hippomenella megalota Reuss	#	#	#	#	
Hippomonavella bisulca	#				
Hippomonavella exarata (Reuss)	#	#	#	#	
Hippomonavella stenosticha (Reuss)		#	#		
Hornera concatenata Reuss	#	#	#	#	#
Hornera frondiculata Mongereau	#	#	#		
Hornera simplicissima Braga & Barbin	#		#		#
Hornera verrucosa Reuss	#	#	#	#	#
Houzeauina parallela (Reuss)		#	#		
Idmidronea uniporica sp.n.				#	
Iodictyum rubetschii (Reuss)			#		
Kionidella excelsa Koschinsky				#	#
Lacrimula perfecta (Accordi)		#			#
Lagenicella helmbergii Zágoršek				#	
Lagenipora ampullacea (Roemer)	#				#
Lagenipora tuba (Manzoni)	#				
Lagenipora urceolaris Goldfuss	#				
Lichenopora turbinata Defrance				#	
Lunulites quadrata (Reuss)	#			#	
Margaretta ceroides (Ellis-Solander)			#	#	
Mecynoecia geinitzi Reuss	#	#	#	#	#
Mecynoecia proboscidea (Milne Edwards)	#	#	#	#	#
Mecynoecia pulchella (Reuss)	#	#	#	#	#
Meniscopora syringopora (Reuss)		#	#	#	
Metradolium obliquum Canu & Bassler	#				
Metrarabdotos maleckii Cheetham			#	#	
Micropora ? sp.		#			
Micropora hexagona (Zágoršek)				#	
Mollia patellaria (Moll)	#		#	#	
Nematifera susannae Zágoršek		#			
Ogivalina dimorpha (Canu)		#	#		
Oncousoecia biloba (Reuss)	#	#			#
Onychocella subpyriformis (d'Archiac)		#	#	#	#
Orbitulipora petiolus Lonsdale		#		#	
Otiochmella discoida gen. nov. sp. n.					#
Plagiosmittia denticulifera Canu & Bassler				#	
Polyascosoecia cancellata Canu	#	#	#	#	#
Porella clavula (Canu & Bassler		#		#	
Poricellaria complicata (Reuss)	#			#	
Porina coronata (Reuss)	#	#	#	#	#
Porina duplicata (Reuss)	#	#	#	#	
Prenantia phymatopora (Reuss)			#	#	
Puellina (*Cribrilaria*) *radiata* (Moll)		#		#	#
Pyripora huckei Buge		#			
Reteporella simplex (Busk)			#	#	
Reteporella subovata (Stoliczka)	#			#	#
Reteporella tuberculata (Reuss)	#			#	#
Reussia (*Smittina*) *regularis* (Reuss)	#	#	#	#	
Rosseliana rosselii (Audouin)		#	#		
Schizomavella larva (Reuss)	#	#	#		
Schizoporella cf. *geminipora* (Reuss)			#		
Schizoporella dunkeri (Reuss)				#	
Schizotheca (?) sp.				#	
Schizotheca (?) *ternata* (Reuss)				#	
Scrupocellaria brendolensis Waters	#	#	#		
Scrupocellaria gracilis Reuss		#	#		#
Smittina cervicornis (Pallas)	#	#	#		#
Smittoidea angulata Bronn				#	
Smittoidea excentrica (Reuss)		#	#	#	
Smittoidea perforata (Canu & Bassler)				#	

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TAXA	RH SS	RH 1x	RH 2x	RH 3x	Haselbach
Smittoidea sp.				#	
Sparsiporina elegans (REUSS)	#		#	#	#
Steginoporella cucullata (REUSS)	#	#	#	#	
Steginoporella elegans chattiensis P.& D.	#				
Steginoporella firma (REUSS)	#			#	#
Steginoporella haidingeri (REUSS)		#		#	#
Steginoporella reingruberhohensis sp.n.	#		#	#	
Stenosipora simplex (KOSCHINSKY)	#		#		#
Tayloripora ovicellata sp.n.				#	
Teichopora cf. *clavata* GREGORY				#	
Tervia serrata (REUSS)		#	#	#	
Trochiliopora beyrichii (REUSS)	#		#	#	#
Trochiliopora planiformis sp.n.				#	
Tubucella mammillaris (MILNE EDWARDS)		#	#		
Tubucella papillosa (REUSS)		#	#	#	#
Tychinella schreibersi (REUSS)		#	#		
Umbonula macrocheila (REUSS)	#	#	#	#	
Umbonulla monoceros (REUSS)		#			
Unifissurinella boulangeri POIGNANT		#	#		
Vavropora pupuliformis ZÁGORŠEK		#			
Vibracella trapezoidea (REUSS)	#	#			#
Vincularia subsymmetrica (CANU)		#			
Ybselosoecia typica (MANZONI)		#		#	
Zuzanella kovaci ZÁGORŠEK				#	
Total number of taxa 153	68	80	75	91	44

Table 1: Faunal list of the sites Reingruberhöhe und Haselbach.

sample number 5752). According to our study, the lower part of the profile is not preserved any more, so all our collections come from the upper, slightly lithified part of the profile. SEIFERT (1980) described also one more, small occurrence of Upper Eocene sediments near Haselbach (his sample number 5751) from which he mentioned bryozoans. However, we could not find this locality during our fieldwork. His collection of Bryozoa does not contain material from this locality. In addition to the Bryozoa, the studied samples were rich in small benthic foraminifera, which predominated. A few fragments of molluscs, algal remains and echinoids were also found. From the locality Haselbach, 44 bryozoan taxa have altogether been determined (tab. 1). Among them, 1 new species has been described.

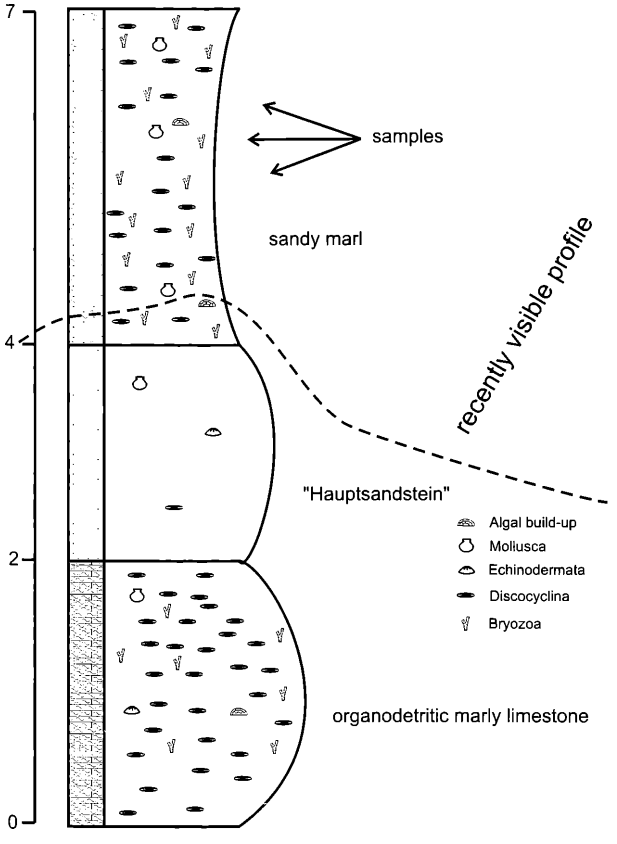

Figure 2: Geological profile of the locality Haselbach. (According to SEIFERT, 1980 – modified).

2.2.2. Locality Reingruberhöhe

The locality Reingruberhöhe is situated on a hill slope with the same name near the village Bruderndorf (Lower Austria), about 8 km northeast from Stockerau (fig. 3). The locality is an abandoned quarry (sample number 5808 in SEIFERT, 1980), which shows parts of a profile of calcareous sandstone with iron content producing the reddish colour of the sediments.

The locality is well known since the work of PRINZINGER (1852). The first detailed description was given by RZEHAK (1891) who was the first to mention Bryozoa from this locality. VÁVRA (in SEIFERT, 1980) determined altogether 25 bryozoan species from this locality.

The locality is type area for Reingruberserie (SEIFERT, 1980), renamed by STEININGER (1991) as Reingruber Formation.

According to SEIFERT (1980), the whole profile of the Reingruber Formation is almost 37 m thick (fig. 4). He recognised altogether 19 beds and three microfacial types.

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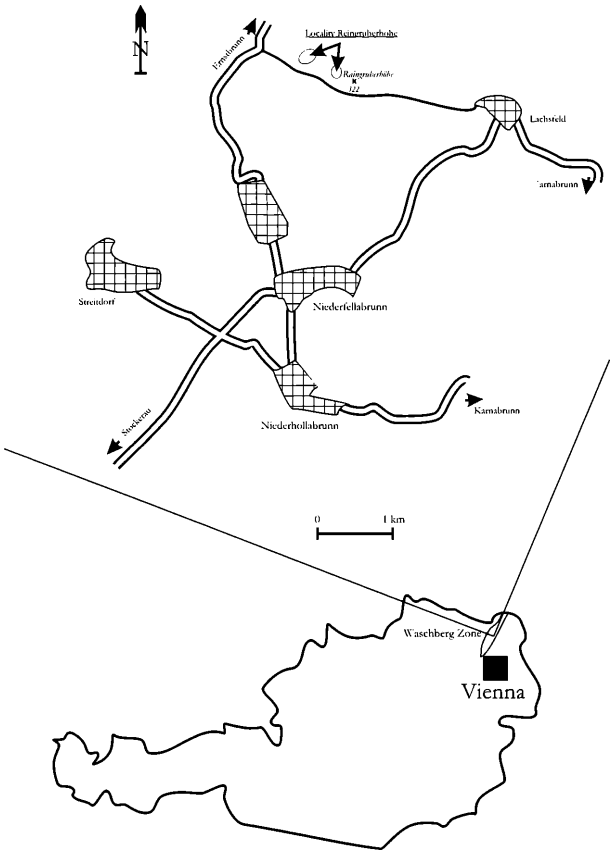

Figure 3: Geographical sketch of the locality Reingruberhöhe (1) and 2) different parts of the same quarry.

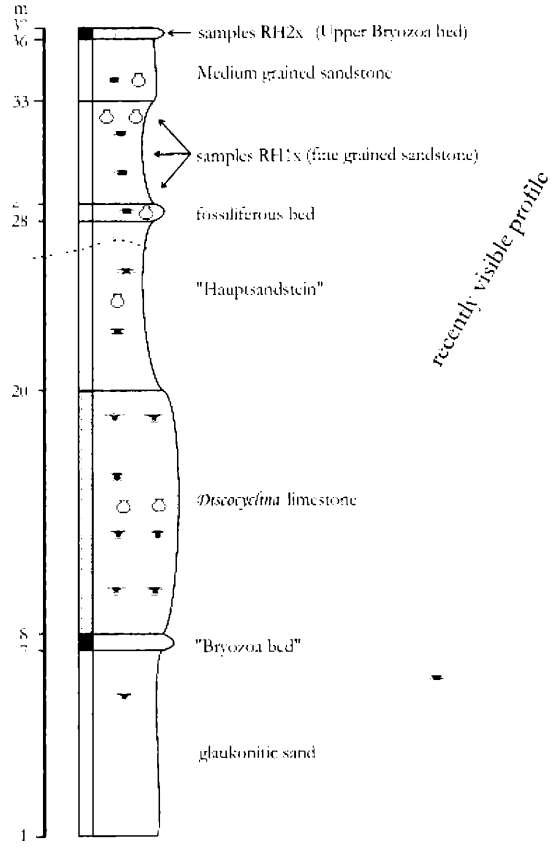

Figure 4: Geological profile of the locality Reingruberhöhe (According to SEIFERT, 1980 – modified).

The largest part of the profile (almost 28 meters) is represented by 3 thick layers (glauconitic sand, Discocyclina limestone with so-called bryozoan beds and the sandstone, so-called "Hauptsandstein"). Recently, the lower part of the profile, approximately the first 25 meters, has not been accessible. During the fieldwork made in the course of my study, only samples of the "Hauptsandstein" could be found. The Hauptsandstein is typically very poor in fossil remains. I was unable to find so-called bryozoan bed, but perhaps few loose rocks represent this microfacial type.

The whole profile nowadays is less than 10 m high and is formed only by the upper part of the old profile (fig. 4). All the samples studied were taken from this part of the section only. The four lithologically different layers could be distinguished in the visible upper part of the section: sandy limestone (fossiliferous bed), fine-grained calcareous sandstone, medium-grained calcareous sandstone and sandy limestone with algal build-ups.

Above the Hauptsandstein, there is a thin bed of sandy limestone with many macrofossils, the so-called fossiliferous bed. Fragments of molluscs and echinoids dominate in this bed. Bryozoa are very rare and almost missing here.

The profile continues with two beds of calcareous and glauconitic sandstone reddish in colour. These layers could be perhaps regarded as the continued facies of the Hauptsandstein. They are quite poor in fossils, dominated by large foraminifera and algal remains, but contain also bryozoan colonies. Other organic remains (fragments of molluscs, planktonic foraminifera tests, echinoids and small fish teeth) are also associated with them.

The uppermost part of the section consists of rounded pebbles of algal build-ups accompanied by medium to coarse-grained calcareous sandstone. The build-ups are large, about 4 to 7 cm in diameter, oval to shape. The algal balls consist of concentrically arranged algal layers of a thickness of about 2 - 3 mm. Each algal layer has dark red to black colour at the bottom surface, probably caused by oxides of manganese. This could be probably the layer, which has previously been reported also as the "Bryozoan layer", but SEIFERT (1980) refer no algal colonies in this layer. Therefore perhaps the position of the true "Bryozoan layer" was not found during recent research.

The presence of many encrusting organisms (algal and Bryozoa) and the reddish colour of the sediment could be explained by a slight terrigenous input. The encrusting organisms had therefore enough time to grow, and at the sea bottom there was a development of a so-called hardground. These special environmental conditions could be caused by the highest sea level (so-called highstand), during a small sea-level oscillation.

All samples taken have been divided into three groups: RH 1x, RH 2x and RH 3x.

The samples RH 1x (altogether 9 samples RH 11–RH 19) have been taken from the fine-grained calcareous sandstone at the bottom of the visible profile (fig. 4). The samples were composed of slightly lithified sandstone with

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a high content of quartz grains and reddish colour.
The samples RH 2x (altogether 4 samples RH 20–RH 23) are from the uppermost part of the profile. This is also a calcareous sandstone, but it consists here of larger grains of quartz than in the lower part. For this sedimentary sequence, the presence of rounded algal build-ups is typical. Bryozoans often encrust the upper surface of these algal build-ups.
Besides these samples, with clearly defined positions in the sedimentary sequence, there were found also some loose rocks in the vicinity of the quarry with many bryozoans visible on the rock surface. These pieces of the rock represent the samples RH 3x (altogether 7 samples RH 31–RH 37), which have uncertain position in the sedimentary sequence. Mostly they were represented by hard-lithified sandy limestone, whitish to slightly reddish colour. This is probably from the layer, which has previously been reported as the "Bryozoan layer"
SEIFERT (1980) described bryozoans also from two other different places around Reingruberhöhe (sample numbers 5883 and 5749). In these places, the same bryozoans occur as in the main quarry but they are very rare, and therefore I consider all of them as one locality. Altogether 149 bryozoan taxa have been determined from Reingruberhöhe, among which are 7 new species and probably two new genera. The Bryozoa found at Reingruberhöhe are listed in tab. 1. No Bryozoa have been reported by SEIFERT (1980) from any of the other localities from the Waschberg Zone (Upper Eocene), and I did not find any other Bryozoa during my fieldwork in the years 1999 to 2000 either.

3. Methods

3.1. Methods used

To disintegrate the lithified rocks and to yield good bryozoan colonies for taxonomical study the following method has been used:
The rock samples were cut to pieces of about 5 cm in diameter and dried at about 80 to 100 °C for about 24 to 48 hours.
Then the hot samples were covered with concentrated acetic acid (about 98% or more). The vessel with the sample must be covered to avoid the admission of moisture from the air. The sample was sometimes heated in a water bath up to 80°C. The samples disintegrated usually within 2 to 8 weeks. Sometimes however it can take even 6 months. Often a precipitation is formed and the rest of acetic acid evaporated.
The precipitated sample was washed and sieved quickly to remove the acetic acid and to prevent corrosion of fossils. To clean the washed samples before detailed taxonomic study, they were macerated in Quaternary "O"™ for about 2-3 days. The samples with Quaternary "O"™ could be heated for a better effect of cleaning in water bath to 80-100 °C.
All the specimens were cleaned in an ultrasonic cleaner before taking any photos. For more details about the methods see ZÁGORŠEK & VÁVRA (2000).

3.2. Samples from Haselbach

After the usual washing and sieving, many of the apertures on bryozoan colonies were not clean, and important morphological features could not be observed. Therefore, the samples were cleaned in Quaternary "O"™ with good success. The preservation of fossils is good, after cleaning in Quaternary "O"™ all-important features can be observed and documented.
Predominant fossils in washed sample are tests of benthic foraminifera and tube fragments of „Vermes" Bryozoans are a common part within the sample studied, together with fragments of molluscs and echinoids. Altogether 28 different bryozoan species have been determined from samples treated in acetic acid, the rest species were determined from samples washed and sieved by usual methods.

3.3. Samples from Reingruberhöhe

The samples from the lower part of the profile (samples RH1x) are represented by slightly lithified calcareous sandstone, which was not washable. The samples were therefore dissolved in acetic acid, which was during this period heated each weak at least once at 80 °C. The precipitation was formed usually during 4 to 12 weeks. One sample (RH 15) was destroyed during the acetic acid treatment.
Besides bryozoan colonies, which are the dominant fossils, the samples contain fragments of echinoids, tests of planktonic foraminifera and rare fragments of fish and shark teeth.
The upper part of the profile is represented by small algal builds-ups slightly lithified. The dissolving in acetic acid takes therefore less time; the "faster" samples were disintegrated after 3 to 8 weeks. Some of the samples however were in concentrated acetic acid more than 4 month. The samples RH 20 and RH 21 have been stored together.
The washed samples contain most abundantly the fragments of algae. The Bryozoa formed an important part of the organic remains, and were preserved in very good condition. The other fauna was rare, mostly consisting of fragments of large foraminifera, molluscs and echinoids.
The samples from loose rocks (samples RH 3x) were hard-lithified limestone. The disintegration in concentrated acetic acid takes usually more than 15 to 18 weeks. On the other hand, the preservation of the Bryozoa was the best within the studied material and the diversity of the bryozoan fauna was the highest.
There are almost only bryozoan colonies in the washed samples. The other fossils are very rare and are limited to few remains of foraminifera and brachiopods of *Argy-*

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rotheca. For more details about the methods and quality of the results, see ZÁGORŠEK & VÁVRA (2000).

4. Systematic Paleontology

The systematics of Cyclostomatida has been modified on the basis of BASSLER (1953) and VÁVRA (1977). The systematics of Cheilostomatida is modified according to GORDON (1984, 1989) and by my own studies.
All measurements have been made by SemAfore® 3.0 pro Jeol software, all photos were taken through SEM Jeol, type JSM-6400 and prints have been made by Mr. Gold.

Phylum Bryozoa EHRENBERG, 1831
Class Stenolaemata BORG, 1926

4.1. Order Cyclostomatida BUSK, 1852

Suborder Articulata BUSK, 1859
Family Crisiidae JOHNSTON, 1838

Genus *Crisia* LAMOUROUX, 1812

The colony growth form is erect flexible and articulated. The articles (internodes) are biserial; the number of zooecia in each article varies from 4 up to 10. The zooecial apertures are situated on one side only. The dorsal side of the colony is slightly porous or rarely nonporous. Gonozooecia are present, large and its grown direction is parallel to the colonial axis.

***Crisia elongata* MILNE EDWARDS, 1838**
pl. 1, fig. 1

1838 *Crisia elongata* sp.n., MILNE EDWARDS p. 203, Pl. 7, Fig. 2
v. 1848 *Crisia Edwardsii* sp.n., REUSS p. 53, Pl. 7, Fig. 20
1920 *Crisia Edwardsii* REUSS, CANU & BASSLER p. 705, Pl. 141, Fig. 5-7 (cum. syn.)
1958 *Crisia elongata* MILNE EDWARDS, BOBIES p. 158, Pl. 13, Fig. 4, Pl. 15, Fig. 22, 23 (cum. syn.)
v. 1963 *Crisia edwardsii* REUSS, MAŁECKI p. 54
1980 *Crisia elongata* MILNE EDWARDS, BRAGA p. 35, Fig. 17
v. 1992 *Crisia elongata* MILNE EDWARDS, ZÁGORŠEK p. 235
v. 2001a *Crisia elongata* MILNE EDWARDS, ZÁGORŠEK p. 23, Pl. 1, Fig. 4, 5

Diagnosis: The width of the colony article (internode) is about 0.3 mm, which is the width of about 4 zooecial tubes and it is approximately equal or little smaller than the distance between apertures (0.25 to 0,35 mm). The apertures are circular with a very salient peristome. The peristome is slightly developed, sometimes little curved laterally. The zooecial frontal wall is smooth, slightly ribbed, but little convex. The dorsal wall is smooth, porous and convex. Gonozooecia have not been observed.
Remarks: The frontal side of the described specimens has the same granulation as described by BRAGA (1980) but those specimens found by MILNE EDWARDS (1838), are more granular. The presence or absence of granules can be explained by different preservation. The micrometric dimensions as well as the ratio between apertural distance and the colonial width is the same as described by BRAGA (1980) and CANU & BASSLER (1920), so I believe that all these specimens are conspecific.
BOBIES (1958) concluded that *Crisia Edwardsii* REUSS, 1848 is a junior synonym of *Crisia elongata* MILNE EDWARDS, 1838. The specimens described by REUSS and stored in the Museum of Natural History in Vienna have less granular dorsal walls. All other features are the same as described by MILNE EDWARDS (1838).
Occurrence: Reingruberhöhe (only SEIFERT's samples).
Distribution in time and space:
Lutetian - Paris (CANU & BASSLER, 1920)
Priabonian Vicentin (REUSS, 1869a), South Carolina (CANU & BASSLER, 1920), Poland (MAŁECKI, 1963), France (BOBIES, 1958), Italy (BRAGA, 1980), Slovakia (ZÁGORŠEK, 1992), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Rupelian - Germany (REUSS, 1866), France - Gaas (REUSS, 1869b), Italy (BOBIES, 1958)
Burdigalian Gard (CANU & BASSLER, 1920), France (MAŁECKI, 1963)
Serravallian - Italy (CANU & BASSLER, 1920), Gard (CANU & BASSLER, 1920)
Tortonian - Austria & Hungary (REUSS, 1848), Italy (CANU & BASSLER, 1920), Poland (BOBIES, 1958), France (BOBIES, 1958), Czech (VÁVRA, 1977)
Zanclean - Italy (CANU & BASSLER, 1920)
Piacenzian - Italy (CANU & BASSLER, 1920)
Recent - Mediterranean (MAŁECKI, 1963), Mexico Gulf (BRAGA & BARBIN, 1988), Red see (VÁVRA, 1977)

***Crisia hoernesii* REUSS, 1848**
pl. 1, fig. 2

v.* 1848 *Crisia Hörnesii* sp.n., REUSS p. 54, Pl. 7, Fig. 21, Pl. 11. Fig. 28
1920 *Crisia hörnesi* REUSS, CANU & BASSLER p. 704, Pl. 141, Fig. 1-4 (cum. syn.)
1958 *Crisia hoernesii* REUSS, BOBIES p. 155, Pl. 14, Fig. 9-13
1975 *Crisia hoernesi* REUSS, BRAGA p. 143, Pl. 1, Fig. 1
v. 1988 *Crisia hoernesi* REUSS, BRAGA & BARBIN p. 505
v. 1992 *Crisia hoernesi* REUSS, ZÁGORŠEK p. 235, Pl. 1, Fig. 1
v. 2001a *Crisia hoernesii* REUSS, ZÁGORŠEK p. 23, Pl. 1, Fig. 3

Diagnosis: The colony width is approximately equal to the width of 5 to 7 zooecial tubes. The width of the colony (0.25 to 0,35 mm) is always larger than the distance between the apertures (0.20 to 0,30 mm). The aperture is

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circular with a slight peristome. The zooecial frontal wall is slightly porous and smooth. No furrows between the zooecial tubes are developed. The dorsal side of the colony is nonporous. The gonozooecium is not known.

Remarks: The material (syntypes) described by REUSS (1848) and stored in the Museum of Natural History in Vienna are almost identical with the described specimens. The syntypes have strongly porous frontal walls and the apertural diameter is a little larger than in the studied specimens from Waschberg zone. No gonozooecia have been observed in the syntype specimens, neither in specimens from the Reingruberhöhe.

The species is one of the most common small cyclostomatous Bryozoa in Eocene sediments in Alpine Carpathians region. The most similar species *Crisia elongata* MILNE EDWARDS, 1838 differs in having a larger distance between zooecial apertures then the width of the colony.

Occurrence: Haselbach and Reingruberhöhe in the entire section (samples RH 2, RH 3, RH 10+11, RH 31 and RH 33).

Distribution in time and space:

Lutetian - Paris (CANU & BASSLER, 1920)

Priabonian - Mississippi & Alabama (CANU & BASSLER, 1920), France (BOBIES, 1958), Romania (GHIURCA, 1987), Italy (BRAGA, 1975), Slovakia (ZÁGORŠEK, 1992), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Rupelian Germany (REUSS, 1866), France (BOBIES, 1958)

Burdigalian - Gard (CANU & BASSLER, 1920)

Serravallian - Herault (CANU & BASSLER, 1920), Italy (CANU & BASSLER, 1920), Gard (CANU & BASSLER, 1920)

Tortonian - Austria & Hungary (REUSS, 1848), Italy (CANU & BASSLER, 1920), Poland (BOBIES, 1958), Italy (BOBIES, 1958), Czech (VÁVRA, 1977), Greece (VÁVRA, 1977), Romania (VÁVRA, 1977),

Zanclean - Italy (CANU & BASSLER, 1920), Greece (BOBIES, 1958)

Piacenzian - Italy (CANU & BASSLER, 1920)

Recent - Mediterranean (CANU & BASSLER, 1920), Philippines (BRAGA & BARBIN, 1988)

Crisia eburnea (LINNAEUS, 1758)

pl. 1, fig. 3

1958 *Crisia eburnea* (LINNAEUS), BOBIES p. 151, Pl. 12, Fig. 2, 3

1977 *Crisia eburnea* (LINNAEUS), VÁVRA p. 11

v. 1974 *Crisia eburnea* (LINNAEUS), VÁVRA p. 347

v. 2001a *Crisia eburnea* (LINNAEUS), ZÁGORŠEK p. 23, Pl. 1, Fig. 1

Diagnosis: The colony branches (internodes) are very narrow. The maximum width of the colony (about 0,287 mm) is only the width of the two zooecial tubes. A narrow furrow laterally separates the zooecia. The zooecial tubes are long (0.75 - 1 mm) terminated with a rounded aperture. The zooecial wall is slightly ribbed or smooth, nonporous and little convex. The gonozooecium is rare, large and globular.

Remarks: A strikingly similar species, *Crisia haueri* REUSS, 1848 has even narrower colony branches, with most of the width of its colony composed by one zooecial tube only. *Crisia eburnea* (LINNAEUS) is known only with smooth frontal walls up to now, however the slight ribs present in Reingruberhöhe specimens could be regarded as within species variation, or they could be caused by preservation. All other features present on the Reingruberhöhe specimens are identical with those described and pictured by BOBIES (1958) and VÁVRA (1977 and 1974).

Occurrence: Reingruberhöhe (samples RH 1, RH 7, RH 10+11 and SEIFERT's samples).

Distribution in time and space:

Priabonian Hungary (ZÁGORŠEK, 2001a), Romania (GHIURCA, 1987), Austria (ZÁGORŠEK, 2001b)

Serravallian - France (BOBIES, 1958)

Helvetian - France (VÁVRA, 1977)

Tortonian - France (BUGE, 1957), Italy, Poland, Austria, Hungary (BOBIES, 1958), Russian (VÁVRA, 1977)

Messinian - Italy (BOBIES, 1958), Greece (VÁVRA, 1977)

Quaternary & recent - Mediterranean & north Atlantic (BOBIES, 1958), North see (VÁVRA, 1977)

Suborder Tubuliporina MILNE EDWARDS, 1838
Family Diastoporidae GREGORY, 1899

Genus *Diastopora* LAMOUROUX, 1821

The colony is erect with an encrusting base; the encrusting stage is a so-called "Berenicea" stage. The adult colony is characteristically bilamellar and thin. The shape of the colony is, as seen from the frontal, irregularly circular. The peristome is short, or not developed. According to BORG (1944) the gonozooecia are oval, polygonal, or strongly expanded transversely.

Diastopora flabellum REUSS, 1848

pl. 1,fig. 5, 6

1848 *Diastopora flabellum* sp.n., REUSS p. 51, Pl. 7, Fig.9

v. 1963 *Berenicea planulata* CANU & LECOINTRE, MAŁECKI p. 56, Pl. 1, Fig. 2

1977 *Diastopora flabellum* REUSS, VÁVRA p. 20

v. 2001b *Diastopora flabellum* REUSS, ZÁGORŠEK p. 516, Pl. 1. Fig. 3

Diagnosis: The colony is erect, bilamellar and thin. Laterally, the colony has shape as rounded square. The zooecia are short, tube-like, with circular apertures surrounded by a short peristome. The frontal wall is smooth and nonporous. Gonozooecia have not been described.

Remarks: The original REUSS material has not been found

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in his collection in the Museum of Natural History in Vienna. Nevertheless, the description and illustrations are almost identical with specimens from Waschberg zone.
MAŁECKI (1963) described *Berenicea planulata* CANU & LECOINTRE, 1933 which exhibits all the taxonomical features of *Diastopora flabellum* REUSS. Encrusting colonies with very short, tube-like zooecia probably also belong to *Diastopora flabellum* REUSS. The zooecial apertures are circular surrounded with a short peristome. The frontal wall of this zooecium is smooth and slightly perforated by very small pores. The described encrusting colonies have no gonozooecia. Therefore, their species determination is not possible. They seem however to be very similar to the so-called "Berenicea" ontogenetic stage of *Diastopora flabellum* REUSS, 1848 as described by REUSS (1848).
Occurrence: Haselbach and Reingruberhöhe (sample RH 31 and SEIFERT's samples).
Distribution in time and space:
Priabonian - Poland (MAŁECKI, 1963), Austria (ZÁGORŠEK, 2001b)
Tortonian - Austria & Hungary (REUSS, 1848), France (BUGE, 1957), Italy (VÁVRA, 1977), Serb (VÁVRA, 1977), Poland (VÁVRA, 1977)
Zanclean - Italy (VÁVRA, 1977)

Family Tubuliporidae JOHNSTON, 1838

Genus *Exidmonea* DAVID, MONGEREAU & POUYET, 1972

The colony is erect, rod-like and rarely bifurcating. The transverse section is always triangular, the zooecial apertures are situated laterally; one side (dorsal) of the colony is without any apertures. The dorsal side is always smooth, or slightly ribbed without pores (kenozooecia). The zooecial tubes are arranged in fascicles, the fascicles are parallel to each other; the number of apertures in each fascicle varies from 2 to 6. The apertures are mostly square-shaped or little rounded. The zooecial frontal wall is slightly porous, or smooth. The gonozooecia are developed on the frontal side, they are usually large globular with an oeciopore smaller than the zooecial aperture.
Remarks: The genus *Exidmonea* was first described by MONGEREAU (1969). However, he did not establish a type species, and therefore it is not a valid genus (as pointed out by TAYLOR & VOIGT, 1992). According to them, the first who gave also a type species for this genus were DAVID, MONGEREAU & POUYET (1972), so they are the authors of the valid genus *Exidmonea*.

Exidmonea atlantica DAVID, MONGEREAU & POUYET, 1972

pl. 2, fig. 1, 2

1920 *Idmonea atlantica* JOHNSTON, CANU & BASSLER p. 778, Pl. 140, Fig. 1-13 (cum. syn)
v. 1963 *Idmonea atlantica* JOHNSTON, MAŁECKI p. 62, Fig. 25, Pl. 2, Fig. 1
1969 *Exidmonea atlantica* Auct., MONGEREAU p. 216, Pl. 16, Fig. 1-11, Pl. 17, Fig. 1 (cum. syn)
1977 *Exidmonea atlantica* Auct., VÁVRA p. 25
v. 1988 *Exidmonea atlantica* Auct., BRAGA & BARBIN p. 506, Pl. 1, Fig. 1
v. 1992 *Exidmonea atlantica* Auct., ZÁGORŠEK p. 238, Pl. 2, Fig. 7
v. 2001a *Exidmonea atlantica* DAVID, MONGEREAU & POUYET, ZÁGORŠEK p. 24, Pl. 1, Fig. 8, 9

Diagnosis: The colony is bifurcated with oval to triangular transverse section. The angle between frontal sides is sharp, about 60 degrees. Usually 3 to 5 zooecia are arranged in each fascicular row. The zooecial fascicles are arranged alternately on each side of the frontal part of the colony, protruding beyond the colonial margin. The lateral walls of zooecia are usually very well visible thanks to their different colour. The aperture is rectangular to oval. The dorsal side of the colony is smooth or slightly ribbed and convex or flat. The gonozooecia are large, convex, usually placed on the median part of the colony, or near a bifurcation. The frontal wall of the gonozooecium is slightly porous.
Remarks: The described specimens are slightly more porous on their dorsal side and their peristomes are less protruding than in MONGEREAU specimens. According to MONGEREAU (1969), *E. atlantica* is a widely variable taxon, so these features are not specific.
Occurrence: Reingruberhöhe in the entire section (samples RH 1, RH 4, RH 10+11, RH 13, RH 31, RH 37 and SEIFERT's samples).
Distribution in time and space:
Lutetian - Argentina (VÁVRA, 1977)
Priabonian - Poland (MAŁECKI, 1963), Austria (ZÁGORŠEK, 2001b), Hungary (ZÁGORŠEK, 2001a), Italy (BRAGA & BARBIN, 1988), Slovakia (ZÁGORŠEK, 1992), North Carolina & Georgia & Florida & Alabama (CANU & BASSLER, 1920), France (MONGEREAU, 1969), Romania (GHIURCA, 1987)
Tortonian - Austria (VÁVRA, 1977), France, Czech and Australia (VÁVRA, 1977)
Zanclean - Mexico (VÁVRA, 1977)
Quaternary & Recent - cosmopolitan (VÁVRA, 1977)

Exidmonea giebeli (STOLICZKA, 1862)

pl. 2, figs. 4, 5

v.*1862 *Idmonea giebeli* sp.n., STOLICZKA p. 81, Pl. 1, Fig. 6
1963 *Platonea* cf. *clavata* (CANU & BASSLER), MAŁECKI p. 65, Pl. 2, Fig. 2
1969 *Exidmonea giebeli* (STOLICZKA), MONGEREAU p. 232, Pl. 20, Fig. 1-3, 9, 11
v. 1988 *Exidmonea giebeli* (STOLICZKA), BRAGA & BARBIN p. 506

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v. 1992 *Exidmonea giebeli* (STOLICZKA), ZÁGORŠEK p. 240, Pl. 1, Fig. 5
v. 2001a *Exidmonea giebeli* (STOLICZKA), ZÁGORŠEK p. 24, Pl. 1, Fig. 10, 11

Diagnosis: The colony has a triangular transverse section; the angle between the frontal sides is about 100 degrees. Usually 3 to 4 zooecia are arranged in each fascicular row. The zooecial fascicles are not in pairs, but they are arranged on the frontal part of the colony, protruding beyond the colonial margin. The frontal wall is strongly porous. The apertures are circular with short and narrow peristome, curved little laterally. The dorsal side of the colony is slightly porous, flat or rarely slightly convex. The gonozooecia are unknown.
Remarks: The specimens described as *Platonea* cf. *clavata* (CANU & BASSLER) by MAŁECKI (1963) have colonies almost identical to *Exidmonea giebeli* (STOLICZKA). Therefore, I believe that it belongs to this species.
The syntypes deposited in the Museum of Natural History in Vienna have mostly a circular to oval transverse section and the diameter of their apertures is little smaller than in the Reingruberhöhe specimens. The specimens described by MAŁECKI (1963) have also a smaller diameter of aperture, but MONGEREAU's specimens have larger apertural diameters. However, other features are identical, so I believe that all these specimens belong to the same species.
Occurrence: Haselbach and Reingruberhöhe, in the entire section (samples RH 1, RH 6, RH 10+11, RH 13, RH 31, RH 33 and SEIFERT's samples).
Distribution in time and space:
Priabonian - Poland (MAŁECKI, 1963), Slovakia (ZÁGORŠEK, 1992), Romania (GHIURCA, 1987), Italy (STOLICZKA, 1862, BRAGA & BARBIN, 1988), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b), France (MONGEREAU, 1969)
Tortonian - New Zealand (BRAGA & BARBIN, 1988)

Exidmonea hoernesi (STOLICZKA, 1862)
pl. 2, fig. 3

v.* 1862 *Idmonea Hörnesi* sp.n., STOLICZKA p. 82, Pl. 1, Fig. 7
v. 1963 *Idmonea petri* D'ARCHIAC, MAŁECKI p.64, Fig. 26, Pl. 2, Fig. 5
1969 *Exidmonea hörnesi* (STOLICZKA), MONGEREAU p. 235, Pl. 18, Fig. 8, 9 (cum. syn)
v. 1992 *Exidmonea hörnesi* (STOLICZKA), ZÁGORŠEK p. 237, Pl. 1, Fig. 4
v. 2001a *Exidmonea hoernesi* (STOLICZKA), ZÁGORŠEK p. 25, Pl. 2, Fig. 1, 2

Diagnosis: There are about 3 to 4 zooecia in each fascicular row; the fascicles are in pairs. One zooecial tube is sometimes arranged outside the fascicle. This tube is situated near the dorsal side of the colony, in the most lateral position. The aperture of this zooecial tube is usually shifted more proximally from the fascicle. The zooecial frontal wall is strongly porous. The apertures are rectangular, with a short and narrow peristome or without any peristome. The dorsal side of the colony is ribbed, slightly convex or flat. The gonozooecia are large, convex, usually placed on the median part of the colony. The frontal wall of the gonozooecium is nonporous and slightly granular.
Remarks: The described specimens have somewhat triangular transverse sections (angle between frontal walls about 40°), while specimens described by MONGEREAU (1969) have a more circular or a triangular section with angles about 60°.
Because of the presence of 3 to 4 zooecia in each fascicular row, the triangular cross section and strongly porous zooecial frontal wall the *Idmonea petri* D'ARCHIAC, as described by MAŁECKI (1963) belongs to *Exidmonea hörnesi* (STOLICZKA)
The syntypes deposited in the Museum of Natural History in Vienna also have a more circular, even oval, transverse section and have fascicles with about 4 zooecial tubes. The single zooecial tube in each syntype that is not in the fascicle is also shifted a little proximally. Although no gonozooecia have been found among the studied material, the specific features, especially the presence of zooecial tubes outside the fascicle shifted a little proximally are identical with described specimens.
Occurrence: Haselbach and Reingruberhöhe, in the entire section (samples RH 2, RH 6, RH 10+11, RH 13, RH 31, RH 37 and SEIFERT's samples).
Distribution in time and space:
Priabonian Italy (STOLICZKA, 1862), Poland (MAŁECKI, 1963), Slovakia (ZÁGORŠEK, 1992), France (MONGEREAU, 1969), Romania (GHIURCA, 1987), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Oligocene - Germany (MONGEREAU, 1969)

Genus *Tayloripora* gen. nov.

Diagnosis: The colony is fixed-walled, erect with triangular transverse section and zooecial apertures situated on two sides. The dorsal side is without apertures. The zooecial frontal wall is porous. The dorsal side is formed by parallel narrow kenozooecia closed by diaphragms (so called dactylethrae). The gonozooecia are situated on dorsal side of colony.
Derivatio nominis: In honour of Dr. Paul Taylor, specialist on Cyclostomatida at the Natural History Museum in London (United Kingdom).
Included species: Type species: *Tayloripora ovicellata* sp.n., perhaps also *Idmonea reticulata* REUSS, 1869
Comparison: The most similar genus is *Erkosonea* CANU & BASSLER, 1920 in having dorsal kenozooecia closed by diaphragms (dactylethrae) and having similarly arranged zooecia in the colony. It differs mainly in having frontal ovicells known only in one specimen. This ovicell with a broken frontal wall is situated in the bifurcation of the co-

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lonial branch (BASSLER, 1953).*Exidmonea* is very similar in structures of the frontal side of the colony. It has the same fixed-walled organisation, slightly porous frontal walls, and alternating fascicles. It has however typical frontal gonozooecia with slightly porous frontal wall.

The known genera with dorsal ovicells are *Tervia* JULLIEN, 1882 and *Pseudidmonea* BORG, 1944. *Tervia* has free-walled organisation of the colony, *Pseudidmonea* has a dorsal side of the colony formed by nervi and sulci as in *Hornera*.

Remarks: *Tayloripora* seems to have a combination of characters of three genera: *Erkosonea* (development of dorsal side of colony), *Tervia* (dorsal ovicells with porous rim inside) and *Exidmonea* (development of frontal side of colony).

Due to the zooecia in fascicles opening only on one side of the colony, *Tayloripora* is listed in the Family Tuboliporidae JOHNSTON, 1838

Tayloripora ovicellata sp.n.

pl. 3, figs. 1–8

Diagnosis: The colony is fixed-walled, with zooecia arranged in alternating fascicles. The fascicles are formed by 3 to 5 zooecial apertures. The zooecial frontal wall is porous. The dorsal side of the colony is formed by parallel kenozooecia closed by diaphragms (so called dactylethrae). The diameter of kenozooecia is about half of the diameter of the autozooecia. The gonozooecium is situated on the dorsal side of the colony; it is prominent, globular, usually perforated laterally by pores, frontally smooth. The oeciopore opens on the distal margin of the gonozooecium.

Holotype: The specimen depicted in pl. 3, fig. 1, 2, from the locality Reingruberhöhe, deposited in the Institute of Palaeontology, University of Vienna, Austria.

Paratypes: 9 specimens from the locality Reingruberhöhe, deposited in the Institute of Paleontology, University of Vienna, Austria.

Derivatio nominis: Due to the presence of ovicell - gonozooecia

Locus typicus: Reingruberhöhe (sample RH 31).

Stratum typicum: Eocene - Priabonian.

Dimensions:

(in micro meters = μm; x = average, details in fig. 5)

length of the colony: 1612 - 3825; x = 2497

width of the colony: 576 - 770; x = 659

width of the colony in bifurcation: 739 - 1466; x = 1129

length of zooecial aperture: x = 120

width of zooecial aperture: x = 103

area of zooecial aperture: 7 878 - 15 729;x = 11 391

length of ovicell: x = 912

width of ovicell: x = 658

height of ovicell: 252 - 453; x = 391

length of oeciopore: 80

width of oeciopore: 148

width of porous ring in the ovicell: 157 - 206; x = 177

diameter of pores in the ovicell: 29 - 71; x = 46

diameter of kenozooecial tubes: 32 - 94; x = 57

length of dactylethrae: x = 145

width of dactylethrae: x = 97

width of zooecia: x = 77 - 96; x = 80

thickness of frontal part of the colony from lateral view: x = 333

thickness of dorsal part of the colony from lateral view: x = 378

Description: The colony is fixed-walled, erect, branching with zooecia arranged in alternating fascicles. The transverse section of the colony is oval to rounded triangular. The fascicles are with long peristomes, formed by 3 to 5 zooecial tubes. The zooecial frontal wall is smooth, slightly porous. Usually the aperture of the most marginal zooecium is not in the fascicle. The zooecial apertures are square shape, the most marginal zooecium has aperture almost circular or more rounded than the apertures of the regular zooecia. The dorsal side of the colony is formed by parallel narrow kenozooecia closed by diaphragms (so called dactylethrae in CANU & BASSLER, 1920). The diameter of kenozooecia is about half of the diameter of autozooecial tubes. The diaphragms exposed on the dorsal side of the colony have the same diameter, or are larger than autozooecial aper-

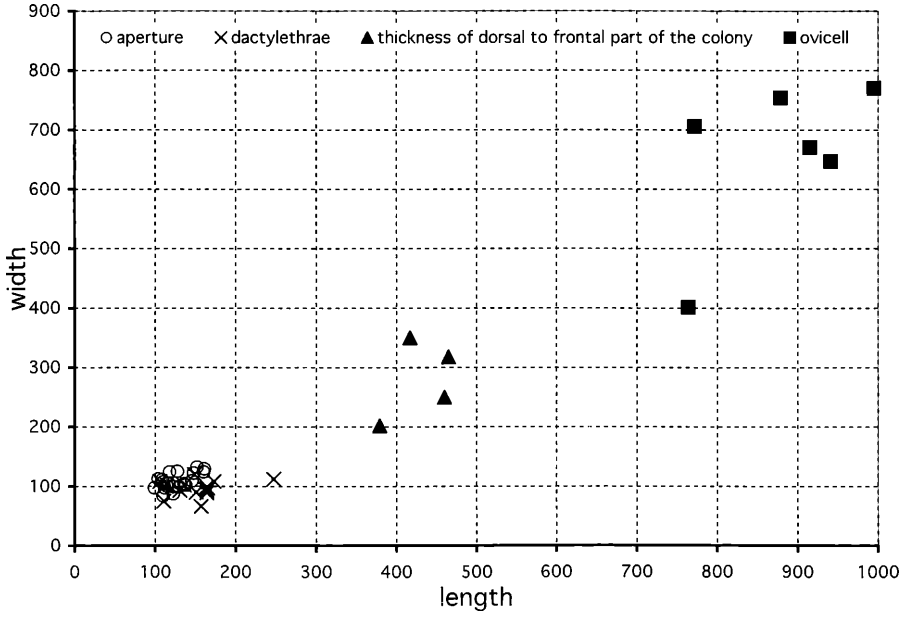

Figure 5: Chart of important measurements of *Tayloripora ovicellata* sp.n. (values in μm).

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tures. The diaphragms are usually not developed around the gonozooecium. The gonozooecium is situated always on the dorsal side of the colony. It is prominent, globular usually perforated laterally by pores. The frontal wall of the gonozooecium is smooth, nonporous, but only rarely preserved. When the gonozooecial frontal wall is missing, the porous rim is preserved inside the remains of the gonozooecium. The position of the oeciopore can be supposed to be located where the porous rim is interrupted. Usually the rim is cut in its distal margin. Therefore, the oeciopore probably opened at the distal edge of the gonozooecium. The oeciopore itself has not been observed.

Remarks: REUSS (1869) described a new species *Idmonea reticulata* from the locality Val di Lonte, Italy, (REUSS, 1869: Pl. 34, Fig. 13, MONGEREAU, 1969: Pl. 20, Fig. 5, 10). The species is very similar to *Tayloripora ovicellata* sp.n. in general morphology. The syntypes of the *Idmonea reticulata* REUSS, 1869 deposited in the Museum of Natural History in Vienna have narrower branches, shorter peristomes and developed no gonozooecia. Other features are identical with the *Tayloripora ovicellata* sp.n. Because gonozooecia are unknown in *Idmonea reticulata* REUSS, 1869, the correct attribution of this species remains uncertain.

Occurrence: Reingruberhöhe (samples RH 31 and RH 33).

Genus *Idmidronea* CANU & BASSLER, 1920

The colony is erect, branching with apertures only on one side. The transverse section is triangular to oval. The zooecia are in fascicles, usually only a few apertures (2-4) are arranged in the fascicle. The dorsal side is formed by thin, narrow long kenozooecia (so called firmatopores). The gonozooecium is not known.

Idmidronea uniporica sp.n.

pl. 4, figs. 1–3

Diagnosis: The colony is narrow, erect with circular to oval transverse section. The fascicles are quite close together, arranged alternately. They are formed only by two zooecia. The zooecial aperture situated more frontally is larger than the second one, which lies more marginally. The peristome is short, but wide. Numerous parallel narrow kenozooecial tubes form the dorsal side of the colony.

Holotype: The specimen depicted in pl. 4, fig. 1, from the locality Reingruberhöhe (sample RH 31), deposited in the Institute of Paleontology Vienna University, Austria.

Paratypes: 5 specimens from the locality Reingruberhöhe, deposited in the Institute of Palaeontology, University of Vienna, Austria.

Derivatio nominis: Due to the one frontal aperture in the fascicle, this, from frontal view, looks like the only aperture in the fascicles.

Locus typicus: Reingruberhöhe (sample RH 31).

Stratum typicum: Eocene - Priabonian.

Dimensions:

(in micro meters = μm; x = average, details in fig. 6)

length of the colony: 1347 - 2221; x = 1845

width of the colony: 387 - 562; x = 458

diameter of kenozooecia: 20 - 44; x = 29

width of zooecia: 55 - 97; x = 89

length of frontal zooecial aperture (as preserved): x = 165

width of frontal zooecial aperture: x = 89

length of marginal zooecial aperture (as preserved): x = 103

width of marginal zooecial aperture: x = 78

thickness of frontal part of the colony (measured from lateral view): 196 - 231; x = 208

thickness of dorsal part of the colony (measured from lateral view): 148 - 295; x = 224

Description: The colony is narrow, small, erect straight; no bifurcated colony has been found. The transverse section is oval or circular with flat frontal side and rounded dorsal side. The frontal side appears little different from the rest of the colony, flat, narrow with slightly porous zooecial frontal walls. The alternately arranged fascicles are formed only by two zooecial tubes with apertures only on the frontal side of the colony. The aperture, visible only from the frontal side, opens frontally, is large, oval with a wide peristome. The second aperture opens in the margin of the frontal area and sometimes is visible only from lateral view. It is oval to circular and little more than half the diameter of the frontal one. This second aperture has usually no peristome. The dorsal side of colony is rounded, and is formed by numerous parallel narrow kenozooecial tubes (called firmatopores in CANU & BASSLER, 1920). They form a thick collar. Gonozooecia are unknown.

Comparison: The most similar species is *Idmidronea maxillaris* LONSDALE, 1845 described by CANU & BASSLER

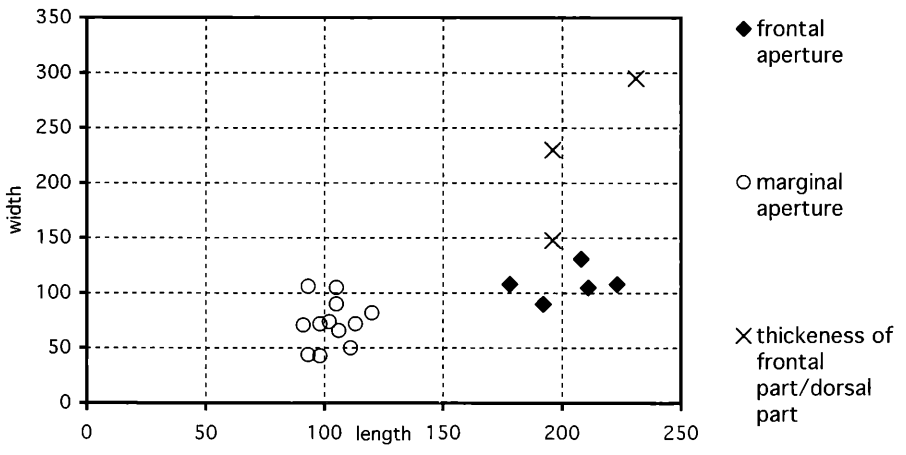

Figure 6: Chart of important measurements of *Idmidronea uniporica* sp.n. (values in μm).

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(1920 on page 785, Pl. 131, Fig. 1-7), having very similar frontal side of colony and same structures on dorsal side. It differs however in having always three zooecia in fascicles and in having a much larger colony with branch widths about 1 mm.

Idmidronea coronopus DEFRANCE, 1822 illustrated in CANU & BASSLER (1920, p. 787, Fig. 253) is also similar in having only two zooecia in the fascicles, but both of them are situated on the frontal side of the colony, and the colony is usually very robust and branching. *Idmidronea coronopus* described by BRAGA (1963) has four zooecial tubes in fascicles so probably it does not belong to the same species. MOISSETTE (1988) described as *Idmidronea coronopus* from the Miocene, which has only two zooecia in the fascicles, but they are small and facing on the lateral side of the colony. The distinctive features seem to be the narrow branches and two zooecia in fascicles, one of which being large opens on the frontal and second one being smaller situated on the marginal side of colony.

Remark: The measured length of the zooecial apertures strongly depends on preservation, and therefore length & width ratio is about 2:1, however usually they are almost always nearly equal. Due to presence of "firmatopores" this species is listed under *Idmidronea* CANU & BASSLER, 1920

Occurrence: Reingruberhöhe (samples RH 31 and RH 33).

Family Oncousoeciidae CANU, 1918

Genus *Oncousoecia* CANU, 1918

The colony is encrusting, or erect with an encrusting base. The zooecial tubes are short but wide, with a short peristome. The gonozooecium is large, spread out between few zooecial tubes; the oeciopore is larger than the zooecial aperture. The axis of the gonozooecium is parallel to that of the zooecial tubes.

Oncousoecia biloba (REUSS, 1848)

pl. 5, fig. 1

v.* 1848 *Hornera biloba* sp.n., REUSS p. 43, Pl. 6, Fig. 21

v. 1869a *Filisparsa varians* sp.n., REUSS p. 286, Pl. 35, Fig. 14, 15

1920 *Oncousoecia varians* (REUSS), CANU & BASSLER p. 690, Pl. 157, Fig. 17-24 (cum. syn.)

v. 1963 *Proboscina variabilis* CANU & BASSLER, MAŁECKI p. 69, Fig. 29

v. 1963 *Proboscina admonta* CANU & BASSLER, MAŁECKI p. 70, Pl. 3, Fig. 6

? 1972 "*Oncousoecia*" *biloba* (REUSS), MONGEREAU p. 321, Pl. 2, Fig. 6

1977 *Oncousoecia biloba* (REUSS), VÁVRA p. 31

1988 *Oncousoecia biloba* (REUSS), BRAGA & BARBIN p. 508, Pl. 2, Fig. 1, 2 (cum. syn.)

v. 2001a *Oncousoecia biloba* (REUSS), ZÁGORŠEK p. 26, Pl. 2, Fig. 6

Diagnosis: The colony is erect, unilamellar with 5 to 10 zooecial rows obliquely parallel to each other. The zooecial tubes are short with a nonporous frontal wall. The apertures are circular, situated on a short but wide peristome. The gonozooecium is situated on the proximal end of the colony. It is usually large with nonporous frontal wall, spread between 3 to 6 zooecial tubes. The oeciopore is without peristome. The dorsal wall is smooth, nonporous.

Remarks: The syntypes deposited in the Museum of Natural History in Vienna have a little longer zooecial tubes. Other features, especially the shape and the position of the gonozooecium, are identical with described specimens. *Proboscina variabilis* CANU & BASSLER, 1920 and *Proboscina admonta* CANU & BASSLER, 1920 as described by MAŁECKI (1963) display all important features of *Oncousoecia biloba* (REUSS) and are therefore listed here as synonyms. BRAGA & BARBIN (1988) described zooecia with shorter zooecial tubes. They also pointed out that *Filisparsa varians* REUSS, 1869a is a junior synonym of *Hornera biloba* REUSS, 1848.

A lectotype erected by MONGEREAU (1972) is an erect bifurcated colony with only 5 short zooecial tubes, without a gonozooecium. Therefore, I am not sure if it belongs to this species. The species seems to be very variable in shape and length of zooecial tubes, so perhaps the length of zooecial tube is only within-species variability.

Occurrence: Haselbach and Reingruberhöhe (samples RH 2, RH 9 and SEIFERT's samples).

Distribution in time and space:

Tertiary - Germany, France, Italy, North America, Romania and Russia (VÁVRA, 1977)

Lutetian - France (CANU & BASSLER, 1920)

Priabonian - Vicentin (REUSS, 1869a), Romania (GHIURCA, 1987), Poland (MAŁECKI, 1963), Italy (BRAGA & BARBIN, 1988), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Rupelian - France (CANU & BASSLER, 1920)

Serravallian - Gard & Italy (CANU & BASSLER, 1920)

Tortonian - Austria & Hungary (REUSS, 1848), Italy (CANU & BASSLER, 1920), Russia (CANU & BASSLER, 1920), Czech (VÁVRA, 1977)

Zanclean - Italy (CANU & BASSLER, 1920)

Piacenzian - Italy (CANU & BASSLER, 1920), France (CANU & BASSLER, 1920)

Quaternary & Recent - Mediterranean (BRAGA & BARBIN, 1988)

Genus *Filisparsa* D'ORBIGNY, 1853

The colony is erect, unilamellar, dichotomously branching, narrow; about 3 to 6 zooecial tubes form the width of the colony. The zooecial apertures are irregularly arranged only on the frontal side. The dorsal side is smooth, nonporous. The apertures are situated on the top of the short peristome. Gonozooecia are unknown.

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Filisparsa tenella STOLICZKA, 1862
pl. 2, fig. 6

v.* 1862 *Filisparsa tenella* sp.n., STOLICZKA p. 80, Pl. 1, Fig. 5
v. 1963 *Proboscina colubra* CANU & BASSLER, MAŁECKI p. 70, Pl. 3, Fig. 4
v. 2001b *Filisparsa tenella* STOLICZKA, ZÁGORŠEK p. 519

Diagnosis: The width of the colony is formed by about 5 zooecial tubes. The zooecia are not in fascicles, the zooecial tubes are long, with porous, slightly convex frontal wall. The apertures are circular, sometimes at the top of a peristome, arranged in irregular position. The dorsal side of the colony is smooth, slightly ribbed.
Remarks: The holotype in the Museum of Natural History in Vienna is identical with specimens described here, except that some specimens have more parallel zooecial tubes, up to 7. The specimens described by MAŁECKI (1963) exhibit the same features as the holotype and therefore belong to this species.
Occurrence: Haselbach and Reingruberhöhe in the entire section (samples RH 1, RH 3, RH 8, RH 10+11 and RH 31).
Distribution in time and space:
Priabonian Italy (STOLICZKA, 1862), Poland (MAŁECKI, 1963), Romania (GHIURCA, 1987), Austria (ZÁGORŠEK, 2001b)

Family Terviidae CANU & BASSLER, 1920

Genus *Tervia* JULLIEN, 1882

The colony is erect, dichotomously branching, unilamellar. The zooecial apertures are situated only in one side, arranged in fascicles. The fascicles are never parallel to each other (unlike *Exidmonea*). Lateral walls of the zooecia form structures similar to the nervi in Horneridae arranged between zooecial apertures. The structures are not developed on the dorsal side. Gonozooecia are developed dorsally; the axis is parallel with direction of growth. The oeciostome is terminal.

Tervia serrata (REUSS, 1869a)

v.* 1869a *Hornera serrata* sp.n., REUSS p. 285, Pl. 35, Fig. 10, 11
1892 *Hornera serrata* REUSS, WATERS p. 159, Pl. 3, Fig. 11
1963 *Ybselosoecia typica* (MANZONI), MAŁECKI p. 76, Pl. 5, Fig. 1
1972 "*Hornera*" *serrata* REUSS, MONGEREAU p. 343, Pl. 9, Fig. 5, 10
v. 1988 *Tervia serrata* (REUSS), BRAGA & BARBIN p. 508, Pl. 2, Fig. 3, 4
1974 *Filisparsa cuvillieri* sp.n., DEBOURLE p. 51, Pl. 2, Fig. 5
v. 1992 *Filisparsa cuvilierii* DEBOURLE, ZÁGORŠEK p. 240, Pl. 4, Fig. 4-5
v. 2001a *Tervia serrata* (REUSS), ZÁGORŠEK p. 26, Pl. 2, Fig. 5

Diagnosis: The zooecial apertures are circular. Between the apertures, there are thick, long structures similar to nervi. The dorsal side of the colony is formed by alternating flat tubes, separated by very thin nervi. The gonozooecium is dorsal with porous wall.
Remarks: The holotype in the Museum of Natural History in Vienna is a large bifurcated colony, and shows identical features as the described specimens.
MONGEREAU (1972) assigned this species to *Tervia* because of the structures on the dorsal side. The ovicells have not been known up to now. The first ovicell has been found in the specimen from Reingruberhöhe. The ovicell is situated on the dorsal side of the colony, and corresponds to the characteristic features of the genus *Tervia*. The ovicell has no preserved frontal wall.
The lateral walls are porous with pores smaller than the autozooecial apertures. Specimens described by MAŁECKI (1963) indicate all characteristic features as *Tervia serrata* (REUSS).
Occurrence: Reingruberhöhe in the entire section (samples RH 1, RH 3, RH 8, RH 12 and RH 31).
Distribution in time and space:
Lutetian - Alabama (CANU & BASSLER, 1920), France (CANU & BASSLER, 1920)
Priabonian Austria & Hungary (REUSS, 1869a), Italy (WATERS, 1892, BRAGA & BARBIN, 1988), Poland (MAŁECKI, 1963), France (MONGEREAU, 1972, DEBOURLE, 1974), Romania (GHIURCA, 1987), Slovakia (ZÁGORŠEK, 1992), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Burdigalian - France (CANU & BASSLER, 1920)
Serravallian - France (CANU & BASSLER, 1920)
Tortonian Italy & France (MAŁECKI, 1963), Austria & Hungary (MANZONI, 1877) Poland (MAŁECKI, 1963)
Messinian - Italy (NEVIANI, 1896b)

Family Entalophoridae REUSS, 1863

Genus *Mecynoecia* CANU, 1918

The colony is erect, multilamellar, bifurcated. About 4 to 20 zooecial tubes are arranged around the colonial axis. The apertures open on all sides. The gonozooecium is parallel with the zooecial axis.

Mecynoecia proboscidea (MILNE EDWARDS, 1838)
pl. 2, fig. 7

1838 *Pustulopora proboscidea* sp.n., MILNE EDWARDS p. 219, Pl. 12, Fig. 2
1920 *Mecynoecia proboscidea* (MILNE EDWARDS), CANU & BASSLER p. 726, Pl. 108, Fig. 1 - 15 (cum. syn)
1963 *Entalophora attenuata* (STOLICZKA), MAŁECKI p. 71, Fig. 31, Pl. 3, Fig. 10
v. 1963 *Entalophora magnicella* (CANU & BASSLER) MAŁECKI p.73, Pl. 4, Fig. 4

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1977 *Mecynoecia proboscidea* (MILNE EDWARDS), VÁVRA p. 41

v. 1988 *Mecynoecia proboscidea* (MILNE EDWARDS), BRAGA & BARBIN p.509, Pl.2, Fig 5

v. 1992 *Mecynoecia proboscidea* (MILNE EDWARDS), ZÁGORŠEK p. 240, Pl. 2, Fig. 8, Pl. 5, Fig. 3

v. 2001a *Mecynoecia proboscidea* (MILNE EDWARDS), ZÁGORŠEK p. 26, Pl. 2, Fig. 7, 8

Diagnosis: The colony has 3 to 5 zooecial tubes around the colonial axis. The zooecial tubes are very long with circular to oval aperture. Some apertures are situated on long peristomes. The frontal walls are convex, slightly porous; mostly smooth. The gonozooecium is symmetrical, situated between the autozooecial tubes.

Remarks: The studied zooecia are longer and their frontal walls are more convex than in specimens described by BRAGA & BARBIN (1988). The specimens described by MILNE EDWARDS (1838) have much longer peristomes and shorter frontal walls. However, the specimens described by CANU & BASSLER (1920) are almost identical, except that American specimens have a more porous frontal wall. CANU & BASSLER (1920) mentioned also a great variability in the zooecial tube length for this species. Therefore, the differences could be explained by variability within the species.

Entalophora attenuata (STOLICZKA) and *Entalophora magnicella* (CANU & BASSLER) described by MAŁECKI (1963) have long zooecia and strongly porous frontal walls as shown in the specimens from Waschberg Zone. The micrometric differences between MAŁECKI's specimens and those studied here are small. The specimens have the same micrometric characters as the species described from the Hungarian Eocene, but are less porous (ZÁGORŠEK, 2001a).

This species represents one of the most common large species of Cyclostomatida between the studied Eocene Bryozoa, however most of the colonies are only preserved as short fragments with one or two zooecial apertures.

Occurrence: Haselbach and Reingruberhöhe in the entire section (samples RH 1, RH 3, RH 4, RH 6, RH 9, RH 10+11, RH 12, RH 31, RH 33, RH 37 and SEIFERT's samples).

Distribution in time and space:

Cretaceous - cosmopolitan in Europe and America (CANU & BASSLER, 1920)

Tertiary - France (VÁVRA, 1977)

Lutetian - Arkansas (CANU & BASSLER, 1920)

Priabonian Poland (MAŁECKI, 1963), cosmopolitan in USA (CANU & BASSLER, 1920), Italy (BRAGA & BARBIN, 1988), Slovakia (ZÁGORŠEK, 1992), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b), Romania (GHIURCA, 1987)

Tortonian - Austria (VÁVRA, 1977),

Quaternary & Recent cosmopolitan in Europe and America (CANU & BASSLER, 1920)

Mecynoecia pulchella (REUSS, 1848)

pl. 5, fig. 2

v.* 1848 *Cricopora pulchella* m., REUSS p. 40, Pl. 6, Fig. 10

1963 *Entalophora pulchella* (REUSS), MAŁECKI p.74, Pl. 3, Fig. 9

v. 1963 *Entalophora subcompressa* (REUSS), MAŁECKI p.74, Pl. 4, Fig. 10, 11

1963 ?*Spiropora pulchella* (REUSS), MAŁECKI p.74, Pl. 4, Fig. 1

1970 *Mecynoecia*(?) *pulchella* (REUSS), VOIGT & FLOR p. 67, Pl. 15, Fig. 13-17

1977 *Mecynoecia pulchella* (REUSS), VÁVRA p. 41 (cum. syn.)

v. 1988 *Mecynoecia pulchella* (REUSS), BRAGA & BARBIN p. 509, Pl. 2, Fig. 6

v. 2001b *Mecynoecia pulchella* (REUSS), ZÁGORŠEK p. 520, Pl. 3. Fig. 1

Diagnosis: The colony has 12 to 16 zooecial tubes around the colonial axis. The zooecial tubes are narrow, short with circular to oval aperture. Some apertures are situated on short peristomes. The frontal walls are convex and smooth. Gonozooecium is small, situated among 5-6 zooecial tubes. The frontal of the gonozooecium is smooth and nonporous.

Remarks: The colony of *Mecynoecia pulchella* (REUSS, 1848) is very large and heavily calcified. The syntypes stored in the Museum of Natural History in Vienna have massive colonies, with short zooecial tubes terminated by a short peristome. *Mecynoecia pulchella* (REUSS, 1848) is very abundant in Miocene from Eisenstadt (Austria) and in respect to general shape is identical with the described specimens.

Entalophora subcompressa (REUSS) as described by MAŁECKI (1963) has colonies similar to *Mecynoecia pulchella* (REUSS). ?*Spiropora pulchella* (REUSS), as described by MAŁECKI (1963) has zooecia in almost regular fascicles, but I believe that this difference is only within-species variability. Only gonozooecium have been described by VOIGT & FLOR (1970). He found the gonozooecium in one specimen among the more than 400 specimens checked. All other known specimens do not developed gonozooecia.

Occurrence: Haselbach and Reingruberhöhe in the entire section (samples RH 1, RH 4, RH 6, RH 9, RH 10+11, RH 12, RH 31, RH 37 and SEIFERT's samples).

Distribution in time and space:

Lutetian - Germany (MAŁECKI, 1963)

Priabonian Poland (MAŁECKI, 1963), Italy (BRAGA & BARBIN, 1988), Romania (GHIURCA, 1987), Austria (ZÁGORŠEK, 2001b), Slovakia

Rupelian Italy (BRAGA & BARBIN, 1988), Austria (MAŁECKI, 1963)

Tortonian Austria & Hungary (REUSS, 1848), Poland (MAŁECKI, 1963), Czech (VÁVRA, 1977)

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Mecynoecia geinitzi (REUSS, 1872)
pl. 5, fig. 4, pl. 6, figs. 1–4

1929 *Entalophora geinitzi* (REUSS), PAZDRO p. 152, Pl. 1, Fig. 14
v. 1963 *Entalophora geinitzi* (REUSS), MAŁECKI p. 73, Pl. 4, Fig. 5
v. 1963 *Entalophora subverticulata* (BUSK), MAŁECKI p. 73, Pl. 4, Fig. 2
v. 2001b *Mecynoecia geinitzi* (REUSS), ZÁGORŠEK p. 520

Diagnosis: The colony is rod-like, very large. The length of the colony is up to 10 mm and the width is up to 2 mm. The zooecia are arranged in regular rows, about 18 to 25 rows around zooecial axis. The zooecial tubes have rhombic cross sections seen on the surface as rhombic to hexagonal, rarely oval apertures. The frontal walls are porous, with slightly elongated lateral parts, which are usually not preserved. In the middle of the colonial stem, there occurs sometimes an area without any apertures. This area is nonporous, little depressed. It might be a gonozooecium, however no oeciopore has been found.
Remarks: The colony of *Mecynoecia geinitzi* (REUSS, 1872) differs from *Mecynoecia pulchella* (REUSS, 1848) in having a much larger colony and in having larger rhombic zooecial tubes. Although the presence of gonozooecia is uncertain, the zooecial features allow us to list this species under *Mecynoecia*. *Entalophora subverticulata* (BUSK) as described by MAŁECKI (1963) has slightly shorter zooecial tubes than *Mecynoecia geinitzi* (REUSS). I believe however, that they are only younger colonies of *Mecynoecia geinitzi* (REUSS). The original REUSS material has not been found in his collection in the Museum of Natural History in Vienna. Nevertheless, the description and illustration by MAŁECKI (1953) are almost identical with the specimens studied here and therefore I believe that they are conspecific.
Occurrence: Haselbach and Reingruberhöhe in the entire section (samples RH 3, RH 4, RH 6, RH 10+11, RH 12, RH 31, RH 37 and SEIFERT's samples).
Distribution in time and space:
Lutetian - Germany (MAŁECKI, 1963)
Priabonian - Poland (MAŁECKI, 1963), Italy (PAZDRO, 1929), Austria (ZÁGORŠEK, 2001b),
Tortonian - France (MAŁECKI, 1963)

Genus *Nematifera* CANU & BASSLER, 1922

The colony is erect, rod-like and multilamellar. The zooecia are long with perforated frontal wall and bordered by a salient thread. The gonozooecium is very long, usually not elevated from the colonial stem.
Remarks: BASSLER (1953) pointed out that *Nematifera* is only a Lower Cretaceous genus; the gonozooecia are however identical with the specimens studied from Waschberg zone and described here. The salient "thread" separating all zooecia from each other is also present in the specimens studied as well as in the original material by CANU & BASSLER (1922).

Nematifera susannae ZÁGORŠEK, 1992
pl. 7, fig. 3

v.* 1992 *Nematifera susannae* sp.n., ZÁGORŠEK p. 240, Pl. 3, Fig. 1-7
v. 2001a *Nematifera susannae* ZÁGORŠEK, ZÁGORŠEK p. 27, Pl. 2, Fig. 11

Diagnosis: The colony is multilamellar, cylindrical, with circular or oval cross-section. The zooecia are long, with large orifices. The proximal margin of the orifice is straight, the distal margin is oval. A salient thread marks the lateral walls.
The frontal wall has a slightly convex bend and is densely perforated by small pores. The gonozooecium is longer than regular zooecia, narrow, not deforming a neighbouring zooecium. The oeciopore is as large as the zooecial orifice.
Remarks: A similar species is *Mecynoecia pulchella* (REUSS, 1848), which however, differs in having shorter zooecia, circular apertures, nonporous frontal walls, and no thread. The gonozooecium is unknown in *Mecynoecia pulchella* (REUSS, 1848). The presence of the thread between neighbouring zooecia is perhaps the most distinctive feature of the genus *Nematifera*, when no gonozooecium is found.
Occurrence: Reingruberhöhe (sample RH 2).
Distribution in time and space:
Priabonian Slovakia (ZÁGORŠEK, 1992), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Genus *Exochoecia* CANU & BASSLER, 1920

The colony is erect, bilamellar, with flat cross section. The apertures are arranged in fascicles opening on both side of the colony. The number of zooecial tubes in fascicles varies from 5 to 20. The fascicles are curved directly towards the frontal margin of the colony. The gonozooecium is very large, symmetrical and prominent, with nonporous frontal, placed on the frontal side of the colony.

Exochoecia compressa (REUSS, 1848)

1848 *Idmonea compressa* sp.n., REUSS p. 46, Pl. 6, Fig. 32
v. 1963 *Bicrisina compressa* (REUSS), MAŁECKI p. 57, Fig. 21
non 1977 *Bicrisina* ? *compressa* (REUSS), VÁVRA p. 72 (cum. syn.)
1988 *Exochoecia compressa* (REUSS), BRAGA & BARBIN p. 509, Pl. 3, Fig. 1, 2 (cum. syn)
1992 *Exochoecia compressa* (REUSS), ZÁGORŠEK p. 240, Pl. 1, Fig. 9
v. 2001a *Exochoecia compressa* (REUSS), ZÁGORŠEK p. 27, Pl. 3, Fig. 2

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Diagnosis: The colony is reticulate, narrow. The zooecial tubes are arranged in curving lines directed towards the frontal margin of the colony. The circular apertures form radial rows (fascicles) oblique to perpendicular to the direction of growth. About 6 to 8 zooecial apertures are arranged in each fascicle. The peristome is small. The gonozooecium is large and it is situated on the frontal part, protruding out of the colonial margin. The frontal wall of the gonozooecium is smooth, slightly porous with small pores.

Remarks: The gonozooecia are extremely rare in this species. Holotype, as well as syntypes has no gonozooecia. The gonozooecia are known only in material described from Hungary (ZÁGORŠEK, 2001a). CANU & BASSLER (1920) established *Exochoecia*, which has to have large frontal gonozooecia. Although I did not find gonozooecia in Austrian material according to other features, which are identical, I believe that all these specimens are conspecific.

Miocene species (among others for example VÁVRA, 1977) do not belong to this species. The morphology of the colony is identical with the Eocene samples, but the Miocene specimens developed small lateral gonozooecia (VÁVRA pers. com., 2001a).

Occurrence: Reingruberhöhe (sample RH 12).

Distribution in time and space:

Lutetian - Germany (MAŁECKI, 1963)

Priabonian Poland (MAŁECKI, 1963), Italy (BRAGA & BARBIN, 1988), Slovakia (ZÁGORŠEK, 1992), Romania (GHIURCA, 1987), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b), Germany (VÁVRA, 1977)

Tortonian Austria & Hungary (REUSS, 1848), Poland (MAŁECKI, 1963), Czech (VÁVRA, 1977)

Quaternary & Recent - Mediterranean (MAŁECKI, 1963)?

Family Diaperoeciidae CANU, 1918

Genus *Diaperoecia* CANU, 1918

The colony is encrusting, or erect from an encrusting base. The zooecial tubes grow more or less in chaotic way, not in fascicles. The apertures are usually on the top of a peristome. The gonozooecium is large, irregular, lies between several zooecial tubes. The oeciopore is elliptical, adjacent to a zooecial aperture, which is usually a little larger than the regular ones.

Diaperoecia sparsa (REUSS, 1848)

pl. 1, fig. 4

v.* 1848 *Diastopora sparsa* sp.n., REUSS p. 51, Pl. 7, Fig. 10
1972 *Diaperoecia sparsa* (REUSS), DAVID, MONGEREAU & POUYET p. 87, Pl. 11, Fig. 5, 8
1977 *Diaperoecia sparsa* (REUSS), VÁVRA p. 45

Diagnosis: The zooecia are arranged in irregular, monoserial and radial rows. The zooecial tubes are long, circular, with smooth frontal walls. The peristome is long, little curved laterally. The gonozooecium is small, with semilunar to oval oeciopore.

Remarks: This species is readily distinguishable in having a smaller gonozooecium than other similar species.

Very similar is for example *Tubulipora flabellaris* (FABRICIUS, 1780) in having circular, monoserial zooecial rows, but differing in having fascicles, larger peristomes and gonozooecia.

Occurrence: Reingruberhöhe (sample RH 2).

Distribution in time and space:

Tortonian - Austria & Hungary (REUSS, 1848), France (DAVID, MONGEREAU & POUYET, 1972), Czech (VÁVRA, 1977)

Genus *Diplosolen* CANU, 1918

The colony is erect or encrusting. The zooecia are arranged in regular rows, sometimes also in fascicles. Between the zooecial tubes, there are adventitious, narrow tubes, which open usually proximally from the zooecial aperture. The gonozooecium is very large, frontal, unsymmetrical and has a porous frontal wall. The oeciopore is smaller than the zooecial aperture.

Diplosolen brendolensis (WATERS, 1892)

pl. 7, fig. 6

1892 *Diastopora brendolensis* sp.n., WATERS p. 155, Pl. 3, Fig. 1

v. 2001a *Diplosolen brendolensis* (WATERS), ZÁGORŠEK p. 521, Pl. 4, Fig. 4

Diagnosis: The colony is erect, with flat cross section. The zooecia are arranged in more or less regular rows and shifted slightly laterally. The apertures are on both sides of the colony and arranged in fascicles, which are slightly curved directed towards the frontal margin of the colony. The adventitious tubes are situated along the zooecial tubes, opened usually proximally at the zooecial aperture, but sometimes also laterally from the zooecial aperture. The gonozooecia are unknown.

Remarks: The species resembles *Exochoecia compressa* (REUSS) in general view, but differs in having adventitious tubes.

Occurrence: Reingruberhöhe (sample RH 31 and SEIFERT's samples).

Distribution in time and space:

Priabonian Italy (WATERS, 1892), Austria (ZÁGORŠEK, 2001b)

Family Annectocymidae HAYWARD & RYLAND, 1985

Genus *Ybselosoecia* CANU & LECOINTRE, 1933

The colony is erect, rarely bifurcating. The cross section is oval to semilunar. The apertures are only on one side,

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the dorsal side is smooth, often concave. The apertures are arranged in many irregular rows, which are not in fascicles. The gonozooecium is frontal, large, spreading among many zooecia, flat. The oeciopore is as large as the aperture of regular zooecia, sometimes with a short peristome opening in the centre of gonozooecium.

***Ybselosoecia typica* (MANZONI, 1878)**
pl. 4, figs. 5, 6

1878 *Filisparsa typica* sp.n., MANZONI p. 10, Pl. 8, Fig. 30
v. 1963 *Ybselosoecia typica* (MANZONI), MAŁECKI p. 76, Fig. 33, Pl. 5, Fig. 1
1965 *Ybselosoecia typica* (MANZONI), MONGEREAU p. 317, Fig. 1
1974 *Ybselosoecia typica* (MANZONI), VÁVRA p. 362, Pl. 2, Fig. 9-10
1977 *Ybselosoecia typica* (MANZONI), VÁVRA p. 48
1997 *Ybselosoecia typica* (MANZONI), POUYET p. 26, Pl. 1, Fig. 1-4

Diagnosis: The colony is erect with semilunar cross section. The apertures are in 5 to 10 irregular rows with long peristomes. The frontal wall is slightly porous. The dorsal side is concave, smooth sometimes slightly concentrically ribbed. The gonozooecium is extremely rare. It is large perforated by 5 to 20 zooecia, very flat, thus the volume is small. The frontal surface of the gonozooecium is smooth. The oeciopore is little larger than apertures of regular zooecia, sometimes with a peristome (so-called oeciostome) little curved proximally.
Remarks: The species is known to have very rare gonozooecia. MONGEREAU (1965) first described the gonozooecia. This gonozooecium is rather small, perforated only by 5 zooecia. POUYET (1997) also described gonozooecia with a short peristome (oeciostome). Her gonozooecium is perforated by 12 zooecia. The studied specimens from Reingruberhöhe have the largest gonozooecium perforated by 20 zooecial tubes. The size, position and direction of oeciopore are identical in all mentioned specimens.
Occurrence: Reingruberhöhe (samples RH 1, RH 2, RH 31 and RH 33).
Distribution in time and space:
Lutetian - Europe (BUGE, 1957)
Priabonian Poland (MAŁECKI, 1963), France (MONGEREAU, 1965), Romania (GHIURCA, 1987), USA (BUGE, 1957)
Oligocene - USA (VÁVRA, 1977)
Tortonian - Austria (VÁVRA, 1974), Poland (POUYET, 1997), France (BUGE, 1957)
Messinian - Italy (VÁVRA, 1977)
Quaternary & Recent - Italy (BRAGA & BARBIN, 1988)

Family Frondiporidae BUSK, 1875

Genus *Bobiesipora* VÁVRA, 1977

The colony is erect from encrusting base. The zooecial apertures are arranged in several rows on elevated fascicles. The fascicles are multilaminar and robust. Among the fascicles, there are kenozooecia that are almost as large as zooecial apertures. The dorsal side of the colony is porous with small pores and large kenozooecia, the kenozooecia are arranged in longitudinal rows. The gonozooecium is situated on the dorsal side.

***Bobiesipora fasciculata* (REUSS, 1848)**
pl. 5, fig. 3

v.* 1848 *Apsendesia fasciculata* sp.n., REUSS p. 40, Pl. 6, Fig. 8
1977 *Bobiesipora fasciculata* (REUSS), VÁVRA p. 73
v. 1978 *Bobiesipora fasciculata* (REUSS), VÁVRA p. 230, Pl. 1, Fig. 3-6, Pl. 2, Fig. 1-4
v. 1984 *Bobiesipora fasciculata* (REUSS), VÁVRA p. 228, Pl. 1, Fig. 8-9
v. 1989 *Bobiesipora fasciculata* (REUSS), VÁVRA p. 92, Pl. 1, Fig. 5
v. 2001a *Bobiesipora fasciculata* (REUSS), ZÁGORŠEK p. 27, Pl. 2, Fig. 9

Diagnosis: The colony has a large circular encrusting basal part. The branches with zooecial tubes are regular, alternating, perforated by large apertures and kenozooecia. The fascicles correspond with a keel on the dorsal surface of the colony. Rarely, there are fascicles composed of slightly larger pores, present at the end of the branches. The gonozooecium is dorsal and rare. The dorsal side of colony is with typically arranged pores surrounded by a narrow and low rim.
Remarks: The syntypes in the Museum of Natural History in Vienna are erect, branching colonies and show identical features with the Reingruberhöhe specimens.
The species is known mainly from the Miocene of Poland and Austria (VÁVRA, 1984), but present also in the Eocene in Hungary. The specimens from Reingruberhöhe have the same fine, strongly porous branches as described by VÁVRA (1984, 1989) and like the specimens from Hungary. However, the basal parts of the colony as well as gonozooecia have not been found.
Occurrence: Reingruberhöhe (samples RH 1, RH 9, RH 31 and SEIFERT's samples).
Distribution in time and space:
Priabonian Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Tortonian - Austria & Hungary (REUSS, 1848), Austria (VÁVRA, 1989)

Suborder Cancellata GREGORY, 1899
Family Horneridae GREGORY, 1899

Genus *Hornera* LAMOUROUX, 1821

The colony is erect, bifurcated. The frontal side of the colony is formed by zooecial tubes with apertures, between

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which are sulci with vacuoles. The dorsal side of the colony has only sulci and nervi, no zooecial apertures. The gonozooecium is large, situated always on the dorsal side.

Hornera frondiculata Forbes in: Johnson

? 1920 *Hornera frondiculata* Lamouroux, Canu & Bassler p. 797, Fig. 257
v. 1963 *Hornera frondiculata* Auct., Małecki p. 80, Pl. 5, Fig. 2
v. 1963 *Hornera rhomboidalis* Busk, Małecki p. 81, Pl. 6, Fig. 4
1972 *Hornera frondiculata* Auct., Mongereau p. 329, Pl. 5, Fig. 6, Pl. 6, Fig. 7, Pl. 7, Fig. 6 - 8 (cum. syn)
1977 *Hornera frondiculata* Auct., Vávra p. 53
v. 1988 *Hornera frondiculata* Auct., Braga & Barbin p. 511, Pl. 2, Fig. 3, 4 (cum. syn)
v. 1992 *Hornera frondiculata* Auct., Zágoršek 242, Pl. 4, Fig. 3, 6-8
v. 2001a *Hornera frondiculata* Auct., Zágoršek p. 28, Pl. 3, Fig. 9

Diagnosis: The colony is ramose, mostly very large. The apertures are only on the frontal side of the colonial branch. The zooecial tubes are cylindrical with terminal aperture; 2 to 4 vacuoles are placed proximally to the aperture. On the dorsal side of the colony, the vacuoles are situated at the base of longitudinal sulci. The nervi are long, curving between apertures and anastomosing; the dorsal side is strongly radially ribbed. The gonozooecium is large, arranged on the dorsal side of the colony.
Remarks: The Reingruberhöhe specimens are almost identical with Hungarian specimens. Both have larger and more circular apertures than described by Mongereau (1972) as *H. frondiculata* forma frondiculata. Many authors (among others Braga & Barbin, 1988) pointed out a considerable variation in the *Hornera frondiculata* subspecies. Therefore, I do not use subspecies name in our determination. *Hornera rhomboidalis* Busk in Małecki (1963) has also 2 to 4 vacuoles situated proximally to the aperture, long curving nervi and a dorsal side strongly radially ribbed. So, I believe that these specimens also belong to *Hornera frondiculata*.
Occurrence: Reingruberhöhe (samples RH 1, RH 4, RH 7, RH 10+11, RH 13 and Seifert's samples).
Distribution in time and space:
Priabonian - Poland (Małecki, 1963), France (Mongereau, 1972), Italy (Braga & Barbin, 1988), Romania (Ghiurca, 1987), Slovakia (Zágoršek, 1992), Hungary (Zágoršek, 2001a), Austria (Zágoršek, 2001b), Germany (Vávra, 1977)
Oligocene - Italy (Vávra, 1977)
Burdigalian - France (Buge, 1957)
Tortonian - Poland (Małecki, 1963), France & Germany (Małecki, 1963), Austria (Vávra, 1977), France, Italy and Czech (Vávra, 1977)
Piacenzian - United Kingdom (Małecki, 1963), Belgium, Holland, Italy (Vávra, 1977)
Quaternary & Recent - Mediterranean (Braga & Barbin, 1988), Atlantic (Vávra, 1977)

Hornera concatenata Reuss, 1869a
pl. 5, fig. 6, pl. 6, fig. 5, pl. 7, fig. 4

v.* 1869a *Hornera concatenata* sp.n., Reuss p. 293, Pl. 35, Fig. 5-6.
1972 *Hornera concatenata* Reuss, Mongereau p. 324, Pl. 3, Fig. 2-5, 7
v. 1988 *Hornera concatenata* Reuss, Braga & Barbin p. 511, Pl. 2, Fig. 8-9
v. 1992 *Hornera concatenata* Reuss, Zágoršek p. 242 Pl. 4, Fig. 2
v. 2001b *Hornera concatenata* Reuss, Zágoršek p. 522, Pl. 4. Fig. 1

Diagnosis: The zooecial tubes are short, abundant and cylindrical with terminal, circular aperture. There are about 7 to 10 zooecial tubes arranged longitudinally one to each other on the frontal size of the colony. The nervi are linear and smooth without ribs, on the dorsal side they are anastomosing. The sulci are short. The vacuoles are small, abundant, a small one situated distally from the aperture, two, larger ones proximally from the aperture on frontal side. On the dorsal side of the colony, the vacuoles are also abundant, but smaller than on the frontal side. The gonozooecium is unknown.
Remarks: The syntypes stored in the Museum of Natural History in Vienna are nearly identical with specimens described here, mainly in having very short zooecia and a dorsal side with sulci and without ribs. Some of the syntypes have longer zooecial tubes, but have always a dorsal side without ribs and show small vacuoles proximally from the aperture. The number of vacuoles arranged distally and proximally from the apertures is identical. *Hornera concatenata* Reuss, 1869a differs from *H. frondiculata* in having rare vacuoles on frontal side and their nervi not anastomosing.
Occurrence: Haselbach and Reingruberhöhe in the entire section (samples RH 1, RH 3, RH 7, RH 10+11, RH 13, RH 31, RH 33 and Seifert's samples).
Distribution in time and space:
Priabonian - Austria & Hungary (Reuss, 1869a), Poland (Małecki, 1963), France (Mongereau, 1972), Romania (Ghiurca, 1987), Italy (Braga & Barbin, 1988), Slovakia (Zágoršek, 1992), Austria (Zágoršek, 2001b)
Rupelian - Italy (Braga & Barbin, 1988)

Hornera verrucosa Reuss, 1866
pl. 5, fig. 5, pl. 7, fig. 5

v.* 1866 *Hornera verrucosa* sp.n., Reuss p. 197, Pl. 9, Fig. 9
v. 1963 *Hornera polyporoides* Canu & Bassler, Małecki p.81, Pl. 6, Fig. 2

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1972 *Hornera verrucosa* REUSS, MONGEREAU p. 352
v. 1988 *Hornera verrucosa* REUSS, BRAGA & BARBIN p. 512
v. 2001b *Hornera verrucosa* REUSS, ZÁGORŠEK p. 522

Diagnosis: The zooecial tubes are long cylindrical with a terminal, circular aperture. On the frontal side of the colony, there are about 3 to 5 zooecial tubes arranged one to each other. The nervi are linear, smooth, anastomosing on the frontal side as well as on the dorsal side of the colony. The nervi situated on the dorsal side are not ribbed. The sulci are short. The vacuoles are abundant, of different size. Smaller vacuoles are located distally from the aperture, larger ones proximally from the aperture and on the dorsal side. Gonozooecia are not known.
Remarks: The types stored in the Museum of Natural History in Vienna have very short zooecia with anastomosing nervi and one large vacuole near the proximal margin of the aperture and a rarely present smaller distal vacuole. These features can be distinguished also in the studied material, however the distal vacuole is more abundant than seen in the syntypes. Other features are identical. *Hornera polyporoides* CANU & BASSLER in MAŁECKI (1963) has all characteristic features of *Hornera verrucosa* REUSS, 1866. *Hornera verrucosa* REUSS, 1866 differs from *H. concatenata* REUSS, 1869a in having fewer zooecial tubes on the frontal side of the colony, having longer zooecial tubes and having vacuoles also distally from the aperture.
Occurrence: Haselbach and Reingruberhöhe in the entire section (samples RH 1, RH 3, RH 7, RH 10+11, RH 13, RH 31, RH 33 and SEIFERT's samples).
Distribution in time and space:
Priabonian - Poland (MAŁECKI, 1963), France (MONGEREAU, 1972), Romania (GHIURCA, 1987), Italy (BRAGA & BARBIN, 1988), Austria (ZÁGORŠEK, 2001b)
Rupelian - Germany (REUSS, 1866)
Tortonian - Italy (BRAGA & BARBIN, 1988), Austria, Poland, Czech, Hungary (VÁVRA, 1977)

Hornera simplicissima BRAGA & BARBIN, 1988
pl. 7, fig. 1, 2

v. 1963 *Hornera tenuirama* CANU & BASSLER, MAŁECKI p. 83, pl. 6, Fig. 1
v.* 1988 *Hornera simplicissima* sp.n., BRAGA & BARBIN p. 512, Pl. 3, Fig. 5

Diagnosis: The zooecial tubes are very long cylindrical with terminal, circular aperture. There are only 3 to 4 zooecial tubes situated on the frontal side of the colony. The nervi are linear, smooth and rare. There are only 3 to 4 nervi on the whole colony. The sulci are short, developed on the frontal and dorsal side of the colony. The vacuoles are rare and small. They are developed more on the frontal side than on the dorsal side of the colony. Gonozooecia are unknown.
Remarks: *Hornera tenuirama* CANU & BASSLER as described by MAŁECKI (1963) exhibits all the features of *Hornera simplicissima* BRAGA & BARBIN.
Occurrence: Haselbach and Reingruberhöhe (sample RH 12 and SEIFERT's samples).
Distribution in time and space:
Priabonian Poland (MAŁECKI, 1963), Italy (BRAGA & BARBIN, 1988), Austria (ZÁGORŠEK, 2001b)
Rupelian - Italy (BRAGA & BARBIN, 1988)

Family Petaloporidae GREGORY, 1899

Genus *Crisidmonea* MARSSON, 1887

The colony is fixed-walled, erect, with triangular transverse section. The fascicles are in pairs arranged on frontal side of the colony, number of zooecia in each fascicle varies from 6 to 10. The mesopores are abundant covering almost the whole frontal side of the colony. The dorsal side shows large vacuoles. The gonozooecium is large, elongated situated on the frontal side, with a strongly porous frontal wall.

Crisidmonea tripora (CANU & BASSLER, 1926)
pl. 4, fig. 4

1984 *Crisidmonea tripora* (CANU & BASSLER), VOIGT p. 402, Pl. 7 Fig. 4-5

Diagnosis: The colony is rod-like. About 6 to 8 zooecia are in each fascicle. The zooecia are relatively long, with peristome. The mesopores are very abundant and large. The dorsal side of the colony is little convex with very large vacuoles. The vacuoles are sometimes as large as mesopores on the frontal side. The gonozooecium with strongly porous frontal wall is situated on the frontal side of the colony. It is perforated by 3 zooecial fascicles.
Remarks: Only one specimen has been found with gonozooecium. All the features visible on this specimen are identical with the description and illustration VOIGT (1984). He however argued that this species is typically Maastrichtian, but according to the present similarities I believe that my specimen is conspecific.
Occurrence: Reingruberhöhe (sample RH 31).
Distribution in time and space:
Cretaceous - Germany (VOIGT, 1984)

Genus *Polyascosoecia* CANU, 1920

The colony is fixed-walled, erect, with a triangular to transverse cross section. The fascicles are in pairs arranged on the frontal side of the colony, numbers of zooecia in each fascicle vary from 3 to 7. Typically a separated circular aperture occurs a little proximally, near each regular fascicle. The mesopores are abundant covering almost the whole frontal side of the colony. Large vacuoles are developed on the dorsal side. The gonozooecium is large,

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globular situated on the frontal side, with a roof formed by an exterior wall. The frontal shield of the gonozooecium is slightly perforated by many pseudopores, but laterally, in few occasions, also by large pores (cancelli).

Type species: *Polyascosoecia cancellata* CANU, 1920 (synonym: *Polyascosoecia coronopus* CANU & BASSLER, 1920).

Discussion: Although authorship of the genus *Polyascosoecia* is generally attributed to CANU & BASSLER (1920), recently TAYLOR & MCKINNEY (1996) discovered that CANU (1920) also established the genus *Polyascosoecia* and published his paper before that of CANU & BASSLER (1920). Therefore, CANU (1920) is the correct author of the name *Polyascosoecia.*

CANU (1920) selected as the type species ("genotype") of his genus *Idmonea cancellata* REUSS, 1848. However, REUSS (1848) himself did not describe *Idmonea cancellata* he only described *Idmonea cancellata* as species of GOLDFUSS and made a new combination of species and genus. REUSS (1848) reassigned GOLDFUSS's species *Retepora cancellata* to *Idmonea.* REUSS obviously mean, that his specimen even similar to GOLDFUSS shows features more closely related to *Idmonea*, than in *Retepora.* CANU (1920) has later chosen this species as a type species for his *Polyascosoecia.* TAYLOR & MCKINNEY (1996) concluded that CANU (1920) when giving the type species as *Idmonea cancellata* REUSS, 1848, meant in fact *Retepora cancellata* GOLDFUSS, 1829, which is the type species of the genus Crisidmonea. Therefore, *Polyascosoecia* is a junior synonym of *Crisidmonea* according to this interpretation. To make available generic name for *Polyascosoecia* as generally understood, TAYLOR & MCKINNEY (1996) established a new genus *Polyascosoeciella* with type species *Idmonea foraminosa* REUSS, 1951. CANU is an author of both publications in which *Polyascosoecia* is "established" (CANU, 1920 and CANU & BASSLER, 1920). I believe therefore that *Polyascosoecia* sensu CANU & BASSLER (1920) should be the same genus as *Polyascosoecia* sensu CANU (1920). VOIGT (1984) considered *Polyascosoecia coronopus* CANU & BASSLER, 1920 as a junior synonym of *Idmonea cancellata* sensu REUSS, 1848. So, when CANU (1920) erected the new genus *Polyascosoecia* and selected the type species as *Idmonea cancellata* REUSS, 1848 he meant *Idmonea cancellata* sensu REUSS, 1848 and not *Retepora cancellata* GOLDFUSS, 1829, and *Polyascosoecia* sensu CANU & BASSLER (1920) is the same genus as *Polyascosoecia* sensu CANU (1920). *Polyascosoecia* is therefore a valid genus with the type species becoming *Polyascosoecia cancellata* CANU, 1920 according to ICZN article 70/c.

According to VOIGT (1984) *Idmonea cancellata* sensu REUSS, 1848 (which is *Polyascosoecia cancellata* CANU, 1920 see above), *Polyascosoecia coronopus* CANU & BASSLER, 1920, *Idmonea foraminosa* REUSS, 1851 and *Idmonea subcancellata* D'ORBIGNY, 1853, are synonymous.

I study the type specimens of *Idmonea cancellata* sensu REUSS, 1848. According to his description this species occur in the localities Mörbisch, Rust, Nussdorf, Eisenstadt and Kroisbach. Among the originals of Reuss stored in NHM Vienna, there are only specimens from the locality Balanensand, Meissau (= Maissau) L.193; the number of specimens is 34. Among them 28 are kept in a separate tube and look like *Polyascosoecia coronopus* CANU & BASSLER, 1920; the rest of six (one of them being fenestrate) are of the "Crisidmonea-type"

However REUSS (1848) did not selected type locality and type specimen, the specimen illustrated on the Pl. 6, Fig. 33 (REUSS, 1848) resemble more *Polyascosoecia* than *Crisidmonea* in respect to the number of zooecia in each fascicle (3-4) and slightly proximally shifted the most dorsal aperture on the fascicle. Also other originals determined as Idmonea cancellata, stored in NHM, are narrow colonies without gonozooecia, but with 3-4 zooecia in one fascicle, with one aperture shifted slightly distally. These features are characteristic to *Polyascosoecia* and therefore I believe that these specimens belong to *Polyascosoecia.* Also the illustrations more resemble *Polyascosoecia*, because there are only 3-4 zooecial apertures in each fascicle and the most dorsal aperture in slightly shifted and not in the fascicle. These features allow us to determine these specimens as *Polyascosoecia.* It means, that CANU (1920), when describing new genus *Polyascosoecia* and established a type species as *Idmonea cancellata* sensu REUSS (1848) he really described a new genus in the concept of *Polyascosoecia coronopus* CANU & BASSLER, 1920 as generally understood by many authors (VOIGT, 1984; VÁVRA, 1991 etc.).

According to REUSS (1851) *Idmonea foraminosa* should occur in the follow localities: Nussdorf, Freibühl, Grosing, Würzing, Kroisbach, Eisenstadt, Mörbisch and Rust. However, among the originals of Reuss, deposited in the NHM in Vienna, there are only specimens from the localities Freibühl and Eisenstadt. The material from the locality Freibühl represents 7 specimens, three of them are very similar to *Polyascosoecia* and four is more closely related to *Crisidmonea.* None of them have developed ovicells. Therefore it is very complicated to establish which specimen should be regarded as a holotype (lectotype). Also MONGEREAU (1969) confirmed that he could not find the holotype of *Idmonea foraminosa* REUSS, 1851. One of the specimens however closely resembles the illustrated specimen on Pl. 9, Fig. 19 (REUSS, 1848). This specimen has almost flat frontal part of the colonial stem, fascicles not alternating and all apertures are on the fascicles. Therefore this specimen is most similar to *Crisidmonea*, that to *Polyascosoecia.* We can therefore assumed, that *Idmonea foraminosa* REUSS 1851 is in fact *Crisidmonea foraminosa* and all genera having *Idmonea foraminosa* REUSS 1851 as a type species is synonymous to *Crisidmonea* (for example *Polyascosoeciella* TAYLOR & MCKINNEY, 1996)

I am unable to study specimens of *Idmonea subcancellata* D'ORBIGNY, 1853 and therefore I cannot proof their genus attribution. It means, that according to ICZN article 70/c the first designation of this species became *Polyascosoe-*

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cia cancellata CANU, 1920, which is in fact synonymous with *Polyascosoecia coronopus* CANU & BASSLER, 1920. Therefore we should use this name as the oldest synonym, when describing this species.

Remarks: Within Eocene sediments, also *Crisidmonea* MARSSON, 1887 shows very similar colonies. These two genera differ mainly in the structures on the gonozooecia. *Crisidmonea* has smaller, elongated gonozooecia, with porous frontal wall. According to VÁVRA (1991), correct determinations can be made only when gonozooecia are known. Nevertheless, there are some other differences, which allow us to distinguish these two genera. *Crisidmonea* has larger and more robust branches (number of zooecia in one fascicle vary from 6 to 10), branches usually anastomosing and all zooecia are in fascicles (a separated aperture lying a little proximally from the regular fascicle can never be found). This somewhat proximally shifted aperture occurs also in the species of *Polyascosoecia* described by CANU & BASSLER (1922). Therefore, I believe than according to these small differences also specimens without gonozooecia can be determined.

Polyascosoecia cancellata CANU, 1920 (=*Polyascosoecia coronopus* CANU & BASSLER, 1920)

pl. 7, fig. 7

v.* 1848 *Idmonea cancellata* GOLDFUSS, REUSS p. 46, Pl. 5, Fig. 25-27, Pl. 6, Fig. 33 (partim)
1920 *Polyascosoecia coronopus* sp.n., CANU & BASSLER p. 837
1922 *Polyascosoecia coronopus* sp.n., CANU & BASSLER p. 126, Pl. 20, Fig. 1-8
v. 1963 *Reteporidea cancellata* (REUSS), MAŁECKI p. 84, Fig. 36, Pl. 6, Fig. 5
v. 1963 *Reteporidea subcancellata* HAGENOW, MAŁECKI p. 85
v. 1963 *Reteporidea foraminosa* (REUSS), MAŁECKI p. 85, Pl. 6, Fig. 6
? 1963 *Laterocavea* cf. *dutempleana* D'ORBIGNY, MAŁECKI p. 83, Pl. 5, Fig. 3
1969 *Reteporidea coronopus* (CANU & BASSLER), MONGEREAU p. 240, Pl. 17, Fig 4, 6
1977 *Reteporidea coronopus* CANU & BASSLER, VÁVRA p. 59
1984 *Polyascosoecia coronopus* CANU & BASSLER, VOIGT p. 407, Pl. 7, Fig. 8-13
v. 1988 *Reteporidea coronopus* (CANU & BASSLER), BRAGA & BARBIN p. 513, Pl. 3, Fig. 8, 9
v. 1991 *Polyascosoecia coronopus* (CANU & BASSLER), VÁVRA p. 499, Pl. 1, Fig. 5, Pl. 2, Fig. 1-3
v. 1992 *Reteporidea coronopus* (CANU & BASSLER), ZÁGORŠEK p. 242, Pl. 5, Fig. 4-6
v. 2001a *Polyascosoecia coronopus* CANU & BASSLER, ZÁGORŠEK p. 28, Pl. 3, Fig. 4, 6

Diagnosis: The colony is rod-like, rarely bifurcated. About 3 to 5 zooecial tubes form each fascicle. One aperture occurs outside of the regular fascicle, it is shifted a little proximally. The zooecia are relatively long, with a peristome. The mesopores are very abundant and large. The dorsal side of the colony is flat with very large vacuoles, they are sometimes as large as the mesopores on the frontal side. The gonozooecium is large, with a nonporous frontal wall situated on the frontal side of the colony, usually in the place of a bifurcation.

Remarks: Specimens described as *Idmonea cancellata* GOLDFUSS by REUSS (1848) stored in the Museum of Natural History in Vienna are identical with *Polyascosoecia coronopus* CANU & BASSLER (1920). In the same result came also VÁVRA (1991). According to VOIGT (1984) *Polyascosoecia coronopus* CANU & BASSLER, 1920 and *Idmonea subcancellata* D'ORBIGNY, 1853, are also synonymous (see discussion within genus description).

Reteporidea cancellata (REUSS), *Reteporidea subcancellata* HAGENOW, and *Reteporidea foraminosa* (REUSS), which were described by MAŁECKI (1963) have the entire features characteristic for *Polyascosoecia coronopus* CANU & BASSLER, 1920. The MAŁECKI specimens however very often developed ovicells. They are frontal, mostly globular, prominent, but also slightly immersed and all of them have strongly porous frontal walls. *Laterocavea* cf. *dutempleana* D'ORBIGNY in MAŁECKI (1963) differs in not developing the one aperture situated out of the regular fascicle and shifted a little proximally. This difference however could be regarded as very slight and therefore I believe that also these specimens belong to *Polyascosoecia coronopus* CANU & BASSLER, 1920. On one specimen found at the Reingruberhöhe a globular structure very similar to a gonozooecium in *Crisidmonea* (porous walls) occurs. Because this structure grows from the dorsal side of the colony, it is probably not a gonozooecium. This specimen belongs probably to *Polyascosoecia coronopus* CANU & BASSLER, 1920, because other features (number of zooecia in fascicles 3 to 4, presence of shifted aperture and narrow zooecial branch) indicate this species.

Occurrence: Haselbach and Reingruberhöhe in the entire section (samples RH1, RH 4, RH 9, RH 10+11, RH 31, RH 33 and SEIFERT's samples).

Distribution in time and space:

Cretaceous - Germany (VOIGT, 1984)

Priabonian Poland (MAŁECKI, 1963), Italy (BRAGA & BARBIN, 1988), Slovakia (ZÁGORŠEK, 1992), France (MONGEREAU, 1969), Romania (GHIURCA, 1987), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Zanclean - Germany (VÁVRA, 1977)

Tortonian Austria & Hungary (REUSS, 1848), France, Italy, Poland, Czech (VÁVRA, 1977)

Piacenzian - America (CANU & BASSLER, 1920)

Pliocene - United Kingdom, Nederland (VÁVRA, 1977)

Suborder Cerioporina HAGENOW, 1851

Family Heteroporidae WATERS. 1880

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Genus *Heteropora* Blainville, 1830

The colony is erect or encrusting, with a smooth surface. The zooecial tubes are long, mostly cylindrical with perforated walls, arranged around the whole branch of the colony, but not in fascicles. Between zooecial tubes, there are many mesopores. The gonozooecium is known only in cretaceous species.

Heteropora subreticulata Reuss, 1869a

v.* 1869a *Heteropora subreticulata* sp.n., Reuss p. 288, Pl. 36, Fig. 7
v. 1963 *Heteropora* cf. *cryptopora* (Goldfuss), Małecki p. 86, Fig. 37, Pl. 7, Fig. 2
v. 1963 *Heteropora* sp., Małecki p. 87, Pl. 8, Fig. 11
v. 1963 *Heteroporella radiata* (Busk), Małecki p. 86, Pl. 7, Fig. 3
v. 1988 *Heteropora subreticulata* Reuss, Braga & Barbin p. 513, Pl. 4, Fig. 2
v. 1992 *Heteropora subreticulata* Reuss, Zágoršek p. 245, Pl. 4, Fig. 9
v. 2001a *Heteropora subreticulata* Reuss, Zágoršek p. 29, Pl. 3, Fig. 7

Diagnosis: The colony is erect, bifurcated. The branches have circular transverse section. The zooecial tubes are cylindrical and very long.
The apertures are almost rectangular. The mesopores are abundant, small circular to polygonal, equal in size. The gonozooecium is unknown.
Remarks: The holotype in the Museum of Natural History in Vienna is only a very small fragment of the rod-like colony. The specific features (small, abundant mesopores and almost rectangular transverse section of zooecial tube) are identical with those in Austrian material.
Heteropora cf. *cryptopora* (Goldfuss), *Heteropora* sp. and *Heteroporella radiata* (Busk) described by Małecki (1963) show very long and cylindrical zooecial tubes, rectangular apertures and abundant, circular to polygonal mesopores, so I believe that they belong to *Heteropora subreticulata*.
Occurrence: Haselbach and Reingruberhöhe (samples RH 10+11, RH 12, RH 31 and RH 33).
Distribution in time and space:
Priabonian - Vicentin (Reuss, 1869a), Poland (Małecki, 1963), Italy (Braga & Barbin, 1988), Slovakia (Zágoršek, 1992), Romania (Ghiurca, 1987), Hungary (Zágoršek, 2001a), Austria (Zágoršek, 2001b)
Rupelian - Italy (Braga & Barbin, 1988)

Suborder Rectangulata Waters, 1887
Family Lichenoporidae Smitt, 1866

Genus *Lichenopora* Defrance, 1823

The colony is conical with a nonporous outer surface (so called basal wall) and with zooecial apertures opening on the apical, circular part of the colonial centre. The zooecia are tubular, straight opening in circular frontal area. The apertures are typically arranged in radial ridges - fascicles, but rarely the fascicles are not developed. The fascicles are multilaminar but not prominent. The colonial centre is usually flat, but might be also concave or convex. The cancelli are polygonal. The gonozooecium is small, situated in the middle of the colonial centre and usually has a small pore (oeciopore).
Remarks: The distinctive feature of *Lichenopora* is the presence of nonporous outer surface of conical colony (Gordon & Taylor, 1997). The true *Lichenopora* is very rare within Eocene sediments in the Alpine Carpathians region. Most of the species erroneously listed under *Lichenopora* belong to *Disporella*.

Lichenopora turbinata Defrance, 1823
pl. 8, fig. 1

1997 *Lichenopora turbinata* Defrance, Gordon & Taylor p. 73, Figs 1-10 (cum. syn.)

Diagnosis: The colony is pedunculate. The apical colonial centre is flat, or little convex. The zooecia are arranged in slight biserial fascicles, sometimes fascicles are not preserved. The gonozooecium is situated in the colonial centre, which is, in this case, concave. The cancelli are polygonal, smaller than the zooecial tubes.
Remarks: The Reingruberhöhe specimens have not developed gonozooecia, however other features are almost identical as described by Gordon & Taylor (1997).
Occurrence: Reingruberhöhe (sample RH 31).
Distribution in time and space:
Lutetian - France (Gordon & Taylor, 1997)
Priabonian northern Aquitanian (Gordon & Taylor, 1997)

Genus *Disporella* Gray, 1848

The colony is encrusting, non-pedunculate, and discoidal to oval with well-developed basal lamella. The zooecia are arranged in radial ridges - fascicles only on the apical side of the colony.
The fascicles are prominent, uniserial or multilaminar, with large zooecial apertures. The colonial centre is concave. The cancelli are polygonal. The gonozooecium, if present, is situated in the central area. The dorsal side of the colony is nonporous, usually with visible growing lines and/or slightly ribbed.

Disporella coronula (Reuss, 1848)
pl. 8, fig. 3

v.* 1848 *Defrancia coronula* sp.n., Reuss p. 38, Pl. 6, Fig. 5
non 1963 *Lichenopora coronula* (Reuss), Małecki p. 91, Pl. 8, Fig. 4

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v. 1992 *Lichenopora coronula* (REUSS), ZÁGORŠEK p. 245, Pl. 5, Fig. 8

v. 2001a *Disporella coronula* (REUSS), ZÁGORŠEK p. 29, Pl. 3, Fig. 5

Diagnosis: The colony is probably free-living or encrusting with a thin basal lamella. The 6 to 8 triserial or multilaminar fascicles are developed on the frontal surface of the colony and rarely additional fascicles are present. The colonial centre is concave, with cancelli and rarely with a gonozooecium. The cancelli are polygonal, as large as zooecial tubes. The dorsal side of the colony is smooth or slightly ribbed.

Remarks: Specimens found in Austria have usually six multilaminar fascicles, which are slightly less prominent than in the syntypes in the Museum of Natural History in Vienna. The studied colony is larger than the syntypes, but smaller than specimens described from Hungary (ZÁGORŠEK, 2001a) and Poland (MAŁECKI, 1963). The distinctive feature of *Disporella coronula* (REUSS, 1848) seems to be the very prominent fascicles, which are triserial or multilaminar.

Lichenopora coronula (REUSS) in MAŁECKI (1963) has zooecia arranged in longitudinal fascicles, which are in two parallel rows. This feature is characteristic for the *Disporella verrucosa* (PHILIPPI).

Occurrence: Haselbach and Reingruberhöhe in the entire section (samples RH 3, RH 7, RH 10+11, RH 31 and RH 33).

Distribution in time and space:

Priabonian - Poland (MAŁECKI, 1963), Romania (GHIURCA, 1987), Slovakia (ZÁGORŠEK, 1992), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Tortonian - Austria & Hungary (REUSS, 1848), France, Czech (VÁVRA, 1977)

Disporella goldfussi (REUSS, 1864a)

pl. 8, fig. 6, 7

v. 1848 *Defrancia stellata* GOLDFUSS, REUSS p. 37, Pl. 6, Fig. 2.

v.* 1864b *Radiopora goldfussi* sp.n., REUSS p. 676

1866 *Radiopora goldfussi* REUSS, REUSS p. 84, Pl. 10, Fig. 11, 12

1878 *Defrancia stellata* GOLDFUSS, MANZONI p. 16, Pl. 16, Fig. 63

non 1920 *Lichenopora goldfussi* (REUSS), CANU & BASSLER p. 821, Pl. 162, Fig. 8-20

? 1920 *Lichenopora prolifera* (REUSS), CANU & BASSLER p. 820, Pl. 162, Fig. 4-7

non 1963 *Lichenopora goldfussi* (REUSS), MAŁECKI p. 92, Fig. 41, Pl. 8, Fig. 1-2

v. 1963 *Lichenopora californica* (CONRAD), MAŁECKI p. 91, Pl. 7, Fig. 7

1977 *Lichenopora goldfussi* (REUSS), VÁVRA p. 67

? 1988 *Lichenopora radiata* (SAVIGNY-AUDOUIN), BRAGA & BARBIN p. 514, Pl. 4, Fig. 3, 4.

1988 *Lichenopora goldfussi* (REUSS), MOISSETTE p. 67, Pl. 9, Fig. 10, 11.

1992 *Lichenopora goldfussi* (REUSS), EL HAJJAJI p. 76, Pl. 3, Fig. 15.

Diagnosis: The colony is globular to columnar, composed of superposed disks, sometimes very large. The basal lamella is thick, narrow and characteristically radially striated. The central area is large, little convex or flat with numerous (from 16 to 25), triserial fascicles. The fascicles are slightly visible, short and protruding from the colonial margin. The zooecial tubes are rectangular or oval, smaller than kenozooecial tubes, which are polygonal to oval. The gonozooecium is very large, occupying almost the whole terminal part of colony. When a gonozooecium is developed, the fascicles are very inconspicuous, sometimes not visible.

Remarks: VÁVRA (1977) pointed out that *Defrancia stellata* GOLDFUSS, described by REUSS (1848) is identical with *Radiopora goldfussi* REUSS, 1864a.

The specimens deposited in the Museum of Natural History in Vienna have mostly globular colonies; sometimes several colonies grow together. The fascicles are uniserial, but very rarely also biserial, not prominent. Gonozooecia have not been found within the REUSS material stored in the Museum of Natural History in Vienna.

Lichenopora prolifera (REUSS), described by CANU & BASSLER (1920) perhaps belongs to this species. The specimens have uniserial fascicles and a large central area, but the colony is discoidal, sometimes composed of superposed disks.

Lichenopora goldfussi (REUSS), described by CANU & BASSLER (1920) and MAŁECKI (1963) have large multilaminar fascicles and a small central part. They perhaps belong to *Disporella radiata* (SAVIGNY-AUDOUIN, 1826).

Lichenopora radiata (SAVIGNY-AUDOUIN), as described by BRAGA & BARBIN (1988) with its columnar colony and uniserial fascicles shows all features like *Lichenopora goldfussi* (REUSS).

Lichenopora californica (CONRAD) described by MAŁECKI (1963) displays all important features of *Disporella goldfussi* (REUSS, 1864a) and therefore is listed here among the synonyms.

Occurrence: Reingruberhöhe (sample RH 31).

Distribution in time and space:

Priabonian - Austria & Hungary (MANZONI, 1878) Poland (MAŁECKI, 1963), Italy (BRAGA & BARBIN, 1988),

Rupelian - Germany (REUSS, 1864b)

Serravallian - Italy (CANU & BASSLER, 1920)

Tortonian Austria & Hungary (REUSS, 1848), France, Romania, Czech (VÁVRA, 1977)

Messinian Algeria (MOISSETTE, 1988), Morocco (EL HAJJAJI, 1992)

Piacenzian - Italy (CANU & BASSLER, 1920),

Quaternary & recent cosmopolitan (BRAGA & BARBIN, 1988)

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Disporella grignonensis Milne Edwards, 1838
pl. 8, fig. 2

1838b *Tubulipore de Grignon* sp.n., Milne Edwards p. 333, Pl. 13, fig. 2-2d
v.* 1862 *Domopora prolifera* (Reuss, 1848), Stoliczka p. 82
1920 *Lichenopora grignonensis* Milne Edwards, Canu & Bassler p. 818, Pl. 129, Fig. 1-11 (cum. syn)
v. 1963 *Lichenopora grignonensis* Milne Edwards, Małecki p. 93, Pl. 8, Fig. 6
1980 *Lichenopora grignonensis* Milne Edwards, Braga p. 44, Fig. 25, 26
1988 *Lichenopora grignonensis* Milne Edwards, Braga & Barbin p. 514, Pl. 4, Fig. 1
v. 1992 *Lichenopora grignonensis* Milne Edwards, Zágoršek p. 245, Pl. 5, Fig. 7
v. 2001a *Disporella grignonensis* Milne Edwards, Zágoršek p. 29, Pl. 3, Fig. 10

Diagnosis: The colony is encrusting. The basal lamella is thick. The central area is large and concave without cancelli. The fascicles are short, uniserial, and never reach the margins of the colony. The cancelli are polygonal, in the central area missing, between the fascicles sometimes as large as autozooecial apertures. The dorsal side of the colony is slightly ribbed. A gonozooecium is often developed in the central area. It is small with flat, nonporous frontal wall.

Remarks: Most of the specimens described by Stoliczka (1862) as *Domopora prolifera* (Reuss, 1848) deposited in the Museum of Natural History in Vienna belong to *Disporella grignonensis* Milne Edwards, 1838. Some of them are very similar to *Disporella radiata* (Savigny-Audouin, 1826).

The original illustration from Milne Edwards (1838) shows only undistinguished uniserial fascicles and long zooecial tubes. However, other features are identical (polygonal cancelli, thick basal lamella and zooecial tubes never reaching colonial margin). Therefore, all these specimens could be conspecific.

Occurrence: Reingruberhöhe in the entire section (samples RH 3, RH 4, RH 10+11, RH 31 and RH 33).

Distribution in time and space:

Lutetian - Germany (Stoliczka, 1892), America (Canu & Bassler, 1920), France (Canu & Bassler, 1920)

Priabonian - America (Canu & Bassler, 1920), Poland (Małecki, 1963), Romania (Ghiurca, 1987), Italy (Braga & Barbin, 1988), Slovakia (Zágoršek, 1992), Hungary (Zágoršek, 2001a), Austria (Zágoršek, 2001b)

Disporella radiata (Savigny-Audouin, 1826)
pl. 8, fig. 4

v.* 1848 *Defrancia prolifera* sp.n., Reuss p. 37, Pl. 6, Fig. 1
v. 1862 *Domopora prolifera* (Reuss), Stoliczka p. 82
1920 *Lichenopora goldfussi* (Reuss), Canu & Bassler p. 821, Pl. 162, Fig. 8-20
v. 1963 *Lichenopora goldfussi* (Reuss), Małecki p. 92, Fig. 41, Pl. 8, Fig. 1-2
v. 1963 *Lichenopora brongniarti* (Reuss), Małecki p. 90, Pl. 7, Fig. 6
1929b *Lichenopora radiata* (Savigny-Audouin), Canu & Bassler p. 556, Pl. 88, Fig. 1-6
1977 *Lichenopora radiata* (Savigny-Audouin), Vávra p. 69 (cum. syn.)
non 1988 *Lichenopora radiata* (Savigny-Audouin), Braga & Barbin p. 514, Pl. 4, Fig. 3, 4.
v. 2001a *Disporella radiata* (Savigny-Audouin), Zágoršek p. 30, Pl. 3, Fig. 8

Diagnosis: The colony is encrusting. The basal lamella is thin. The central area is very small. The fascicles are very long, occupying almost the whole central area. They are triserial and narrow. The cancelli are large, polygonal and sometimes as large as autozooecia. The dorsal side of the colony is slightly ribbed and porous. No gonozooecia are known from fossil material.

Remarks: According to Vávra (1977) *Defrancia prolifera* Reuss, 1848 is a junior synonym of *Disporella radiata* (Savigny-Audouin, 1826). The syntypes deposited in the Museum of Natural History in Vienna show all features present in the studied material.

The gonozooecia have been described only by Canu & Bassler (1929b) from the recent sea from Philippine region. Due to the presence of a characteristically radially ribbed basal lamella, I believe that these specimens are conspecific with fossil ones found at Reingruberhöhe.

Lichenopora goldfussi (Reuss), described by Canu & Bassler (1920) and Małecki (1963) have large multilaminar fascicles and a small central part. Therefore, these specimens perhaps belong to *Disporella radiata* (Savigny-Audouin, 1826).

Lichenopora radiata (Savigny-Audouin) described by Braga & Barbin (1988) has uniserial fascicles and columnar colonies, so it probably belongs to *Disporella goldfussi* (Reuss, 1864a).

Małecki (1963) described *Lichenopora brongniarti* (Reuss) which however has all the features of *Disporella radiata* and therefore is listed here among its synonyms

Occurrence: Reingruberhöhe (samples RH 1, RH 2 and RH 31).

Distribution in time and space:

Lutetian Germany (Stoliczka, 1892), Egypt (Ziko, 1985)

Priabonian - Poland (Małecki, 1963), Slovakia (Zágoršek, 1992), Romania (Ghiurca, 1987), Italy (Braga & Barbin, 1988), Hungary (Zágoršek, 2001a), Austria (Zágoršek, 2001b)

Rupelian - Germany (Canu & Bassler, 1920)

Tortonian - Austria & Hungary (Reuss, 1848), New Zealand (Ziko, 1985), Italy, Czech (Vávra, 1977)

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Pliocene - Italy (VÁVRA, 1977)
Quaternary & Recent Philippine (CANU & BASSLER, 1929b), Mediterranean (ZIKO, 1985), Japan, Red see, Italy, Greece (VÁVRA, 1977)

Disporella cf. *verrucosa* (PHILIPPI, 1843)
pl. 8, fig. 5

v. 1864b *Heteroporella verrucosa* (PHILIPPI), REUSS p. 681, Pl. 7, Fig. 1, 2
v. 1869b *Heteroporella verrucosa* (PHILIPPI), REUSS p. 480
? 1920 *Lichenopora verrucosa* (PHILIPPI), CANU & BASSLER p. 818, Pl. 131, Fig. 10 - 13, Pl. 130, Fig. 12, 13
v. 1963 *Lichenopora verrucosa* (PHILIPPI, 1843), MAŁECKI p. 95, Pl. 8, Fig. 8
v. 1963 *Lichenopora coronula* (REUSS), MAŁECKI p. 91, Pl. 8, Fig 4

Diagnosis: The colony is simple, encrusting, rarely composed of superposed disks. The basal lamella is nonporous and thin. The central area is large and convex. The fascicles are salient biserial or triserial not continued to the colonial margin. The cancelli are larger in central area than between the fascicles. The gonozooecium is situated in the central area, rare.
Remarks: The gonozooecia have been only mentioned by CANU & BASSLER (1920). They did not illustrate or describe them. Gonozooecia have not been found among REUSS material or at Reingruberhöhe. Therefore, the features of the gonozooecium are unknown.
The Reingruberhöhe specimens are identical with material deposited in the Museum of Natural History in Vienna. The specimens from the REUSS collection have however larger colonies. Because only small fragments have been recently found at Reingruberhöhe without gonozooecia, the species determination is uncertain.
MAŁECKI (1963) described *Lichenopora coronula* (REUSS) that has characteristic features of *Disporella verrucosa* (PHILIPPI).
Occurrence: Reingruberhöhe (sample RH 31).
Distribution in time and space:
Lutetian - Egypt (ZIKO, 1985)
Priabonian - Poland (MAŁECKI, 1963), Carolina (CANU & BASSLER, 1920), France (ZIKO, 1985)
Rupelian - Germany (REUSS, 1864b), France - (REUSS, 1869b)

Genus *Trochiliopora* GREGORY, 1909

The colony is pedunculate, conical with porous outer surface (so called basal wall) and with zooecial apertures opening on the apical, circular part of the colonial centre. The apertures are typically arranged in radial biserial to multilaminar fascicles. The cancelli are usually small and rare. The colonial centre is depressed with large gonozooecium.

Trochiliopora beyrichi (REUSS, 1851)
pl. 9, figs. 1, 2

v.* 1851 *Pelagia Beyrichi* sp.n., REUSS p. 176, Pl. 9, Fig. 23, 24
1866 *Defrancia Beyrichi* (REUSS), REUSS p. 193, Pl. 10, Fig. 7-9
1887 *Lichenopora beyrichi* (REUSS), PERGENS p. 66
? 1963 *Lichenopora beyrichi* (REUSS), MAŁECKI p. 88, Pl. 7, Fig. 8, 9
v. 1992 *Lichenopora beyrichi* (REUSS), ZÁGORŠEK p. 245, Pl. 5, Fig. 9
1997 *Trochiliopora beyrichi* (REUSS), POUYET p. 31, Pl. 2, Fig. 1-4
v. 2001a *Trochiliopora beyrichi* (REUSS), ZÁGORŠEK p. 30, Pl. 3, Fig. 3

Diagnosis: The colony is erect from encrusting base. The apical part of the colony is formed by 8 to 12 prominent, biserial to multilaminar fascicles. The cancelli are rare, small and oval. The colonial centre is extremely depressed, and gonozooecia are rare. The gonozooecium is very large occupying almost the whole central area. The frontal wall of the gonozooecium has not been preserved.
Remarks: The described specimens have zooecial fascicles larger and more prominent and have wider colonial cones than the holotype stored in the Museum of Natural History in Vienna. These features are however perhaps not specific. Other features are identical with the holotype.
Occurrence: Haselbach and Reingruberhöhe (samples RH 13, RH 31, RH 33 and SEIFERT's samples.
Distribution in time and space:
Priabonian - Poland (MAŁECKI, 1963), Romania (GHIURCA, 1987), Slovakia (ZÁGORŠEK, 1992), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Rupelian - Germany (REUSS, 1866)
Tortonian - Poland (POUYET, 1997), Austria & Hungary (REUSS, 1851)

Trochiliopora planiformis sp.n.
pl. 9, figs. 3–7

Diagnosis: The colony is erect from encrusting base, rarely pedunculate. The frontal surface of the colony is formed by 12 to 14 short, slightly prominent, multilaminar fascicles. The cancelli are large and circular. The outer surface of colonial cone is porous. The colonial centre is flat, rarely slightly convex with gonozooecium. The gonozooecium is large occupying almost the whole central area. The oeciopore is oval, opening in the margin of the central area, twice as wide as the regular aperture.
Holotype: The specimen depicted in pl. 9, figs. 3, 7 from the locality Reingruberhöhe (samples RH31), deposited in the Institute of Paleontology of University Vienna, Austria.
Paratypes: 15 specimens from the locality Reingruberhöhe, deposited in the Institute of Palaeontology, University of

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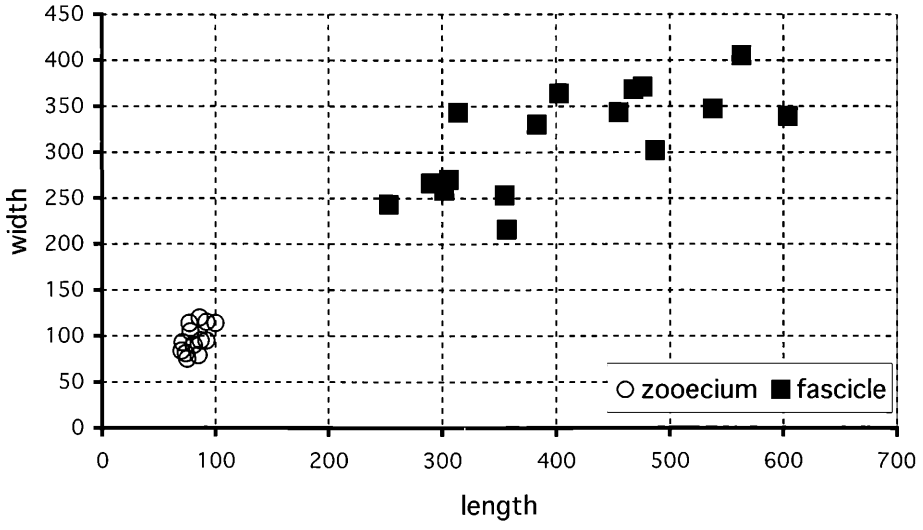

Figure 7: Chart of important measurements of *Trochiliopora planiformis* sp.n. (values in μm).

Vienna, Austria.
Derivatio nominis: Due to flat colonial central area; planus in Latin means flat and forma means shape.
Locus typicus: Reingruberhöhe (sample RH 31).
Stratum typicum: Eocene - Priabonian.
Dimensions: (in micro meters = μm; x = average, details in fig. 7):
size of frontal side of colony: 1051 x 2564 to 2398 x 2412; x = 1807 x 2397
height of colony: 1239 -1826; x = 1533
length of zooecia: x = 82
width of zooecia: x = 97
length of fascicle: x = 410
width of fascicle: x = 314
diameter of kenozooecia: 32 - 57; x =42
diameter of peduncle: 445, 705
diameter of oeciopore: 152 x 21, 104 x 46
Description: The colony is encrusting, rarely with a long peduncle. The apical surface of the colony is formed by 12 to 14 prominent, multilaminar fascicles situated around a large central area. The fascicles are developed only in the margin of the colony. They are short, slightly rise above the colonial central area. The zooecial apertures are arranged in fascicles in 2 or 3 radial rows, but sometimes not in rows. The colonial centre is oval, rarely circular and flat, never concave, rarely convex when gonozooecium is developed. The gonozooecium is large occupying the whole central area. The gonozooecial chamber is wide, large, spreading also among fascicles. The oeciopore is oval, larger than autozooecial apertures, with short peristome opening in the margin of the central area. The cancelli are abundant, half the diameter of autozooecial apertures, circular. Small pores perforate the outer surface of the colonial cone.
Comparison: The most similar species seems to be *Lichenopora falunica* Buge, 1957 with its short fascicles and with very little concave central area, which can be flat when a gonozooecium is developed. This species differs mainly in having a non-pedunculate colony and uniserial fascicles. Also, the oeciopore is much larger than in *Trochiliopora planiformis* sp.n. *Trochiliopora insignis* (Manzoni, 1878) is also similar in having a pedunculate colony and multilaminar fascicles. It differs, because the fascicles are very long, and therefore the central area is very small. The most abundant similar form in Eocene sediments is *Trochiliopora beyrichi* (Reuss, 1851); it differs from *Trochiliopora planiformis* sp.n. in having very long fascicles, never a flat or convex central area and by having smaller gonozooecia.
Remark: Because of the pedunculate colony, porous outer surface of colony and abundant cancelli the species is listed under *Trochiliopora*.
Occurrence: Reingruberhöhe (samples RH 31 and RH 33).

Class Gymnolaemata Allman, 1896

4.2. Order Cheilostomatida Busk, 1852

Suborder Malacostegina Levinsen, 1902
Superfamily Membraniporoidea Busk, 1852
Family Membraniporidae Busk, 1852

Genus *Biflustra* d'Orbigny 1852

The colony is erect, bilamellar to multilaminar. The zooecia have a well-developed cryptocyst, no avicularia and spines. The opesia are usually very large. The gymnocyst is not developed. The ovicells are unknown.

***Biflustra savartii texturata* (Reuss, 1848)**
pl. 12, fig. 4

1848 *Vaginopora texturata* sp.n., Reuss p. 73, Pl. 9, Fig. 1
v. 1862 *Biflustra clathrata* (Philippi), Stoliczka p. 85
1923 *Acanthodesia savartii texturata* (Reuss), Canu & Bassler p. 32, Pl.5, Fig. 1-5, Pl. 46, Fig. 8, 9
1963 *Acanthodesia savartii texturata* (Reuss), Braga p. 22, Pl. 2, Fig. 2
v. 1963 *Smittipora midwayanica* Canu & Bassler, Małecki p. 106, Pl. 10, Fig. 1, 2
1973 *Biflustra savartii* forme *texturata* (Reuss), Buge p. 34, Pl. 5, Fig. 7
1974 *Biflustra savartii* forme *texturata* (Reuss), David & Pouyet p. 99, Pl. 3, Fig. 6
1977 *Biflustra savartii texturata* (Reuss), Vávra p. 77 (cum. syn.)

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1980 *Biflustra savartii texturata* (REUSS), BRAGA p. 44

v. 1988 *Biflustra savartii texturata* (REUSS), BRAGA & BARBIN p. 515, Pl. 4, Fig. 6

v. 1996 *Biflustra savartii texturata* (REUSS), ZÁGORŠEK p. 123, Pl. 1, Fig. 1-2

v. 2001b *Biflustra savartii texturata* (REUSS), ZÁGORŠEK p. 524

Diagnosis: The colony is bilamellar to multilaminar with circular or slightly oval cross section. The zooecia are arranged in 8 to 10 regular longitudinal zooecial rows. They are oval, two times longer than wide. The cryptocyst is well developed, smooth, sometimes situated very deeply inside the zooecium. The opesia are circular to oval, placed near the distal margin of the zooecium. The mural rim is smooth and narrow. The lateral parts of the mural rim form regular longitudinal lines.

Remarks: Some of the specimens from Reingruberhöhe have developed a very short cryptocyst, and these specimens are very similar to *Crassimarginatella macrostoma*. *Crassimarginatella* differs however mainly in having larger zooecia and a wider mural rim.

MAŁECKI (1963) described *Smittipora midwayanica* CANU & BASSLER, 1920 which exhibits all the features characteristic for *Biflustra savartii texturata* (REUSS, 1848) and therefore is listed here.

Occurrence: Haselbach and Reingruberhöhe (samples RH31 and RH 33).

Distribution in time and space:

Priabonian Poland (MAŁECKI, 1963), Italy (STOLICZKA, 1862, BRAGA & BARBIN, 1988), Egypt (ZIKO, 1985), Romania (GHIURCA, 1987), France and Belgium (ZIKO, 1985), Slovakia (ZÁGORŠEK, 1996), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Burdigalian - Jamaica (CANU & BASSLER, 1923)

Tortonian - Austria & Hungary (REUSS, 1848, DAVID & POUYET, 1974), France, Italy, Egypt and Spain (ZIKO, 1985), USA (BUGE, 1957), Poland, Czech (VÁVRA, 1977), Romania (BUGE, 1973)

Piacenzian - Italia (BUGE, 1957)

Quaternary & Recent - Florida (CANU & BASSLER, 1923), Argentina and Mediterranean (ZIKO, 1985), cosmopolitan (BUGE, 1957)

Family Electridae D'ORBIGNY, 1851

Genus *Pyripora* D'ORBIGNY, 1852

The colony is uniserial encrusting and branching. The zooecia have well-developed nonporous gymnocyst and very large opesium, but lack spines and cryptocyst. The colony has no avicularia or ovicells.

Pyripora huckei BUGE, 1973

pl. 10, figs. 1, 2

1973 *Pyripora huckei* sp.n., BUGE p. 35, Pl. 5, Fig. 6

Diagnosis: The colony forming regular uniserial longitudinal rows of zooecia placed one after the other, is laterally branching in oblique or in right angle. The zooecia are oval, proximally tapering with reduced gymnocyst. The gymnocyst is convex, nonporous, about one third to one fourth the length of the zooecia, proximal to a large, oval, rimless opesium. The cryptocyst is reduced almost not observable.

Remarks: The Waschberg specimens exhibit the same features as described by BUGE (1973). The specific features seem to be large opesium and lateral budding of branches in angles up to 90 degrees.

Occurrence: Reingruberhöhe (sample RH 2).

Distribution in time and space:

Helvetian - France (BUGE, 1973)

Suborder Flustrina SMITT, 1868

Superfamily Calloporoidea NORMAN, 1903

Family Calloporidae NORMAN, 1903

Genus *Alderina* NORMAN, 1903

The colony is unilamellar or encrusting. Large opesia have a short gymnocyst and no cryptocyst. The mural rim is without spines. The hyperstomial ovicell has a granular frontal wall and/or ribs. No avicularia are known.

Alderina subtilimargo (REUSS, 1864a)

pl. 10, fig. 4

v.* 1864a *Membranipora subtilimargo* sp.n., REUSS p. 630, Pl. 9, fig.5

v. 1869a *Membranipora laxa* sp.n., REUSS p. 252, Pl. 36, Fig. 14

v. 1963 *Conopeum lacroixii* (BUSK), MAŁECKI p. 998, Pl. 9, Fig. 4

v. 1963 *Membraniporina laxa* (REUSS), MAŁECKI p. 99, Pl. 9, Fig. 7

v. 1963 *Electra elliptica* (HAGENOW), MAŁECKI p. 101, Pl. 9, Fig. 3

1974 *Alderina subtilimargo* (REUSS), DAVID & POUYET p. 106, Pl. 2, Fig. 4

1977 *Alderina subtilimargo* (REUSS), VÁVRA p. 82 (cum. syn.)

1980 *Alderina subtilimargo* (REUSS), BRAGA p. 45

v. 1988 *Alderina subtilimargo* (REUSS), BRAGA & BARBIN p. 516, Pl. 5, Fig. 5

1996 *Alderina subtilimargo* (REUSS), ZÁGORŠEK p. 123, Pl. 1, Fig. 3-5

v. 2001b *Alderina subtilimargo* (REUSS), ZÁGORŠEK p. 525

Diagnosis: The colony is encrusting. The zooecia are oval, with calcified margin (mural rim) and uncalcified frontal wall. The zooecia grow mostly chaotically, sometimes in rows. The opesia are large, occupying almost all the frontal area. The gymnocyst is very short, smooth or sometimes

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not developed. The mural rim is thick and smooth. The ovicell is hyperstomial; only small remains of ovicell have been found.

Remarks: The specimens found at Reingruberhöhe have a wider mural rim than shown by the holotype in the Museum of Natural History in Vienna. Other features are almost identical. Ovicells are previously unknown in this species. A small fragment of the ovicell has been found in one specimen from Reingruberhöhe. The ovicell is prominent, small with missing frontal area. DAVID & POUYET (1974) pointed out that *Membranipora laxa* REUSS, 1869a was a junior synonym of *Alderina subtilimargo* (REUSS, 1864a). *Conopeum lacroixii* (BUSK) and *Electra elliptica* (HAGENOW) in MAŁECKI (1963) have thin mural rims, large opesia and a smooth gymnocyst. Presence of these features allows us to list these specimens within *Alderina subtilimargo*.According to GORDON (1984), *Alderina* differs from depicted specimens in having umbones on the small gymnocyst. Because the type species of this genus *Alderina imbellis* (HINCKS. 1860) lacks umbones as well, I believe that this species also belongs to genus *Alderina*.

Occurrence: Reingruberhöhe in the entire section (samples RH 3, RH 8, RH 12, RH 31, RH 33 and SEIFERT's samples).

Distribution in time and space:

Lutetian - Germany (REUSS, 1864a)

Priabonian - Vicentin (REUSS, 1869a), Poland (MAŁECKI, 1963), Carolina USA (CANU & BASSLER, 1920), Italy (BRAGA & BARBIN, 1988), Romania (GHIURCA, 1987), Slovakia (ZÁGORŠEK, 1996), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b), Tunisian (VÁVRA, 1977)

Oligocene - Italy, Germany (VÁVRA, 1977)

Tortonian - Austria & Hungary (DAVID & POUYET, 1974), Serbia (VÁVRA, 1977)

Genus *Amphiblestrum* GRAY, 1848

The colony is encrusting. The zooecia have a short gymnocyst, a well-developed cryptocyst, an extensive mural rim and oblong opesia. The avicularia are adventitious, usually paired on a short peduncle. The ovicell is globular, with a nonporous frontal. Spines are absent.

Amphiblestrum appendiculatum (REUSS, 1848)

pl. 10, figs. 5, 6

v.* 1848 *Cellepora appendiculata* sp.n., REUSS p. 96, Pl. 11, fig. 22

? 1864a *Membraniporella appendiculata* var. apora REUSS p. 631, Pl. 9, Fig. 4

v. 1874 *Membraniporella appendiculata* REUSS, REUSS p. 181, Pl. 9, Fig. 13 -16

1963 *Ramphonotus appendiculatus* (REUSS), BRAGA p. 23

v. 1963 *Amphiblestrum patens* CANU & BASSLER, MAŁECKI p. 102, Pl. 9, Fig. 8

1974 *Ramphonotus appendiculata* (REUSS), DAVID & POUYET p. 108, Pl. 1, Fig. 2, 6

1977 *Ramphonotus appendiculata* (REUSS), VÁVRA p. 84

v. 1996 *Ramphonotus* sp., ZÁGORŠEK p. 125, Pl. 2, Fig. 2

1997 *Amphiblestrum appendiculatum* (REUSS), ZÁGORŠEK p. 403, Pl. 1, Fig. 1

v. 2001a *Amphiblestrum appendiculatum* (REUSS), ZÁGORŠEK p. 32, PL. 4, FIG. 5, 6

Diagnosis: The zooecia are oval to triangular, with a very short cryptocyst. A shallow, narrow furrow separates neighbouring zooecia. The small gymnocyst is sometimes developed, usually missing. The mural rim is narrow and smooth. It has the same width around the entire zooecium. The avicularia are small, tube-like, with circular orifice, situated usually on the gymnocyst. The ovicells are prominent, small with a nonporous frontal wall. Ovicelled zooecia usually have paired avicularia.

Remarks: The described specimens are almost identical with syntypes of *Cellepora appendiculata* REUSS 1848 deposited in the Museum of Natural History in Vienna. The syntypes, however, usually grow in regular rows and have only rare avicularia. Nevertheless, REUSS (1874) described *Membraniporella appendiculata* with pairs of avicularia situated proximally to the opesia. Probably the number of avicularia is not a specific feature, and all these specimens belong to the same species.

Up to now, no ovicells have been described. Only *Membraniporella appendiculata* var. *apora* described by REUSS (1864a) has small globular ovicells similar to those found in Reingruberhöhe specimens. *Membraniporella appendiculata* var. *apora* REUSS, 1864a differs in having a large oeciopore however, and by a well-developed, smooth gymnocyst. Due to the presence of a large oeciopore and a well-developed gymnocyst, these specimens probably do not belong to the described species. MAŁECKI (1963) described *Amphiblestrum patens* CANU & BASSLER, 1920 from the Skalnik limestone. These specimens have the same features as *Amphiblestrum appendiculatum* (REUSS, 1848).

Occurrence: Reingruberhöhe in the entire section (samples RH 3, RH 8, RH 10+11, RH 12, RH 31, RH 33 and SEIFERT's samples).

Distribution in time and space:

Lutetian - Germany (REUSS, 1864a)

Priabonian - Poland (MAŁECKI, 1963), Italy (BRAGA, 1963), Romania (GHIURCA, 1987), Slovakia (ZÁGORŠEK, 1997), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Oligocene - Germany (VÁVRA, 1977)

Tortonian - Austria & Hungary (REUSS, 1848, DAVID & POUYET, 1974), Poland, Hungary (VÁVRA, 1977)

Genus *Crassimarginatella* CANU, 1900

The colony is erect, rod-like, bilamellar or multilamellar. The zooecia have large opesia, a well-developed gym-

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nocyst and a mural rim without spines. The cryptocyst is reduced. The avicularium is large, vicarious with pivotal bar. The ovicell is hyperstomial and globular.

***Crassimarginatella macrostoma* (REUSS, 1848)**
pl. 10, fig. 3, pl. 11, fig. 3

v.* 1848 *Cellaria macrostoma* sp.n., REUSS p. 64, Pl. 8, Fig. 5-6
v. 1869a *Biflustra macrostoma* (REUSS, 1848), REUSS p. 274, Pl. 33, Fig. 12, 13
v. 1963 *Membraniporina macrostoma* (REUSS), MAŁECKI p. 100, Pl. 9, Fig. 5
1974 *Crassimarginatella macrostoma* (REUSS), DAVID & POUYET p. 107, Pl. 3, Fig. 3, 4
1977 *Crassimarginatella macrostoma* (REUSS), VÁVRA p. 83 (cum. syn.)
1980 *Crassimarginatella macrostoma* (REUSS), BRAGA p. 45, Fig. 27, 28
v. 1988 *Crassimarginatella macrostoma* (REUSS), BRAGA & BARBIN p. 516, Pl. 4, Fig. 5, 8
v. 1996 *Crassimarginatella macrostoma* (REUSS), ZÁGORŠEK p. 123, Pl. 1, Fig. 6, Pl. 2, Fig. 1

Diagnosis: The colony is columnar or flat, mostly bilamellar, with 3 - 5 zooecial rows around the colony. The zooecia are oval, with a smooth and short, reduced gymnocyst. A very narrow furrow separates adjacent zooecia. The mural rim is wide, smooth and rarely doubled. The avicularia are vicarious, the same size as regular zooecia, with pivot bar, but very rare. The ovicell has not been described.
Remarks: The lectotype erected by DAVID & POUYET (1974) stored in the Museum of Natural History in Vienna is the only specimen with an avicularium. Neither syntypes, nor other specimens described by REUSS (1848, 1869A), BRAGA (1980, 1988), DAVID & POUYET (1974) or ZÁGORŠEK (1996) have avicularia. Although I have found more than 50 specimens at Reingruberhöhe, none of them has avicularia, but other features are identical. Ovicells have not been described in any of the specimens.
According to a personal communication by BRAGA and VÁVRA and also according to my opinion, all specimens found in Eocene-Miocene sediments which exhibit an erect colony with membraniporiform zooecia, with short gymnocyst and without spines and cryptocyst could be described as *Crassimarginatella macrostoma* (REUSS, 1848), although no avicularia or ovicells have been found.
Occurrence: Haselbach and Reingruberhöhe in the entire section (samples RH 3, RH 8, RH 10+11, RH 12, RH 31, RH 33 and SEIFERT's samples).
Distribution in time and space:
Lutetian - Germany (MAŁECKI, 1963)
Priabonian - Vicentin (REUSS, 1869a), Poland (MAŁECKI, 1963), Romania (GHIURCA, 1987), Italy (BRAGA & BARBIN, 1988), Slovakia (ZÁGORŠEK, 1996), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Oligocene - France, Italy (VÁVRA, 1977)
Tortonian - Austria & Hungary (REUSS, 1848, DAVID & POUYET, 1974)

Genus *Ogivalina* CANU & BASSLER, 1917

The colony is erect, or encrusting forming an erect base, unilamellar. The zooecia have large opesia with a reduced or no gymnocyst at all and without spines. The cryptocyst is well developed, often granular. The avicularia are rare and vicarious. No pore chambers (dietellae) has been observed, however lateral interzooecial communication pores are present. The ovicell is probably endozooecial, or deeply immersed hyperstomial.
Remarks: According to the original description *Ogivalina* has endozooecial ovicells. However, According to original photos and descriptions of other species (CANU & BASSLER, 1920) the ovicells seem to be more hyperstomial than endozooecial. In studied material, no ovicells have been found, thus the type of ovicell remains uncertain.

***Ogivalina dimorpha* (CANU, 1907)**
pl. 11, fig. 4

1966 *Ogivalina? dimorpha* (CANU), CHEETHAM p. 22, Fig. 1-3.
v. 2001b *Ogivalina dimorpha* (CANU), ZÁGORŠEK p. 526, Pl. 5. Fig. 1

Diagnosis: The colony is erect, unilamellar. The zooecia grow in regular longitudinal rows, which are easily separable. The zooecia are dimorphic: The ordinary zooecia are oval to rectangular, with well-developed cryptocyst. The cryptocyst is flat and little granular. The opesia are large and oval. The second type of zooecia is "membraniporiform", with large circular opesia, without cryptocyst and gymnocyst. About 3-5 communication pores in a single row perforate lateral walls of the zooecium. The small avicularium is rarely present among the three zooecia. The ovicell is unknown.
Remarks: The second type of zooecia, without cryptocyst, could be perhaps regarded as within zooecial variation, because also in the original description by CANU & BASSLER (1917) some "membraniporiform" zooecia are present.
Though the ovicell has not been found, the presence of communication pores, a granular cryptocyst, as well as the general shape of the opesia and the form and position of avicularia allow us to list these specimens in *Ogivalina dimorpha* (CANU, 1907).
Occurrence: Reingruberhöhe (samples RH 1, RH 6 and RH 10+11).
Distribution in time and space:
Thanetian - Senegal (CHEETHAM, 1966)
Lutetian - France (CHEETHAM, 1966)
Priabonian - United Kingdom (CHEETHAM, 1966), Poland (CHEETHAM, 1966), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

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Family Candidae D'ORBIGNY, 1851

Genus *Foveolaria* BUSK, 1884

The colony is encrusting, free or erect from encrusting base. The zooecia grow in regular rows. They are oval to rectangular with well-developed usually granular cryptocystal rim. The gymnocyst is developed, however usually reduced and short. The avicularia are adventitious, drop-like, situated on the gymnocyst. The ovicell is hyperstomial, globular rarely immersed, not closed by the zooecial operculum.

***Foveolaria vibraculata* ZÁGORŠEK, 2001a**
pl. 11, figs. 1, 2

v.* 2001a *Foveolaria vibraculata* sp.n., ZÁGORŠEK p. 34, Pl. 5. Fig. 6-8

Diagnosis: The colony is unilamellar, probably encrusting. The encrusted substratum has not been found, so it may be algae or the growth form of the colony is free. The zooecia are with large opesia and calcified mural rim. They are growing in regular rows, about 4 to 6 zooecia arranged one to each other. The opesia are large, oval to circular with a granular cryptocystal rim. The mural rim is narrow and depressed. Two pairs of small pores are situated on the proximal margin of the mural rim. Very narrow furrows separate the neighbouring zooecia from each other. The avicularium is large and occupies the whole gymnocyst. It is square or circular in shape with oval opesia. The mural rim of the avicularium is flat, or slightly elevated. The ovicell is globular with a large semilunar opening and with a nonporous frontal wall.
Remarks: The Austrian specimens have somewhat smaller avicularia compared with the size of zooecia than the paratypes described from Hungary (ZÁGORŠEK, 2001a). Other morphological features are however identical with them. The ovicells have not been described for the Hungarian specimens. The size, type and shape of the ovicells are similar to other species belonging to *Foveolaria*.
Occurrence: Reingruberhöhe, only in SEIFERT's samples.
Distribution in time and space:
Priabonian - Hungary (ZÁGORŠEK, 2001a)

Family Vincullariidae BUSK, 1852

Genus *Vincularia* DEFRANCE, 1829

The colony is rod-like, erect articulated, narrow and quadriserial. The zooecia are dimorphic or trimorphic with developed cryptocyst and grow in regular rows. The ordinary zooecia are symmetrical with large opesia, the avicularian zooecia (intrazooecial avicularia) are larger and have asymmetrical opesia and the ovicelled zooecia are the largest and are surmounted by the endozooecial ovicells (CHEETHAM, 1966). Gymnocyst and spines are not developed. The mural rim is slightly prominent and rarely carries adventitious avicularia.

***Vincularia subsymmetrica* (CANU, 1907)**
pl. 11, fig. 5

1966 *Vincularia subsymmetrica* (CANU), CHEETHAM p. 54
v. 1988 *Vincularia subsymmetrica* (CANU), BRAGA & BARBIN p. 515, Pl. 4, Fig. 7

Diagnosis: The zooecia are arranged in four longitudinal rows, the colonial cross section is rhombic to rectangular. The zooecia are dimorphic; ovicelled zooecia are not developed. The ordinary zooecia have a small opesium and a large cryptocyst. The zooecia with avicularia have opesia occupying almost the whole central area and have a short cryptocyst curved slightly to the margin of the colonial stem. The mural rim is slightly prominent, smooth. No adventitious avicularia are developed.
Remarks: Specimens from Reingruberhöhe are usually very poor preserved, and only one or two types of zooecia can be distinguished. Nevertheless, due to the erect, quadriserial colonial growth form and the presence of the dimorphic zooecia the specimens could be determined as *Vincularia subsymmetrica* (CANU, 1907), which is one of the common species within the Eocene sediments in the Alpine Carpathian region.
Occurrence: Reingruberhöhe (samples RH 1, RH 2 and RH 4).
Distribution in time and space:
Priabonian - United Kingdom (CHEETHAM, 1966), Romania (GHIURCA, 1987), Italy (BRAGA & BARBIN, 1988)

Superfamily Buguloidea GRAY, 1848
Family Candidae D'ORBIGNY, 1851

Genus *Scrupocellaria* VAN BENEDEN, 1845

The colony is erect flexible, branched, bifurcated and unilamellar. The zooecia are in two alternating rows, facing on one side. They have large oval opesia and a well-developed gymnocyst. Distal marginal avicularia are always present, the frontal avicularia may be present or not. Spines and scuta may be present. The ovicell is hyperstomial. The dorsal side of the colony has paired vibracular chambers.
Remarks: Although no ovicells have been observed in the material studied, all other features typical for *Scrupocellaria* are present. Therefore, the following specimens are listed under *Scrupocellaria*.

***Scrupocellaria brendolensis* WATERS, 1891**
pl. 12, fig. 2

1891 *Scrupocellaria brendolensis* sp.n., WATERS p. 7, Pl. 1, Fig. 14, 15

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v. 1963 *Scrupocellaria* cf. *dubia* CANU & BASSLER, MAŁECKI p. 113, Pl. 10, Fig. 3
1975 *Scrupocellaria brendolensis* WATERS, BRAGA p. 146, Pl. 2, Fig. 1, 2
v.? 1988 *Scrupocellaria brendolensis* WATERS, BRAGA & BARBIN p. 520, Pl. 6, Fig. 2 - 3
v. 1997 *Scrupocellaria brendolensis* WATERS, ZÁGORŠEK p. 405, Pl. 1, Fig. 7, Pl. 2, Fig. 3-4

Diagnosis: The opesia are large and long about one half of the zooecial length. The gymnocyst is well developed and smooth. A small, circular avicularium is attached near the disto-lateral margin of the opesium. Spines and scuta are not developed. A triangular to oval avicularium is located on the proximal margin of the opesium, on the gymnocyst. The ovicell has not been observed. The vibracular chambers are paired, small and triangular.
Remarks: Some of the specimens found have wider colonial branches, and some of them are very narrow. Probably wider specimens were located near a bifurcation, and the narrower ones directly after the bifurcation. The specimens described by BRAGA & BARBIN (1988) show a narrower colony and a small furrow separating adjacent zooecia. This furrow has not been found in any other specimen of *Scrupocellaria brendolensis* WATERS. Realizing that this species can have a large variability (BRAGA & BARBIN, 1988) I believe that these specimens also belong to the same species.
Scrupocellaria cf. *dubia* CANU & BASSLER as described by MAŁECKI (1963) shows all the features like *Scrupocellaria brendolensis* WATERS.
Occurrence: Reingruberhöhe (samples RH 4, RH 9, RH 10+11, RH 13 and SEIFERT's samples).
Distribution in time and space:
Priabonian - Italy (WATERS, 1891, BRAGA & BARBIN, 1988), Romania (GHIURCA, 1987), Poland (MAŁECKI, 1963), Slovakia (ZÁGORŠEK, 1997), Hungary (ZÁGORŠEK, 2001a)

Scrupocellaria gracilis REUSS, 1869a
pl. 12, fig. 3

v.* 1869a *Scrupocellaria gracilis* sp.n., REUSS p. 260, Pl. 29, Fig. 4
1891 *Scrupocellaria gracilis* REUSS, WATERS p. 6, Pl. 1, Fig. 12-13
1920 *Scrupocellaria gracilis* REUSS, CANU & BASSLER p. 185, Pl. 33, Fig. 8-9
1963 *Scrupocellaria gracilis* REUSS, BRAGA p. 27, Pl. 3, Fig. 3-4
v. 1963 *Scrupocellaria elliptica* REUSS, MAŁECKI p. 113
1975 *Scrupocellaria gracilis* REUSS, BRAGA p. 146
1980 *Scrupocellaria gracilis* REUSS, BRAGA p. 51

Diagnosis: The opesia are very large and the gymnocyst is well developed and smooth. Distal marginal avicularia are large and reach out of the margin of the colonial branch. Spines and scuta have not been preserved. Frontal avicularia are not present. The ovicell has not been observed. The vibracular chambers are paired, large and elongated triangular.
Remarks: *Scrupocellaria gracilis* REUSS, 1869a differs from *S. brendolensis* WATERS, 1891 in having larger distal marginal avicularia and vibracular chambers and by the absence of frontal avicularia. As pointed out by BIZZARINI & BRAGA (1997) *Scrupocellaria elliptica* REUSS is only a Miocene species. Also the specimens described by MAŁECKI (1963) exhibit all the features characteristic for *Scrupocellaria gracilis* REUSS, 1869a.
Occurrence: Haselbach and Reingruberhöhe (samples RH 4, RH 9, RH 10+11 and RH 13).
Distribution in time and space:
Priabonian - Vicentin (REUSS, 1869a), Italy (WATERS, 1891, BRAGA, 1975), Poland (MAŁECKI, 1963), Romania (GHIURCA, 1987), Carolina (CANU & BASSLER, 1920)
Rupelian - France - Gaas (REUSS, 1869b), Italy (BRAGA & BARBIN, 1988)

Superfamily Microporoidea GRAY, 1848
Family Microporidae GRAY, 1848

Genus *Micropora* GRAY, 1848

The colony is encrusting. The zooecia have a prominent mural rim surrounding a well-developed cryptocyst. The cryptocyst is large, occupying almost the whole frontal area, porous, or granular and perforated by two opesiules lying proximo lateral, near to the orifice. The oral spines are rare and mostly absent. The ovicell is recumbent and prominent. The avicularia are adventitious, interzooidal, or absent.

Micropora hexagona (ZÁGORŠEK, 1994)
pl. 12, fig. 1

? 1864a *Lepralia gracilis* sp.n., REUSS p. 632, Pl. 13, Fig. 1
v.* 1994 *Calpensia hexagona* sp.n., ZÁGORŠEK p. 368, Fig. 6a, b, d, f
v. 1996 *Calpensia hexagona* ZÁGORŠEK, ZÁGORŠEK p. 531, P. 4, Fig. 1, 2, 4
v. 2001b *Micropora hexagona* (ZÁGORŠEK), ZÁGORŠEK p. 526

Diagnosis: The zooecia are regularly hexagonal, in regular axial rows parallel one to each other. The cryptocyst is flat, perforated by abundant and small to intermediate pores. The opesia are semilunar with oral spines. The opesiules are very small and unequal in size. The ovicell is recumbent, slightly elevated above the surface of the zooecium, flat and small. The length of the ovicell is one half of length of zooecium. The ovicell frontal wall is smooth, without pores. Avicularia have not been observed.
Remarks: *Lepralia gracilis* REUSS, 1864a is quite similar to this species. The original material has not been found in

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the Reuss collection in the Museum of Natural History in Vienna; it is probably lost. The original description of the species does not include the opesiules or the ovicells. The different size of opesiules and the presence of globular ovicells with a smooth frontal wall are perhaps the most distinctive features of *Micropora hexagona* (Zágoršek, 1994).
Occurrence: Reingruberhöhe (sample RH 31).
Distribution in time and space:
Lutetian - Germany (Reuss, 1864a)
Priabonian - Slovakia (Zágoršek, 1994 & 1996), Hungary (Zágoršek, 2001a), Austria (Zágoršek, 2001b)

Micropora? sp.
pl. 11, fig. 6

Diagnosis: The zooecia are regularly hexagonal and disposed in alternating rows. The cryptocyst is flat or little concave, circular, nonporous and slightly granular. It is perforated by two semilunar narrow long slits, which could be regarded as opesiules. The opesia are semicircular, with a straight proximal margin with 6 large oral spines. The lateral walls of each zooecium are perforated by 6 communication pores, each pore on one side of the hexagonal-shaped zooecium. The ovicell is unknown. Avicularia have not been observed.
Remarks: Opesiules developed as narrow slits are not known in any species of *Micropora*. The hexagonal shape of the zooecia, the presence of a cryptocyst and oral spines however show closest similarity to *Micropora*. Because only one small fragment has been found, and no more details are visible, the exact determination remains uncertain.
Occurrence: Reingruberhöhe (sample RH 2).

Genus *Mollia* Lamouroux, 1821

The colony is encrusting. The zooecia are easily separable, connected by short tubes and lack avicularia and spines. Gymnocyst is absent. The cryptocyst is well developed, granular or porous. The opesia have rounded corners for parietal muscles, and opesiules. The ovicell is globular, hyperstomial or immersed.

Mollia patellaria (Moll, 1803)
pl. 12, fig. 6

v.* 1848 *Cellepora formosa* sp.n., Reuss p. 95, Pl. 11, Fig. 18
v. 1874 *Membranipora formosa* (Reuss), Reuss p. 185, Pl. 10, Fig. 12
v. 1963 *Aechmella crassimargo* Canu & Bassler, Małecki p. 107, Fig. 50, Pl. 10, Fig. 10
v. 1963 *Aechmella filimargo* Canu & Bassler, Małecki p. 108
1974 Floridinella formosa (Reuss), David & Pouyet p. 117, Pl. 1, Fig. 3, 4
1977 *Floridinella formosa* (Reuss), Vávra p. 89
v. 1989 *Mollia patellaria* (Moll), Schmid p. 18, Pl. 3, Fig. 1-7

Diagnosis: The zooecia are regular in shape, oval, easily separable and connected by short tubes to neighbouring individuals. The remains of this tube are observable laterally as a large pore chamber. The cryptocyst is extended and granular, occupying almost the whole frontal area. The mural rim is developed mostly in the distal part of zooecia, proximally almost absent. The opesia are small, circular with rounded corners for parietal muscles. The diameter of this rounded corners is sometimes almost the same as the diameter of the opesium itself; sometimes it can be very small, preserved as narrow slits. The ovicell is subglobular large, partly immersed in the distal zooecium.
Remarks: The zooecia of *Cellepora formosa* Reuss, 1848 from the Museum of Natural History in Vienna exhibit all features of *Mollia patellaria* (Moll) and therefore can be regarded as a junior synonym (Schmid, 1989). The recent specimens (for example as described by Zabala & Maluquer, 1988) have however usually long connecting tubes, but fossil zooecia grow close to each other and formed encrusting colonies.
Małecki (1963) described *Aechmella crassimargo* Canu & Bassler, 1920 and *Aechmella filimargo* Canu & Bassler, 1917. These specimens however have all the features characteristic for *Mollia patellaria* (Moll) and are therefore listed here as synonyms.
Occurrence: Reingruberhöhe (samples RH 12, RH 13, RH 31, RH 33 and Seifert's samples).
Distribution in time and space:
Priabonian - Poland (Małecki, 1963),
Tortonian - Austria & Hungary (Reuss, 1848, David & Pouyet, 1974), Czech (Vávra, 1977)
Quaternary & Recent - Mediterranean (Schmid, 1989)

Genus *Rosseliana* Jullien, 1888

The colony is encrusting. The zooecia have a well-developed cryptocyst, a semicircular orifice with enlarged proximo-lateral corners and no opesiules. Avicularia are unknown. The ovicell is endozooecial and prominent.

Rosseliana rosselii (Audouin, 1826)
pl. 12, fig. 5

v. 1869a *Membranipora deplanata* sp.n., Reuss p. 263, Pl. 29, Fig. 12
v. 1963 *Rosseliana parvipora* Canu & Bassler, Małecki p. 109, Fig. 52, Pl. 10, Fig. 7
v. 1988 *Rosseliana rosselii* (Audouin), Braga & Barbin p. 517, Pl. 6, Fig. 4
1991 *Rosseliana rosselii* (Audouin), Braga Tab. 1
v. 1996 *Rosseliana rosselii* (Audouin), Zágoršek p. 529, Pl. 3, Fig. 6

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Diagnosis: The zooecia are oval to drop-like and have a well-developed cryptocyst and a low, narrow mural rim. The cryptocyst is smooth and sometimes slightly granular. The opesia are semilunar, large. The enlarged proximo-lateral corners are large, oval to circular usually situated more lateral than proximal. The endozooecial ovicell has not been found.

Remarks: *Membranipora deplanata* sp.n. described in REUSS (1869a) has been considered by BRAGA (1991) as a junior synonym of *Rosseliana rosselii* (AUDOUIN, 1826). Although no ovicells have been found among the Austrian material, all other features allow us to determine these specimens. *Rosseliana rosselii* (AUDOUIN) is quite similar to *Mollia patellaria* (MOLL) mainly in its general shape. The main difference is the type and size of ovicells (*Mollia* has hyperstomial ovicell, *Rosseliana* endozooecial). When no ovicells have been found, the main difference is the development of enlarged proximo-lateral corners in the opesium.

Mollia has more proximal openings for parietal muscles more proximal, *Rosseliana* has them more lateral and more rounded. The genera differ also in respect to the lateral communication pores: *Mollia* has zooecia connected by short tubes, but Rosseliana has zooecia closely appressed. *Rosseliana parvipora* CANU & BASSLER as described by MAŁECKI (1963) has a narrow mural rim, a slightly granular cryptocyst and opesia with enlarged proximo-lateral corners; so I believe that these specimens belong to *Rosseliana rosselii* (AUDOUIN).

Occurrence: Reingruberhöhe (samples RH 3, RH 6 and RH 10+11).

Distribution in time and space:

Priabonian - Austria & Hungary (REUSS, 1869), Poland (MAŁECKI, 1963), Italy (BRAGA & BARBIN, 1988), Slovakia (ZÁGORŠEK, 1996), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Quaternary & Recent - Mediterranean (BRAGA & BARBIN, 1988), Atlantic (RYLAND & HAYWARD, 1977)

Genus *Calpensia* JULLIEN, 1888

The colony is encrusting. The cryptocyst is well developed, porous, surrounded by a mural rim and perforated by two opesiules. The orifice is semilunar without spines. Avicularia and ovicells are unknown.

Calpensia gracilis (MÜNSTER, 1826)

pl. 13, fig. 1

v. 1848 *Membranipora gracilis* MÜNSTER, REUSS p. 93, Pl. 11, Fig. 12

v. 1963 *Calpensia calpensis* (MANZONI), MAŁECKI p. 111, Pl. 10, Fig. 13

1974 *Calpensia gracilis* (MÜNSTER), DAVID & POUYET p. 121, Pl. 3, Fig. 7

1977 *Calpensia gracilis* (MÜNSTER), VÁVRA p. 92

1985 *Calpensia gracilis* (MÜNSTER), ZIKO p. 40, Pl. 10, Fig. 4, 5

v. 1989 *Calpensia gracilis* (MÜNSTER), SCHMID p.17, Pl. 2, Fig. 4-7

v. 1996 *Calpensia gracilis* (MÜNSTER), ZÁGORŠEK p. 529, Pl. 1, Fig. 7

Diagnosis: The colony has 6 to 8 irregular zooecial rows. The zooecia are elongated to rectangular or irregular in shape and have a porous cryptocyst. The pores are small. The cryptocyst is flat and slightly depressed towards the opesia. The lateral walls are very thin, slightly prominent, smooth and sometimes reduced, or rarely missing. The opesium is semilunar to oval, large with an almost straight proximal margin. One pair of opesiules is situated below the opesia. They are small and circular.

Remarks: The specimens found in Austria are very short and small colonies, however specific features are visible (elongated zooecia with porous cryptocyst, two opesiules and slightly prominent mural rim). The pores perforating the cryptocyst are however much smaller that those described by ZIKO (1985) or SCHMID (1989).

MAŁECKI (1963) described *Calpensia calpensis* (MANZONI). The specimens have elongated to rectangular zooecia, flat, porous cryptocyst, thin, slightly prominent and smooth lateral walls and one pair of opesiules situated below the semilunar to oval, large opesia. These features are characteristic for *Calpensia gracilis* (MÜNSTER, 1826) and therefore MAŁECKI's specimens are listed here.

Occurrence: Reingruberhöhe (samples RH 1, RH 4, RH 31, RH 33 and SEIFERT's samples).

Distribution in time and space:

Thanetian - France (DEBOURLE, 1974)

Lutetian - Egypt (ZIKO, 1985)

Priabonian - Poland (MAŁECKI, 1963), Italy (BRAGA, 1963), Slovakia (ZÁGORŠEK, 1996), Hungary (ZÁGORŠEK, 2001a)

Oligocene – Germany (VÁVRA, 1977)

Tortonian - Austria & Hungary (REUSS, 1848, DAVID & POUYET, 1974), France, Czech (VÁVRA, 1977)

Calpensia polysticha (REUSS, 1848)

pl. 13, fig. 2

v.* 1848 *Cellaria polysticha* sp.n., REUSS p. 61, Pl. 7, Fig. 33

v. 1869a *Eschara polysticha* (REUSS), REUSS p. 269, Pl. 32, Fig. 3

1891 *Micropora polysticha* (REUSS), WATERS p. 14, Pl. 2, Fig. 7

v. 1963 *Steginoporella similis* (KOSCHINSKY), MAŁECKI p. 112, Pl. 11, Fig. 3

1980 *Calpensia polysticha* (REUSS), BRAGA p. 47, Fig. 33, 34

v. 1988 *Calpensia polysticha* (REUSS), BRAGA & BARBIN p. 518, Pl. 7, Fig. 5.

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v. 2001a *Calpensia polysticha* (REUSS), ZÁGORŠEK p. 31, Pl. 7, Fig. 1, 2

Diagnosis: The colony is erect, rarely bifurcated, multilamellar having 5 to 8 longitudinal, parallel zooecial rows. The cross section of the colony is usually oval, elongated oval or circular. The zooecia are extremely elongated, with a strongly porous cryptocyst and wide, smooth lateral walls (mural rim). The cryptocyst is slightly deepening towards the opesium and near the opesium is nonporous. The opesium is semilunar, with a straight proximal margin. The slight peristome is rarely developed. Two circular opesiules are arranged proximally to the margin of the opesium.

Remarks: I have found only one specimen of this species. Nevertheless, this specimen is identical with syntypes deposited in the Museum of Natural History in Vienna. The syntypes usually have a circular cross-section.

MAŁECKI (1963) described specimens with extremely elongated zooecia with strongly porous cryptocyst and wide, smooth lateral walls. The cryptocyst is perforated by the two circular opesiules. He determined it as *Steginoporella similis* (KOSCHINSKY), but I believe that it belongs to *Calpensia polysticha* (REUSS, 1848).

Occurrence: Reingruberhöhe (samples RH 31 and RH 33).

Distribution in time and space:

Priabonian - Italy (REUSS, 1869a, WATERS, 1891), Poland (MAŁECKI, 1963), Italy (BRAGA & BARBIN, 1988), Romania (GHIURCA, 1987), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b) and Slovakia

Rupelian - Italy (BRAGA & BARBIN, 1988)

Genus *Aviculiera* ZÁGORŠEK, 2001a

The colony is erect, multilaminar, with oval to circular cross section. The zooecia are long, oblong with a porous cryptocyst and thick lateral walls. The opesium is semilunar with a straight proximal margin. The small opesiules are paired. A circular avicularium is arranged on the distal-most margin of the zooecium. The ovicell is probably endozooecial.

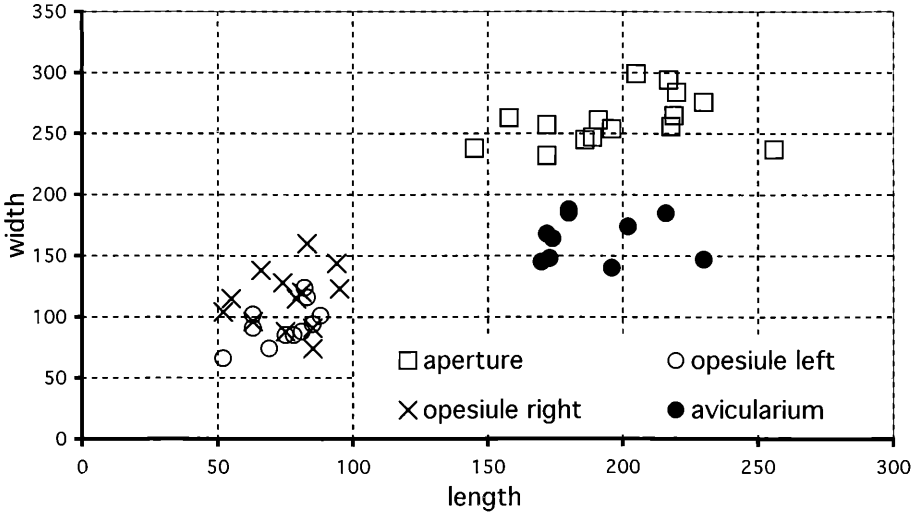

Figure 8: Chart of important measurements of *Aviculiera austriensis* sp.n. (values in μm).

Aviculiera hungarii ZÁGORŠEK, 2001a
pl. 13, figs. 4

v.* 2001a *Aviculiera hungarii* sp.n., ZÁGORŠEK p. 37, Pl. 8, Fig. 1-4

Diagnosis: The colony is erect, multilamellar with 5 to 8 regular zooecial rows. The cross-section is circular to slightly oval. The zooecia are oblong about four times longer than wide. The cryptocyst is flat with numerous (about 50 to 70) small pores in irregular position. The lateral walls are thick, little elevated and smooth. The orifice is semilunar sometimes with a straight proximal margin. Two small, circular to oval opesiules are immediately proximal to the orifice. Frequently, but not on each zooecium, occurs an avicularium. The avicularium is oval, with a well developed pivotal bar and is situated on the distal-most margin of the orifice. The ovicell has not been found among the Reingruberhöhe specimens.

Occurrence: Reingruberhöhe (sample RH 31).

Distribution in time and space:

Priabonian Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Aviculiera austriensis sp.n.
pl. 13, fig. 3, 5

v. 2001b *Aviculiera* cf. *hungarii* ZÁGORŠEK, ZÁGORŠEK p. 527, Pl. 6. Fig. 2

Diagnosis: The colony is erect, multilaminar and very flat. The zooecia are very long, oblong with a strongly porous cryptocyst and a thick mural rim. The opesium is oval. The paired large opesiules are situated proximal to the opesia. The avicularium is circular and usually situated on the distal-most margin of the opesia. The ovicell is unknown.

Holotype: The specimen (1329) depicted in pl. 13, fig. 3, from the locality Reingruberhöhe, deposited in the Institute of Paleontology, of University Vienna, Austria.

Paratypes: 12 specimens from the locality Reingruberhöhe, deposited in the Institute of Paleontology of University Vienna, Austria.

Derivatio nominis: Due to its occurrence in Austria.

Locus typicus: Reingruberhöhe (sample RH 10+11).

Stratum typicum: Eocene Priabonian.

Dimensions: (in micro meters

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= μm; x = average, details see in fig. 8):
length of the colony: 4639 - 6121; x = 5423
width of the colony: 3671 - 4933; x = 3617
length of zooecia: 715 - 1193; x = 1013
width of zooecia: 445 - 700; x = 529
length of zooecial aperture: x = 198
width of zooecial aperture: x = 261
area of zooecial aperture: x = 36300
length of left opesiule: x = 74
width of left opesiule: x = 92
area of left opesiule: x = 5388
length of right opesiule: x = 76
width of right opesiule: x = 115
area of right opesiule: x = 6265
length of avicularium: x = 189
width of avicularium: x = 164
area of avicularium: x = 21518

Description: The colony is erect, very flat, often bifurcating, multilaminar with a very narrow cross-section. The zooecia are arranged in 8 to 12 regular longitudinal rows on each side of the colony stem. They are oblong, about three to four times longer than wide. The cryptocyst is flat with numerous (about 30 to 45) large pores in irregular position. The lateral walls are thick, little elevated and smooth. The opesium is oval, with an arched proximal margin. The opesiules are paired, large and circular. The avicularium is circular and it is situated distally from the opesia. The diameter of the avicularium is about half and rarely more than half of the diameter of the opesium. The pivotal bar is not developed. The avicularium occurs mostly in the place, where one zooecial row is dichotomously divided into two rows. These avicularia are little larger than those occurring within one zooecial row. In some colonies each zooecium has an avicularium, in others, the avicularia are present only in the points of bifurcation of the zooecial rows. The ovicell is unknown.

Comparison: *Aviculiera hungarii* ZÁGORŠEK, 2001a is the most similar species to *Aviculiera austriensis* sp.n. It differs mainly in having smaller colonies with oval to circular cross section. *Aviculiera hungarii* ZÁGORŠEK, 2001a has a maximum of only 8 zooecial rows around the colonial stem, however *Aviculiera austriensis* sp.n. can have more than 12 on one side of the colony. *Aviculiera hungarii* ZÁGORŠEK, 2001a has also larger opesiules, less abundant pores (about 50 to 80 pores perforating the cryptocyst) and smaller avicularia.

A quite similar species is *Microporina japonica* CANU & BASSLER, 1929b in respect to type of the colony and with its distal avicularia. This species however has an articulated colony, so no bifurcated specimens can be found. Also its zooecia are narrower (about half of *Aviculiera austriensis* sp.n.) and the avicularia are always tapering proximally.

Remark: Although no ovicell has been found, the other presented features allow us to list this species in *Aviculiera*.

Occurrence: Haselbach and Reingruberhöhe (samples RH 1, RH 2, RH 3, RH 10+11 and SEIFERT's samples).

Distribution in time and space:
Priabonian - Austria (ZÁGORŠEK, 2001b)

***Aviculiera* sp.**
pl. 30, fig. 2

Diagnosis: The colony is encrusting. The zooecia are oval to elongated rhomboidal. The opesium is oval and small. The cryptocyst is imperforate except for a pair of opesiules developed as long slits. The opesiules run from the proximal margin of the aperture to the approximately the middle of the length of the zooecium. The large adventitious, drop-like avicularium with pivot is situated distally from the aperture.

Remarks: I have only one poorly preserved specimen. It exhibits the typical features of *Aviculiera* (cryptocyst with two opesiules, and avicularium distally from the aperture), but only one poorly preserved specimen is not enough to determine it at species level.

Occurrence: Reingruberhöhe (sample RH 2).

Family Poricellariidae HARMER 1926

Genus *Poricellaria* D'ORBIGNY 1852

The colony is erect, flexible with a rectangular to oval cross section. The zooecia are arranged in 4 longitudinal rows, one row on each side. The zooecia have a well-developed gymnocyst and a small orifice. Orifices may be facing only one side, or around whole internodes. The cryptocyst is complete and has a marginal slit-like opesiule. The opesiules perforate the cryptocyst along one side only, the opposite side of the cryptocyst remains nonporous. The avicularia are vicarious, situated on the gymnocyst. The ovicell is unknown.

Remarks: REUSS (1869b) established a new genus *Diplodidymia*. According to the BASSLER (1953), *Diplodidymia* is a junior synonym of *Poricellaria*. CHEETHAM (1966) however proposed to use *Diplodidymia* as a subgenus of *Poricellaria* for Miocene species, because they have larger avicularia and a zooecial orifice facing around the internodes. There are, among the studied material, some specimens facing only one side, as well as some facing around the whole colonial branch, but with the same zooecial morphology. So probably, the direction of the facing of the orifice could be caused by ecological needs and therefore has no taxonomy value. I agree with BASSLER (1953) and consider *Diplodidymia* as a junior synonym of *Poricellaria*.

***Poricellaria complicata* (REUSS, 1869a)**
pl. 14, fig. 1

1869b *Diplodidymia complicata* nov. gen., sp.n., REUSS p. 469, Pl. 3, Fig. 6-9

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v. 2001b *Poricellaria complicata* (REUSS), ZÁGORŠEK p. 527

Diagnosis: The colony has a rectangular transverse section. The zooecia are asymmetrical, oval with circular orifice. Most with orifices facing all sides of the internodes, but rarely only in one side. The cryptocyst is imperforate except for the two long opesiules. The distal opesiule is wider but shorter than the proximal one. A large adventitious, drop-like avicularium without pivot is situated on the gymnocyst.

Remarks: *Poricellaria complicata* (REUSS, 1869a) is very similar to *Poricellaria alata* D'ORBIGNY, 1854 as described by VOIGT (1964). It differs, however in having larger zooecia and considerable larger avicularia. The zooecia of *Poricellaria alata* D'ORBIGNY, 1854 are mostly facing on one side of the internodes, but *Poricellaria complicata* (REUSS, 1869a) has orifices often around the whole colonial branch. The original REUSS material has not been found among his collection in the Museum of Natural History in Vienna. Nevertheless, the description and illustration are almost identical with the specimens from Waschberg zone.

Occurrence: Reingruberhöhe (samples RH 31, RH 33 and SEIFERT's samples).

Distribution in time and space:

Priabonian Italy (BRAGA, 1975), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Rupelian - France - Gaas (REUSS, 1869b)

Family Lunulitidae GREGORY, 1893

Genus *Lunulites* LAMARCK, 1816

The colony is free, discoidal or conical. The zooecia are arranged in regular radial rows and have a well-developed cryptocyst. The zooecial rows alternate with rows of heterozooecia (avicularia or/and vibracularia). The ovicell is endozooecial.

Lunulites quadrata (REUSS, 1848)

1848 *Cellepora quadrata* sp.n., REUSS p. 95, Pl. 11, Fig. 17

v. 1869a *Lunulites quadrata* (REUSS), REUSS p. 278, Pl. 28, Fig. 16

1963 *Lunulites quadrata* (REUSS), BRAGA p. 25, Pl. 2, Fig. 8

v. 1963 *Lunulites ovata* (CANU & BASSLER), MAŁECKI p. 110, Pl. 10, Fig. 8

1980 *Lunulites quadrata* (REUSS), BRAGA p. 47, Fig. 37.

v. 1988 *Lunulites quadrata* (REUSS), BRAGA & BARBIN p. 518.

v. 2001a *Lunulites quadrata* (REUSS), ZÁGORŠEK p. 38, Pl. 7, Fig. 7.

Diagnosis: The colony forms a conical disk. The zooecia have trapezoidal or rectangular shape, about 15 to 25 zooecia occur in each radial row. The orifice is oval to circular. The mural rim is narrow. A cryptocyst is developed and slightly granular. Avicularia as well as vibracularia are present. Both are small, circular to drop like.

Remarks: Only one large colony with a few preserved zooecia has been found. The shape and morphology of these zooecia allow us to determine it as the most probable species, although many specific features have not been preserved. *Lunulites quadrata* (REUSS, 1848) is a common species in shallow water Eocene sediments.

Syntypes of this species have not been found in the REUSS collection in the Museum of Natural History in Vienna. BRAGA (1991) also pointed out that the original specimens of *Cellepora quadrata* REUSS, 1848 were lost.

Lunulites ovata (CANU & BASSLER) in MAŁECKI (1963) has all features typical for *Lunulites quadrata* (REUSS, 1848) and therefore is listed here in synonymy.

Occurrence: Reingruberhöhe (sample RH 31 and SEIFERT's samples).

Distribution in time and space:

Priabonian - Vicentin (REUSS, 1869a), Poland (MAŁECKI, 1963), Romania (GHIURCA, 1987), Italy (BRAGA & BARBIN, 1988), Hungary (ZÁGORŠEK, 2001a), Slovakia (ZÁGORŠEK, 1996)

Rupelian - Italy (BRAGA & BARBIN, 1988)

Tortonian - Austria & Hungary (REUSS, 1848),

Genus *Vibracella* WATERS, 1891

The colony is unilamellar, free, encrusting or orbicular. The zooecia have a well-developed cryptocyst and large opesia. The opesia are triangular with denticles and enlarged proximo-lateral corners. The avicularia are adventitious. The ovicell is endozooecial as large as a regular zooecium, with a calcified porous convex frontal wall.

Vibracella trapezoidea (REUSS, 1848)

pl. 14, fig. 3

v.* 1848 *Cellepora trapezoidea* sp.n., REUSS p. 96, Pl. 11, Fig. 21

v. 1869a *Flustrellaria trapezoidea* (REUSS), REUSS p. 268, Pl. 29, Fig. 21

1891 *Vibracella trapezoidea* (REUSS), WATERS p. 11, Pl. 1, Fig. 23

v. 1963 *Rhagasostoma circumvallum* KOSCHINSKY, MAŁECKI p. 112, Pl. 11, Fig. 5

1974 *Vibracella trapezoidea* (REUSS), DAVID & POUYET p. 120

1977 *Vibracella trapezoidea* (REUSS), VÁVRA p. 91

1980 *Vibracella trapezoidea* (REUSS), BRAGA p. 46, Fig. 39

v. 1988 *Vibracella trapezoidea* (REUSS), BRAGA & BARBIN p. 518, Pl. 6, Fig. 1

v. 1996 *Vibracella trapezoidea* (REUSS), ZÁGORŠEK p. 529, Pl. 3, Fig. 4

Diagnosis: The zooecia are rectangular to oval, with a well-developed mural rim and a flat cryptocyst with opesia. The opesia are large, lunar and have typical enlarged

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proximo lateral corners for parietal muscles. The cryptocyst is slightly granular. The adventitious avicularium is developed as a vicarious cell with an oval aperture. The avicularium is small, about 1/4 of the length of a zooecium, trapezoidal to oval and usually arranged between three or four zooecia. The palate of the avicularium is acute distally. The frontal wall of the endozooecial ovicell is strongly porous and convex. The ovicell aperture is oval and small, about one half of the opesia.

Remarks: Due to the similar shape of colony, the presence of endozooecial ovicells and similar mode of life (free living colonies) the genus *Vibracella* is listed under the family Lunulitidae GREGORY, 1893.

The holotype stored in the Museum of Natural History in Vienna is an encrusting colony, identical with those found in Reingruberhöhe. Though no ovicells have been found among Austrian specimens, other features allow us to determine the Waschberg specimens as *Vibracella trapezoidea* (REUSS).

Due to a recent study, *Rhagasostoma circumvallum* KOSCHINSKY, as described by MAŁECKI (1963) belongs to *Vibracella trapezoidea* (REUSS).

Occurrence: Haselbach and Reingruberhöhe (samples RH 1, RH 2 and SEIFERT's samples).

Distribution in time and space:

Priabonian - Vicentin (REUSS, 1869a), Italy (WATERS, 1891, BRAGA & BARBIN, 1988), Poland (MAŁECKI, 1963), Romania (GHIURCA, 1987), Slovakia (ZÁGORŠEK, 1996), Hungary (ZÁGORŠEK, 2001a),

Rupelian - Italy (BRAGA & BARBIN, 1988)

Tortonian - Austria & Hungary (REUSS, 1848, DAVID & POUYET, 1974)

Family Onychocellidae JULLIEN, 1881

Genus *Onychocella* JULLIEN, 1882 (= *Semieschara* D'ORBIGNY, 1852)

The colony is erect or encrusting. The zooecia lack a gymnocyst, but have a well-developed cryptocyst. A mural rim is present. The orifice has typical enlarged proximo lateral corners for parietal muscles. The avicularia are vicarious, asymmetrical, typically curved in one side. The ovicell is unknown.

Remarks: GORDON (pers. com., 1998) as well as VOIGT (pers. com., 1999) pointed out that the type species of *Semieschara* (*S. flabellata* D'ORBIGNY) pointed out that Onychocella JULLIEN, 1882 is a junior synonym of *Semieschara* D'ORBIGNY, 1852. All species of genus *Onychocella* should be therefore listed under the genus *Semieschara*. *Onychocella* is however a well-established genus, and the type genus for family Onychocellidae JULLIEN, 1881. The genus name *Semieschara* has been established by D'ORBIGNY (1852) as a type of growth forms - erect unilamellar. The type species, *S. flabellata* D'ORBIGNY, could have however, also bilamellar colonies (VOIGT pers. com., 1999). *Semieschara* has not been used as a genus name for a long time, therefore it may be perhaps, in respect to stability of taxonomy and nomenclature, regarded as "unused name" (according to ICZN). Therefore it seems to be better to use *Onychocella* instead of *Semieschara*.

Onychocella subpyriformis (D'ARCHIAC, 1846)

pl. 14, fig. 2

v.* 1848 *Eschara excavata* sp.n., REUSS p. 72, Pl. 8, Fig. 36

v. 1869a *Vincularia geometrica* sp.n., REUSS p. 276, Pl. 33, Fig. 16

1891 *Onychocella angulosa* (REUSS), WATERS p. 9, Pl. 1, Fig. 20

v. 1963 *Onychocella angulosa* (REUSS), MAŁECKI p.104, Pl. 9, Fig. 14

v. 1963 *Onychocella celsa* CANU & BASSLER, MAŁECKI p. 105, Pl. 9, Fig. 11

v. 1963 *Onychocella laciniosa* CANU & BASSLER, MAŁECKI p. 105, Pl. 9, fig. 9

1980 *Onychocella subpyriformis* (D'ARCHIAC), BRAGA p. 46, Fig. 29-30

v. 1988 *Onychocella subpyriformis* (D'ARCHIAC), BRAGA & BARBIN p. 516, Pl. 5, Fig. 3, 4

v. 1996 *Onychocella subpyriformis* (D'ARCHIAC), ZÁGORŠEK p. 525, Pl. 1, Fig. 1-6

Diagnosis: The colony is erect, multilamellar, large, flat with a very narrow and long cross-section, rarely with oval to circular cross-section. The zooecia are hexagonal to oval in shape, slightly longer than wide with large and semilunar opesia. The cryptocyst is extensive, shallow, flat and smooth. The mural rim is prominent, narrow and smooth. The vicarious avicularium is as long as the zooecium, but the width is about half of the zooecium. The orifice of the vicarious avicularium is small and circular or seldom narrow oval. The palate is very long, sharpening distally and usually curved laterally.

Remarks: The syntypes of *Vincularia geometrica* REUSS, 1869a and *Eschara excavata* REUSS, 1848 deposited in the Museum of Natural History in Vienna belong to *Onychocella subpyriformis* (D'ARCHIAC, 1846). The same results were achieved also by BRAGA (1991). *Onychocella angulosa* (REUSS) described by WATERS (1991) is also *O. subpyriformis* (According to BRAGA & BARBIN, 1988). Already BRAGA (1980) mentioned the large variability of *Onychocella subpyriformis* (D'ARCHIAC, 1846). Therefore I believe that also the specimens determined by MAŁECKI (1963) as *Onychocella celsa* CANU & BASSLER and *Onychocella laciniosa* CANU & BASSLER belong to this species.

Occurrence: Haselbach and Reingruberhöhe in the entire section (samples RH 1, RH 4, RH 8, RH 10+11, RH 12, RH 31, RH 32, RH 33 and RH 37).

Distribution in time and space:

Lutetian - France (CANU & BASSLER, 1920), Egypt (ZIKO, 1985)

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Priabonian Vicentin (REUSS, 1869a), Italy (WATERS, 1891), Poland (MAŁECKI, 1963), Italy (BRAGA & BARBIN, 1988), Romania (GHIURCA, 1987), Slovakia (ZÁGORŠEK, 1996), France (MAŁECKI, 1963), United Kingdom (CHEETHAM, 1966), Spain (ZIKO, 1985), Carolina (CANU & BASSLER, 1920), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Rupelian - Italy (BRAGA & BARBIN, 1988)
Burdigalian - France (MAŁECKI, 1963)
Tortonian - Austria & Hungary (REUSS, 1848),
Quaternary & Recent - Mediterranean (CANU & BASSLER, 1920)

Genus *Otiochmella* gen. nov.

Diagnosis: The colony is encrusting or free, discoidal. The zooecia are circular to oval with an extended cryptocyst, wide but low mural rim and small opesia. The opesiules are not developed. The avicularia are adventitious rhombic in shape, straight without indentation, situated usually among four zooecia. There is a little suture distally from circular avicularian opesia. The ancestrular area is indistinct. The ovicell is probably endozooecial, with a very extended opesia.
Derivatio nominis: Due to similarity with the genera *Otionellina* BOCK & COOK, 1998 and *Aechmella* CANU & BASSLER, 1917
Included species: Type species: *Otiochmella discoida* sp.n.
Comparison: The most similar genus is *Otionellina* BOCK & COOK, 1998 in its general shape and type of avicularia. According to COOK (pers. com., 1999) it however differs in having avicularia on the distal and proximal margin of ancestrular area and by being radially budded. Also the opesia have not enlarged proximo-lateral corners and are much bigger than in *Otiochmella*. The avicularia have large opesia with a paddle-shaped palate.
The second, very similar genus *Aechmella* CANU & BASSLER, 1917 differs in having very large opesia, elongated zooecia and large, drop-like avicularia with an oval proximal and sharp distal margin.
Pseudolunulites COOK & VOIGT, 1986, similar in colonial grown form and type of budding, has however developed a cryptocyst in avicularia and dimorphic zooecia.
Pavolunulites D'ORBIGNY, 1852 has indentations in avicularia (according to COOK & VOIGT, 1986).
Remarks: Due to the development of adventitious avicularia and the type of zooecia *Otiochmella* is listed under the Onychocellidae.

Otiochmella discoida sp.n.

pl. 14, figs. 4–6

Diagnosis: The colony is free and discoidal. The zooecia are circular to oval developing wide mural rim and a concave cryptocyst. The mural rim is on the proximal end of zooecia indistinct. The opesia are small with little enlarged proximo lateral corners. The adventitious avicularium is rhombic to circular with a circular opesium. The ancestrular area is indistinct. The ovicell is probably endozooecial.
Holotype: The specimen depicted in pl. 14, fig. 4, from the locality Haselbach, deposited in the Institute of Palaeontology, University of Vienna, Austria.
Paratypes: 4 specimens from the locality Haselbach, deposited in the Institute of Palaeontology, University of Vienna, Austria.
Derivatio nominis: Due to the discoidal shape of the colonies
Locus typicus: Haselbach - Waschberg zone
Stratum typicum: Eocene - Priabonian.
Dimensions:
(in micro meters = μm; x = average, details in fig. 9)
length of the colony: x = 1792
width of the colony: x = 1619
length of zooecia: x = 309
width of zooecia: x = 279
length of zooecial aperture: x = 56
width of zooecial aperture: x = 94
length of avicularium: x = 209
width of avicularium: x = 116
length of avicularian opesium: x = 47
width of avicularian opesium: x = 52
area of zooecial aperture: x =

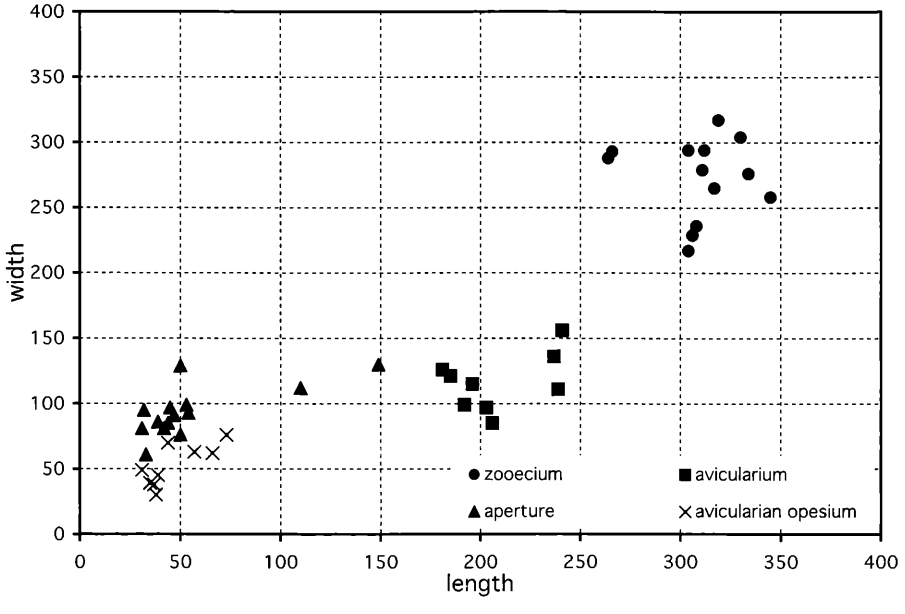

Figure 9: Chart of important measurements of *Otiochmella discoida* sp.n. (values in μm).

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5162, area of avicularium: x = 1756

Description: The colony is free and discoidal or encrusting. The zooecia are circular to oval with the distal margin always rounded and the proximal margin irregular. The zooecia lack a gymnocyst. The mural rim is wide but low, it is widest in the mid-length of zooecia, on the distal edge it is narrow and on the proximal edge is indistinct. The cryptocyst is well developed, little concave, smooth or slightly granular and nonporous. The opesia are small oblong, with a distal margin little rounded, and with little enlarged proximo-lateral corners. The proximo-lateral corners are directed proximally, never laterally. The avicularia are adventitious, usually situated between four zooecia. They are rhombic to oval in shape, tapering distally and proximally. A short suture runs distally from circular avicularian opesium to the margin of the avicularium. The ancestrular area is indistinct. The ovicell is probably endozooecial, as large as regular zooecia. The brooding zooecia have large circular opesia and a much-reduced cryptocyst. The mural rim is also present. It is developed around the whole ovicell.

Comparison: The most similar species is *Aechmella crassimargo* CANU & BASSLER, 1920 in general shape and in having a mural rim developed only in the distal part of the zooecium. This species however differs from *Otiochmella discoida* sp.n. in having rare avicularia tapering only distally and being rounded proximally and by the fact that its enlarged proximo lateral corners of the opesium are directed always laterally, never proximally. Also *Otionellina paradoxa* BOCK & COOK, 1998 is similar to the described species, in having very similar brooding zooecia, but differs in having large opesia without enlarged proximo-lateral corners and in having large, paddle-shaped avicularia.

Remark: Due to the presence of endozooecial ovicells the species is also similar to *Lunulites* LAGAAIJ, 1952, which has, however, a completely differently organised colony.

Occurrence: Haselbach.

Family Steginoporellidae HINCKS, 1884

Genus *Steginoporella* SMITT, 1873

The colony is erect or encrusting. The zooecia are dimorphic (A and B zooecia), always with a well-developed, porous cryptocyst and the lacking a gymnocyst. The opesiules may be present, when absent the orifice has enlarged proximo-lateral corners for parietal muscles. The mural rim is developed. The vicarious avicularia (B-zooecia) occur within zooecial rows, they are larger than autozooecia (A-zooecia), and have extended, concave, smooth distal parts - palate. There are no ovicells.

Steginoporella cucullata (REUSS, 1848)

v.* 1848 *Cellaria cucullata* sp.n., REUSS p. 60, Pl. 7, Fig. 31
1974 *Steginoporella cucullata* (REUSS), DAVID & POUYET p. 124, Pl. 10, Fig. 4
1977 *Steginoporella cucullata* (REUSS), VÁVRA p. 94 (cum. syn.)
1979 *Steginoporella cucullata* (REUSS), POUYET & DAVID p. 774, Fig. 3, Pl. 3, Fig. 10
v. 2001b *Steginoporella cucullata* (REUSS), ZÁGORŠEK p. 528, Pl. 5. Fig. 3

Diagnosis: The colony is erect and bilamellar, sometimes multilamellar. The zooecia are arranged in 4 to 6 regular axial rows. The zooecial rows are separated by a thin furrow. The zooecia are elongated, oval to sub-hexagonal, with wide, smooth and non-granular mural rim. The orifice is oval to semilunar with a straight proximal margin. The opesiules are large, paired, situated proximally from the orifice. The B-zooecia are a little longer, but much wider and larger than A-zooecia, the palate is small, narrow, but wide and flat. The orifice of B-zooecia has enlarged proximo lateral corners, so it lacks opesiules.

Remarks: The holotype deposited in the Museum of Natural History in Vienna is a badly preserved specimen, with a very thick mural rim and very rare B-zooecia. The other syntypes (especially those labelled as found in 1867 by REUSS) show the most important features (wide mural rim, small B-zooecia and small palate) identical with described specimens. POUYET & DAVID (1979) selected a lectotype among the syntypes, which is also identical with described specimens.

Steginoporella cucullata (REUSS, 1848) mostly occurs in Miocene sediments, however it has been found in Hungarian Eocene too (ZÁGORŠEK, 2001a).

Occurrence: Reingruberhöhe in the entire section (samples RH 2, RH 10+11, RH 31, RH 33 and SEIFERT's samples).

Distribution in time and space:

Priabonian - Romania (GHIURCA, 1987), Italy (POUYET & DAVID, 1979), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Tortonian - Austria & Hungary (REUSS, 1848, DAVID & POUYET, 1974), Poland (POUYET & DAVID, 1979), Czech (VÁVRA, 1977)

Steginoporella haidingeri (REUSS, 1848)

pl. 15, fig. 1

v.* 1848 *Cellaria haidingeri* sp.n., REUSS p. 60, Pl. 7, Fig. 30
v. 1862 *Eschara Reussi* sp.n., STOLICZKA, p. 88
1963 *Steginoporella jacksonica* CANU & BASSLER, MAŁECKI p. 112, Pl. 11, Fig. 7
1979 *Steginoporella haidingeri* (REUSS), POUYET & DAVID p. 779, Pl. 1, Fig. 1
1980 *Steginoporella haidingeri* (REUSS), BRAGA p. 48, Fig. 31-32
v. 1988 *Steginoporella haidingeri* (REUSS), BRAGA & BARBIN p. 519, Pl. 6, Fig. 9
v. 1996 *Steginoporella haidingeri* (REUSS), ZÁGORŠEK p. 531, Pl. 4, Fig. 6, 7

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Diagnosis: The colony is erect, multilamellar sometimes bilamellar, large and flat. The transverse section is oval to circular. The zooecia are arranged in 8 to 20 regular axial rows. The zooecia are elongated oval with a thick, smooth and sometimes little granular mural rim. The orifice is large, oval to semilunar with a straight proximal margin and with very small, badly visible opesiules. The cryptocyst is strongly porous and little concave. The B-zooecia are significantly larger than A-zooecia, with much bigger orifice. The orifice of B-zooecia has enlarged proximo lateral corners for parietal muscles. The width of the palate is approximately two times larger than the width of the A-zooecium. The palate is smooth, concave and narrow.

Remarks: I do not agree with DAVID & POUYET (1974), who pointed out that *Eschara reussi* STOLICZKA, 1862 is a junior synonym of *Steginoporella cucullata* (REUSS, 1848). STOLICZKA's (1862) material has all features identical with syntypes collected by REUSS and deposited in the Museum of Natural History in Vienna and therefore his species is listed under *S. haidingeri* (REUSS). *Steginoporella jacksonica* CANU & BASSLER in MAŁECKI (1963) shows all the important features of *Steginoporella haidingeri* (REUSS) and therefore is listed as a synonym too.

VÁVRA (pers. com., 2001a) pointed out that *Steginoporella haidingeri* (REUSS) has mostly bilamellar colonies. The specimens found in Eocene sediments (Italy, Slovakia, Hungary etc.) show however mostly multilamellar colonies.

Occurrence: Haselbach and Reingruberhöhe (samples RH 2, RH 4 and RH 31).

Distribution in time and space:

Priabonian Poland (MAŁECKI, 1963), Italy (BRAGA & BARBIN, 1988), Slovakia (ZÁGORŠEK, 1996), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Rupelian - Italy (POUYET & DAVID, 1979)

Tortonian - Austria & Hungary (REUSS, 1848, DAVID & POUYET, 1974)

Steginoporella elegans chattiensis POUYET & DAVID, 1979

1885 *Steginoporella elegans* (EDWARDS), KOSCHINSKY p. 33

v. 1963 *Steginoporella elegans* (EDWARDS), MAŁECKI p. 111, Pl. 11, Fig. 6

1979 *Steginoporella elegans chattiensis* sp.n., POUYET & DAVID p. 777, Pl. 1, Fig. 2-3 (cum. syn.)

v. 2001b *Steginoporella elegans chattiensis* POUYET & DAVID, ZÁGORŠEK p. 528

Diagnosis: The colony is erect and bilamellar to multilamellar. The zooecia are elongated hexagonal to oval and arranged in regular longitudinal rows. There are 8 to 10 rows of zooecia around the colonial stem. The zooecia have a narrow, slightly granular mural rim and are separated one from another by a very thin furrow. The cryptocyst is strongly porous having many small pores (about 15-20 pores on each cryptocyst) and has small, circular opesiules. The opesiules are as large as the regular pores. The B-zooecia are as large as A-zooecia, however the orifice is about two times larger. The opesia of B-zooecia have enlarged proximo-lateral corners. The palate is flat, smooth and little wider than the width of the zooecium.

Remarks: The description as well as photos of *Steginoporella elegans* (EDWARDS) as described by KOSCHINSKY (1885) and MAŁECKI (1963) show the same features as *Steginoporella elegans chattiensis* POUYET & DAVID, 1979.

Occurrence: Reingruberhöhe only SEIFERT's samples.

Distribution in time and space:

Priabonian Germany (KOSCHINSKY, 1885), Poland (MAŁECKI, 1963), Romania (GHIURCA, 1987), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Chattian - France (POUYET & DAVID, 1979)

Burdigalian - France (BUGE, 1957)

Steginoporella firma (REUSS, 1869a)

pl. 15, fig. 2

v.* 1869a *Lepralia firma* m., REUSS p. 180, Pl. 15, Fig. 11

1979 *Steginoporella firma* (REUSS), POUYET & DAVID p. 778, Text-fig. 3, Pl. 4, Fig. 8

Diagnosis: The colony is encrusting. The zooecia are oval to rectangular and little longer than wide. The mural rim is narrow. The cryptocyst is perforated by large and rare pores (about 4 to 10 pores on each cryptocyst). Opesiules are not developed. The orifice is large, semilunar with enlarged proximo-lateral corners. The B-zooecia are little wider than the A-zooecia. The opesium of the B-zooecium is oval with well-developed enlarged proximo-lateral corners. Therefore a median part of the proximal margin of the opesia is prominent, thus looking like a lyrula. The palate is flat and narrow.

Remarks: The REUSS material deposited in the Museum of Natural History in Vienna has more rectangular A-zooecia with smaller apertures and the B-zooecia have a very prominent "lyrula" (median projection of proximal margin of the aperture formed because of development of large and deep proximo-lateral corners). The specific features that allow us to list our specimens in this species, although only fragments have been found, are size of the palate, absence of the opesiules and the general shape of the colony.

Occurrence: Haselbach and Reingruberhöhe (sample RH 31 and SEIFERT's samples).

Distribution in time and space:

Priabonian - Vicentin - Italy (REUSS, 1869a)

Steginoporella reingruberhohensis sp. n.

pl. 15, fig. 3, 4

v. 2001b *Steginoporella* aff. *montenati* DAVID, MONGEREAU & POUYET, ZÁGORŠEK p. 529, Pl. 5. Fig. 4

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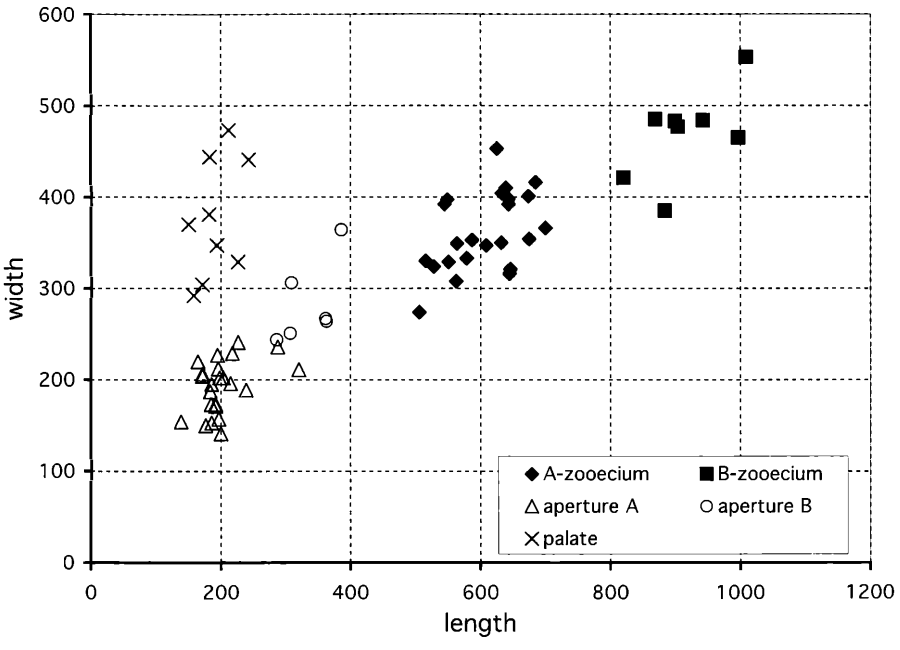

Figure 10: Chart of important measurements of *Steginoporella reingruberhohensis* sp.n. (values in μm).

Diagnosis: The colony is erect and bilamellar to multilamellar. The zooecia are elongated and growing in regular rows. The mural rim is wide. The cryptocyst is deeply immersed, porous with large pores but without any opesiules. The B-zooecia are about two times longer and wider than the A-zooecia. The palate is concave and narrow.

Holotype: The specimen depicted in pl. 25, fig. 4, from the locality Reingruberhöhe, deposited in the Institute of Palaeontology, University of Vienna, Austria.

Paratypes: 15 specimens from the locality Reingruberhöhe, deposited in the Institute of Palaeontology, University of Vienna, Austria.

Derivatio nominis: Due to the occurrence at Reingruberhöhe.

Locus typicus: Reingruberhöhe (sample RH 31).

Stratum typicum: Eocene - Priabonian.

Dimensions:

(in micro meters = μm; x = average, details in fig. 10):

length of the colony: 2739 - 5214; x = 3836
width of the colony: 1485 - 2769; x = 1799
length of A-zooecia: x = 606
width of A-zooecia: x = 362
length of B-zooecia: x = 916
width of B-zooecia: x = 474
length of A-zooecial aperture: x = 202
width of A-zooecial aperture: x = 193
area of A-zooecial aperture: x = 27998
length of B-zooecial aperture: x = 336
width of B-zooecial aperture: x = 283
area of B-zooecial aperture: x = 69838
length of palate x = 191
width of palate x = 376
area of palate x = 63890

Description: The colony is erect and multilamellar, with an oval transverse section. The elongated zooecia are growing in regular longitudinal rows, about 4 to 10 rows on each side of the colony. The cryptocyst is deeply immersed, mostly visible only in its proximal part. It runs distally very deep towards the orifice. Therefore the proximal margin of the orifice is difficult to see. The A-zooecia are elongated and about two times longer than wide and have a wide mural rim. The cryptocyst of A-zooecia is perforated by large pores. The number of pores varies from 10 to 20. The orifice is large, the proximo-lateral corners are slightly enlarged and have no opesiules. The B-zooecia are about three times longer than wide and about two times larger than A-zooecia. The cryptocyst of the B-zooecia is perforated by 7 to 15 pores. The B-zooecia have very large opesia, occupying almost the whole zooecium, and the large proximo-lateral corners are well developed. There are also no opesiules on the B-zooecia. The palate is concave, smooth, narrow and bordered distally by a thick mural rime. The ovicell is unknown.

Comparison: The most similar species is *S. montenati* DAVID & POUYET, 1972 as described by POUYET & DAVID (1979). It has a very similar shape of the zooecia, but differs by an almost flat cryptocyst perforated by very small pores. Also the size of the B-zooecial opesia is much smaller than that in *S. reingruberhohensis* sp. n.

Also *S. cucullata* (REUSS, 1848) is similar to the described species, mainly in having a thick mural rim and large B-zooecial opesia. It differs however in having opesiules in A-zooecia and also in having almost a flat cryptocyst strongly porous with small pores. The cryptocyst deepening toward the orifice perforated by large pores and lacking any opesiules seems to be the specific features for *S. reingruberhohensis* sp. n.

Remark: Due to the presence of dimorphic zooecia (A-zooecia and B-zooecia) and due to the absence of ovicells the described species is listed under the genus *Steginoporella*.

Occurrence: Reingruberhöhe (samples RH 12, RH 13, RH 31 and SEIFERT's samples).

Distribution in time and space:

Priabonian - Austria (ZÁGORŠEK, 2001b)

Superfamily Cellarioidea FLEMING, 1828

Family Cellariidae FLEMING, 1828

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Genus *Cellaria* Ellis & Solander, 1786

The colony is erect flexible and articulated, with cylindrical segments (internodes). The zooecia are rhomboidal to drop-like and grow in regular rows around the whole branch. A mural rim is developed, the cryptocyst is nonporous and the gymnocyst is very short. The orifice is semilunar with a raised proximal margin and with condyles. Avicularia are generally present, they are vicarious or interzooidal. The ovicell is endotoichal.

Cellaria reussi d'Orbigny, 1851

pl. 15,fig. 5

v. 1869a *Salicornaria reussi* (d'Orbigny), Reuss p. 261, Pl. 29, Fig. 5
1963 *Cellaria reussi* d'Orbigny, Braga p. 26
1977 *Cellaria reussi* d'Orbigny, Vávra p. 98
1980 *Cellaria reussi* d'Orbigny, Braga p. 50, Fig. 43
v. 1988 *Cellaria reussi* d'Orbigny, Braga & Barbin p. 519, Pl. 6, Fig. 7
v. 1997 *Cellaria reussi* d'Orbigny, Zágoršek p. 405, Pl. 1, Fig. 4, 6

Diagnosis: The zooecia are mostly arranged in four longitudinal rows, rarely in six rows. The zooecia are drop-like in shape and proximally tapering. The mural rim is narrow and smooth. The cryptocyst is concave, large and smooth. The orifice is semilunar with big corners developed for the parietal muscles. Avicularia have not been observed. The ovicell is endotoichal, small.

Remarks: Only a few specimens have been found. Although one specimen of *Cellaria reussi* d'Orbigny, 1851 could yield several internodes, which look like fragments of the colony, they are very rare in Alpine-Carpathians region. They have been probably found only as reworked material. On the other hand, fragments of *Cellaria* are abundant among the shallow water Eocene sediments in Southern Alps (Italy).

Occurrence: Haselbach.

Distribution in time and space:

Priabonian Vicentin Italy (Reuss, 1869a), Romania (Ghiurca, 1987), Italy (Braga & Barbin, 1988), Slovakia (Zágoršek, 1997), Hungary (Zágoršek, 2001a), Austria (Zágoršek, 2001b)

Rupelian Italy (Braga & Barbin, 1988), Germany (Vávra, 1977)

Tortonian - Austria (Vávra, 1977)

Quaternary & Recent - tropical seas (Braga & Barbin, 1988)

Family Bicorniferidae Keij, 1977

Genus *Babickella* gen. nov.

Diagnosis: The colony is perhaps flexible erect, articulated. The preserved segments (internodes) are elongated in shape, in lateral view semilunar, very narrow, and consist of 4 to 6 individuals (zooecia) arranged in one row. The orifices are opening only in one side of the internode. The orifice is circular, terminal, large and some of them exhibit a typically Anascan structure (mural rim), some are more calcified. The zooecia are separated by a very shallow but wide furrow. The largest zooecia are situated in the middle of the internodes; towards the ends of the internode, the zooecia became smaller. The marginal zooecia are about four times smaller than the central ones. The internode is open usually in both tapering ends, sometimes only in one end. No other pores are visible on the internode surface.

Derivatio nominis: In honour of my grandmother, who died exactly in the day, when I have found the first specimens of the described specimens. Grandmother in Czech language is "babicka"

Included species: Type species: *Babickella janensis* sp.n.. Probably also *Bicornifera* (?) *longa* Lindenberg, 1965 as described by Keij (1977) and "*Bicornifera*" n. sp. Keij, 1977 could belong to this genus.

Comparison: The most similar genus is *Bicornifera* Lindenberg, 1965 in having a similar morphology of internodes, but differs in having always only 2 zooecia in each internode (Haman, Finger & Huddleston, 1984) and having small zooecia usually in one, rarely at both ends of the internode. The type species (*B. alpina* Lindenberg, 1965) has very wide, almost globular internodes and has rare pores on the frontal as well as on the lateral side of the internode. Keij (1977) described a new species *Bicornifera lagaaiji* that is very similar to *Bicornifera longa* Lindenberg, 1965 and has only two zooecia in each internode and a porous wall. However he described also two species *Bicornifera* (?) *longa* Lindenberg, 1965 and "*Bicornifera*" n. sp., which have up to four zooecia in each very narrow internode and apertures more circular than a "typical" *Bicornifera*. These specimens could probably also belong to the new genus *Babickella*.

Szczechura (1992) argued that *Bicornifera* could have up to four zooecia, but this opinion is based on Keij's species *Bicornifera* (?) *longa* Lindenberg, 1965 in Keij (1977) and "*Bicornifera*" n. sp. Keij, 1977, which probably belong to the genus *Babickella* gen. nov. Haman, Finger & Huddleston (1984) tested the morphology of *Bicornifera lagaaiji* Keij, 1977. They examined 15 specimens, and all of them had only two zooecia per internode. *Bifissurinella* Poignant & Ubaldo, 1973 has also a similar morphology, but its internodes consist only of two triangular zooecia, and the whole shape of the internode is more triangular and globular.

Remarks: Due to the similarities between *Bicornifera* and *Babickella* the new genus is listed in the family Bicorniferidae Keij, 1977. As proposed by Szczechura (1992) the oldest Bicorniferidae have 4 zooecial units and being younger, the number of zooecial units in each internode decreases up to two. The new genus *Babickella* fits into this

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scheme, because it exhibits also usually 4 up to 6 zooecia per internode; it is one of the oldest Bicorniferidae.

***Babickella janensis* sp.n.**
pl. 15, figs. 6, 7

Diagnosis: The internodes are elongated, very narrow. The internodes consist of 4 to 6 zooecia in one row. The orifice opens on one side of the internode. It is circular usually with a mural rim. The zooecia are separated by a furrow. The zooecia towards the margin decrease in size. No other pores are visible. The internodes are usually open on both ends.

Holotype: The specimen depicted in pl. 15, fig. 6, from the locality Reingruberhöhe, deposited in the Institute of Paleontology of University Vienna, Austria.

Paratypes: 4 specimens from the locality Reingruberhöhe, deposited in the Institute of Paleontology of University Vienna, Austria.

Derivatio nominis: Due to the given name of my grandmother - Jane.

Locus typicus: Reingruberhöhe (sample RH 12).

Stratum typicum: Eocene - Priabonian.

Dimensions:
(in micro meters = μm; x = average, details in fig. 11):
length of the colony: 922 - 1198; x = 1060
width of the colony: 256 - 260; x = 258
length of central zooecia: x = 198
width of central zooecia: x = 131
thickness of central zooecia: x = 121
length of central zooecial aperture: x = 100
width of central zooecial aperture: x = 52
area of central zooecial aperture: x = 4712
length of middle zooecia: x = 154
width of middle zooecia: x = 101
thickness of middle zooecia: x = 94
length of middle zooecial aperture: x = 62
width of middle zooecial aperture: x = 26
area of middle zooecial aperture: x = 1168
length of marginal zooecia: x = 98
width of marginal zooecia: x = 54
thickness of marginal zooecia: x = 61
length of marginal zooecial aperture: x = 24
width of marginal zooecial aperture: x = 17
area of marginal zooecial aperture: x = 227

Description: The colony is articulated, probably flexible erect and consists of several internodes (units). The internodes are elongated in shape, very narrow, the dorsal side of the internodes is straight, and the frontal side is convex bearing zooecial apertures. There are, in each internode, about 4 to 6 zooecia arranged in a longitudinal row and open on the frontal side of the internode. The orifice exhibits a typically Anascan structure - mural rim and wide opesium. The opesium is circular, terminal, large and sometimes more calcified and forms blind (sealed) zooecia. The mural rim is wide, but low, smooth, nonporous. The zooecia are separated from one another by a wide but very shallow furrow. The largest zooecia are situated in the middle of the internode. Usually the central pair of the zooecia is equal in size, although sometimes one zooecium is larger and one is blind. The zooecia from both margins of the central pair are also equal in size, but significantly smaller than the central pair. The marginal zooecia are the smallest, about four times smaller than central ones. Spines and gymnocyst are not known. The internode is open usually at both ends, sometimes only in one end. No other pores are observable on the internode surface.

Comparison: The most similar specimens have been described as *Bicornifera* (?) *longa* LINDENBERG, 1965 by KEIJ (1977). They have up to three zooecia in each internode, but differ by their oval apertures, a very deep furrow separating neighbouring zooecia within the internode and by having significantly wider internodes. However, these differences could be regarded as within species variability and these specimens could belong to *Babickella janensis* sp.n. A similar species is also *Bicornifera lagaaiji* KEIJ, 1977, which has a similar general morphology. It differs mainly in having always only two zooecia per each internode, porous walls and also the furrows separating neighbouring zooecia are much more deep than shown in *Babickella janensis* sp.n. *Bicornifera lindenbergii* KEIJ, 1969 differs in having a triangular shape of the internodes and always only 2 zooecia per internode.

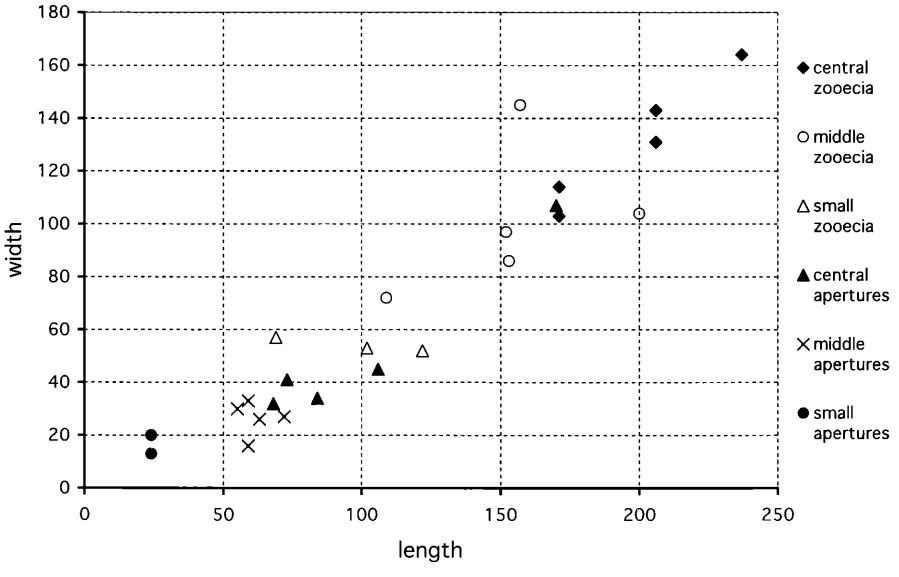

Figure 11: Chart of important measurements of *Babickella janensis* sp.n. (values in μm).

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Remark: Specimens of *Babickella janensis* sp.n. are extremely rare. I have examined about 2 kg of washed material, and only 3 internodes have been found. The rest of the paratypes come from the older collection of Dr. SEIFERT deposited in the Institute of Paleontology, Vienna University.
Occurrence: Reingruberhöhe (sample RH 12 and SEIFERT's samples).

Suborder Ascophorina LEVINSEN, 1909
Infraorder Acanthostegomorpha LEVINSEN, 1902
Superfamily Cribrilinoidea HINCKS, 1879
Family Cribrilinidae HINCKS, 1879

Genus *Puellina* JULLIEN, 1886

Subgenus *Cribrilaria* CANU & BASSLER, 1929

The colony is encrusting or erect. The zooecia are oval with a costal frontal wall and with lateral costal fusions. The gymnocyst is reduced or absent. The orifice has calcified margins, a suboral lacuna and oral spines. Large interzooecial avicularia are developed. The ovicell is hyperstomial with a nonporous frontal wall.
Remarks: GORDON (1984) reduced *Cribrilaria* to a subgenus of *Puellina*. The genus *Puellina* s.s. differs from *Cribrilaria* in having an extended gymnocyst, an ovicell with ovicellular pores and by having small interzooidal avicularia or it is without any avicularia.

Puellina (*Cribrilaria*) *radiata* (MOLL, 1803)
pl. 16, fig. 1

1920 *Puellina radiata* MOLL, CANU & BASSLER p. 294, Fig. 84/G-J, Pl. 41, Fig. 14-18
1972 *Cribrilaria radiata* (MOLL), DAVID & MONGEREAU & POUYET p. 30, Pl. 9, Fig. 3
1977 *Cribrilaria radiata* (MOLL), VÁVRA p. 102
v. 1988 *Cribrilaria radiata* (MOLL), BRAGA & BARBIN p. 521
v. 1997 *Cribrilaria radiata* (MOLL), ZÁGORŠEK p. 407, Pl. 2, fig. 6-7

Diagnosis: The colony is encrusting. The zooecia are oval with a very short gymnocyst, in some specimens the gymnocyst is missing. The frontal wall consists of 6 - 8 pair of costae with very narrow lateral costal fusions. A median lamella is not developed. The aperture is semilunar and has a very small lacuna. The oral spines are sometimes missing, sometimes developed. The avicularium is large, intrazooecial, with a long and acute palate, but without any pivot. The ovicell is hyperstomial, globular, with a smooth and nonporous frontal wall.
Occurrence: Haselbach and Reingruberhöhe (samples RH 2, RH 4 and RH 31).
Distribution in time and space:
Lutetian - Europe (CANU & BASSLER, 1920)
Bartonian - Belgium (CHEETHAM, 1966)
Priabonian - Carolina, Georgia, Mississippi - USA (CANU & BASSLER, 1920), Poland (MAŁECKI, 1963), France (DAVID & MONGEREAU & POUYET, 1972), Romania (GHIURCA, 1987), Italy (BRAGA & BARBIN, 1988), Slovakia (ZÁGORŠEK, 1997), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Oligocene - Italy (VÁVRA, 1977)
Tortonian - Poland (MAŁECKI, 1963), Austria, Italy Czech (VÁVRA, 1977)
Pliocene - Italy (VÁVRA, 1977)
Quaternary & Recent - Mediterranean (MAŁECKI, 1963), cosmopolitan (CANU & BASSLER, 1920)

Family Pelmatoporidae LANG, 1916

Genus *Gephyrotes* NORMAN, 1903

The colony is encrusting. The zooecia are oval and have a gymnocyst. The frontal wall is formed by many costules, which are perforated by pores (pelmatidia). The pair of the costules arranged below the aperture is bifurcated and forms a porous area (spiramen). A median area is developed, strongly porous. The aperture is semilunar to oval. Oral spines are present. The oral avicularia are paired and have a pivot bar. The ovicell is hyperstomial and has a nonporous frontal wall.

Gephyrotes convexa CANU & BASSLER, 1920
pl. 16, fig. 2

1920 *Gephyrotes convexa* sp.n., CANU & BASSLER p. 302, Pl. 42, Fig. 2-3

Diagnosis: The zooecia are oval, separated by deep furrows. The frontal wall is convex, formed by 6 to 8 pairs of short costules. The costules are perforated by two equal pores (pelmatidia), each pore on one end of the costa. A median area is developed, oval perforated by large pores (lacunae). The gymnocyst is short, smooth and convex. The aperture is semilunar and has slightly concave proximal corners. Oral spines are present on the distal margin of the aperture. The oral avicularia are two and situated laterally from the aperture. They are oval, small and have a pivot bar. The ovicell is hyperstomial and has a convex, smooth or sometimes a little porous or granular, frontal wall.
Remarks: *Gephyrotes convexa* CANU & BASSLER, 1920 has been found in Hungary as well as in Alabama (USA). Because all the described and depicted features are identical with Reingruberhöhe specimens, I believe, they are conspecific.
Occurrence: Reingruberhöhe SEIFERT's samples.
Distribution in time and space:
Priabonian - Alabama (CANU & BASSLER, 1920), Hungary (ZÁGORŠEK, 2001a)

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Genus *Vavropora* ZÁGORŠEK, 2001a

Diagnosis: The colony is encrusting, the zooecia have 6 to 8 pairs of costae. The costa has a single small pore at the distal end. Interzooidal kenozooids along the lateral margins are not developed. The apertural bar is wide and not perforated. The avicularium is large, arranged distally from the aperture and is transversely oriented. The ovicell is hyperstomial and has a strongly pitted endoecium.

Vavropora pupuliformis ZÁGORŠEK, 2001a

pl. 17, fig. 1

? 1848 *Cellepora pupula* sp.n., REUSS p 83, Pl. 10, Fig. 7
? 1974 „*Cellepora*" *pupula* (REUSS), DAVID & POUYET p. 220
v.* 2001a *Vavropora pupuliformis* sp.n., ZÁGORŠEK p. 44, Pl. 12, Fig. 1, 2
v. 2001b *Vavropora pupuliformis* ZÁGORŠEK, ZÁGORŠEK p. 516, Pl. 1. Fig. 3

Diagnosis: Zooecia are oval and arranged in regular longitudinal, alternating rows. The zooecial frontal shield is composed of 6 to 8 pairs of costae, which form a zigzag pattern or a straight median lamella. Each costa has one small pore on its distal end. The costae are laterally contiguous; but no lateral costal fusion or lacunae are developed. The apertural bar is wide, without any pores. The aperture is oval and large. The oral spines are paired, one or two pairs are situated on the distal margin of the aperture. The avicularia are large, interzooecial, with a narrow, acute, long palate and without any pivot. The palate is directed laterally (right or left), never longitudinally. The ovicell is hyperstomial, deeply immersed in the distal zooecium. The frontal wall of the ovicell is flat, formed almost entirely by a strongly porous endoecium. The remnants of the ectoecium are preserved only as a narrow lateral hoop.
Remarks: The median lamella in specimens from Reingruberhöhe is more straight than in the holotype and specimens from Hungary, but other features are identical. The original material described by REUSS (1848) has not been found, so the species attribution of his species remains uncertain.
Occurrence Reingruberhöhe (samples RH 1 and RH 4).
Distribution in time and space:
Priabonian - Hungary (ZÁGORŠEK, 2001a)
Tortonian - Austria & Hungary (REUSS, 1848, DAVID & POUYET, 1974) ?

Genus *Gordoniella* ZÁGORŠEK, 2001a

Diagnosis: The colony is encrusting, the zooecia are easily separable. The zooecia are oval with a costal frontal wall and a smooth, flat nonporous dorsal wall. The frontal costae are perforated by many pores; usually there are one or two large pores (pelma) and several small pores (pelmatidia). A median area may be present. The aperture is oval with one pair of apertural spines. Near the aperture, there is a large chamber on the distal most end of the dorsal wall. This distalo-dorsal chamber is as large as the aperture and has a small peristome. Lateral communication pores are developed. The ovicell is small and hyperstomial. The interzooecial avicularia are rarely developed.

Gordoniella diporica ZÁGORŠEK, 2001a

v.* 2001a *Gordoniella diporica* sp.n., ZÁGORŠEK p. 46, Pl. 13, Fig. 1-5, Pl. 14, Fig. 1, 3, 5, Pl. 21, Fig. 4
v. 2001b *Gordoniella diporica* ZÁGORŠEK, ZÁGORŠEK p. 531, Pl. 7. Fig. 1

Diagnosis: The zooecia are oval with a costal frontal wall and a smooth, flat nonporous dorsal wall. The frontal wall is composed of 6 to 8 pairs of costae, which have one large pore (pelmata) and several small pores (pelmatidia). The median area is narrow. The aperture is oval with two apertural spines. The large orifice on the distal most end of the dorsal wall is circular to rectangular and has a short peristome. The lateral walls of each zooecium are perforated by two large communication pores close together and, proximally situated, by one smaller pore. So each zooecium has three pores on each lateral side. The ovicell is small and has a nonporous frontal wall. The interzooecial avicularia are large, without a pivotal bar.
Remark: The material from Reingruberhöhe is poorly preserved and no ovicells have been found. The space between costae is wider than in the originals described from Hungary. Because all other features are identical with the holotype, the present material is listed as *Gordoniella diporica* ZÁGORŠEK, 2001a.
Occurrence: Reingruberhöhe (samples RH 10+11 and RH 12).
Distribution in time and space:
Priabonian Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Gordoniella longituda sp. n.

pl. 16, figs. 3, 4

1990 *Dicasignetella* (?) sp., POIGNANT & POUYET p. 294, Pl. 1, Fig. 14-16

Diagnosis: The colony is probably encrusting. The zooecia are elongated oval with a costal frontal wall and a nonporous dorsal wall. The frontal costae are perforated by one large and rarely also by two small pores on its medial ends. The aperture is almost terminal, oval and has apertural spines. The dorsally distal orifice is shifted more proximally, situated in about one third of the zooecial length. Avicularia are unknown. The communication pores are developed laterally, paired. The ovicell is unknown.
Holotype: The specimen depicted in pl. 16, fig. 3, from the locality Reingruberhöhe, deposited in the Institute of

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Paleontology, University of Vienna, Austria.
Paratypes: 5 specimens from the locality Reingruberhöhe, deposited in the Institute of Paleontology of University Vienna, Austria.
Derivatio nominis: Due to the elongated shape of zooecia.
Locus typicus: Reingruberhöhe (sample RH 2).
Stratum typicum: Eocene - Priabonian.
Dimensions:
(in micro meters = μm; x = average, details in fig. 12):
length of zooecia: x = 771
width of zooecia: x = 400
width of zooecial aperture: 139 - 216; x = 192
length of pelma: x = 16
width of pelma: x = 27
width of proximal pore: 91 114; x = 102
width of costae: 31 - 94: x = 63
Description: The colony is probably encrusting, or erect flexible. No jointed specimen has been found. The zooecia are elongated oval and somewhat curved. The frontal wall is formed by about 8 pairs of wide costae. The costae are perforated by one large pore (pelma) on their median ends, the marginal ends of the costae continuously building the dorsal wall of the zooecium. Small pores are rarely developed, usually missing. The gymnocyst is very short and smooth. The dorsal side of the zooecium is nonporous, smooth and flat. The aperture is situated distal most, almost terminal, oval in shape with one pair of apertural spines. The disto-dorsal chamber is slightly shifted proximally, situated in about one third of the zooecial length. The communication pores are arranged in two pairs, the distal pair smaller than the proximal one. The pore chamber is circular and slightly oval. On the proximal end of the zooecium, there is a large circular pore. This pore was perhaps connected to the proximal neighbour zooecium. Avicularia and ovicell are not observed.
Comparison: The most similar species is *Gordoniella diporica* ZÁGORŠEK, 2001a in its general shape and in the development of the frontal costal wall. It differs mainly in having a second orifice in distal most position, whereas *Gordoniella longituda* sp.n. has this orifice shifted slightly proximally on the dorsal wall and by having the proximal end of the zooecia less open.
Gordoniella longituda sp.n. has very rarely and usually not developed small pores of the costae, however *Gordoniella diporica* ZÁGORŠEK, 2001a has at least two pairs of small pores on each costa. POIGNANT & POUYET (1990) described similar zooecia from SW France as *Dicasignetella* (?) sp. However, their specimens have a more elongated distal end of zooecia, smaller apertures and have a larger gymnocyst tapering to a stolon like structure. The development of the frontal wall is however almost identical. Therefore these specimens probably belong to *Gordoniella* and perhaps to *Gordoniella longituda* sp.n.
Remark: Due to the similar general shape of zooecia and the development of the frontal wall, the described species is listed under *Gordoniella*.
Occurrence: Reingruberhöhe (sample RH 2).
Distribution in time and space:
Priabonian - France (POIGNANT & POUYET, 1990)

Castanopora megacephala (REUSS, 1848)

pl. 16, fig. 5, 6

v.* 1848 *Cellepora megacephala* m., REUSS p. 83, Pl. 10, Fig. 5
non 1974 *Cribrilaria megacephala* (REUSS), DAVID & POUYET p. 136

Diagnosis: The colony is encrusting. The zooecia are elongated and have no gymnocyst. The frontal wall consists of 10 - 13 pairs of costae with very wide lateral costal fusions. Each costa is perforated by small narrow slits. A median lamella is developed, little curved and sometimes straight. The aperture is oval, with a wide oral bar. Oral spines are missing. Avicularium is unknown. The hyperstomial ovicell is globular, small, with a granular and nonporous frontal wall.
Remarks: Only a poorly preserved avicularium has been observed, however the reduction of gymnocyst and the perforated costae allow us to list the described species in *Castanopora*. *Castanopora* can lack oral spines as well as avicularia (LARWOOD, 1962). DAVID & POUYET (1974) listed

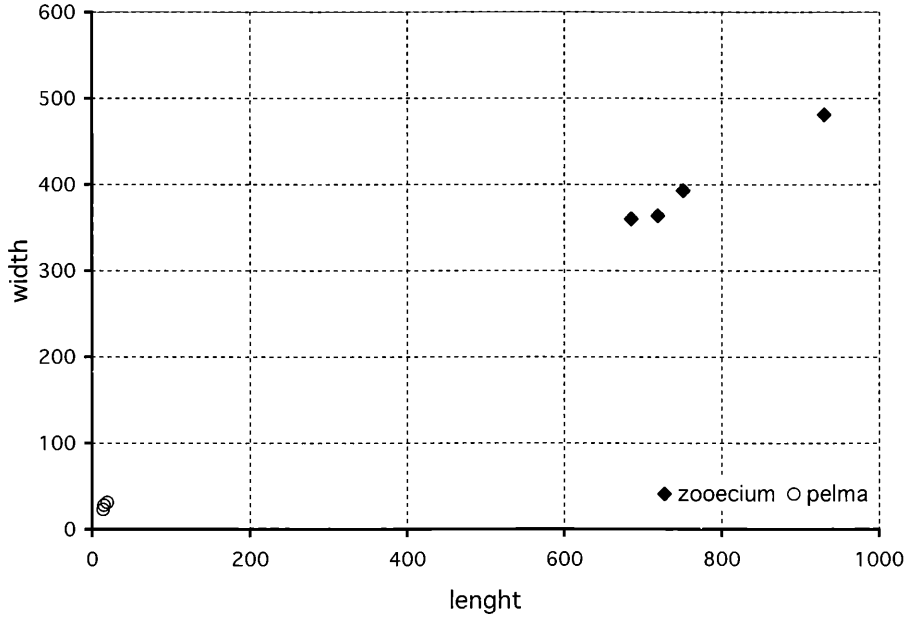

Figure 12: Chart of important measurements of *Gordoniella longituda* sp. n. (values in μm).

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Cellepora megacephala REUSS, 1848 within the synonyms of *Puellina* (*Cribrilaria*) *radiata* (MOLL, 1803). The original material of REUSS, stored in the Museum of Natural History in Vienna exhibits however very different features. The syntypes of *Cellepora megacephala* REUSS, 1848 have perforated costae, lack any oral spines and adventitious avicularia. All these features are visible on the studied material. Also the size and development of the ovicell is identical. Therefore I believe that these specimens are conspecific, and that *Cellepora megacephala* REUSS, 1848 is not a synonym of *Puellina* (*Cribrilaria*) *radiata* (MOLL, 1803).
Occurrence: Reingruberhöhe (sample RH 31).
Distribution in time and space:
Tortonian - Austria & Hungary (REUSS, 1848)

Superfamily Catenicelloidea BUSK, 1852
Family Catenicellidae BUSK, 1852

Genus *Caberoides* CANU, 1908

The colony is erect, biserial and unilamellar. The zooecial frontal wall has a tiny suboral costal shield with a few costae. The gymnocyst has shallow pore-chambers, at least one situated axially and one laterally. The avicularia are suboral and usually paired. The ovicell is hyperstomial and large with narrow windows showing endoecium. The dorsal side of the zooecium has at least 2 pore-chambers, which are typically narrow and curved.

***Caberoides continua* (WATERS, 1891)**
pl. 17, fig. 3

1891 *Catenicella continua* sp. n., WATERS p. 6, Pl. 1, Fig. 9-10
non 1980 *Vittaticella continua* (WATERS), BRAGA p. 61, Fig. 68-69
1994 *Caberoides continua* (WATERS), GORDON & BRAGA p. 62, Fig. 3c-f.

Diagnosis: The colony is small, unilamellar and rarely bifurcated with zooecia arranged in two alternating rows in zigzag. The zooecia are oval to elongate oval with a smooth well-developed gymnocyst and a small costal area. The number of costae varies from 5 to 7. The shallow pore-chambers are narrow and are situated on both sides of the zooecium. The aperture is semilunar with a straight proximal margin. The avicularia are suboral and small, drop-like with a pivotal bar. The ovicell is unknown. The dorsal side of the colony has semilunar and narrow pore chambers.
Remarks: No ovicells have been known for this species, however the presence of a small costal shield shows the close relationship with Caberoides.
Vittaticella continua (WATERS), as described and figured by BRAGA (1980), show different features, mainly larger and wider frontal pore chambers and larger apertures. According to the illustrations, this specimen could perhaps belong to *Ditaxipora internodia* (WATERS, 1891).
Occurrence: Reingruberhöhe (sample RH 10+11).
Distribution in time and space:
Priabonian - Italy (WATERS, 1891)

Superfamily Catenicelloidea BUSK, 1852
Family Catenicellidae BUSK, 1852

Genus *Costatimorpha* gen. nov.

Diagnosis: The colony is flexible, the internodes are unizooidal. The frontal wall has a costal shield formed by a few smooth costae without any pores and lateral costal fusions. The rest of the frontal wall is nonporous. The zooecia are disto-laterally extended, these processes carrying avicularia. The aperture is circular with a straight proximal margin and with condyles. A pore chamber is present. The dorsal wall is nonporous. The ovicell is unknown.
Derivatio nominis: Similar to *Costaticella* MAPLESTONE, 1899.
Included species: Type species: *Costatimorpha algella* sp.n.
Comparison: The most similar genus is *Costaticella* MAPLESTONE, 1899 as described by BANTA & WASS (1979) in having a comparable flexible and unizooidal colony, and the development of the frontal wall is very similar. *Costaticella* MAPLESTONE, 1899 differs however mainly in having perforated costae, having developed lateral costal fusions and a series of infracostal windows on the frontal wall. It has also pores in disto-lateral processes and usually more than one pair of lateral communication pores (pore chambers). *Catenicella* DE BLAINVILLE, 1830 as described by GORDON (1984) is also similar with the described species in respect to the same mode of grown and the general shape of zooecia. The main differences between *Catenicella* and *Costatimorpha* are that *Catenicella* has no costal shield, but it has a pair of long narrow longitudinal pore-chambers (vittae). The most characteristic feature of *Costatimorpha* gen. nov. is a small costal shield developed without any pores, lumen pores or infracostal windows.
Remarks: As shown by BANTA & WASS (1979) some of the species of *Costaticella* during ontogenesis form in youngest development a costal shield and later, being adult, pores, lumen pores and infracostal windows. As *Costaticella* is up to now known only from recent, *Costatimorpha* gen. nov. may be perhaps regarded as its ancestor.
Due to similarities with *Costaticella*, *Costatimorpha* gen. nov. is listed under the Catenicellidae BUSK, 1852.

***Costatimorpha algella* sp.n.**
pl. 18, figs. 1–7

Diagnosis: The colony is erect flexible, the internodes consist of one zooecium. The zooecial frontal wall is non-

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porous, with a developed small costal shield. The shield is formed by smooth spines without lacunae or lumen pores. The infracostal windows are also not developed. The zooecia have disto-lateral processes probably carrying avicularia. The aperture is circular and has condyles. The lateral communication pores are situated on the proximal end of the zooecium.

Holotype: The specimen depicted in pl. 18, fig. 1, from the locality Reingruberhöhe, deposited in the Institute of Paleontology of University Vienna, Austria.

Paratypes: 8 specimens from the locality Reingruberhöhe, deposited in the Institute of Paleontology of University Vienna, Austria.

Derivatio nominis: Due to its occurrence within the algae build-ups.

Locus typicus: Reingruberhöhe (sample RH 6).

Stratum typicum: Eocene - Priabonian.

Dimensions:

(in micro meters = μm; x = average, details in fig. 13):

length of zooecia: x = 451
width of zooecia: x = 251
length of zooecial aperture: x = 74
width of zooecial aperture: x = 73
area of zooecial aperture: 4749
length of cribrimorph area: x = 112
width of cribrimorph area: x = 98
area of cribrimorph area: x = 10847
length of avicularium: x = 61
width of avicularium: x = 15
length of lateral pore: x = 36
width of lateral pore: x = 16
diameter of stolon: 51 - 73; x = 64
diameter of proximal pore: 60 - 65; x = 62

Description: The colony is erect flexible composed of unizooidal internodes. The zooecia are triangular, tapering proximally. The frontal wall is slightly convex, smooth and has a small costal shield situated in the middle of the frontal wall, proximally from the aperture. The costal shield is formed by 5-8 smooth costae. In some specimens, the costal shield is not preserved and only a circular hole is visible. The costae are smooth without any pores and are arranged close one to each other, so lacunae are also not developed. The rest of the frontal wall is nonporous, without infracostal windows. The zooecia have, as typically for Catenicellidae, enlarged disto-lateral corners. These processes probably carry a pair of avicularia, however avicularia themselves are not preserved. The aperture is large and circular with a straight proximal edge and with condyles. Distal from the aperture, a short tubular process occurs, which connects distally the neighbouring zooecium. This distal process has usually the same length as the aviculiferous disto-lateral processes. Lateral communication pores are developed on the margin of the proximal end of the zooecium, usually as a pair, circular or slightly oval. Rarely, a second pair of communication pore chambers occurs, near the proximal margin of the aviculiferous disto-lateral processes. This second pair of pores is smaller than the most proximal one. The proximal end of the zooecium is open, perhaps during life connected to the proximal neighbour zooecium. The dorsal wall is nonporous and rarely slightly ribbed. The ovicell is unknown.

Comparison: The most similar species in general shape of zooecia, forming aviculiferous disto-lateral processes, and in developing a costal shield is *Costaticella solida* (Levinsen) as described by Banta & Wass (1979). It differs mainly in having lacunae, lumens and infracostal windows and in having larger apertures.

The young stages of *Costaticella hastata* (Busk) exhibit a development of a costal shield without any openings. However in this stage also aviculiferous disto-lateral processes are not developed and the calcification is very weak (Banta & Wass, 1979 Fig. 42, 43). Therefore I believe that the ancestor of *Costaticella hastata* (Busk) could be closely related to *Costatimorpha algella* sp.n.

Remark: Some of the Reingruberhöhe specimens exhibit a very long proximal part of the zooecium, a narrow frontal wall with a very small costal shield. These specimens could be probably regarded as younger stages of the same species, or as a new species of *Costatimorpha*. I

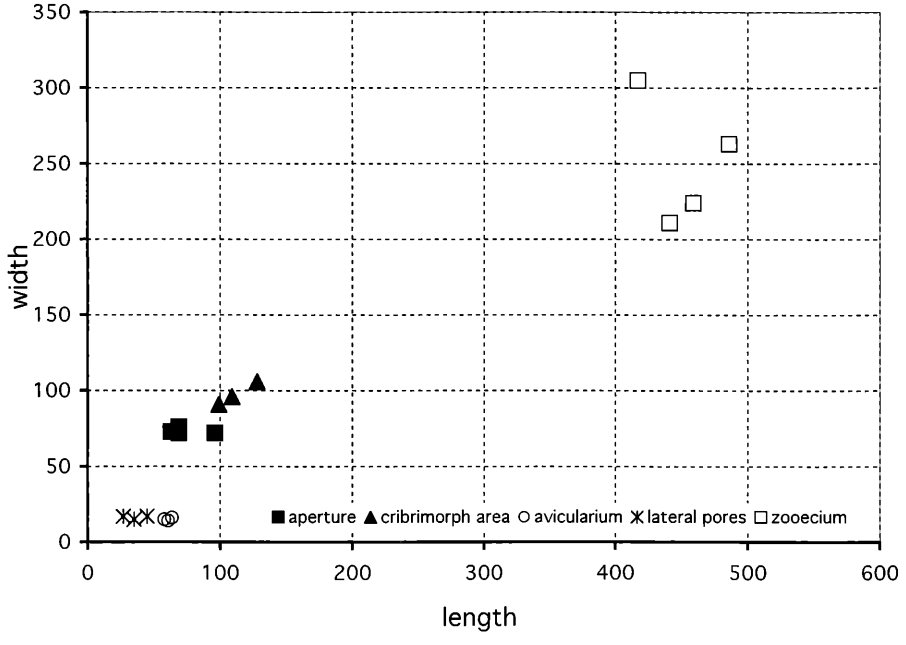

Figure 13: Chart of important measurements of *Costatimorpha algella* sp.n. (values in μm).

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have only three such specimens, not very well preserved, so I cannot solve this question.
Occurrence: Reingruberhöhe (samples RH 1, RH 6, RH 10+11 and RH 12).

Genus *Ditaxiporina* STACH, 1935

The colony is erect with two alternating longitudinal rows of zooecia. The zooecia are facing only one side of the colony. The frontal wall is created by a porous gymnocyst, which is on its proximal end nonporous. The proximalmost part of the aperture is formed by one pair of costae. The avicularia are paired situated disto-lateral from the aperture. The dorsal surface of the zooecium is smooth and nonporous. The ovicell is smooth and hyperstomial.

Ditaxiporina septentrionalis (WATERS, 1891)
pl. 17, fig. 2

1891 *Catenicella septentrionalis* sp.n., WATERS p. 5, Pl. 1, Fig. 1-8
1994 *Ditaxiporina septentrionalis* (WATERS), GORDON & BRAGA p. 75, Fig. 10 a-d
v. 2001a *Ditaxiporina septentrionalis* (WATERS), ZÁGORŠEK p. 48, Pl. 15, Fig. 1

Diagnosis: The colony is unilamellar and erect with zooecia arranged in zigzag pattern. The zooecia are oval with a strongly porous frontal wall. The proximal part of the frontal wall is smooth and perforated by small pores. The orifice is oval with a proximal margin formed by a pair of short costae. Each costa has a small central pore. The avicularia are large, suboral, arranged in pairs and have a pivot. The ovicell is subglobular with a smooth frontal wall.
Remarks: No ovicells have been found in the present specimens. Nevertheless other features allow the correct determination.
Occurrence: Reingruberhöhe (samples RH 1, RH 6, RH 10+11 and RH 12).
Distribution in time and space:
Priabonian - Italy (WATERS, 1891), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Infraorder Hippothoomorpha GORDON, 1989
Superfamily Hippothooidea BUSK, 1859
Family Pasytheidae DAVIS, 1934

Genus *Unifissurinella* POIGNANT, 1991

The colony is erect flexible and articulated. The zooecia are symmetrical, from lateral view approximately triangular. The frontal wall is porous. The apertures are circular with sinus, condyles and with a nonporous short peristome. The calcified stolon runs along the dorsal wall. Avicularia and ovicells are unknown.

Unifissurinella boulangeri POIGNANT, 1991
pl. 17, figs. 4–6

1991 *Unifissurinella boulangeri* sp.n., POIGNANT pp. 95, Pl. 1, Fig. 1-10.
v. 2000 *Unifissurinella boulangeri* POIGNANT, ZÁGORŠEK p. 315, Fig. 1-3
v. 2001b *Unifissurinella boulangeri* POIGNANT, ZÁGORŠEK p. 533, Pl. 7. Fig. 2

Diagnosis: The colony is erect flexible, articulated. The complete colony has not been found. The segments (internodes) are composed of two zooecia joined by their dorsal walls. The internodes as well as zooecia are easily separable. The zooecia have probably grown in vertical lines. They are triangular in lateral view but tube-like with a terminal aperture in frontal view. The frontal wall is strongly porous and convex. Distally from the frontal wall a nonporous peristome is developed. Proximally the frontal wall is extending to a nonporous tubular portion. This tube is joined to a proximal (lower) neighbour zooecium. The aperture is circular with a shallow sinus and laterally carrying condyles. Oral spines have not been observed. The dorsal wall is long but narrow. The calcified stolon is developed in the middle of the dorsal wall of each zooecium and runs along all the length of the zooecium. The stolon is open on the distal as well as on the proximal end of the dorsal wall. The proximal end shows a more tubular portion; the distal end is more dilated. The cross section of the stolon is circular with the same diameter in whole length. The stolon is connected vertically with neighbour zooecia only. Therefore zooecia have probably grown with apertures in one line and are not alternating. The dorsal wall is rounded by a coarse, low and narrow rim.
Remarks: For detailed systematic affinities see ZÁGORŠEK (2000). Reingruberhöhe specimens have not been jointed; the reconstruction was made due to the finds at Helmberg-1 (ZÁGORŠEK, 2000).
Occurrence: Reingruberhöhe (samples RH 1, RH 4, RH 9 and RH 10+11).
Distribution in time and space:
Lutetian - France (POIGNANT, 1991)
Priabonian - Austria (ZÁGORŠEK, 2000),

Infraorder Umbonulomorpha GORDON, 1989
Superfamily Adeonoidea BUSK, 1884
Family Adeonidae BUSK, 1884

Genus *Adeonella* BUSK, 1884

The colony is erect, flat and bilamellar. The frontal wall is well-developed umbonuloid, smooth, with large marginal pores. The aperture has a crossbar structure, forming proximally a small spiramen and carrying a pair of small, oral avicularia. The median ascopore is not developed. Adventitious avicularia may be present. The brooding

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zooecia (gonozooecia) are a little larger than ordinary zooecia, but rare.

Adeonella minor (Reuss, 1869a)
pl. 19, fig. 1

v.* 1869a *Eschara minor* sp.n., Reuss p. 272, Pl. 33, Fig. 4
v. 1963 *Adeonella polystomella* (Reuss), Małecki p. 127, Pl. 14, Fig. 9
1975 *Adeonella syringopora* (Reuss), Braga p. 147, Pl. 3, Fig. 1
v. 1988 *Adeonella syringopora* (Reuss), Braga & Barbin p. 526, Pl. 9, Fig. 9
1991 *Adeonella minor* (Reuss), Braga Tab. 1

Diagnosis: The colony has 6 to 9 longitudinal rows of zooecia. The zooecia are two times longer at the edge of the colony than in the middle part of the colony. The frontal wall is smooth, marginally perforated by about 20 areolar pores. The aperture is oval to circular. The spiramen is very small, the diameter is about one fifth of the diameter of the aperture. The small, oral avicularia are paired and situated on both sides of the aperture, sometimes inside the aperture. Rarely, an adventitious avicularium may be present on the frontal wall. The gonozooecium has not been observed.
Remarks: This is a very abundant species within the Eocene sediments in Alpine-Carpathians region. The length of zooecia is usually varying, the median zooecia are about half the length of the marginal zooecia. This feature occurs in all studied material. *Adeonella polystomella* (Reuss) as described by Małecki (1963) exhibits all the characteristic features of *Adeonella minor* (Reuss) and is therefore listed among its synonyms.
Occurrence: Haselbach and Reingruberhöhe (samples RH 1, RH 2, RH 4, RH 7, RH 9, RH 10+11, RH 12, RH 31, RH 33 and Seifert's samples).
Distribution in time and space:
Priabonian - Vicentin (Reuss, 1869a), Poland (Małecki, 1963), Germany (Vávra, 1977), Romania (Ghiurca, 1987), Italy (Braga & Barbin, 1988), Slovakia (Zágoršek, 1996b), Hungary (Zágoršek, 2001a), Austria (Zágoršek, 2001b)
Rupelian - Italy (Braga & Barbin, 1988)

Adeonella ornatissima (Stoliczka, 1862)
pl. 19, fig. 2

v.* 1862 *Eschara (Escharifora) ornatissima* sp.n., Stoliczka p. 86, Pl. 2, Fig. 7
? 1864a *Eschara tetrastoma* sp.n., Reuss p. 205, Pl. 2, Fig. 9
? 1869b *Eschara subquadrangularis* sp.n., Reuss p. 477, Pl. 4, Fig. 7, Pl. 5, Fig. 1
1914 *Adeonella ornatissima* (Stoliczka), Canu p. 471, Pl. 15, Fig. 1-3
v. 1963 *Meniscopora semitubulosa* Reuss, Małecki p. 129, Pl. 14, Fig. 5, 6
v. 2001b *Adeonella ornatissima* (Stoliczka), Zágoršek p. 534, Pl. 8. Fig. 2

Diagnosis: The colony has 8 to 10 longitudinal rows of zooecia. The zooecia at the edge of the colony are two times longer than in the middle part of the colony. The frontal wall is smooth and has about 25 to 35 marginal areolar pores around each zooecium. The frontal wall is very narrow on the zooecia located in the middle part of the colony. The aperture is semilunar to oval. The spiramen is large, about half the diameter of the aperture. The small, circular, oral avicularia are paired and placed on both sides of the aperture. Adventitious avicularia have not been found. Gonozooecia are unknown.
Remarks: Syntypes in the Museum of Natural History in Vienna are identical with described specimens. They have also lateral zooecia elongated and central ones rhomboid in shape. One syntype has large ovicells with semilunar aperture and a slightly convex frontal wall. This syntype shows also different autozooecia, and therefore it probably does not belong to the same species. Canu (1914) listed *Eschara tetrastoma* Reuss, 1864a and *Eschara subquadrangularis* Reuss, 1869a among synonyms of *Adeonella ornatissima* (Stoliczka, 1862). Unfortunately the original specimens of *Eschara tetrastoma* Reuss, 1864a and *Eschara subquadrangularis* Reuss, 1869a were not found within the collection in the Museum of Natural History in Vienna, so I cannot confirm this opinion. Małecki (1963) described some specimens as *Meniscopora semitubulosa* Reuss, however they exhibit similar features like *Adeonella ornatissima* (zooecia situated at the edge of the colony are two times longer than in the middle part of the colony; the spiramen is large, about half the diameter of the aperture; and oral avicularia are paired). I therefore believe that his specimens also belong to *Adeonella ornatissima.*
Occurrence: Reingruberhöhe (samples RH 1, RH 4 and RH 31).
Distribution in time and space:
Priabonian - Germany (Stoliczka, 1892), France (Canu, 1914), Poland (Małecki, 1963), Austria (Zágoršek, 2001b)
Rupelian - France - Gaas (Reuss, 1869b)?

Genus *Teichopora* Gregory, 1893

The colony is erect, usually bilamellar, rarely multilamellar. The zooecia have a flat frontal wall and large marginal areolar pores. The ascopore or spiramen is not developed. The avicularia are adventitious and small, situated usually near the aperture. Gonozooecium is unknown.

Teichopora cf. *clavata* Gregory, 1893
pl. 21, fig. 6

1966 *Teichopora clavata* Gregory, Cheetham p. 88, Fig. 65, 66

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Diagnosis: The colony has 9 to 11 rows of zooecia on each side. The zooecia are elongated and proximally tapered. The frontal wall is smooth, with about 20 to 25 marginal areolar pores around each zooecium. The aperture is semilunar to oval. The avicularium is large (sometimes as large as the aperture) and has a well-developed pivotal bar.
Remarks: The specimens described by CHEETHAM (1966) have larger circular apertures and smaller avicularia like the Reingruberhöhe specimens. Although all other features are identical the size and shape of apertures and avicularia are important features, and the differences between CHEETHAM's and the Reingruberhöhe specimens are significant. Because only a few specimens have been found it is not enough to demonstrate if the differences are of species variability or it is a new species. Therefore, the species attribution remains uncertain.
Occurrence: Reingruberhöhe (sample RH 31).
Distribution in time and space:
Lutetian - France (CHEETHAM, 1966)
Priabonian United Kingdom & Belgium (CHEETHAM, 1966)

Genus *Adeonellopsis* MACGILLIVRAY, 1886

The colony is erect, columnar or flat, bilamellar to multilamellar. The zooecia have marginal pores and a large spiramen area ("cribrimorph area") occupying almost all frontal wall. The avicularia are adventitious paired or single. Vicarious avicularia may also be present. A gonozooecium (brooding zooecium) is clearly dimorphic. It is as large as the autozooecium, but rarely developed.

Adeonellopsis coscinophora (REUSS, 1848)
pl. 20, fig. 4

v.* 1848 *Eschara coscinophora* sp.n., REUSS p. 67, Pl. 8, Fig. 20
v. 1862 *Eschara coscinophora* (REUSS), STOLICZKA p. 89, Pl. 2, Fig. 11
1863 *Eschara subteres* sp.n., ROEMER p. 205, Pl. 35, Fig. 6
1963 *Adeonellopsis subteres* (ROEMER), BRAGA p. 37, Fig. 4
1963 *Adeonellopsis punctata* (REUSS), MAŁECKI p. 128, Pl. 14, Fig. 4
1974 *Adeonellopsis coscinophora* (REUSS), DAVID & POUYET p. 201, Pl. 8, Fig. 3
1977 *Adeonellopsis coscinophora* (REUSS), VÁVRA p. 148

Diagnosis: The colony has 4 to 6 zooecial rows on each side. The cross-section of the colony is mostly oval rarely circular. The zooecia are oval with thick, smooth remains of the frontal wall, which is weakly discernible in the distal part. The marginal areolar pores are rare, very small and arranged in irregular position around the zooecium. The spiramen area is oval to semilunar, large and perforated by 8 to 10 pores. The aperture is oval, circular to semilunar. The avicularium is placed proximally from the aperture. The avicularium is mostly small, circular, but sometimes also drop-like, sharpening distally or laterally. The gonozooecium is unknown.
Remarks: *Adeonellopsis coscinophora* (REUSS) differs from other similar species in having a small avicularium, a large spiramen area and a complete remains of the frontal wall.
MAŁECKI (1963) described few poorly preserved specimens as *Adeonellopsis punctata* (REUSS), which are however identical with *Adeonellopsis coscinophora* (REUSS).
Occurrence: Reingruberhöhe in the entire section (samples RH 1, RH 4, RH 9, RH 10+11, RH 12, RH 31, RH 33 and SEIFERT's samples).
Distribution in time and space:
Priabonian - Germany (STOLICZKA, 1892), Italy (BRAGA, 1963), Poland (MAŁECKI, 1963), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a)
Chattian - Germany (ROEMER, 1863)
Tortonian - Austria & Hungary (REUSS, 1848, DAVID & POUYET, 1974), Czech (VÁVRA, 1977)

Adeonellopsis porina (ROEMER, 1863)
pl. 19, figs. 3, 4

1863 *Vincularia porina* sp.n., ROEMER p. 204, Pl. 35, Fig. 2
1963 *Adeonellopsis coscinophora* (REUSS), MAŁECKI p. 128
1965 *Adeonellopsis porina* (ROEMER), BRAGA p. 229, Pl. 29, Fig. 2-11 (cum syn.)
1975 *Adeonellopsis porina* (ROEMER) BRAGA p. 147, Pl. 3, Fig. 2, 3
1980 *Adeonellopsis porina* (ROEMER) BRAGA p. 58
v. 1988 *Adeonellopsis porina* (ROEMER), BRAGA & BARBIN p. 527, Pl. 10, Fig. 3

Diagnosis: The colony has 4 to 6 zooecial rows on one side. The zooecia are oval with flat, poorly visible remains of frontal wall, which is prominent only around the aperture, mostly on its distal margin. The marginal areolar pores are circular and very rare. The spiramen area is small, oval and perforated by 4 to 5 large pores. The aperture is oval to semilunar. The avicularia are large (sometimes as large as the aperture), circular to drop-like and without pivot. Direction of the palate is always lateral. The gonozooecium was not observed.
Remarks: *Adeonellopsis porina* (ROEMER, 1863) differs from other species of the genus *Adeonellopsis* in the prominent remains of the frontal wall only around the aperture and in the size of the avicularium, which is almost equal in size to the aperture. From the other species, it differs also in having a small spiramen and very rare marginal areolar pores. MAŁECKI (1963) described *Adeonellopsis coscinophora* (REUSS) from Skalnik limestone (Poland). According to the recently made study, the specimens belong in fact to *Adeonellopsis porina* (ROEMER).
Occurrence: Haselbach and Reingruberhöhe (samples RH 10+11, RH 12, RH 31, RH 33 and SEIFERT's samples).

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Distribution in time and space:
Priabonian - Italy (BRAGA, 1965), Poland (MAŁECKI, 1963), Romania (GHIURCA, 1987), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Chattian Germany (ROEMER, 1863), Italy (BRAGA & BARBIN, 1988)

Adeonellopsis giampietroi ZÁGORŠEK, 2001a
pl. 19, fig. 5

v.* 2001a *Adeonellopsis giampietroi* sp.n., ZÁGORŠEK p. 49, Pl. 15, Fig. 3, 8

Diagnosis: The colony has about 6 to 8 zooecial rows on each side. The zooecia have regular oval elongated shape and are separated one to each other by a shallow furrow. The remains of the frontal wall are formed by a thick, smooth, lateral lobe, which is significantly narrower in the proximal margin of the zooecium. The outer margin of the remains of the frontal wall is perforated by about 20 small, parietal marginal areolar pores. The spiramen area is very large, oval, proximally narrowed and perforated by 18 to 22 small pores. The aperture is situated on a short peristome. It is semilunar and has a flat proximal margin. The large avicularium is arranged between the aperture and the remains of the frontal wall. The avicularium has a flat palate, which sharpens laterally, but has no pivot. The gonozooecium is unknown.
Remark: The most specific features of *Adeonellopsis giampietroi* ZÁGORŠEK, 2001a are the presence of large, numerous parietal marginal areolar pores, and the number of pores in the spiramen and the thickness of the remains of the frontal wall.
Occurrence: Haselbach and Reingruberhöhe in the entire section (samples RH 1, RH 4, RH 9, RH 10+11, RH 12, RH 31, RH 33 and SEIFERT's samples).

Distribution in time and space:
Priabonian - Hungary (ZÁGORŠEK, 2001a)

Adeonellopsis triporica sp.n.
pl. 20, figs. 1–3

v. 2001b *Adeonellopsis* aff. *coscinophora* (REUSS), ZÁGORŠEK p. 534, Pl. 9. Fig. 1

Diagnosis: The colony is erect and bilamellar. The zooecia are elongated, with a narrow lateral lobe and numerous parietal marginal areolar pores. The aperture is oval. The spiramen is typically very small, usually smaller than the aperture and is perforated by two to four large pores. The avicularia are large. The gonozooecium is unknown.
Holotype: The specimen depicted in pl. 20, fig. 3, from the locality Reingruberhöhe, deposited in the Institute of Palaeontology, University of Vienna, Austria.
Paratypes: 11 specimens from the locality Reingruberhöhe, deposited in the Institute of Paleontology of University Vienna, Austria.
Derivatio nominis: Due to the presence of aperture, avicularia and spiramen almost equal in size, and therefore all zooecium looks like as composed by three pores.
Locus typicus: Reingruberhöhe (sample RH 2).
Stratum typicum: Eocene - Priabonian.
Dimensions:
(in micro meters = μm; x = average, details in fig. 14):
length of the colony: 1575 - 3755; x = 2731
width of the colony: 990 - 1461; x = 1218
length of zooecia: x = 345
width of zooecia: x = 158
length of zooecial aperture: x = 68
width of zooecial aperture: x = 71
area of zooecial aperture: x = 3805
length of spiramen: x = 53
width of spiramen: x = 55
area of spiramen: x = 1921
length of avicularium: x = 57
width of avicularium: x = 45
area of avicularium: x = 2186
Description: The colony is erect, bilamellar and has about 6 to 10 zooecial rows close to each other on each side. The cross-section of the colony is usually flat or narrow oval. The zooecia have regular oval elongated shape and are separated from one another by lines of small marginal areolar

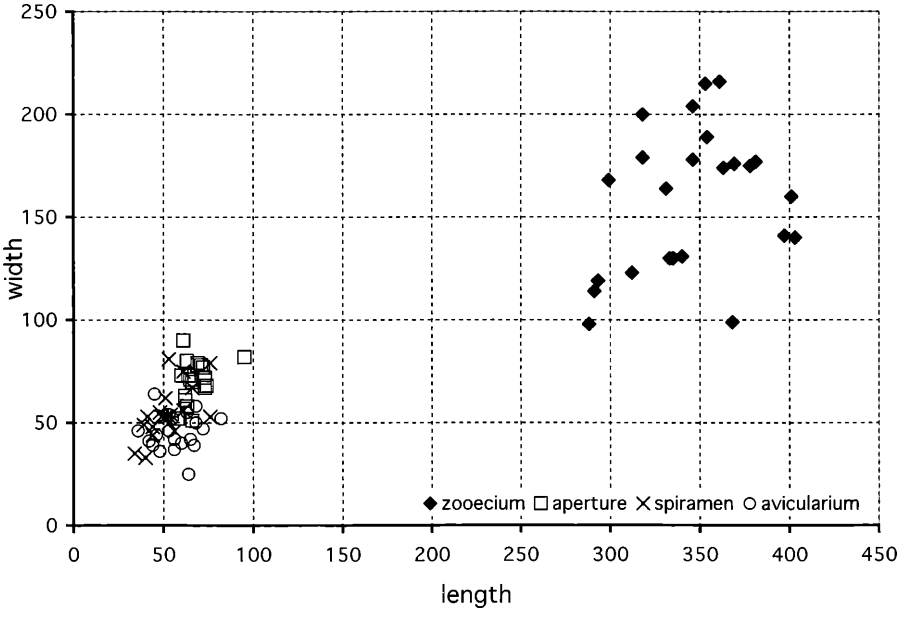

Figure 14: Chart of important measurements of *Adeonellopsis triporica* sp.n. (values in μm).

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pores. The remains of the frontal wall are flat, not elevated above the surrounded surface. The aperture is semilunar to oval. The spiramen area is small (typically smaller than the apertures), oval and perforated by 2, rarely by 4 large pores. The avicularium is large, almost as large as the aperture, circular, without pivot and is situated between the aperture and the spiramen. The gonozooecium has not been found.

Comparison: *Adeonellopsis* (= *Eschara*) *perforata* (REUSS, 1869a) has no avicularium and occurs only in the Oligocene.

Adeonellopsis porina (ROEMER, 1863) has a big, distally acute shoe-shaped avicularium distally acute. Around the zooecium are a few small, poorly visible parietal marginal areolar pores. The remains of frontal wall are prominent only on the distal margin of the aperture, around the zooecium it is very low. The spiramen of *Adeonellopsis porina* (ROEMER, 1863) is perforated by 4-5 large pores.

Adeonellopsis (= *Eschara*) *coscinophora* (REUSS, 1848) syn. *Adeonellopsis* (= *Eschara*) *subteres* (ROEMER, 1863) has a small cylindrical avicularium. Around the zooecium, there are very few, small, indistinct, irregular parietal marginal areolar pores. The spiramen of this species is small, about one half of the diameter of the aperture.

Adeonellopsis giampietroi ZÁGORŠEK, 2001a has a very large spiramen area perforated by 18 to 22 small pores.

Remark: The most specific feature of *Adeonellopsis triporica* sp.n. is the presence of an aperture, an avicularium and a spiramen area almost equal in size, and the presence of only 2-4 pores in the spiramen area.

The same specimens have been found also in the borehole Helmberg-1 (Salzburg, Austria - ZÁGORŠEK, 2001b)

Occurrence: Reingruberhöhe (samples RH 2, RH 4, RH 8, RH 10+11, RH 12 and SEIFERT's samples).

Distribution in time and space:

Priabonian - Austria (ZÁGORŠEK, 2001b)

Adeonellopsis sp.

pl. 19, fig. 6

Diagnosis: The colony is erect, flat with about 6 to 7 zooecial rows on one side. The zooecia are of regular oval elongated shape. The remains of the frontal wall are narrow and smooth. The parietal marginal areolar pores are very rare, almost not visible. The aperture is semilunar, large, with a flat proximal margin. The spiramen is as large as the aperture. The pores perforating the spiramen area are not visible. The avicularium is small, about one third of the size of the aperture, drop-like and tapering distally. Between the rows of zooecia, there are rows with paired globular structures. The size of the globes is approximately equal to the size of the aperture and has a porous frontal wall. The globes are slightly immersed in the frontal surface of the colony. The globes could be perhaps the brooding chambers (ovicells), but very unusual for the genus *Adeonellopsis*.

Remark: Similar globular structures have been described by SCHMID (1989) on *Adeonella polystomella* (REUSS, 1848). She supposed that these globules might have been attributed to the brooding structures.

Because of the presence of a spiramen and an avicularium between aperture and spiramen this specimens are listed in the genus *Adeonellopsis*. I have found only 2 specimens with similar morphology, and both are poorly preserved, so the details of the globular structures are not observable.

Occurrence: Haselbach.

Genus *Meniscopora* GREGORY, 1893

The colony is erect, bilamellar, flat with elongated cross section. The zooecia have large lateral areolae and a non-porous frontal wall without an ascopore. The aperture is almost oval, with semilunar distal part (anterior) and concave proximal part (posterior). This part of the aperture is almost equal in size to the anterior. The avicularia are oral and usually paired. The ovicell is unknown.

Meniscopora syringopora (REUSS, 1848)

pl. 21, fig. 1

v.* 1848 *Eschara syringopora* sp.n., REUSS p. 68, Pl. 8, Fig. 23
1891 *Lepralia* (?) *lontensis* sp.n., WATERS p. 21, Pl. 3, Fig. 5
1963 *Meniscopora lontensis* (WATERS), BRAGA p. 38, Fig. 5
1963 *Adeonella folliculata* CANU & BASSLER, MAŁECKI p. 127, Pl. 14, Fig. 2
1965 *Meniscopora lontensis* (WATERS), BRAGA p. 231, Pl. 30, Fig. 1-3
1977 *Adeonella syringopora* (REUSS), VÁVRA p. 148
1980 *Meniscopora lontensis* (WATERS), BRAGA p. 58, Fig. 49
v. 1988 *Meniscopora lontensis* (WATERS), BRAGA & BARBIN p. 527, Pl. 10, Fig. 1
1991 *Meniscopora syringopora* (REUSS), BRAGA Tab. 1
v. 2001b *Meniscopora syringopora* (REUSS), ZÁGORŠEK p. 535, Pl. 9. Fig. 3

Diagnosis: The colony is erect with about 10 - 14 longitudinal zooecial rows. The zooecia are very elongated (about 5 times longer than wide) and have about 30 large, circular marginal areolar pores. The aperture is circular, with a short, wide and smooth peristome. The avicularium is oral, paired, usually placed on the proximal margin of the aperture, within the margins of the peristome. The avicularium is small, circular and without pivot bar.

Remarks: The material studied has more prominent and larger marginal areolar pores. All other features are identical with the syntypes deposited in the Museum of Natural History in Vienna.

The specimens originally described as *Adeonella folliculata* CANU & BASSLER by MAŁECKI (1963) have all the features characteristic for *Meniscopora syringopora* and therefore are listed among the synonyms.

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Occurrence: Reingruberhöhe in the entire section (samples RH 1, RH 6, RH 10+11, RH 31 and RH 37).
Distribution in time and space:
Priabonian - Italy (WATERS, 1891), Italy (BRAGA & BARBIN, 1988), Poland (MAŁECKI, 1963), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b), Germany (VÁVRA, 1977)
Rupelian - Italy (BRAGA & BARBIN, 1988)
Tortonian - Austria & Hungary (REUSS, 1848)

Superfamily Lepralielloidea VIGNEAUX, 1949
Family Rhamphostomellidae KLUGE 1962

Genus *Porella* GRAY, 1848

The colony is encrusting or erect from encrusting base. The zooecia have only marginal areolar pores, the frontal wall is nonporous. The aperture is semilunar, with or without a lyrula. Oral spines are not developed. The avicularium is suboral, arranged within the peristome and typically circular. The ovicell is globular, imperforate, opening into the peristome and is not closed by the zooecial operculum.

Porella clavula (CANU & BASSLER, 1920)
pl. 21, fig. 2

1920 *Aimulosia clavula* sp.n., CANU & BASSLER p. 429, Pl. 9, Fig. 13-16
v. 2001a *Porella clavula* (CANU & BASSLER), ZÁGORŠEK p. 50, Pl. 16, Fig. 5

Diagnosis: The colony is encrusting. The zooecia are oval or a little elongated, and have elevated lateral walls. The frontal wall is convex and surrounded with large marginal areolar pores. The aperture is semilunar and has a short lyrula. The avicularium is frontal, suboral situated on the prominent chamber (umbo) and has a complete pivot. The ovicell is hyperstomial, globular and has a nonporous frontal wall.
Remarks: The material from Reingruberhöhe has larger avicularia than the specimens described by CANU & BASSLER (1920) and than the Hungarian specimens (ZÁGORŠEK, 2001a). Other features are identical.
Occurrence: Reingruberhöhe (samples RH 2, RH 4 and RH 31).
Distribution in time and space:
Priabonian - Alabama (CANU & BASSLER, 1920), Romania (GHIURCA, 1987), Italy (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Genus *Cystisella* CANU & BASSLER, 1917

The colony is erect or encrusting. The frontal wall is nonporous and slightly granular. The whole frontal wall is almost covered by the long avicularian chamber.

Cystisella midwayanica CANU & BASSLER, 1917
pl. 23, fig. 4

1920 *Cystisella midwayanica* CANU & BASSLER, CANU & BASSLER p 479, Pl. 8, Fig. 5, 6

Diagnosis: The colony is encrusting. The zooecia are elongated with a smooth, strongly convex frontal wall. The aperture is oval to circular, with a short peristome. On the peristome, there are located a few (2 or 4) oral spines. The avicularium is very long, but narrow. The ovicell is unknown.
Remarks: The colonies found at Reingruberhöhe have fewer oral spines than described by CANU & BASSLER (1920). Other features are identical; therefore, I believe that it is the same species.
Occurrence: Reingruberhöhe, only SEIFERT's samples.
Distribution in time and space:
Priabonian Alabama & Georgia (CANU & BASSLER, 1920)

Genus *Reussia* NEVIANI, 1895

The colony is erect, multilamellar or bilamellar. The zooecia have a smooth and flat frontal wall and large marginal areolar pores. The lateral walls are typically prominent. The aperture is oval and has median avicularium. The ovicell is hyperstomial and has a nonporous frontal wall.

Reussia regularis (REUSS, 1866)
pl. 21, fig. 3

1866 *Eschara regularis* sp.n., REUSS p. 185, Pl. 6, Fig. 13
v. 1963 *Hippodiplosia falcifera* CANU & BASSLER, MAŁECKI p. 118, Pl. 12, Fig. 3
non 1968 *Reussia regularis* (REUSS), DAVID & POUYET p. 92, Pl. 14, Fig. 7-9
1974 *Reussia regularis* (REUSS, 1866), DAVID & POUYET p. 193
1977 *Reussia regularis* (REUSS, 1866), VÁVRA p. 140
v. 1988 *Smittina* (*Reussia*) *regularis* (REUSS), BRAGA & BARBIN p. 524, Pl. 9, Fig. 4
v. 1994 *Reussia* (*Smittina*) *regularis* (REUSS), ZÁGORŠEK p. 362

Diagnosis: The colony is large, erect, multilamellar and has an oval cross-section. The zooecia are elongated and laterally perforated by about 15 to 20 large, circular marginal areolar pores. The lateral walls are strongly prominent, wide and smooth. The aperture is oval to circular. The median, small, circular avicularium is located on the proximal margin of the aperture. The ovicell is usually small.
Remarks: The colonies found at Reingruberhöhe have rarely some zooecia with porous frontal wall. These zooecia have usually a deformed shape, and slightly larger apertures.

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Development of this unusual zooecia may have probably a pathological background. According to a recent study of the originals of MAŁECKI (1963) *Hippodiplosia falcifera* CANU & BASSLER as he described it, belongs to *Reussia regularis* (REUSS, 1866).

Occurrence: Reingruberhöhe in the entire section (samples RH 2, RH 4, RH 7, RH 10+11, RH 12, RH 31, RH 33 and SEIFERT's samples).

Distribution in time and space:

Priabonian Poland (MAŁECKI, 1963), Italy (BRAGA & BARBIN, 1988), Slovakia (ZÁGORŠEK, 1994), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Rupelian - Germany (REUSS, 1866), France (BUGE, 1957)

Burdigalian - France (BUGE, 1957)

Tortonian - Austria & Hungary (DAVID & POUYET, 1974), Italy (BUGE, 1957), North Africa (BUGE, 1957), Poland, Czech (VÁVRA, 1977)

Piacenzian - Italy (BRAGA & BARBIN, 1988)

Family Romancheinidae JULLIEN, 1888

Genus *Escharella* GRAY, 1848

The colony is encrusting. The zooecia have a nonporous, umbonuloid frontal wall with marginal areolar pores only. The aperture has a peristome, a well-developed lyrula and typically oral spines. Condyles may be present. Avicularia are unknown. The hyperstomial ovicell has a nonporous frontal wall.

Escharella tenera (REUSS, 1874)

pl. 21, fig. 5

v.* 1874 *Lepralia tenera* sp.n., REUSS p. 167, Pl. 2, Fig. 4
1929a *Perigastrella hoernesi* (REUSS), CANU & BASSLER p. 44, Pl. 3, Fig. 7

v. 1963 *Cyclocolposa perforata* CANU & BASSLER, MAŁECKI p. 117, Pl. 12, Fig. 10

v. 1963 *Mucronella hoernesi* (REUSS), MAŁECKI p. 122, Pl. 13, Fig. 3
1974 *Escharella tenera* (REUSS), DAVID & POUYET p. 187, Pl. 9, Fig. 6 (cum. syn)
1977 *Escharella tenera* (REUSS), VÁVRA p. 137

Diagnosis: The zooecia are oval to hexagonal with a smooth, slightly convex, frontal wall. The umbo is prominent and small. The marginal areolar pores are large, about 30 pores are arranged around each zooecium. The aperture is oval to semilunar with 5-8 oral spines. The lyrula is large and rectangular. The ovicell is deeply immersed in the distal zooecium and has a smooth, slightly granular frontal wall.

Remarks: The holotype deposited in the Museum of Natural History in Vienna is almost identical with the described specimens, although it has only 4 oral spines around the aperture and smaller apertures. On the other hand, the well-developed lyrula, the very short peristome and the deeply immersed ovicell are identical features.

Perigastrella hoernesi (REUSS, 1864a) described by CANU & BASSLER (1929a) is very similar to the described specimens. Therefore, I believe that these specimens also belong to the same species. *Cyclocolposa perforata* CANU & BASSLER and *Mucronella hoernesi* (REUSS), in MAŁECKI (1963) exhibit all the important features of *Escharella tenera* (REUSS, 1874) and both belong to this species, too.

Occurrence: Reingruberhöhe in the entire section (samples RH 1, RH 4, RH 8, RH 10+11, RH 12, RH 31, RH 33 and SEIFERT's samples).

Distribution in time and space:

Priabonian - Poland (MAŁECKI, 1963), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Tortonian - Austria & Hungary (REUSS, 1874), Czech (VÁVRA, 1977)

Quaternary & Recent Philippine (CANU & BASSLER, 1929)

Escharella grotriani (STOLICZKA, 1862)

v.* 1862 *Lepralia Grotriani* sp.n., STOLICZKA p. 84, Pl. 2, Fig. 1

non 1866 *Lepralia Grotriani* STOLICZKA, REUSS p. 173, Pl. 7, Fig. 1

v. 1869a *Lepralia Grotriani* STOLICZKA, REUSS p. 43

v. 1963 *Mucronella reussiana* (BUSK), MAŁECKI p. 123, Pl. 13, Fig. 4
1965 *Escharella grotriani* (STOLICZKA, 1862), BRAGA p. 226, Pl. 28, Fig. 4
1974 „*Eschara*" *grotriani* (STOLICZKA, 1862), DAVID & POUYET p. 228
1977 *Escharoides grotriani* (STOLICZKA, 1862), VÁVRA p. 132
1991 *Escharoides grotriani* (STOLICZKA), BRAGA Tab. 1

v. 2001a *Escharella grotriani* (STOLICZKA), ZÁGORŠEK p. 51, Pl. 17, Fig. 8

Diagnosis: The zooecia are oval with about 30 very small marginal areolar pores. The frontal wall is convex, slightly granular or smooth, nonporous and has a small umbo. The aperture is oval and has a short peristome. Oral spines are developed, but undistinguished, usually 4 to 6 spines around each aperture. A small, triangular lyrula is present on the proximal margin of the aperture. The ovicell is small, globular and has a smooth nonporous frontal wall. The ovicell's aperture is small and almost circular.

Remarks: *Escharella grotriani* (STOLICZKA) differs from *Escharella tenera* (REUSS) in having a granular frontal wall, a small umbo and undistinguished oral spines. Due to the presence of a lyrula, oral spines and small ovicells and the absence of avicularia, this species is listed under *Escharella* GRAY, 1848.

REUSS (1866) described *Lepralia Grotriani* STOLICZKA, which has a very prominent peristome around the aperture and no oral spines at all. These features are important, so I believe that the REUSS specimens do not belong to this spe-

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cies. All the features of *Escharella grotriani* (STOLICZKA, 1862) are present also in *Mucronella reussiana* (BUSK) as described by MAŁECKI (1963). Therefore, I believe that these specimens are conspecific.
Occurrence: Reingruberhöhe in the entire section (samples RH 1, RH 2, RH 4, RH 10+11, RH 12, RH 31, RH 33 and SEIFERT's samples).
Distribution in time and space:
Priabonian - Germany (STOLICZKA, 1892), Vicentin (REUSS, 1869a), Poland (MAŁECKI, 1963), Italy (BRAGA, 1965), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Oligocene – Germany, Italy, (VÁVRA, 1977)
Tortonian - Austria & Hungary (DAVID & POUYET, 1974)

Escharella cheilopora (REUSS, 1848)
pl. 30, fig. 1

v.* 1848 *Cellepora cheilopora* m, REUSS p. 91, Pl. 11, Fig. 4
v. 1874 *Lepralia cheilopora* (REUSS), REUSS p. 168, Pl. 4, Fig. 1
1974 *Smittina cheilopora* (REUSS), DAVID & POUYET p. 191, Pl. 12, Fig. 7, Pl. 13, Fig. 6

Diagnosis: The zooecia are oval and have a few small marginal areolar pores. The frontal wall is convex, slightly granular or smooth and nonporous carrying the small umbo. The aperture is oval with a short peristome and oral spines. There are 2 to 4 spines around each aperture. A small, triangular lyrula and well-developed condyles are present inside the aperture. The hyperstomial ovicell is small, globular and has a smooth nonporous frontal wall. The ancestrula is large, about two times the size of the autozooecia, with a wide opesium and without oral spines.
Remarks: DAVID & POUYET (1974) listed this species among *Smittina*. *Smittina* however should have a perforated frontal wall of zooecia as well as of ovicells (GORDON, 1984). The most similar is genus *Escharella*, which has developed a lyrula, condyles and oral spines and has an imperforate ovicell (HAYWARD & RYLAND, 1979). The development of an umbo is unusual, but possible. A similar umbo is developed also in *E. labiosa* (BUSK) as described by HAYWARD & RYLAND (1979).
Occurrence: Reingruberhöhe (sample RH 31).
Distribution in time and space:
Tortonian - Austria & Hungary (REUSS, 1848, DAVID & POUYET, 1974)

Genus *Escharoides* EDWARDS, 1836

The colony is encrusting. The zooecial frontal wall has an umbo and has marginal areolar pores only. A peristome is developed. The aperture has characteristically denticles and oral spines. The avicularia are adventitious, arranged laterally from the aperture and usually paired. The ovicell is hyperstomial and has a nonporous frontal wall.

Escharoides crenilabris (REUSS, 1848)

1848 *Cellepora crenilabris* sp.n., REUSS p. 88, Pl. 10, Fig. 22
v. 2001a *Escharoides crenilabris* (REUSS), ZÁGORŠEK p. 52, Pl. 16, Fig. 7

Diagnosis: The zooecia are oval. The frontal wall is smooth, convex and has very fine ribs. The ribs extend from the proximal margin of the aperture to the proximal end of the frontal wall. There are about 20 to 25 small marginal areolar pores around the frontal wall. The aperture is semilunar and has developed oral spines. The peristome is short and spout-like. The avicularia are in pairs, small and sometimes develop a pivot. The ovicell is unknown.
Remarks: Specimens found at Reingruberhöhe are almost identical with those described from Hungary, however Reingruberhöhe specimens have a pivotal bar in avicularia and Hungarian specimens lack this pivot. Other features are identical.
Occurrence: Reingruberhöhe (sample RH 31 and SEIFERT's samples).
Distribution in time and space:
Priabonian - Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a)
Tortonian - Austria & Hungary (REUSS, 1848)

Escharoides coccinea (ABILDGAARD, 1806)
pl. 23, fig. 3

? 1863 *Eschariporo porosa* PHILIPPI, ROEMER p.209, Pl. 35, Fig. 23
v. 1864b *Eschara Grotriani* sp.n., REUSS, p. 656, Pl. 12, Fig. 3
1866 *Eschara Grotriani* REUSS, REUSS p. 182, Pl. 6, Fig. 1
1869a *Lepralia pteropora* sp.n., REUSS p. 257, Pl. 30, Fig. 4
1874 *Lepralia coccinea* (ABILDGAARD), REUSS p. 155, Pl. 6, Fig. 11
1963 *Escharoides coccineus* (ABILDGAARD), MAŁECKI p. 122
1968 *Escharoides coccineus* (ABILDGAARD), CHEETHAM p. 61, Pl. 16, Fig. 4
1974 *Escharoides coccineus* (ABILDGAARD), DAVID & POUYET p. 179
1977 *Escharoides coccinea* (ABILDGAARD, 1806), VÁVRA p. 132
v. 1988 *Escharoides coccineus* (ABILDGAARD), BRAGA & BARBIN p. 524, Pl. 8, Fig. 5
v. 2001a *Escharoides coccinea* (ABILDGAARD), ZÁGORŠEK p. 52, Pl. 17, Fig. 5, 6

Diagnosis: The zooecia are oval to triangular. The frontal wall is nonporous, granulated and with ribs. The ribs start on the middle of the frontal wall and end between adjacent marginal areolar pores. The marginal areolar pores are intermediate in size, there are about 12 - 18 pores around each zooecium. The aperture is oval and has small denticles. The apertural spines are mostly located on the distal margin of

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the aperture. The peristome is very short or absent. The avicularia are oval and have a long, narrow palate. Two avicularia with pivotal bar are arranged laterally from the aperture and sometimes a additional, third, adnate avicularium lies on the proximal margin of the aperture. The avicularia, which are situated near the aperture, may be located on the top of a small chamber. The chamber is bordered by 5-8 marginal areolar pores, which are smaller than the zooecial marginal areolar pores. The ovicell is prominent, globular and has small marginal areolar pores. The ectoecium is granular or smooth and perforated by very small pores.

Remarks: *Escharoides coccinea* (ABILDGAARD, 1806) differs from similar species in having a granular frontal wall and very prominent marginal areolar pores with ribs. The ovicell has a smooth and slightly porous frontal wall.

Described material has less prominent chambers carrying avicularia than described by CHEETHAM (1968). Probably the development of these chambers can be caused by ecological needs. Some of the zooecia developed only one avicularium however most of them have paired avicularia, equal in size.

ROEMER (1863) described *Escharipora porosa*, which however exhibits all the important features like *Escharoides coccinea* (ABILDGAARD, 1806). Because I do not have this material in my hands, I cannot revise this species.

Occurrence: Reingruberhöhe (samples RH 1, RH 3 and RH 31).

Distribution in time and space:

Lutetian - France (BUGE, 1957)

Priabonian - Italy (REUSS, 1869a), Italy (BRAGA & BARBIN, 1988), Poland (MAŁECKI, 1963), Romania (GHIURCA, 1987), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Oligocene - Italy, USA (VÁVRA, 1977)

Rupelian - Germany (REUSS, 1866)

Chattian - Germany (ROEMER, 1863)?, Germany (REUSS, 1864b)

Tortonian - Austria & Hungary (REUSS, 1874, DAVID & POUYET, 1974), France (BUGE, 1957), Italy, Czech (VÁVRA, 1977)

Quaternary & Recent - Mediterranean (MAŁECKI, 1963), North Atlantic (VÁVRA, 1977)

Escharoides mamillata (WOOD, 1844)

pl. 21, fig. 4

1989 *Escharoides mamillata* (WOOD), BISHOP & HAYWARD p. 26, Fig. 103-106

Diagnosis: The zooecia are oval to triangular with a nonporous, granular frontal wall. The granules on the frontal wall sometimes are forming ribs. The ribs run from the middle of the frontal wall to the zooecial margin. The marginal areolar pores are small, there are about 12 - 30 circular pores around each zooecium. The aperture has a well-developed, but narrow, lyrula and small denticles. The apertural spines are rare, small and situated on the distal margin of the aperture. The peristome is short with a well-developed lateral and proximal margin. The avicularia are situated in two different places: the pair of the oral avicularia is arranged very close to the aperture, on the peristome; the adventitious avicularia are located between the zooecia. The oral avicularia have a long and narrow palate and do not develop a pivotal bar. The adventitious avicularia are large and are sometimes situated on a short peduncle. The adventitious avicularia have a pivotal bar. The ovicell is globular, immersed in the distal zooecium and has small marginal areolar pores. The frontal wall of the ovicell is nonporous and slightly granular.

Remarks: Described specimens differ from those depicted by BISHOP & HAYWARD (1989) in having larger and more abundant adventitious avicularia and having smaller oral avicularia. Other features, especially the development of ovicells is identical with BISHOP & HAYWARD's specimens. *Escharoides mamillata* (WOOD) differs from other species of *Escharoides* in having deeply immersed ovicells, oral avicularia arranged on the peristome and often adventitious avicularia.

Occurrence: Reingruberhöhe (sample RH 2).

Distribution in time and space:

Pliocene - United Kingdom (BISHOP & HAYWARD, 1989)

Quaternary & Recent Atlantic (HAYWARD & RYLAND, 1979)

Genus *Hemicyclicopora* NORMAN, 1909

The colony is encrusting. The zooecia are drop-like with a smooth nonporous frontal wall. The marginal pores are very small. The aperture has a shallow sinus and typically oral spines. A peristome is developed. Avicularia are absent. The ovicell is hyperstomial and characteristically recumbent on the distal neighbour zooecium. The frontal wall of the ovicell is nonporous.

Remarks: This genus seems to be closely related with *Perigastrella* CANU & BASSLER, 1917. Although CANU & BASSLER (1917) do not discuss similarities between these two genera, it seems that the main difference is the position of ovicells and the presence of marginal pores. *Perigastrella* has prominent marginal pores and outstanding globular ovicells.

Hemicyclicopora parajuncta CANU & BASSLER, 1917

pl. 22, figs. 1, 2

1917 *Hemicyclicopora parajuncta* sp.n., CANU & BASSLER p. 69, Pl. 6, Fig. 6

1920 *Hemicyclicopora parajuncta* CANU & BASSLER, CANU & BASSLER p. 586, Pl. 74, Fig. 2, 3

Diagnosis: The zooecia are drop-like and narrow with a smooth, nonporous, convex frontal wall. The marginal pores are very small and rare. The aperture is semicircular with

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oral spines on the top of a short peristome. The peristome is slightly depressed at the proximal part of the aperture and therefore the general view of the frontal wall is very similar to umbonuloid. The ovicell is globular, very small and deeply immersed in the distally adjacent zooecium.
Remarks: The described species differs in having a peristome and a small, immersed ovicell from *Perigastrella granulata* ZÁGORŠEK, 1994, which is more common in Eocene sediments in the Alpine-Carpathians region.
Although *H. parajuncta* was up to now known only from the American Eocene, all features described and depicted by CANU & BASSLER (1917) are identical with studied specimens from Reingruberhöhe.
Occurrence: Reingruberhöhe only SEIFERT's samples.
Distribution in time and space:
Priabonian - Carolina USA (CANU & BASSLER, 1920)

Family Umbonulidae CANU, 1904

Genus *Umbonula* HINCKS, 1848

The colony is encrusting or erect. The frontal wall is convex, centrally imperforate with marginal areolar pores only. The large avicularium is situated at the top of the umbo. Oral avicularia may also be present. Oral spines are not developed. Lyrula absent. The ovicell is globular and has a perforated frontal wall.

Umbonula monoceros (REUSS, 1848)

v.* 1848 *Cellepora monoceros* sp.n., REUSS p. 80, Pl. 9, Fig. 24
v. 1874 *Lepralia monoceros* (REUSS), REUSS p. 170, Pl. 3, Fig. 9
1974 *Umbonula monoceros* (REUSS), DAVID & POUYET p. 145, Pl. 12, Fig. 2
1979 *Umbonula monoceros* (REUSS), VÁVRA Pl. 1, Fig.4
1988 *Umbonula monoceros* (REUSS), MOISSETTE p. 117, Pl. 19, Fig. 9
v. 1989 *Umbonula monoceros* (REUSS), SCHMID p. 32, Pl. 8, Fig. 5, 6
v. 2001a *Umbonula monoceros* (REUSS), ZÁGORŠEK p. 54, 28, Fig. 7

Diagnosis: The colony is encrusting. The zooecia are drop-like, with a convex, granular frontal wall. The marginal areolar pores are rare and small. The aperture is circular to oval without denticles. The proximal margin of the aperture is concave. The small circular avicularium without pivotal bar is arranged on the proximal margin of the aperture, on the top of a short umbo. Oral avicularia are absent. The ovicell is hyperstomial and has a porous frontal wall.
Remarks: The specimens found at Reingruberhöhe are almost identical with the Hungarian material, only the avicularium is a little larger; an ovicell has not been found. The specimens figured by REUSS (1848) have very long umbo with a large avicularium, but other features are identical with the described specimens. The length of the umbo could be probably caused by preservation. Therefore I believe that all these specimens are conspecific. Among the syntypes deposited in the Museum of Natural History in Vienna, there are some specimens with a shorter umbo, and some with a longer one. However the other features (especially the slightly granular frontal wall) are identical with the studied material.
Occurrence: Reingruberhöhe (samples RH 1 and RH 3).
Distribution in time and space:
Priabonian - Hungary (ZÁGORŠEK, 2001a)
Tortonian Austria & Hungary (REUSS, 1848, DAVID & POUYET, 1974), Argentina, Italy, Czech (VÁVRA, 1977)
Messinian - Algeria (MOISSETTE, 1988)

Umbonula macrocheila (REUSS, 1848)
pl. 23, fig. 5

v.* 1848 *Eschara macrocheila* sp.n., REUSS p. 65, Pl. 8, Fig. 14
v. 1989 *Umbonula macrocheila* (REUSS), SCHMID p. 31, Pl. 8, Fig. 1-4 (cum. syn).

Diagnosis: The colony is encrusting or erect. The zooecia are oval and have a convex, smooth frontal wall, sometimes with ribs extending from marginal areolar pores to the top of the umbo. The marginal areolar pores are of medium size, there are about 10 - 15 pores around each zooecium. The aperture is large, oval and carrying small, paired oral avicularia, which are tapering distally. The proximal margin of the aperture is concave. A small adventitious circular avicularium, without pivotal bar, is situated on the proximal margin of the aperture, on the top of the umbo. The ovicell is unknown.
Remarks: The specimens found at Reingruberhöhe are almost identical with those described by SCHMID (1989) as "endlicheri type", although *Eschara macrocheila* REUSS, 1848 has more flat colonies, and slightly prominent ribs on the frontal wall. SCHMID (1989) made a revision of all the original REUSS material and considered *Cellepora Endlicheri* REUSS, 1848 and *Cellepora scarabeus* REUSS, 1848 as junior synonyms of *Umbonula macrocheila* (REUSS). The original REUSS material determined as *Eschara macrocheila* has very rarely large adventitious avicularia. The size of this avicularium is approximately the size of the autozooecia, however only one such avicularium has been observed.
Other specimens are almost identical with those described as *C. endlicheri* REUSS, 1848. Therefore I agree with SCHMID's (1989) opinion, and consider *Cellepora Endlicheri* REUSS, 1848 and *Cellepora scarabeus* REUSS, 1848 as junior synonyms of *Umbonula macrocheila* (REUSS).
Occurrence: Reingruberhöhe in the entire section (samples RH 1, RH 7, RH 9, RH 10+11, RH 12, RH 31, RH 33 and SEIFERT's samples).

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Distribution in time and space:
Priabonian - Romania (GHIURCA, 1987)
Tortonian - Austria & Hungary (REUSS, 1848), Czech, Portugal (VÁVRA, 1977)

Family Metrarabdotosidae VIGNEAUX, 1949

Genus *Metrarabdotos* CANU, 1914

The colony is erect and bilamellar. The zooecia are characteristically very elongated. The aperture has a rounded sinus and denticles. The frontal wall is smooth with marginal areolar pores only. Oral spines are not developed. The avicularia are oral, typically paired, but may be absent. The mature zooecium develops a very large, characteristic ovicell. Avicularia are usually present, but rarely absent on the mature zooecium. The ovicell has a frontal wall formed by costules and has marginal pores.

Metrarabdotos maleckii CHEETHAM, 1968
pl. 23, fig. 1

v. 1963 *Trigonopora moniliferum* (EDWARDS), MAŁECKI p. 130, Pl. 14, Fig. 1
1968 *Metrarabdotos maleckii* sp.n., CHEETHAM p. 104, Pl. 14, Fig. 1-5
1974 *Metrarabdotos maleckii* CHEETHAM, DAVID & POUYET p. 208, Pl. 8, Fig. 5 (cum syn.)
1977 *Metrarabdotos maleckii* CHEETHAM, VÁVRA p. 153 (cum. syn.)
v.? 1989 *Metrarabdotos maleckii* CHEETHAM, SCHMID p. 35, Pl. 9, Fig. 7

Diagnosis: The colony is large, bilamellar, with 7 to 10 zooecial rows on each side. The zooecia are elongated with a large aperture. The frontal wall is slightly convex and smooth. The proximal part of the frontal wall is much narrower than the distal part. The aperture is circular to laterally elongated, oval. The marginal areolar pores are usually big, there are about 16 22 pores around each zooecium. The oral avicularia are usually developed, but in few colonies, many zooecia lack avicularia. The ovicell is large, endozooecial with ribs on its frontal wall.
Remarks: Although the described material has no ovicells, other morphological features are identical with CHEETHAM's (1968) description. *Metrarabdotos maleckii* CHEETHAM is one of the very common species within Eocene sediments in Alpine-Carpathians region. Presence of a narrower proximal part of zooecia, the shallow sinus and the presence of oral avicularia allow me to list described specimens in this species. Although *Trigonopora moniliferum* (EDWARDS) as described by MAŁECKI (1963) did not develop ovicells either, all other features are identical with *Metrarabdotos maleckii* CHEETHAM and it is therefore listed under the synonyms. *Metrarabdotos maleckii* as described by SCHMID (1989) has developed very large marginal areolar pores and the lateral walls are slightly elevated. Because these features are unusual for the species, and these specimens did not develop ovicells their correct determination remains uncertain.
Occurrence: Reingruberhöhe (samples RH 10+11, RH 12 and RH 31).
Distribution in time and space:
Priabonian - Poland (MAŁECKI, 1963), Romania (GHIURCA, 1987), Italy (BRAGA, 1991), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Oligocene- Italy (VÁVRA, 1977)
Tortonian - Austria & Hungary (DAVID & POUYET, 1974), Poland, Czech (CHEETHAM, 1968), Romania (VÁVRA, 1977)

Superfamily Chlidoniopsoidea HARMER, 1957
Family *Chlidoniopdidae* HARMER, 1957

Genus *Chlidoniopsis* HARMER, 1957

The colony is uniserial and articulated and unizooidal. In lateral view the zooecia are drop like, proximally ending in a stolon. The frontal wall is nonporous and has marginal areolar pores. The dorsal wall is also nonporous and has marginal areolar pores. The lateral connection of the frontal

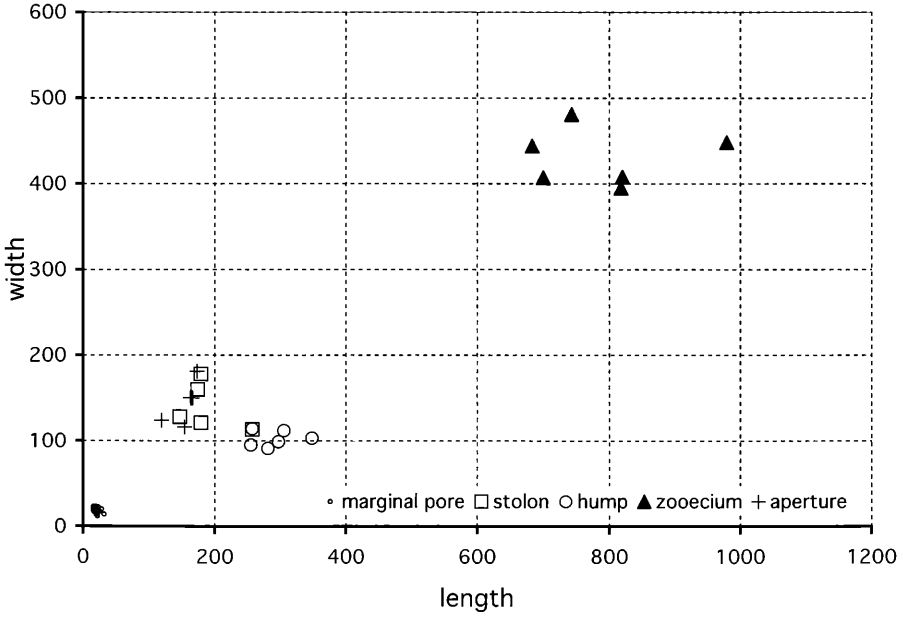

Figure 15: Chart of important measurements of *Chlidoniopsis vavrai* sp.n. (values in μm).

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and the dorsal walls forms a ridge bordered from both sides by areolar pores. This area (the ridge separates two parallel series of areolar pores) is called lateral ornamentation. The aperture is terminal, with a wide sinus on the proximal margin. Ovicell and avicularia are unknown.

Chlidoniopsis vindobonensis (Reuss, 1848)

pl. 22, fig. 3

v.* 1848 *Crisidia vindobonensis* sp.n., Reuss p. 54, Pl. 7, Fig. 25

v. 1869a *Unicrisia tenerrima* sp.n., Reuss p. 279, Pl. 34, Fig. 7

1891 ? *Catenaria tenerrima* (Reuss), Waters p. 5, Pl. 1, Fig. 11

1963 *Catenicella tenerrima* (Reuss), Braga p. 40, Pl. 4, Fig. 2

v. 1963 *Scruparia tenerrima* (Reuss), Małecki p. 95, Fig. 43, Pl. 9, Fig. 1

1977 *Chlidoniopsis vindobonensis* (Reuss), Vávra p. 97

1980 *Chlidoniopsis vindobonensis* (Reuss), Braga p. 49, Fig. 40, 41

v. 1988 *Chlidoniopsis tenerrima* (Reuss), Braga & Barbin p. 519, Pl. 6, Fig. 5, 8 (cum syn.)

v. 1994 *Chlidoniopsis vindobonensis* (Reuss, 1848), Vávra p. 193, Fig. 1, 2

v. 1997 *Chlidoniopsis vindobonensis* (Reuss, 1848), Zágoršek p. 405, Pl. 1, Fig. 2-3

Diagnosis: Zooecia drop-like, very long, from later view narrow. The stolon is enormously elongated. It is as long as the rest of the zooecium, sometimes even longer. The dorsal wall is flat, with a large pore for attachment of the stolon of the distal neighbouring zooecium. The marginal areolar pores are small, the lateral ornamentation is developed also in the stolon. The aperture is small and has a long peristome.

Remarks: The described specimens are identical with syntypes of *Crisidia vindobonensis* Reuss, 1848 as well as with the syntypes of *Unicrisia tenerrima* Reuss, 1869a deposited in the Museum of Natural History in Vienna.

Occurrence: Reingruberhöhe (samples RH 1, RH 2, RH 3, RH 6, RH 8, RH 9, RH 10+11, RH 13 and Seifert's samples).

Distribution in time and space:

Priabonian Vicentin (Reuss, 1869a), Italy (Waters, 1891), Poland (Małecki, 1963), Italy (Braga & Barbin, 1988), Slovakia (Zágoršek, 1997), Hungary (Zágoršek, 2001a)

Rupelian - Italy (Braga & Barbin, 1988)?

Miocene - Austria (Vávra, 1994)

Chlidoniopsis vavrai sp.n.

pl. 22, figs. 4–7

Diagnosis: The zooecia are oval, wide and have a short stolon. The dorsal wall is typically strongly convex, which forms the hump visible from the lateral view. The marginal areolar pores are large, the lateral ornamentation is developed only on the zooecium. The aperture is large and has a short peristome.

Holotype: The specimen (1345) depicted in pl. 22, fig. 4, from the locality Reingruberhöhe, deposited in the Institute of Palaeontology, University of Vienna, Austria.

Paratypes: 11 specimens from the locality Reingruberhöhe, deposited in the Institute of Palaeontology, University of Vienna, Austria.

Derivatio nominis: In honour of Prof. Vávra, specialist in Tertiary Bryozoa.

Locus typicus: Reingruberhöhe (sample RH 4).

Stratum typicum: Eocene - Priabonian.

Dimensions:

(in micro meters = μm; x = average, details in fig. 15):
length of zooecia: x = 755
width of zooecia: x = 431
length of zooecial aperture: x = 153
width of zooecial aperture: x = 149
width of lateral pore area: 93 167; x = 137
length of lateral pores: x = 21
width of lateral pores: x = 17
length of hump: x = 291
width of hump: x = 102
area of hump: 15253 - 21066;

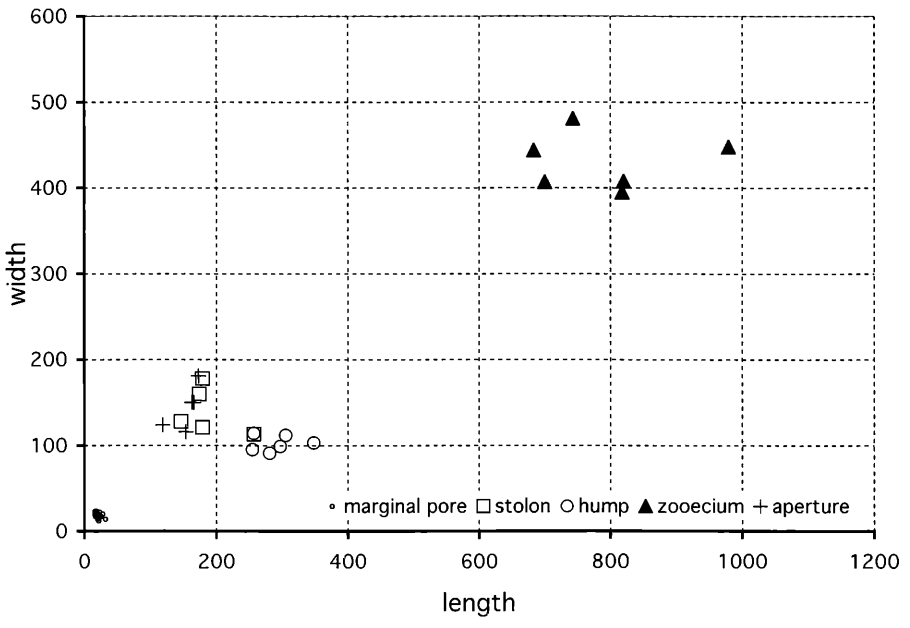

Figure 15: Chart of important measurements of *Chlidoniopsis vavrai* sp.n. (values in μm).

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x = 19183
length of stolon: x = 187
width of stolon: x = 140
diameter of central pore: 45 x 51
area of central pore: 1420
Description: The colony is uniserial, articulated and unizooidal. The internodes consist of one zooecium only. No joint zooecia have been found. The zooecia are drop like, wide and proximally tapering to the short stolon. The frontal wall is flat, slightly convex and has large marginal areolar pores. There are about 8 to 10 areolar pores on each side of the zooecium. The dorsal wall is extremely convex and has about 5 marginal areolar pores on each side. From the lateral view, the marginal areolar pores form a well-developed lateral ornamentation consisting of two rows of pores (8-10 frontal pores and 5 dorsal pores). The most distal pore belonging to the dorsal wall is usually slightly larger than the rest of the pores. The convexity of the dorsal wall forms a prominent hump, which is visible form the lateral view. The dorsal wall has distally situated a large pore, where the neighbour zooecium has been attached during the life of the colony. No remains of the distal stolon are visible. The aperture is large, circular, the wide sinus is poorly visible.
Remark: The most similar species is *Chlidoniopsis vindobonensis* (REUSS, 1848) in respect to its general view. It differs however mainly in having a flat dorsal wall, small areolar pores and a long peristome. *Chlidoniopsis vindobonensis* (REUSS, 1848) has usual preserved the remains of the distal stolon and its lateral ornamentation is developed also on the stolon.
Occurrence: Reingruberhöhe (samples RH 1, RH 4 and RH 31).

Infraorder Lepraliomorpha GORDON, 1989
Superfamily Smittinoidea LEVINSEN, 1909
Family Smittinidae LEVINSEN, 1909

Genus *Smittina* NORMAN, 1903

The colony is typically erect or encrusting. The zooecia have a strongly porous frontal wall. The aperture has a lyrula and condyles and usually also a peristome. Oral spines may be present. The avicularia are suboral, median and characteristically enclosed by the peristome. Adventitious avicularia may rarely also be present. The ovicell is hyperstomial with frontal pores.

Smittina cervicornis (PALLAS, 1766)

? 1920 *Porella cervicornis* (PALLAS), CANU & BASSLER p. 483, Fig. 136 a-q
v. 1963 *Porella abdita* CANU & BASSLER, MAŁECKI p. 123, Pl. 13, Fig. 1
1974 *Porella cervicornis* (PALLAS), DEBOURLE p. 189, Pl. 21, Fig. 1
1974 *Porella cervicornis* (PALLAS), DAVID & POUYET p. 194 (cum. syn.)
1977 *Porella cervicornis* (PALLAS), VÁVRA p. 139 (cum. syn.)
1988 *Porella cervicornis* (PALLAS), MOISSETTE p. 160, Pl. 26, Fig. 6
non 1989 *Porella cervicornis* (PALLAS), SCHMID p. 35, Pl. 10, Fig. 1-3
1992 *Smittina cervicornis* (PALLAS), REGUANT & MALUQUER p. 146, Pl. 1, Fig. 7
v. 2001a *Smittina cervicornis* (PALLAS), ZÁGORŠEK p. 55, Pl. 18, Fig. 7, 9, 10

Diagnosis: The colony is erect, multilamellar with 6 to 7 zooecial rows. The cross-section of the colony is oval to circular. The zooecia are elongated to oval with thin lateral walls. The frontal wall is strongly porous with large circular pores. The aperture is oval, large and has well developed small condyles and a lyrula. The peristome is wide and smooth usually slightly prominent, sometimes even immersed. The avicularium is very small situated on the middle of the proximal margin of the aperture, sometimes inside the aperture. The ovicell is prominent and has a strongly porous frontal wall.
Remarks: CANU & BASSLER (1920) described *Porella cervicornis* (PALLAS) with ovicells, which have a strongly porous frontal wall. However DAVID & POUYET (1974) argued that *Smittina cervicornis* (PALLAS, 1766) lacks ovicells. They do not mention CANU & BASSLER's paper. Neither MOISSETTE (1988), nor REGUANT & MALUQUER (1992) described any ovicells. Also in the studied material there are no ovicells.
However, *Smittina* should have ovicells punctured by numerous pores, so probably *Smittina cervicornis* (PALLAS, 1766) lack ovicells, or developed them only very rarely. *Porella cervicornis* (PALLAS) as described by SCHMID (1989) has a frontal wall reduced to the threads between the large and irregular pores. Also the size and position of the aperture is very unusual compared with the others specimens described as *Porella cervicornis* (PALLAS). Therefore I believe that these specimens represent a new species. The avicularia in the described specimens are usually very small, and even sometimes missing, probably due to preservation. MAŁECKI (1963) described *Porella abdita* CANU & BASSLER, which, due to my recently made study, belongs to *Smittina cervicornis*.
Occurrence: Haselbach and Reingruberhöhe (samples RH 2, RH 7, RH 12, RH 13 and SEIFERT's samples).
Distribution in time and space:
Priabonian - Poland (MAŁECKI, 1963), Romania (GHIURCA, 1987), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Oligocene - Italy (VÁVRA, 1977)
Thanetian - France (DEBOURLE, 1974)
Tortonian - Austria & Hungary (DAVID & POUYET, 1974), Spain (REGUANT & MALUQUER, 1992), France (BUGE,

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1957), Italy, Germany, Poland, Portugal, Romania, Czech (VÁVRA, 1977)
Pliocene - Belgium, Italy, Holland, Portugal, (VÁVRA, 1977)
Messinian - Algeria (MOISSETTE, 1988)
Quaternary & Recent - Mediterranean (CANU & BASSLER, 1920), North Atlantic (VÁVRA, 1977)

Genus *Plagiosmittia* CANU & BASSLER, 1917

The colony is erect, branching, bilamellar or multilamellar. The frontal wall is strongly perforated. The avicularium is situated inside a short peristome. Condyles are developed. The ovicell is immersed and has a porous frontal wall.

Plagiosmittia denticulifera CANU & BASSLER, 1920
pl. 24, fig. 1

1920 *Porella denticulifera* sp.n., CANU & BASSLER p. 485, pl. 63, Fig. 1-5

Diagnosis: The colony is multilamellar with an almost circular transverse section. The zooecia are arranged in longitudinal rows, the number of the rows varies from 6 to 8. The zooecia are rhomboidal. The frontal wall is strongly perforated by large circular pores. The aperture is oval, large with small condyles and perhaps a lyrula. The peristome is wide, smooth and usually slightly prominent sometimes even immersed. The avicularium is large located in the middle of the proximal margin of the peristome. The ovicell is deeply immersed, its frontal wall is strongly porous by small pores.
Remarks: CANU & BASSLER (1920) attributed this species to *Porella*, however *Porella* has only marginal areolar pores (GORDON, 1984). Although this species is up to now known only from Mississippi (USA), all presented features are identical with Reingruberhöhe specimens. Therefore I believe that it is the same species.
Occurrence: Reingruberhöhe (sample RH 31).
Distribution in time and space:
Lutetian - Alabama (CANU & BASSLER, 1920)
Priabonian - Mississippi (CANU & BASSLER, 1920)

Genus *Smittoidea* OSBURN, 1952 (=*Cumulipora* MÜNSTER, 1835)

The colony is encrusting, sometimes forming very large multilaminar colonies. The colony may be also rarely erect, multilamellar. The zooecial frontal wall is nonporous and has developed marginal areolar pores. The lateral wall is slightly elevated. The aperture has a lyrula and condyles, but no peristome. The avicularia are adventitious. They are arranged in the middle of the frontal wall, proximally from the aperture. The ovicell is hyperstomial and the frontal wall is evenly perforated.
Remarks: MÜNSTER (1835) erected the new genus *Cumulipora* without any description, he only mentioned it on his Table I (on page 434). Because MÜNSTER (1835) did not erect any species for his new genus, *Cumulipora* could be recognised as "nomen nudum". *Cumulipora* has most of the features of *Smittoidea* OSBURN, 1952. It has a very similar size and position of the avicularian chamber on the frontal wall, *Cumulipora* has condyles and a lyrula on the aperture and similarly arranged marginal areolar pores. Therefore *Smittoidea* has to be used instead of *Cumulipora*. (for a detailed history of *Cumulipora* see ZÁGORŠEK, 2001a).

Smittoidea excentrica (REUSS, 1864a)
pl. 24, fig. 4

v.* 1864b *Lepralia excentrica* sp.n., REUSS p. 641, Pl. 15, Fig. 4
v. 1866 *Lepralia excentrica* REUSS, REUSS p. 175, Pl. 8, Fig. 2
1869a *Lepralia excentrica* REUSS, REUSS p. 256.
1963 *Umbonula excentrica* (REUSS), BRAGA p. 225, Pl. 28, Fig. 3
partim 1963 *Hippomenella rotula* CANU & BASSLER, MAŁECKI p. 120, Pl. 12, Fig. 4
2001a *Smittoidea excentrica* (REUSS), ZÁGORŠEK p. 58, Pl. 20, Fig. 3, 4

Diagnosis: The colony is erect with an oval cross-section. The zooecia are oval, about three times longer than wide. The frontal wall is smooth and little convex. The marginal areolar pores are large, about 12 to 14 pores around each zooecium. The aperture is oval to semilunar with condyles and a lyrula. In the middle of the frontal wall, near the distal end of the aperture, there is a strongly convex avicularian chamber. The avicularia are circular and with pivot. The ovicell is small and has a smooth, slightly porous frontal wall.
Remarks: Ovicells have not been found among Reingruberhöhe material, however all other features are identical with the original material of REUSS.
Some of the specimens described by MAŁECKI (1963) as *Hippomenella rotula* CANU & BASSLER exhibit all the characteristic features of *Smittoidea excentrica* (REUSS) and therefore belong to this species.
Occurrence: Reingruberhöhe in the entire section (samples RH 2, RH 3, RH 7, RH 9, RH 10+11, RH 12, RH 33 and RH 37).
Distribution in time and space:
Priabonian - Vicentin (REUSS, 1869a), Poland (MAŁECKI, 1963), Italy (BRAGA, 1963), Romania (GHIURCA, 1987), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b) and Slovakia
Rupelian - Germany (REUSS, 1864b & 1866)

Smittoidea angulata BRONN, 1838
pl. 24, fig. 3

1838 *Cumulipora angulata* v. MÜNSTER. - BRONN p. 880, Pl. 36, Fig. 71/2

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1843 *Cumulipora angulata* v. MÜNSTER. - PHILIPPI p. 68
1852 *Cumulipora angulata* v. MÜNSTER. - BRONN p. 282, Pl. 36, Fig. 71/2 a,b,c
v. 1864b *Cumulipora angulata* MÜNSTER, - REUSS p. 642 Pl. 9, Fig. 1
v. 1866 *Cumulipora angulata* MÜNSTER. - REUSS p. 179, Pl. 8, Fig. 12
non 1920 *Smittina angulata* (REUSS). - CANU & BASSLER p. 461, Pl. 60, Fig. 1 16
? 1935 *Smittina perforata* sp. n. - CANU & BASSLER p. 37, Pl. 7, Fig. 3
v. 2001a *Smittoidea angulata* BRONN, ZÁGORŠEK p. 57, Pl. 20, Fig. 1, 2

Diagnosis: The colony is multilamellar, encrusting and rarely very large and massive. The zooecia are hexagonal to oval with about 13 to 16 marginal areolar pores. Each zooecium is separated from the others by a narrow calcite elevation. The frontal wall is smooth, flat, or slightly convex and nonporous. The aperture is oval and has developed a lyrula and condyles. Near the proximal end of the aperture, there is a small avicularium situated at the top of a short avicularian chamber. The avicularium is circular and has no pivot. The ovicell is unknown.
Remarks: The specimens found at Reingruberhöhe are preserved as small fragments, however all morphological features are identical with the REUSS material as well as with the description by BRONN (1838). A detailed discussion about the *Cumulipora/Smittoidea* problem is given in ZÁGORŠEK, 2001a.
Occurrence: Reingruberhöhe (sample RH 31).
Distribution in time and space:
Priabonian - Germany (BRONN, 1838 & 1852) Australia (CANU & BASSLER, 1935)?, Hungary (ZÁGORŠEK, 2001a)
Rupelian - Germany (REUSS, 1864b & 1866)

Smittoidea perforata CANU & BASSLER, 1935
pl. 24,fig. 5

1935 *Smittina perforata* sp.n., CANU & BASSLER p. 37, Pl. 7, Fig. 3

Diagnosis: The colony is encrusting. The zooecia are oval, about two times longer than wide. The frontal wall is smooth and convex. The marginal areolar pores are small, there are about 12 to 14 pores around each zooecium. The aperture is oval to semilunar with condyles and a very prominent lyrula. The avicularia are situated in the middle of the frontal wall, on the top of a small avicularian chamber. They are drop-like and have a pivot, which tapers proximally. The ovicell is large and has a slightly porous frontal wall.
Remarks: The distinguishing feature of this species is a very well developed lyrula and a slightly porous frontal wall of the ovicell. The specimen described by CANU & BASSLER (1935) is almost identical with the found material, only their avicularia have no pivotal bar. This feature can perhaps be regarded as within species variation.
Occurrence: Reingruberhöhe (sample RH 31).
Distribution in time and space:
Priabonian - Australia (CANU & BASSLER, 1935)

Smittoidea sp.

Diagnosis: The colony is encrusting. The zooecia are oval to rhomboidal. The frontal wall is smooth and convex. The marginal areolar pores are large, there are about 9 to 11 pores around each zooecium. The aperture is oval to circular. The avicularia are drop-like and are situated in the middle of the frontal wall. The pivot bar is tapering proximally. The ovicell is large with a probably porous frontal wall.
Remarks: I have found only one specimen, which has preserved only a remnant of one ovicell. It differs from known species in having very large marginal areolar pores and a small avicularium.
Occurrence: Reingruberhöhe (sample RH 31).

Genus *Zuzanella* ZÁGORŠEK, 2001b

Diagnosis: The colony is erect and flat. The zooecia are elongated oval with well-developed marginal areolar pores and a smooth frontal wall. The aperture is oval. The avicularia are oral and immersed into the proximal margin of the aperture. The ovicell is probably hyperstomial, but deeply immersed and has a strongly porous frontal wall.

Zuzanella kovaci ZÁGORŠEK, 2001b
pl. 24, fig. 2

v.* 2001b *Zuzanella kovaci* sp.n., ZÁGORŠEK p. 541, Pl. 14, Fig. 3

Diagnosis: The colony is encrusting, the zooecia are arranged in irregular longitudinal rows. The zooecia are short, oval with a usually reduced smooth, nonporous, flat and rarely little convex frontal wall. Marginal areolar pores are well developed, very large, and unequal in size about 5 to 9 around each zooecium. The aperture is circular to oval with a straight, or little concave proximal margin and without sinus.
The avicularia are oral, oval to drop like with a pivotal bar and deeply immersed into the proximal margin of aperture. The avicularia can deform the proximal margin of the aperture.
The ovicell is probably hyperstomial, or recumbent, deeply immersed into the space between the mature zooecium and the distal zooecium. However, it rarely deformed the shape of distal zooecia. The frontal wall of the ovicell is little convex, strongly porous and strongly perforated by small circular pores, more or less equal in size and shape.

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Comparison: The most similar species is *Zuzanella tomashi* ZÁGORŠEK, 2001b in general shape, development of avicularia and ovicells. *Zuzanella kovaci* ZÁGORŠEK, 2001b differs mainly in having short zooecia with a reduced frontal wall, and encrusting colonies.
Occurrence: Reingruberhöhe (sample RH 31).
Distribution in time and space:
Priabonian - Austria (ZÁGORŠEK, 2001b)

Genus *Houzeauina* PERGENS, 1889

The colony is erect, with a flat cross section. The zooecia are typically elongate, with a nonporous frontal wall rounded by the marginal areolar pores. The aperture has a small sinus. The avicularium is situated in the middle of the frontal wall, near the aperture and has a pivotal bar. The ovicell is hyperstomial with a smooth frontal wall.

Houzeauina parallela (REUSS, 1869a)

v.* 1869a *Eschara parallela* sp.n., REUSS p. 272, Pl. 33, Fig. 2
1891 *Micropora parallela* (REUSS), WATERS p. 14, Pl. 2, Fig. 8
1991 *Houzeauina parallela* (REUSS), BRAGA Tab. 1
v. 2001a *Houzeauina parallela* (REUSS), ZÁGORŠEK p. 59, Pl. 19, Fig. 5

Diagnosis: The colony is erect, flat, and large with a narrow cross section. The zooecia are elongated and have a flat, smooth frontal wall. The frontal wall is rounded by about 12-15 large marginal areolar pores. The aperture is circular to semilunar, with a small sinus. A small triangular avicularium directed downwards (proximally) is situated on each zooecium near the proximal margin of the aperture. A short pivot is developed in the avicularium. The ovicell is globular and has a smooth frontal wall.
Remarks: At Reingruberhöhe only two badly preserved specimens have been found. Because the characteristic features are present (long zooecia with marginal areolar pores and small avicularium situated in the mid-line of the frontal wall), I believe that these specimens belong to the described species.
Occurrence: Reingruberhöhe (samples RH 1 and RH 10+11).
Distribution in time and space:
Priabonian Vicentin (REUSS, 1869a), Italy (WATERS, 1891), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a)

Genus *Prenantia* GAUTIER, 1962

The colony is encrusting or erect. The zooecia have a porous frontal wall. The aperture has a pseudosinus, a small lyrula and condyles. Oral spines are not known. The avicularium is characteristically absent but is suboral when present. The ovicell is recumbent to immersed.

Prenantia phymatopora (REUSS, 1869a)
pl. 23, fig. 2

v.* 1869b *Eschara phymatopora* sp.n., REUSS p. 272, Pl. 33, Fig. 1
v. 1869b *Vincularia impressa* sp.n., REUSS p. 276, Pl. 34, Fig. 2
1963 *Schizoporella phimatopora* (REUSS), BRAGA p. 33, Pl. 4, Fig. 3
1991 *Schizoporella phymatopora* (REUSS), BRAGA Tab. 1
v. 2001a *Prenantia phymatopora* (REUSS), ZÁGORŠEK p. 59, Pl. 23, Fig. 3-5

Diagnosis: The colony is erect, multilamellar, usually with a circular cross section, but sometimes with oval to flat cross-section. The zooecia are arranged in 6 to 10 rows one to each other. The zooecia are elongated hexagonal to oval, with a strongly porous frontal wall. The lateral walls are slightly prominent, elevated, or indistinct. The aperture is oval, with a small pseudosinus. The condyles are well developed, but the lyrula is not observable. Neither oral spines nor peristome are known. The avicularia are very small, suboral, oval to circular with a pivot and present in rare cases. The ovicell is deeply immersed and has a porous frontal wall.
Remarks: There are no ovicells in the studied material. Nevertheless, due to the presence of all other features, the Reingruberhöhe specimens belong to this species. Although no lyrula is developed in *Prenantia phymatopora* (REUSS), I believe that due to the presence of other features (mainly the deeply immersed ovicells, absence of oral spines and presence of condyles) this species belongs to *Prenantia* GAUTIER, 1962.
Occurrence: Reingruberhöhe (samples RH 12, RH 13, RH 33 and RH 37).
Distribution in time and space:
Priabonian Italy (BRAGA, 1963), Romania (GHIURCA, 1987), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Rupelian - France - Gaas (REUSS, 1869b)

Family Bitectiporidae MACGILLIVRAY, 1895

Genus *Hippomonavella* CANU & BASSLER, 1934

The colony is typically encrusting but may also be erect. The frontal wall is nonporous with developed marginal areolar pores. The aperture has usually a concave proximal margin and lateral condyles. A lyrula is however not developed. Peristome and oral spines are lacking. The avicularia are characteristically oral or suboral, adventitious, usually situated in the central line of the frontal wall, sometimes missing. The ovicell is hyperstomial and has a perforated frontal wall.
Remarks: GORDON (1984) argued that *Hippomonavella* has rarely a small suboral avicularium. On the other

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hand, HAYWARD (1995) described *Hippomonavella* with a large avicularia placed on the frontal wall, same as in *Hippomonavella exarata* (REUSS, 1848). GORDON (1984) and HAYWARD (1995) also described ovicells with porous frontal wall, the same as illustrated and described by WATERS (1891) in *Hippomonavella bisulca* (REUSS, 1869a). Although HAYWARD (1995) mentioned that this genus is known only from recent seas in the southern hemisphere, I believe that the following species belongs to this genus.

Hippomonavella bisulca (REUSS, 1869a)

pl. 25, fig. 1

v.* 1869a *Eschara bisulca* sp.n., REUSS p. 270, Pl. 32, Fig. 10
v. 1869a *Eschara microdonta* nov. sp., REUSS p. 271, Pl. 32, Fig. 13
1891 *Lepralia bisulca* (REUSS), WATERS p. 18, Pl. 2, Fig. 16-18, Pl. 3, Fig.1
1963 *Schizoporella bisulca* (REUSS), BRAGA p. 33
1988 *Schizoporella bisulca* (REUSS), BRAGA & BARBIN p. 523, Pl. 8, Fig. 6
2001b *Hippomonavella bisulca* (REUSS), ZÁGORŠEK p. 545, Pl. 12, Fig. 3

Diagnosis: The colony is erect, multilamellar and bifurcated, with circular or oval cross-section. The zooecia are arranged in 4 to 8 longitudinal zooecial rows on one side of the colony. The zooecia are elongated sometimes drop-like, with a flat, nonporous frontal wall bordered by 10 to 18 big marginal areolar pores. The lateral walls are little elevated above the frontal wall, or indistinct. The elevated lateral walls are typically developed on the distal margin of the zooecium, near the aperture. This elevation forms a prominent protuberance. The aperture is oval to circular with prominent condyles, but without peristome and lyrula. The proximal margin of the aperture is slightly concave. The avicularia are rare, small or circular without a pivotal bar, situated on the frontal wall below the aperture. The avicularian palate is tipped laterally. The ovicell is globular with a porous frontal wall.

Remarks: The syntypes of *Eschara microdonta* REUSS, 1869a have smaller marginal areolar pores, but other features are identical with the described species. Therefore I believe that *Eschara microdonta* REUSS, 1869a is a junior synonym of *Hippomonavella bisulca* (REUSS, 1869a). The studied material is almost identical with the syntypes deposited in the Museum of Natural History in Vienna. The syntypes have somewhat larger marginal areolar pores and have no avicularia and no ovicells. The specific elevations situated laterally from the aperture are however present in all studied material.

BRAGA (1963) as well as BRAGA & BARBIN (1988) listed this species in *Schizoporella*, but this genus has to have a perforated frontal wall and a suboral avicularia (GORDON, 1984). Due to the presence of large marginal areolar pores, perforated ovicells and a small avicularium on the frontal wall this species is listed under *Hippomonavella* CANU & BASSLER, 1934.

Occurrence: Reingruberhöhe only SEIFERT's samples.

Distribution in time and space:

Priabonian Vicentin (REUSS, 1869a), Italy (WATERS, 1891, BRAGA & BARBIN, 1988), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Romania (GHIURCA, 1987), Austria (ZÁGORŠEK, 2001b)

Hippomonavella exarata (REUSS, 1848)

pl. 25, figs. 2, 3

v.* 1848 *Cellaria exarata* sp.n., REUSS p. 61, Pl. 7, Fig. 32
1891 *Smittina exarata* (REUSS), WATERS p. 22, Pl. 3, Fig. 6
1991 *Hippoporina exarata* (REUSS), BRAGA Tab. 1
2001a *Hippomonavella exarata* (REUSS, 1848), ZÁGORŠEK p. 60, Pl. 21, Fig. 5, 6

Diagnosis: The colony is flat, erect with a narrow cross section and 7-8 zooecia in parallel rows on one side of the colony. The zooecia are elongated and have about 15 to 25 large marginal areolar pores and elevated lateral walls. The frontal wall is slightly convex and nonporous. The aperture is circular with a concave proximal margin and condyles.

A large, circular, suboral avicularium without pivot is situated on the frontal wall. The avicularium is rare, it occurs only in one zooecium among 5 to 10 zooecia. The avicularium develops sometimes a small chamber, which is as large as the aperture. The ovicell is unknown.

Remarks: The described specimens have fewer marginal areolar pores (about 10-15) than the syntypes deposited in the Museum of Natural History in Vienna. The syntypes have around each zooecium 25 marginal areolar pores. Because also in Hungarian specimens marginal areolar pores are rarer, I think that this feature may be explained by variation within the species. Although ovicells are unknown in this species, all other features allow us to list it in *Hippomonavella*.

Occurrence: Reingruberhöhe in the entire section (samples RH 2, RH 4, RH 9, RH 12, RH 13, RH 31, RH 33 and SEIFERT's samples).

Distribution in time and space:

Priabonian - Italy (WATERS, 1891), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Tortonian - Austria & Hungary (REUSS, 1848)

Hippomonavella stenosticha (REUSS, 1848)

pl. 25, fig. 6

v.* 1848 *Cellaria stenosticha* sp.n., REUSS p. 64, Pl. 8, Fig. 10
v. 1869a *Eschara stenosticha* (REUSS), REUSS p. 269, Pl. 32, Fig. 4
1988 *Smittina* sp. cf. *stenosticha* (REUSS), BRAGA & BARBIN p. 525, Pl. 9, Fig. 3

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2001a *Hippomonavella stenosticha* (REUSS, 1848), ZÁGORŠEK p. 59, Pl. 21, Fig. 1, 2

Diagnosis: The colony is erect, multilamellar with 6 to 8 zooecial rows on one side. The cross-section of the colony is circular or oval. The zooecia are elongated with a flat or little convex, nonporous frontal wall and with 10 to 18 large marginal areolar pores. The marginal areolar pores are often also proximal to the aperture. The lateral walls are little elevated above the frontal wall. The aperture is oval to circular with condyles and without a peristome. The proximal margin of the aperture is slightly concave. The avicularia are rarely developed, very small and situated on the frontal wall below the aperture. The palate is laterally tapered. The ovicell is unknown.
Remarks: The holotype deposited in the Museum of Natural History in Vienna has a little-convex frontal wall, same as the described specimen, but slightly different compared with those found in Hungary. The Reingruberhöhe specimens have however fewer marginal areolar pores than the holotype as well as Hungarian specimens. The other features observable in the holotype are identical with those in the described specimens.
Occurrence: Reingruberhöhe (samples RH 1, RH 4 and RH 10+11).
Distribution in time and space:
Priabonian Vicentin (REUSS, 1869a), Italy (WATERS, 1891), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a)
Tortonian - Austria & Hungary (REUSS, 1848),
Quaternary & Recent - cosmopolitan (BRAGA & BARBIN, 1988)

Genus *Schizomavella* CANU & BASSLER, 1917

The colony is erect or encrusting. The zooecia have a porous frontal wall and only rarely the central part is nonporous. The apertures have a sinus and usually oral spines. The avicularia are suboral, arranged medially on the frontal wall, or paired situated laterally from the aperture. Adventitious avicularia may also be present. The ovicell has characteristically a nonporous ectoecium and a porous endoecium or (rarely) with irregular perforation.

Schizomavella larva (REUSS, 1848)

v.* 1848 *Eschara larva* sp. n., REUSS p. 69, Pl. 8, Fig. 29
v. 1869a *Eschara semilaevis* sp. n., REUSS p. 270, Pl. 32, Fig. 7-8
v. 1869a *Eschara Suessi* sp. n., REUSS p. 270, Pl. 32, Fig. 9
1991 *Lacerna larva* (REUSS), BRAGA Tab. 1
2001a *Schizomavella larva* (REUSS), ZÁGORŠEK p. 61, Pl. 21, Fig. 3, 7

Diagnosis: The colony is erect, columnar or flat and multilamellar. The zooecia are drop-like to oval, with a frontal wall usually extended proximally and with a nonporous central area. The apertures are circular to oval with a short sinus and small oral spines. The oral spines may be absent. The avicularia are paired, lateral-oral, large and have a pivot bar. The palate is usually acute distally. The hyperstomial ovicell is spheroidal and the frontal wall is slightly perforated.
Remarks: The described specimens from Reingruberhöhe have no ovicells and sometimes, perhaps due to the preservation, the oral spines are not observable. Because the other features are identical with material deposited in the Museum of Natural History in Vienna, these specimens are determined as *Schizomavella larva* (REUSS). Already BRAGA (1991) pointed out that *Eschara semilaevis* REUSS1869a and *Eschara Suessi* REUSS, 1869a are junior synonyms of *Eschara larva* REUSS, 1848.
Occurrence: Reingruberhöhe (samples RH 1, RH 10+11 and SEIFERT's samples).
Distribution in time and space:
Priabonian - Vicentin (REUSS, 1869a), Romania (GHIURCA, 1987), Italy (BRAGA, 1991), Hungary (ZÁGORŠEK, 2001a),
Tortonian - Austria & Hungary (REUSS, 1848).

Superfamily Schizoporelloidea JULLIEN, 1883
Family Schizoporellidae JULLIEN, 1883

Genus *Schizoporella* HINCKS, 1877 (= *Multiporina* D'ORBIGNY, 1852)

The colony is encrusting or erect with an encrusting base and usually bilamellar. The zooecia have a strongly perforated frontal wall and a significant sinus. Oral spines are missing. The avicularia are mostly suboral or oral, sometimes paired. The ovicell is prominent with a porous frontal wall and rarely with umbo or ridges.
Remarks: According to BUGE (1975) *Multiporina* D'ORBIGNY, 1852 is a senior synonym of *Schizoporella* HINCKS, 1877. MCKINNEY (pers. com., 2002) also formally suppress *Multiporina* following the new ICZN rules. However *Schizoporella* is a well-established genus, and also the type genus for family *Schizoporellidae* JULLIEN, 1883. I propose therefore to list *Multiporina* D'ORBIGNY, 1852 among the synonyms of *Schizoporella* HINCKS, 1877.

Schizoporella cf. *geminipora* (REUSS, 1848)
pl. 26, fig. 4

v.* 1848 *Vaginopora geminipora* sp.n., REUSS p. 74, Pl. 9, Fig. 3-4
v. 1874 *Lepralia crassa* sp.n., REUSS p. 175, Pl. 5, Fig. 5
1974 *Schizoporella geminipora* (REUSS), DAVID & POUYET p. 158, Pl. 8, Fig. 4
1977 *Schizoporella geminipora* (REUSS), VÁVRA p. 117
v. 1989 *Schizoporella geminipora* (REUSS), SCHMID p. 38, Pl. 11, Fig. 2-4.

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Diagnosis: The colony is unilamellar, erect, rarely bilamellar or encrusting. The zooecia are indistinct, oval to drop-like, with a strongly porous frontal wall. The number of pores varies from about 8 to 20. The aperture is circular with a remarkably small sinus. The avicularium is suboral without pivotal bar and arranged laterally from the aperture. The avicularium is not developed on each zooecium. Sometimes, the avicularium is situated on the frontal wall and has then a pivotal bar. The ovicell is small, deeply immersed and has a nonporous frontal wall.

Remarks: VÁVRA (1977) pointed out that *Lepralia crassa* REUSS, 1874 is a junior synonym of *Vaginopora geminipora*, REUSS 1848.

The holotype as well as other syntypes from the original REUSS collection are from Miocene localities, and have unilamellar or encrusting colonies. The specimens found at Reingruberhöhe have mostly bilamellar, but rarely also unilamellar colonies. Because other features are identical I believe that all these specimens are conspecific. Although the ovicells are not typical for the genus *Schizoporella* other features allow us to list this species within this genus.

Occurrence: Reingruberhöhe (sample RH 12).

Distribution in time and space:

Priabonian - France (VÁVRA, 1977)

Oligocene - Italy (VÁVRA, 1977)

Tortonian - Austria & Hungary (REUSS, 1848, DAVID & POUYET, 1974), Poland, Romania, Czech, Ukrainia (VÁVRA, 1977)

Schizoporella dunkeri (REUSS, 1848)

pl. 26, figs. 1, 2

v.* 1848 *Cellepora dunkeri* sp.n., REUSS p. 90, Pl. 10, Fig. 27

v. 1874 *Lepralia ansata* JOHNSTON, REUSS p. 158, Pl. 6, Fig. 12

v. 1963 *Hippomenella oligostigma* (REUSS), MAŁECKI p. 120, Pl. 12, Fig. 9

1974 *Schizoporella dunkeri* (REUSS, 1848), DAVID & POUYET p. 159, Pl. 11, Fig. 6

1977 *Schizoporella dunkeri* (REUSS, 1848), VÁVRA p. 116

1988 *Schizoporella dunkeri* (REUSS, 1848), ZABALA & MALUQUER p. 133, fig. 307, Pl. 18, Fig. B

1992 *Schizoporella dunkeri* (REUSS), POUYET & MOISSETTE p. 53, Pl. 7, Fig. 8

1996 *Schizoporella dunkeri* (REUSS), HADDADI-HAMDANE p. 81, Pl. 6, Fig. 9

Diagnosis: The colony is encrusting. The zooecia are rectangular to oval and have a strongly porous frontal wall. The aperture is oval to semicircular with a small sinus. The avicularia are paired, unequal in size. The larger avicularium has a pivotal bar and is situated near the aperture, on the top of a small avicularian chamber. The palate of this avicularium is tapering disto-laterally and is triangular, sharp. The second, smaller avicularium is occasionally developed. It is situated on the opposite side of the aperture and has a palate also directed disto-laterally. The ovicelled zooecia have sometimes both avicularia approximately equal in size, sometimes only the big avicularium. The ovicell is hyperstomial, globular to oval and large. The ovicell has a strongly perforated frontal wall.

Remarks: The Reingruberhöhe specimens have usually only one large avicularium situated on the avicularian chamber. The syntypes have not been found within the REUSS collection in the Museum of Natural History in Vienna. DAVID & POUYET (1974) described specimens also with one avicularium only, however REUSS (1848) described and illustrated only zooecia with paired avicularia, unequal in size. HADDADI-HAMDANE (1996) described specimens only with one avicularium and without ovicells. Also the illustration shows a less convex frontal wall and only one large avicularium.

The Hungarian specimens have usually paired avicularia and a less porous frontal wall (ZÁGORŠEK, 2001a). DAVID & POUYET (1974) listed *Lepralia ansata* JOHNSTON, (REUSS 1874) as a synonym of *Schizoporella dunkeri* (REUSS, 1848).

The specimens described by REUSS (1874) and stored in the Museum of Natural History in Vienna have usually only one avicularium situated in the middle of the frontal wall on the avicularian chamber and no ovicells. Therefore I believe that the number of avicularia is not a specific feature, and it could depend more on environmental conditions than to be regarded as a species character.

I listed therefore all the described specimens in the same species. MAŁECKI (1963) described *Hippomenella oligostigma* (REUSS) which has however all the features of *Schizoporella dunkeri* and therefore is listed here as synonym too.

Occurrence: Reingruberhöhe (sample RH 31).

Distribution in time and space:

Priabonian - Poland (MAŁECKI, 1963), Italy (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a)

Oligocene – Germany (VÁVRA, 1977)

Tortonian - Austria & Hungary (REUSS, 1848, DAVID & POUYET, 1974), Romania, Czech, Hungary (VÁVRA, 1977)

Zanclean - Algeria (HADDADI-HAMDANE, 1996)

Piacenzian - Italy (POUYET & MOISSETTE, 1992)

Quaternary & Recent - Mediterranean (ZABALA & MALUQUER, 1988), Atlantic (HAYWARD & RYLAND, 1979)

Family Teuchoporidae NEVIANI, 1895

Genus *Lagenicella* CHEETHAM & SANDBERG, 1964

The colony is erect or encrusting. The zooecial frontal wall is perforated. The aperture has condyles. The peristome is well developed and nonporous. The avicularia are paired, small or absent. Additional adventitious avicularia may be also present. The ovicell is peristomial and has a perforated frontal wall.

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Lagenicella helmbergensis Zágoršek, 2001b
pl. 26, fig. 3

v.* 2001b *Lagenicella helmbergensis* sp.n., Zágoršek p. 546, Pl. 15, Fig. 1-3

Diagnosis: The colony is encrusting and has zooecia in almost regular longitudinal rows. The zooecia are oval to rhombic, sometimes the shape of zooecia is indistinct. The zooecial frontal wall is strongly perforated by large pores, irregular in shape and size, so the frontal wall is reduced to threads between the pores. A long, thick, nonporous peristome rises from the distal half of the zooecium. The peristome is heavily calcified, smooth without any avicularia. The aperture is circular without any visible condyles or lyrula. Avicularia are not observed. The ovicell is small, deeply immersed in the distal zooecium. Only the narrow semilunar part of the ovicell's frontal wall is exposed. It is strongly perforated by small pores and rounded by a smooth, little prominent calcified rim.
Comparison: The most similar species is *Lagenicella neosocialis* Dick & Ross, 1988 as described by Soule et al. (1995) This species has however small avicularia placed very near to the lateral margins of the aperture and its ovicells are prominent with a nonporous ectoecium. *Lagenicella lacunosa* (Bassler, 1934) as described by Gordon (1984) is also similar to the described species in having immersed ovicells and in lacking any avicularia. Nevertheless, the ovicell has a nonporous frontal wall and the nonporous peristome is very short compared with *Lagenicella helmbergensis* Zágoršek, 2001b.
Remarks: Gordon (pers. com., 2000) suggested also the genus *Teuchopora* Neviani, 1895 for this species. The type species *Teuchopora castrocarensis* (Manzoni, 1875) as described by Poluzzi (1977) is similar to *Lagenicella helmbergensis* sp.n. in having a long nonporous peristome, but the original description does not include the description of ovicells, which are very important. Poluzzi (1977) redescribed type material and found peristomial ovicells with a perforated frontal wall. However, *Teuchopora* has only uniserial or biserial colonies and a very prominent ovicell, which has a small oeciopore and a perforated hood above the frontal wall.
Occurrence: Reingruberhöhe (sample RH 31).
Distribution in time and space:
Priabonian - Austria (Zágoršek, 2001b)

Family Stomachetosellidae Canu & Bassler, 1917

Genus *Metradolium* Canu & Bassler, 1917

The colony is erect and bilamellar. The zooecia are indistinct with a porous frontal wall and a semilunar, immersed aperture. A narrow spiramen opens proximally to the aperture. The avicularia are suboral. The ovicell is deeply immersed and opens into the peristome by a narrow semilunar oeciopore.

Metradolium obliquum Canu & Bassler, 1920
pl. 25, figs. 4, 5

1920 *Metradolium obliquum* sp.n., Canu & Bassler p. 446, Pl. 57, Fig. 4-10
v. 2001b *Metradolium obliquum* Canu & Bassler, Zágoršek p. 548, Pl. 16, Fig. 2, 4

Diagnosis: The colony is erect with about 6 to 8 zooecial rows around the colonial stem. The transverse section of the colony is almost circular. The zooecia are indistinct, oval with a short, convex frontal wall perforated by a few large pores.
The aperture is circular, large and deeply immersed. The spiramen is very narrow, semilunar, unsymmetrical and situated just below (proximally) the aperture, typically a little shifted laterally, not in median position. The avicularium is large, about one half of the aperture, circular and with the palate tapering usually laterally. The avicularium is usually suboral and arranged at the top of a prominent umbo. The ovicell is globular deeply immersed and opens by a narrow lunar oeciopore.
Remarks: Canu & Bassler (1920) reported two avicularia, however the Reingruberhöhe specimens have one large avicularium only. In respect to other features the studied specimens are identical with the originals.
Occurrence: Reingruberhöhe only Seifert's samples.
Distribution in time and space:
Priabonian - (Canu & Bassler, 1920), Austria (Zágoršek, 2001b)

Family Tetraplariidae Harmer, 1957

Genus *Tychinella* Zágoršek, 2001a

Diagnosis: The colony is erect, rod-like, narrow, dichotomously branching and quadriserial. The pairs of zooecia are attached by their dorsal walls. Each zooecial pair is twisted around the colonial axis for 90°. The zooecia are elongated and have a porous, convex frontal wall, which is on the proximal edge nonporous. The aperture is oval. Oral spines are not developed. The avicularia are paired, oral to suboral and arranged very close to the aperture. A pivotal bar of the avicularium is usually developed. The ovicell is unknown.

Tychinella schreibersi (Reuss, 1848)

v.* 1848 *Cellaria Schreibersi* sp.n., Reuss p. 63, Pl. 8, Fig. 8
v. 1869a *Cellaria Schreibersi* Reuss, Reuss p. 262, Pl. 24, Fig. 5-6
1963 *Tetraplaria schreibersi* (Reuss), Braga p. 39
1977 *Tetraplaria schreibersi* (Reuss), Vávra p. 151

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v. 1988 *Hippopleurifera* (?) *schreibersi* (REUSS), BRAGA & BARBIN p. 522
v. 1994 *Hippopleurifera schreibersi* (REUSS), ZÁGORŠEK, Tab.1
v. 2001a *Tychinella schreibersi* (REUSS), ZÁGORŠEK p. 63, Pl. 18, Fig. 3, 4

Diagnosis: The fragments of the colony are usually formed by 3 to 5 alternating pairs of the zooecia. Rarely, the colony is dichotomously branching. The zooecia are elongated and separated by narrow ridges. The frontal wall is convex and strongly porous. The proximal most part of the frontal wall is slightly porous or nonporous. The aperture is terminal, oval and has no condyles. The avicularia are suboral, small, circular to oval, with the palate distally tapered.
Remarks: Although the bifurcation has not been observed in Reingruberhöhe specimens, due to the presence of all other features they belong to this species.
Occurrence: Reingruberhöhe (samples RH 1, RH 6, RH 10+11 and RH 12).
Distribution in time and space:
Priabonian Vicentin (REUSS, 1869a), Italy (BRAGA & BARBIN, 1988), Romania (GHIURCA, 1987), Hungary (ZÁGORŠEK, 2001a), Slovakia (ZÁGORŠEK, 1994), Austria (ZÁGORŠEK, 2001b)
Rupelian - Italy (BRAGA & BARBIN, 1988)

Family Porinidae D'ORBIGNY, 1852

Genus *Porina* D'ORBIGNY, 1852

The colony is erect and bifurcated. The zooecia are indistinct and have a porous frontal wall. The frontal wall is perforated by an ascopore approximately in its mid-length. The aperture is circular and situated on a peristome. The avicularia are numerous, characteristically peristomial. The ovicell is deeply immersed.

***Porina coronata* (REUSS, 1848)**

v.* 1848 *Cellaria coronata* sp.n., REUSS p. 62, Pl. 8, Fig. 3
1980 *Porina coronata* (REUSS), BRAGA p. 51, Fig. 45-48
v. 1988 *Porina coronata* (REUSS), BRAGA & BARBIN p. 521, Pl. 7, Fig. 4
v. 2001a *Porina coronata* (REUSS), ZÁGORŠEK p. 63, Pl. 25, Fig. 1, 2

Diagnosis: The colony is erect, with an oval rarely circular cross-section. The zooecia are arranged in 2 to 6 longitudinal zooecial rows. The shape of the zooecia is indiscernible due to the strongly porous frontal wall and the development of the peristome. The peristome is aviculiferous, prominent and circular. There are 5 to 7 circular avicularia situated around the aperture, placed on the peristome. The most proximal avicularium is the largest and has usually a pivot bar. The ascopore is placed on the frontal wall, and it is a little larger than other pores. The ovicell is unknown.
Occurrence: Haselbach and Reingruberhöhe all studied samples and in SEIFERT's samples.
Distribution in time and space:
Lutetian - Germany (MAŁECKI, 1963)
Priabonian Austria & Hungary (REUSS, 1848), Poland (MAŁECKI, 1963), Slovakia (ZÁGORŠEK, 1994), Romania (GHIURCA, 1987), Italy (BRAGA & BARBIN, 1988), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Rupelian - Italy (BRAGA & BARBIN, 1988)

***Porina duplicata* (REUSS, 1869a)**
pl. 27, fig. 3

v.* 1869a *Acropora duplicata* sp.n., REUSS p. 290, Pl. 34, Fig. 6
1963 *Porina coronata* (REUSS), MAŁECKI p. 116
1988 *Porina* sp. cf. *Acropora duplicata* REUSS, 1869a, BRAGA & BARBIN p. 522, Pl. 7, Fig. 6
v. 2001a *Porina duplicata* (REUSS), ZÁGORŠEK p. 64, Pl. 25, Fig. 4, 5

Diagnosis: The colony is erect and columnar. The zooecia are elongate-oval with a porous, convex frontal wall and a semilunar aperture. The aviculiferous peristome is not well developed, it is short but wide and carries only one large and one small avicularium. The large avicularium is circular, without pivot and situated proximally from the aperture. The second avicularium is much smaller, circular and has also no pivot bar. It is situated on the distal margin of the aperture. The ascopore is very small, sometimes as large as regular pores on the frontal wall and does not perforate the peristome. The ovicell is unknown.
Remarks: Only three badly preserved specimens have been found at Reingruberhöhe. Thanks to preserved features, aperture with one big and one small avicularium situated on the aviculiferous peristome and small the ascopore, these specimens can belong to the described species.
Few of the specimens stored in MAŁECKI (1963) collection as *Porina coronata* (REUSS), belong in fact to the *Porina duplicata* (REUSS).
Occurrence: Reingruberhöhe in the entire section (samples RH 4, RH 8, RH 10+11, RH 31 RH 33 and SEIFERT's samples).
Distribution in time and space:
Priabonian - Vicentin (REUSS, 1869a), Poland (MAŁECKI, 1963), Italy (BRAGA & BARBIN, 1988), Poland (MAŁECKI, 1963), Hungary (ZÁGORŠEK, 2001a)

Family Margarettidae HARMER, 1957

Genus *Margaretta* GRAY, 1843

The colony is erect, articulated and multilamellar. The zooecia are indistinct, elongated with a strongly porous

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frontal wall. The aperture is circular situated on a short peristome. Oral spines and avicularia are not developed. The ascopore is medial. The ovicell is peristomial.

Margaretta cereoides (Ellis & Solander, 1786)

v.* 1848 *Cellaria Michelini* sp.n., Reuss p. 61, Pl. 8, Fig. 1, 2
v. 1874 *Cellaria cereoides* (Ellis & Solander), Reuss p. 146, Pl. 11, Fig. 11 15, Pl. 12, Fig. 12.
1963 *Tubucellaria cereoides* (Ellis & Solander), Braga p. 35
v. 1963 *Tubucellaria cereoides* (Ellis & Solander), Małecki p. 124, Pl. 12, Fig. 6, 7
v. 1963 *Tubucellaria parviporosa* Canu & Bassler, Małecki p. 125, Pl. 12, fig. 8
1974 *Margaretta cereoides* (Ellis & Solander), David & Pouyet p. 196, Pl. 10, Fig. 7
1975 *Margaretta cereoides* (Ellis & Solander), Braga p. 147, Pl. 2, Fig. 15, 16.
1977 *Margaretta cereoides* (Ellis & Solander), Vávra p. 143 (cum. syn)
1980 *Margaretta cereoides* (Ellis & Solander), Braga p. 54, Fig. 55-58.
v. 1988 *Margaretta cereoides* (Ellis & Solander), Braga & Barbin p. 525, Pl. 10, Fig. 5
v. 2001a *Margaretta cereoides* (Ellis & Solander), Zágoršek p. 65, Pl. 26, Fig. 5-7

Diagnosis: The colony is columnar with a circular cross-section. The zooecia are arranged in 4 to 8 longitudinal rows, elongated oval with a strongly porous, little convex frontal wall. The aperture is circular to oval and placed on a short peristome. The peristome is very narrow. The median ascopore is small and usually as large as regular pores on the frontal wall. The ovicell has not been observed.
Remarks: Only small specimens have been found, which showed similar features typical for *Margaretta cereoides*: articulated colony, 4 zooecia around the colony stem and presence of the median ascopore. The colony is however very small with a length only about 600 to 800 μm (the usual specimens of *Margaretta cereoides* have length of about 3-5 mm). Therefore they could be juvenile specimens of *Margaretta cereoides* (Ellis & Solander, 1786). Studying the originals of Małecki (1963) I believe that *Tubucellaria parviporosa* Canu & Bassler, as he described it, belongs to *Margaretta cereoides* (Ellis & Solander, 1786).
Occurrence: Reingruberhöhe (samples RH 12 and RH 31).
Distribution in time and space:
Priabonian - Poland (Małecki, 1963), Romania (Ghiurca, 1987), Italy (Braga & Barbin, 1988), Hungary (Zágoršek, 2001a), Slovakia (Zágoršek & Kázmér, 2000), Austria (Zágoršek, 2001b)
Oligocene - Germany (Vávra, 1977)
Tortonian - Austria & Hungary (Reuss, 1848, David & Pouyet, 1974), France (Buge, 1957), Poland, Romania, Czech (Vávra, 1977)
Piacenzian Panama (Buge, 1957), Italy, USA (Vávra, 1977)
Quaternary & Recent - Mediterranean (Braga & Barbin, 1988), Pacific (Vávra, 1977)

Family Hippopodinidae Levinsen, 1909

Genus *Hippomenella* Canu & Bassler, 1917

The colony is erect or encrusting. The frontal wall has a nonporous central area and numerous marginal areolar pores. The aperture is semilunar and is usually longitudinally elongated with oral spines and condyles near the proximal margin. A peristome is not developed. The avicularia are adventitious, typically paired, situated near the aperture. When only one avicularium is present, it is situated laterally to the aperture. The ovicell is hyperstomial, prominent, with a porous frontal and sometimes with orifices in ectoecium and a porous endoecium.

Hippomenella bragai Zágoršek, 1994

v.* 1994 *Hippomenella bragai* sp.n., Zágoršek p. 373, Fig. 8 a, b, c, Fig. 9a, b

Diagnosis: The colony is erect, columnar and has about 6 to 8 longitudinal rows of oval zooecia around the whole colonial stem. The zooecia have a slightly convex frontal wall about 20 marginal areolar pores. The aperture is large, with a straight proximal edge and with 3 to 4 oral spines. The avicularia are in pairs, laterally adjacent to the aperture and have a pivot. The spheroidal ovicell is bordered by 12 to 15 areolar pores and has developed an ectoecium and an endoecium. There are two circular windows in the smooth, nonporous ectoecium. The endoecium is strongly porous and is visible through the windows.
Remarks: Although no ovicelled zooecia have been found at Reingruberhöhe, the characteristic features for this species have been observed: large apertures with an adjacent pair of avicularia. *Hippomenella bragai* is a common species in Hungarian as well as in Slovakian Eocene sediments, so I believe that the Reingruberhöhe specimens also belong to this species.
Occurrence: Reingruberhöhe (sample RH 10+11 and Seifert's samples).
Distribution in time and space:
Priabonian - Slovakia (Zágoršek, 1994), Austria (Zágoršek, 2001b)

Hippomenella megalota Reuss, 1848
pl. 27, fig. 1, 2

1848 *Cellepora megalota* sp.n., Reuss p. 81, Pl. 10, Fig. 1
non 1874 *Lepralia megalota* (Reuss), Reuss p. 154, Pl. 5, Fig. 3
v. 1874 *Lepralia personata* sp.n., Reuss p. 155, Pl. 8, Fig. 6
1974 *Escharoides megalota* (Reuss), David & Pouyet p. 180, Pl. 10, Fig. 6 (cum. syn)

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Diagnosis: The colony is encrusting. The zooecia are oval with a convex frontal wall, which is marginally perforated usually by two parallel rows of areolar pores (about 30 pores on each zooecium). The large aperture has a straight proximal edge and 4 to 6 oral spines. Characteristically only one avicularium is developed on each zooecium. The avicularium is circular or slightly tapering distally, situated on the frontal wall, near the aperture and has a pivotal bar. The hyperstomial ovicell is spheroidal, bordered by areolar pores and has a porous frontal wall.

Remarks: The syntypes of *Cellepora megalota* REUSS, 1848 have not been found in the Museum of Natural History in Vienna. There are only two specimens of *Lepralia megalota*. One was found at Eisenstadt, and the second at Mörbisch. The original material has been described from Mörbisch, however the figured specimen was not found within the REUSS collection. The specimens from Mörbisch are almost identical with material described here, only the avicularia are slightly larger and are always distally tapered. Size and features of the ovicell are identical with those seen in the studied material. DAVID & POUYET (1974) established a lectotype from Mörbisch material.

The specimens found at Eisenstadt and determined by REUSS as *Lepralia megalota* represent a completely different species, however the autozooecia are quite similar. This species has a globular ovicell with an ectoecium reduced to radial ribs. Among the ribs, there is a porous endoecium. Because the ovicell is the most important feature, these specimens cannot belong to *Lepralia megalota* REUSS, 1848. DAVID & POUYET (1974) pointed out, than *Lepralia personata* REUSS, 1874 is the same species as *Cellepora megalota* REUSS, 1848. They listed this species within *Escharoides*, which has an umbonuloid frontal wall with an umbo, a developed peristome and has an ovicell with a nonporous frontal wall. These features are not present in the described species and therefore, it cannot be *Escharoides*. Due to the presence of large apertures, porous ovicells and only one adventitious avicularium the species is listed under *Hippomenella*.

Occurrence: Reingruberhöhe in the entire section (samples RH 1, RH 6, RH 10+11, RH 31, RH 33 and SEIFERT's samples).

Distribution in time and space:

Tortonian Austria & Hungary (REUSS, 1848, DAVID & POUYET, 1974), France, Czech, Poland (VÁVRA, 1977)

Family Gigantoporidae BASSLER, 1935

Genus *Gigantopora* RIDLEY, 1881

The colony is erect or encrusting. The frontal wall is porous. The aperture has a sinus on the peristome. The peristome is perforated by a large spiramen. The avicularia are oral or suboral, usually situated on the peristome. The ovicell is hyperstomial and has a perforated frontal wall.

Gigantopora duplicata (REUSS, 1848)

pl. 27, fig. 4

v.* 1848 *Cellaria duplicata* sp.n., REUSS p. 62, Pl. 7, Fig. 34

v. 1869a *Eschara duplicata* (REUSS), REUSS p. 273, Pl. 33, Fig. 8-10
1891 *Porina duplicata* (REUSS), WATERS p. 25, Pl. 3, Fig. 14
1963 *Gigantopora duplicata* (REUSS), BRAGA p. 31, Pl. 4, Fig. 1

v. 1963 *Porina coronata* (REUSS),
1988 *Gigantopora duplicata* (REUSS), BRAGA & BARBIN p. 522, Pl. 7, Fig. 8

Diagnosis: The colony is erect, columnar and has about 6 to 8 longitudinal zooecial rows. The cross-section of the colony is usually circular. The zooecia are oval with a convex and very strongly porous frontal wall. The aperture is situated on the top of the short peristome. It is large, circular with very small condyles. The peristomial spiramen is long but very narrow. Two large oral avicularia (one always larger than the second one) and an oval ascopore are also placed on the peristome and situated proximally from the aperture. The avicularia usually have a pivot. The ovicell is unknown.

Remarks: The specimens found at Reingruberhöhe have a very large spiramen elongated laterally. Other features are identical with the syntypes deposited in the Museum of Natural History in Vienna.

Occurrence: Haselbach and Reingruberhöhe (samples RH 12, RH 31 and SEIFERT's samples).

Distribution in time and space:

Priabonian - Austria & Hungary (REUSS, 1848), Vicentin (REUSS, 1869a), Romania (GHIURCA, 1987), Italy (WATERS, 1891, BRAGA & BARBIN, 1988), Hungary (ZÁGORŠEK, 2001a), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Austria (ZÁGORŠEK, 2001b)

Rupelian - Italy (BRAGA & BARBIN, 1988)

Gigantopora lyratostoma (REUSS, 1866)

pl. 27, fig. 5

v.* 1866 *Lepralia lyratostoma* sp.n., REUSS p. 172, Pl. 11, Fig. 9
1980 *Hippoporina lyratostoma* (REUSS), BRAGA p. 50, Fig. 50

v. 2001a *Gigantopora lyratostoma* (REUSS), ZÁGORŠEK p. 65, Pl. 27, Fig. 1

Diagnosis: The colony is encrusting. The zooecia are oval and have a strongly porous frontal wall. The distal part of the aperture is large, circular to oval and has large condyles. The proximal part of the aperture is small and arranged approximately in the middle. The peristome is short, but wide. The peristomial spiramen is circular and small. The oral avicularium is small and has a pivot. The adventitious avicularium is rarely developed, large and

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without pivot. The ovicell is globular, prominent and the frontal wall is slightly porous.
Remarks: The Reingruberhöhe specimens have much larger oral avicularia than the syntypes deposited in the Museum of Natural History in Vienna. The shape and size of the ovicell as well as the size of the spiramen are however identical. Therefore these specimens are listed as *Gigantopora lyratostoma* (REUSS).
Occurrence: Reingruberhöhe (sample RH 4).
Distribution in time and space:
Priabonian - Germany (REUSS, 1866), Italy (BRAGA, 1980), Romania (GHIURCA, 1987), Hungary (ZÁGORŠEK, 2001a), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Austria (ZÁGORŠEK, 2001b)

Family Cyclicoporidae HINCKS, 1884

Genus *Cyclicopora* HINCKS, 1884

The colony is encrusting. The frontal wall is porous, lateral marginal areolar pores are also developed. The aperture is simple, with a straight proximal border. Condyles and oral spines are not developed. The avicularia are typically absent, rarely they may be present. The ovicell is hyperstomial and has a nonporous frontal wall.

Cyclicopora laticella CANU & BASSLER, 1920

1920 *Cyclicopora laticella* sp. n., CANU & BASSLER p. 427, Pl. 55, Fig. 6
v. 1963 *Cyclicopora* cf. *laticella* CANU & BASSLER, MAŁECKI p. 117, Pl. 11, Fig. 8
v. 2001a *Cyclicopora laticella* CANU & BASSLER, ZÁGORŠEK p. 66, Pl. 27, Fig. 2, 4

Diagnosis: The zooecia are irregular in shape, mostly oval. The frontal wall is strongly porous with 13 to 16 large pores. Marginal areolar pores are not observed. The aperture is oval to circular and large. The peristome is short. A small, elliptical avicularium is placed near the margin of the zooecial frontal wall. The ovicell is circular and has a smooth frontal wall. The apertures in ovicelled zooecia are shorter but wider than those in non-ovicelled zooecia.
Remarks: During the recent investigation only one specimen, showing characteristic features of *Cyclicopora laticella* CANU & BASSLER, 1920 has been found. It has also small avicularia and a nonporous ovicell as described from Hungarian material.
It seems that *Cyclicopora laticella* is a widely distributed species, and all found specimens (America, Poland, Hungary as well as Austria) are conspecific.
Occurrence: Reingruberhöhe (sample RH 31).
Distribution in time and space:
Priabonian - Carolina (CANU & BASSLER, 1920), Poland (MAŁECKI, 1963), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a)

Family Lacernidae JULLIEN, 1888

Genus *Arthropoma* LEVINSEN, 1909

The colony is encrusting. The frontal wall has many simple pores. The aperture is circular and has a straight proximal border and a sinus. Oral spines are unknown. The avicularia are vicarious, but only rarely developed. The ovicell is hyperstomial and has a completely imperforate frontal wall.

Arthropoma sparsipora (REUSS, 1869a)
pl. 28, fig. 1

v.* 1869a *Lepralia sparsipora* sp.n., REUSS p. 263, Pl. 30, Fig. 1
non 1891 *Monoporella sparsipora* (REUSS), WATERS p. 17, Pl. 2, Fig. 11
v. 1963 *Buffonellodes rhomboidalis* (CANU & BASSLER), MAŁECKI p. 119, Pl. 12, Fig. 5
v. 1963 *Mucronella peachi* (Johnston), MAŁECKI p. 122, Pl. 13, Fig. 6
v. 1988 *Hippoporina sparsipora* (REUSS), BRAGA & BARBIN p. 524, Pl. 8, Fig. 1
v. 2001a *Arthropoma sparsipora* (REUSS), ZÁGORŠEK p. 66, Pl. 22, Fig. 4-6

Diagnosis: The colony usually has well aligned rows of zooecia, though they are chaotic in some. The zooecia are oval to regularly hexagonal. The frontal wall is smooth and regularly pitted by many small pores. The aperture is keyhole-shaped with a large circular aperture and a very small sinus. The ovicell is very small and has a smooth and nonporous frontal wall. Avicularia are unknown.
Remarks: Specimens found at Reingruberhöhe have a regular hexagonal shape of zooecia and no ovicell, but other features agree with this species. Due to the presence of a U-shaped sinus, a regularly perforated frontal shield and a nonporous ovicell the species belongs to *Arthropoma*.
Monoporella sparsipora (REUSS, 1869a) as described by WATERS (1891) has very big ovicells, no sinus in the aperture and the proximal margin of the aperture is strait, with a small lyrula being developed. The syntypes have small ovicells and key-hole shaped apertures. Therefore specimens described by WATERS represent another, probably a new species. *Buffonellodes rhomboidalis* (CANU & BASSLER) and *Mucronella peachi* (JOHNSTON) as described by MAŁECKI (1963) have oval to regularly hexagonal zooecia with a regularly pitted frontal wall, an aperture with a very small sinus and a very small ovicell with a nonporous frontal wall. These features are characteristic for *Arthropoma sparsipora* (REUSS, 1869a) and therefore these specimens belong to this species.
Occurrence: Reingruberhöhe (samples RH 1, RH 8, RH 12 and SEIFERT's samples).
Distribution in time and space:

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Priabonian Vicentin (REUSS, 1869a), Poland (MAŁECKI, 1963), Italy (BRAGA & BARBIN, 1988), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a).

Arthropoma rugulosa (REUSS, 1874)
pl. 28, fig. 3

v.* 1874 *Lepralia rugulosa* sp.n., REUSS p. 169, Pl. 3, Fig. 2
1963 *Buffonellodes incisa* (REUSS), MAŁECKI p. 118, Pl. 12, Fig. 1
1963 *Buffonellodes microstoma* (CANU & BASSLER), MAŁECKI p. 119
1974 *Hippoporina rugulosa* (REUSS), DAVID & POUYET p. 142, Pl. 6, Fig. 6
1977 *Hippoporina rugulosa* (REUSS), VÁVRA p. 1977
v. 1989 *Hippothoa? rugulosa* (REUSS), SCHMID p. 53, Pl. 11, Fig. 1

Diagnosis: The colony has chaotic rows of zooecia.. The zooecia are oval to elongated hexagonal. The frontal wall is smooth and with a few regularly distributed large pores. The aperture is keyhole-shaped, where the distal part is large and the proximal sinus very small. The ovicell is large, globular and has a smooth frontal wall. Avicularia are unknown.
Remarks: *Arthropoma rugulosa* (REUSS, 1874) differs from *Arthropoma sparsipora* (REUSS, 1869a) in having much larger ovicells and larger frontal pores. Because type and size of the ovicell is one of the most important features, the difference in ovicells validates these two species. Specimens found at Reingruberhöhe have fewer frontal pores than the syntypes deposited in the Museum of Natural History in Vienna. Other features, mainly the large nonporous ovicell are identical. Due to the presence of an U-shaped sinus, a regularly perforated frontal shield, rare avicularia and an imperforate, smooth ovicell, this species belongs to *Arthropoma*. According to a recently made study of the originals of MAŁECKI's *Buffonellodes microstoma* (CANU & BASSLER) and of *Buffonellodes incisa* (REUSS) as described by MAŁECKI (1963), both belong to *Arthropoma rugulosa* (REUSS, 1874).
Occurrence: Reingruberhöhe (samples RH 1, RH 6 and SEIFERT's samples).
Distribution in time and space:
Priabonian - Poland (MAŁECKI, 1963), Austria (ZÁGORŠEK, 2001b)
Tortonian - Austria & Hungary (REUSS, 1874, DAVID & POUYET, 1974), France, Italy, Poland (VÁVRA, 1977)

Family Buffonellodidae GORDON & D'HONDT, 1987

Genus *Aimulosia* JULLIEN, 1888

The colony is encrusting. The frontal wall is nonporous, typically granular with marginal areolar pores. The aperture is bell-shaped (with a wider proximal end) and has lyrula and condyles. Oral spines may be present. The avicularium is situated on a suboral umbo adjacent to the aperture. A pivotal bar my be developed. The ovicell is hyperstomial, prominent with a nonporous frontal wall and characteristically is recumbent on the distal neighbouring zooecium.

Aimulosia manzonii (NEVIANI, 1896)
pl. 28, fig. 4, 5

1896a *Microporella manzonii* sp.n., NEVIANI p. 25, Fig. 7
1896b *Microporella manzonii* NEVIANI, NEVIANI p. 118, Fig. 6

Diagnosis: The zooecia are in chaotic rows. The frontal wall is granular with rare and small marginal areolar pores. The aperture is situated on a short peristome. It is large, oval or almost circular and has a small lyrula. Oral spines are not known. The umbo is prominent. The avicularium is small and has no pivotal bar. The ovicell is very prominent and has a granular frontal wall. The distal zooecium is slightly deformed by the ovicell.
Remarks: The Reingruberhöhe specimens are identical in respect to the general shape, the suboral umbo, adjacent small avicularia without a pivot, presence of lyrula in the aperture and short peristome with the description and illustration by NEVIANI (1896a). Although *Aimulosia manzonii* (NEVIANI, 1896) is known up to now only from Pliocene, I believe that the Reingruberhöhe specimens belong to this species.
Due to the presence of characteristically developed ovicells and other features this species is listed under *Aimulosia*. GORDON (1989) argues that *Aimulosia* should have avicularia with a pivotal bar. No pivot has been observed in the studied material, as well as in the description and illustration by NEVIANI (1896a, b). Probably the presence or absence of the pivotal bar can be regarded as within genus variation.
Occurrence: Reingruberhöhe RH 4, RH 9, RH 10+11 and SEIFERT's samples.
Distribution in time and space:
Priabonian - Romania (GHIURCA, 1987)
Tortonian - Italia (NEVIANI, 1896b)
Quaternary & Recent - Mediterranean (NEVIANI, 1896a)

Superfamily Siphonicytaroidea HARMER, 1957
Family Siphonicytaridae HARMER, 1957

Genus *Tubucella* CANU & BASSLER, 1917

The colony is erect, bilamellar and rigid. The frontal wall is porous. The aperture has a peristome but no oral spines. Avicularia are typically absent, rarely present. The ascopore perforates the frontal wall. The ovicell is peristomial.

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Tubucella papillosa (Reuss, 1848)
pl. 28, fig. 2

v.* 1848 *Eschara papillosa* sp.n., Reuss p. 68, Pl. 8, Fig. 22
1920 *Tubucella papillosa* (Reuss), Canu & Bassler p. 547
1977 *Tubucella papillosa* (Reuss), Vávra p. 144
1980 *Tubucella papillosa* (Reuss), Braga p. 55, Fig. 59-60
1985 *Tubucella papillosa* (Reuss) forma *depressa* n.f., Ziko p. 82, Pl. 18. Fig. 1-5
? 1985 *Tubucella papillosa* (Reuss), Ziko p. 80, Pl. 18. Fig. 6-8
v. 1988 *Tubucella papillosa* (Reuss), Braga & Barbin p. 525, Pl. 9, Fig. 5
v. 2001a *Tubucella papillosa* (Reuss), Zágoršek p. 67, Pl. 28, Fig. 1

Diagnosis: The colony has 4-10 longitudinal zooecial rows around the whole stem. The shape of zooecia is elongated, about three times longer than wide but the borders are indiscernible. The frontal wall is strongly porous, flat or slightly convex. The apertures are circular, with a short and narrow peristome. The ascopore is as large as regular frontal pores, sometimes slightly larger. It is situated on the distal third of the length of the zooecium. Avicularia are rarely present. The ovicell is unknown.
Occurrence: Haselbach and Reingruberhöhe in the entire section (samples RH 7, RH 9, RH 10+11, RH 13, RH 31 and RH 33).
Distribution in time and space:
Priabonian Vicentin (Reuss, 1848), Poland (Małecki, 1963), Romania (Ghiurca, 1987), Egypt (Ziko, 1985), Italy (Braga & Barbin, 1988), Slovakia (Zágoršek, 1994), Hungary (Zágoršek, 2001a), Austria (Zágoršek, 2001b)
Rupelian - Italy (Braga & Barbin, 1988)

Tubucella mammillaris (Milne Edwards, 1836)

1920 *Tubucella gibbosa* sp. n., Canu & Bassler p. 548, Pl. 71, Fig. 1-9
1966 *Tubucella mammillaris* (Milne Edwards), Cheetham p. 85, Fig. 62-64
1985 *Tubucella mammillaris* (Milne Edwards), Ziko p. 78, Pl. 17, Fig. 4, Pl. 19, Fig. 5 - 8
v. 2001a *Tubucella mammillaris* (Milne Edwards), Zágoršek p. 67, Pl. 28, Fig. 2, 3, 5

Diagnosis: The colony is large and has a narrow oval cross-section. There are about 10 to 15 irregularly alternating zooecial rows on each side of the colony. The zooecium is divided into two parts of about equal length: the distal part (so called peristomial part) carries the peristome and avicularium, the proximal part (so called frontal part) is formed by the frontal wall and bears the ascopore. These two zooecial parts are separated by narrow, shallow threads.
The peristomial part is convex, oval to circular and sometimes rounded hexagonal. The aperture is circular to oval arranged on the top of a short and thick peristome. The frontal part is much flatter than the peristomial part. The ascopore is circular and little larger than the regular frontal pores. The ovicell is unknown. The avicularium is small, rarely developed and arranged near the aperture.
Occurrence: Reingruberhöhe (samples RH 8, RH 10+11 and RH 12).
Distribution in time and space:
Lutetian - France & Egypt (Ziko, 1985), Belgium (Cheetham, 1966)
Priabonian Carolina (Canu & Bassler, 1920), United Kingdom (Cheetham, 1966), France (Ziko, 1985), Hungary (Zágoršek, 2001a), Slovakia (Zágoršek & Kázmér, 2000), Austria (Zágoršek, 2001b)
Rupelian - France (Cheetham, 1966)
Chattian - France (Ziko, 1985)
Aquitanian - France (Ziko, 1985)

Superfamily Mamilloporoidea Canu & Bassler, 1927
Family Ascosiidae Jullien, 1883

Genus *Kionidella* Koschinsky, 1885

The colony is large, columnar and free. The zooecia have a terminal aperture, medial large condyles and bud radially from the columnar axis. The avicularia are usually paired and situated on both sides of the aperture. The ovicell is hyperstomial with a porous frontal wall.

Kionidella excelsa Koschinsky, 1885
pl. 28, fig. 6

1885 *Kionidella excelsa* sp.n., Koschinsky p. 68, Pl. 7, Fig. 5-12
1891 *Fedora excelsa* (Koschinsky), Waters p. 29, Pl. 4, Fig. 6
1920 *Fedora excelsa* (Koschinsky), Canu & Bassler p. 623, Fig. 187 d-l
1975 *Kionidella excelsa* Koschinsky, Braga p. 147, Pl. 3, Fig. 6-7
1988 *Kionidella excelsa* Koschinsky, Braga & Barbin p. 528, Pl. 10, Fig. 4
v. 2001a *Kionidella excelsa* Koschinsky, Zágoršek p. 68, Pl. 28, Fig. 4, 6

Diagnosis: The zooecia are globular, sub-hexagonal to oval. The aperture is eight-shaped, the proximal and distal part is approximately equal in size oval and the condyles are arranged in the middle. The avicularia are small, circular to oval with pivot and usually arranged on both sides of the aperture. The ovicell is globular, large, prominent, but slightly immersed. The frontal wall of the ovicell is slightly pitted by small pores.
Remarks: The described specimens have always two

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avicularia on both sides of the aperture. Most of BRAGA's (1975) material as well as KOSCHINSKY's (1885) depicted material contain only one avicularium.
The material described by WATERS (1891) has also two avicularia on each zooecium. The number of avicularia seems to vary within the species. Ovicells are known only from the specimens described by WATERS (1891), so they are very rare. No ovicell is observed in the studied material, however on the basis of the other features it belongs to this species.
Occurrence: Haselbach and Reingruberhöhe (sample RH 31).
Distribution in time and space:
Priabonian Germany (KOSCHINSKY, 1885), Poland (MAŁECKI, 1963), Romania (GHIURCA, 1987), Italy (WATERS, 1891, BRAGA & BARBIN, 1988), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Genus *Stenosipora* CANU & BASSLER, 1927

The colony is free, or encrusting. The zooecia are hexagonal to oval. The aperture is terminal, elliptical and has two low condyles. The avicularium is large, situated laterally from the aperture and sometimes paired. An adventitious avicularium may also be present. The ovicell is hyperstomial.

Stenosipora simplex (KOSCHINSKY, 1885)
pl. 29, fig. 1

1885 *Stichoporina simplex* sp.n., KOSCHINSKY p. 64, Pl. 6, Fig. 4-7
1891 *Stichoporina simplex* KOSCHINSKY, WATERS p. 31, Pl. 4, Fig. 16-18
1963 *Trochopora* cf. *bouei* LEA, MAŁECKI p.101, Pl. 9, Fig. 6
1974 *Stenosipora simplex* (KOSCHINSKY), DAVID & POUYET p. 216
1977 *Stenosipora simplex* (KOSCHINSKY), VÁVRA p. 160
v. 1988 *Stenosipora simplex* (KOSCHINSKY), BRAGA & BARBIN p. 529, Pl. 11, Fig. 3

Diagnosis: The zooecia are rounded hexagonal to oval and have a convex, slightly porous and granular frontal wall. The base of the zooecia is porous. The aperture is elliptical, with two condyles visible on its margin. The distal and proximal part of the aperture is almost equal in the size.
The avicularium is oral, situated laterally from the aperture, large and has developed a pivot. The palate is sharp. The adventitious avicularium is rarely present, it is arranged between several zooecia, large and with a narrow palate. The hyperstomial ovicell is very large, sometimes almost as large as the other zooecia and has a nonporous frontal wall.

Remarks: *Stenosipora reussi* (STOLICZKA, 1862) differs from *Stenosipora simplex* (KOSCHINSKY, 1885) in having no oral avicularia. *Stenosipora protecta* (KOSCHINSKY, 1885) has two smaller avicularia besides a large one. *Trochopora* cf. *bouei* LEA as described by MAŁECKI (1963) has an encrusting colony, an elliptical aperture with two condyles visible on its margin and a large, oral avicularium situated laterally from the aperture with a sharp palate. All these features are typical for *Stenosipora simplex* and therefore these specimens are listed under this species.
Occurrence: Haselbach and Reingruberhöhe (sample RH 12 and SEIFERT's samples).
Distribution in time and space:
Priabonian Germany (KOSCHINSKY, 1885), Poland (MAŁECKI, 1963), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Italy (WATERS, 1891, BRAGA & BARBIN, 1988), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b), France (VÁVRA, 1977)
Rupelian - Italy (BRAGA & BARBIN, 1988)
Tortonian - Austria & Hungary (DAVID & POUYET, 1974)
Quaternary & Recent - Pacific and Indic Ocean (VÁVRA, 1977)

Superfamily Lepralielloidea VIGNEAUX, 1949
Family Lepraliellidae VIGNEAUX, 1949

Genus *Celleporaria* LAMOUROUX, 1821

The colony is large, free or rarely encrusting. The zooecia have a smooth frontal wall, which is perforated by few marginal pores. The aperture is semicircular and has a shallow pseudosinus, often without denticles and oral spines. Suboral and vicarious avicularia are developed. The ovicell is hyperstomial and has a nonporous frontal wall.

Celleporaria globularis (BRONN, 1837)
pl. 29, fig. 2

partim 1848 *Cellepora globularis* BRONN, REUSS p. 76, Pl. 9, Fig. 11-12
partim 1869a *Celleporaria globularis* BRONN, REUSS p. 264
v. 1963 *Holoporella damicornis* CANU & BASSLER, MAŁECKI p. 131, Pl. 15, Fig. 8
non 1973 "*Cellepora*" *globularis* (BRONN), POUYET p. 124, Pl. 2, Fig. 12
? 1977 "*Cellepora*" *globularis* (BRONN), VÁVRA p. 158 (cum. syn.)
1980 "*Cellepora*" *globularis* (BRONN), BRAGA p. 59, Fig. 62
1988 "*Cellepora*" *globularis* (BRONN), BRAGA & BARBIN p. 527, Pl. 11, Fig. 1
v. 2001a *Celleporaria globularis* (BRONN), ZÁGORŠEK p. 69, Pl. 30, Fig. 3-5

Diagnosis: The colony is globular, plurilaminar and free. The zooecia are cumulate, oval and have a terminal, cir-

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cular aperture. The areolar pores are small. The frontal wall is slightly granular or smooth and nonporous. The oral avicularia are small and without a pivotal bar. The intrazooecial avicularia are large, without pivot bar and oriented chaotically. The ovicell is slightly immersed, globular, with a terminal small aperture.

Remarks: This species belongs to the so-called "celleporoids", which is group of bryozoans hardly determinable, mostly listed as undeterminable material. I believe that due to the presence of a smooth frontal wall perforated by a few marginal pores, an aperture with a shallow pseudosinus and hyperstomial ovicells, this species could be listed under *Celleporaria*. REUSS collection however contains several different specimens determined as *Cellepora globularis* BRONN.

Partly they belong to this species, but some of them are very large and are very similar to those described by POUYET (1973). She described specimens with a very large colony (up to 30 mm in diameter), where the shape of zooecia is hardly visible and they have no ovicell and intrazooecial avicularia. There are no "medium sized" colonies (about 7 to 20 mm) in any mentioned paper. I have no original material described by BRONN, although I believe that only the small colony with visible zooecial shape and with intrazooecial avicularia belong to *Celleporaria globularis* (BRONN). The large colony represents probably a different species (genus).

VÁVRA (1977) does not describe the colonies, so it is not clear which colonies he determined as *Celleporaria globularis* (BRONN). Only BRAGA (1980) and BRAGA & BARBIN (1988) described as "*Cellepora*" *globularis* (BRONN) the small colonies only. Perhaps, during the Eocene, there are only small colonies of *Celleporaria globularis* (BRONN); the large colonies were developed only during the Miocene, and therefore they probably belong to a different taxon. According to VÁVRA (personal communication, 2000), the original BRONN material is in fact possibly a sponge. These results are however not published and I have no access to the original BRONN collection, so I cannot solve this problem. The specimens determined as *Holoporella damicornis* CANU & BASSLER, by MAŁECKI (1963) exhibit the characteristic features of *Celleporaria globularis* (BRONN) and developed only small colonies. Therefore, also these specimens are regarded to belong to this species.

Occurrence: Haselbach and Reingruberhöhe (sample RH 31).

Distribution in time and space:

Priabonian - Vicentin (REUSS, 1869a), Romania (GHIURCA, 1987), Poland (MAŁECKI, 1963), Italy (BRAGA & BARBIN, 1988), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Tortonian – Italy, France Poland, Romania, Czech Hungary, Austria (VÁVRA, 1977)

Zanclean - Italy (BRAGA & BARBIN, 1988)?

"*Celleporaria conglomerata* GOLDFUSS, 1827" sensu REUSS (1869a) and BRAGA & BARBIN (1988)

pl. 29, fig. 5

? 1864b *Cellepora conglomerata* GOLDFUSS, REUSS p. 646, Pl. 14, Fig. 3-4

v.* 1869a *Cellepora conglomerata* GOLDFUSS, REUSS p. 292

1988 "*Cellepora*" *conglomerata* GOLDFUSS, BRAGA & BARBIN p. 527 cum. syn

Diagnosis: The colony is cylindrical, plurilaminar, free or multilamellar encrusting and very large. The average width of the colony is about 7 - 10 mm, the length is about 50 mm. The zooecia are cumulate oval with a terminal, circular aperture and with a very small pseudosinus. The frontal wall is slightly granular or smooth and has rarely developed marginal areolar pores. The oral avicularia are small, the intrazooecial avicularia are about two times larger. The ovicell was not observed.

Remarks: The colonial shape is very similar to that described by GOLDFUSS. Because he does not mentioned any zooecia, without careful study of the holotype this species cannot be identified. The original REUSS material stored in the Museum of Natural History in Vienna is identical in shape of the zooecia, size of the pseudosinus and presence of the intrazooecial avicularia. The material described by BRAGA & BARBIN (1988) shows the same features. Therefore, I believe that these specimens are conspecific. I have no original material of GOLDFUSS, but I use the GOLDFUSS name to show the similarity between my material and specimens described by REUSS (1869a) and BRAGA & BARBIN (1988).

Although no ovicell has been found, due to the presence of smooth frontal wall perforated by a few marginal pores, the aperture with a shallow pseudosinus this species can be listed under *Celleporaria*.

Occurrence: Reingruberhöhe (samples RH 2 and RH 31).

Distribution in time and space:

Priabonian - Italy (REUSS, 1869a, BRAGA & BARBIN, 1988), Romania (GHIURCA, 1987), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000),

Chattian - Italy (BRAGA & BARBIN, 1988)

Superfamily Celleporoidea JOHNSTON, 1838

Family Celleporidae JOHNSTON, 1838

Genus *Galeopsis* JULLIEN, 1903

The colony is erect or encrusting. The frontal wall is smooth, nonporous except for a few marginal areolar pores. The aperture is large and has developed a sinus and condyles, which are deeply immersed into the peristome. The peristome is characteristically perforated by a large spiramen. Oral spines are usually absent. The pair of avicularia is situated proximally from the aperture, incor-

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porated within the peristome. The ovicell is hyperstomial and partly immersed.

Galeopsis cf. *subquadrangularis* (REUSS, 1869a)
pl. 29, figs. 3, 4

? 1869b *Eschara subquadrangularis* sp.n., REUSS p. 477 Pl. 4, Fig. 7
v. 2001b *Galeopsis* cf. *subquadrangularis* (REUSS), ZÁGORŠEK p. 556, Pl. 19. Fig. 1

Diagnosis: The colony is erect, bilamellar, flat and large. The zooecia are rhomboidal to oval hexagonal. The frontal wall is reduced, smooth. The marginal pores are large, rare. The pair of pores always occurs in the proximal end of the zooecium, some others may be arranged elsewhere around the zooecium. The aperture is large with a shallow sinus and a straight proximal margin. The peristome is short but wide, it occupies almost the whole frontal area. The spiramen is circular, usually with a diameter about one half of the diameter of the aperture. The avicularia are small, circular without a pivot. They are situated very near one to each other and near to the spiramen. Oral spines are not developed. The ovicell is small, immersed, and probably recumbent with a smooth frontal wall.
Remarks: The syntypes have not been found within the REUSS collection stored in the Museum of Natural History in Vienna.
The description and the illustration of *Eschara subquadrangularis* REUSS, 1869a shows all important features as present on the studied material. According to GORDON (pers. com., 1999) the paired avicularia arranged near the spiramen, a nonporous frontal wall and the small immersed ovicell are the specific features of the *Galeopsis*.
Occurrence: Reingruberhöhe (samples RH 10+11 and RH 31).
Distribution in time and space:
Priabonian - Vicentin (REUSS, 1869a), Austria (ZÁGORŠEK, 2001b)

Genus *Lagenipora* HINCKS, 1877

The colony is encrusting and unilamellar. The zooecia are bottle-shape. The frontal wall is typically strongly convex and smooth perforated by a few marginal pores. The aperture has a shallow sinus. The peristome is well developed, often with a spinous projection usually carrying oral avicularia. Adventitious avicularia are unknown. The ovicell is globular, hyperstomial and opens into the peristome.

Lagenipora ampullacea (ROEMER, 1863)
pl. 31, figs. 1, 2

1863 *Reptescharella ampullacea* sp.n., ROEMER p. 212, Pl. 36, Fig. 5

Diagnosis: The zooecia are elongated and large. The frontal wall is smooth. The marginal pores are prominent in the proximal part of the zooecium; more distally they are indistinct. The aperture is circular, with a weekly defined shallow sinus. The peristome is well developed, smooth and without oral spines. The avicularium is median, large and usually tapering proximally. The hyperstomial ovicell is globular, partly immersed and has a nonporous frontal wall.
Remarks: The specimens described by ROEMER (1863) have no ovicells, but in respect to other features (bottle-shape zooecia, median avicularia, convex frontal nonporous wall), they are identical with the studied material. Due to the presence of a nonporous frontal wall bordered by marginal pores, a well-developed peristome with avicularium and ovicell, which is open in the peristome the described species belongs to *Lagenipora*.
Occurrence: Haselbach and Reingruberhöhe only SEIFERT's samples.
Distribution in time and space:
Chattian - Germany (ROEMER, 1863)

Lagenipora cf. *tuba* (MANZONI, 1875)
pl. 31, fig. 4

1988 *Lagenipora tuba* (MANZONI), MOISSETTE p. 182, Pl. 28, Fig. 6, 9

Diagnosis: The zooecia are elongated and have an immersed proximal part. The frontal wall is flat and nonporous. The marginal pores are indistinct and small. The aperture is rectangular to oval. The peristome is well developed and has spinous projections. The avicularia are in pairs, small. The ovicell is globular and has a nonporous frontal wall.
Remarks: No ovicells have been preserved in the Reingruberhöhe specimens. Due to spinous projections on the peristome, the small avicularia and the rectangular apertures the material belongs to *Lagenipora tuba* (MANZONI, 1875) as described by MOISSETTE (1988).
Occurrence: Reingruberhöhe only SEIFERT's samples.
Distribution in time and space:
Messinian - Algeria (MOISSETTE, 1988)

Lagenipora urceolaris GOLDFUSS
pl. 31, fig. 3

1862 *Cellepora urceolaris* GOLDFUSS p. 25, Pl. 9, Fig. 2
1864b *Lepralia urceolaris* GOLDFUSS, REUSS p. 634, Pl. 12, Fig. 8

Diagnosis: The zooecia are characteristically bottle-shape and large. The frontal wall is strongly convex and smooth. The marginal pores are small, rare and indistinct. The aperture is circular. The peristome is well developed, smooth and without oral spines. The avicularia are small,

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paired and usually circular. The hyperstomial ovicell is small, globular, slightly immersed and has a nonporous frontal wall. The circular oeciopore is situated close to the peristome, near the zooecial aperture.
Remarks: The original descriptions as well as the illustration by GOLDFUSS and also the description by REUSS are identical with presented specimens, except for the size of the ovicells. GOLDFUSS did not describe ovicells, however REUSS figured very small, semilunar ovicells in his specimens. Reingruberhöhe specimens have larger and more globular ovicells. Unfortunately the original material of REUSS has not been found in the Museum of Natural History in Vienna and therefore it is hard to discuss whether these two specimens are conspecific or not. Due to the presence of bottle-shape zooecia with weekly visible marginal pores, a well developed peristome with small avicularia and ovicell opening into the peristome this species is listed under the *Lagenipora*.
Occurrence: Reingruberhöhe only SEIFERT's samples.
Distribution in time and space:
Priabonian - Germany (REUSS, 1864a)

Family Phidoloporidae GABB & HORN, 1862

Genus *Iodictyum* HARMER, 1933

The colony is unilamellar, often branching and forming nets. The frontal wall is centrally nonporous, rare marginal pores may occur. The aperture has well defined denticles inside the peristome. The avicularia are frontal vicarious, or missing. Oral spines are unknown. The ovicell is recumbent and has usually a closing lamella with a median keel.

Iodictyum rubeschii (REUSS, 1848)
pl. 30, fig. 5

v.* 1848 *Retepora Rubeschii* sp.n., REUSS p. 48, Pl. 6, Fig. 35-37
1974 *Iodictyum rubeschii* (REUSS), DAVID & POUYET p. 199
1977 *Iodictyum rubeschii* (REUSS), VÁVRA p. 146
v. 1989 *Iodictyum rubeschii* (REUSS), SCHMID p. 54, Pl. 16, Fig. 1-5
v. 2001a *Iodictyum rubeschii* (REUSS), ZÁGORŠEK p. 70, Pl. 33, Fig. 4

Diagnosis: The zooecia are oval, arranged in 3 to 4 longitudinal rows. The aperture is very large, semilunar, with a straight proximal margin and with a short peristome. The frontal wall is smooth, flat, sometimes little convex. Centrally, the frontal wall is perforated by a small and drop-like sinus.
The ovicell is small, slightly prominent and has a smooth frontal wall. The avicularia are small, rare and arranged on the frontal wall. The dorsal side of the colony is smooth.
Occurrence: Reingruberhöhe (sample RH 10+11).
Distribution in time and space:
Priabonian - Hungary (ZÁGORŠEK, 2001a),
Tortonian - Austria & Hungary (REUSS, 1848, DAVID & POUYET, 1974), Austria (VÁVRA, 1977)

Genus *Reteporella* BUSK, 1884

The colony is erect, unilamellar, dichotomously branching or reticulates. The zooecia are arranged in alternating longitudinal rows and have apertures only on one side. The frontal wall is nonporous and has rare marginal pores. A peristome is developed, characteristically perforated by the spiramen. Oral spines may be present. Adventitious avicularia are usually situated on the frontal wall. The ovicell is hyperstomial. The dorsal surface of the colony is often smooth.
Remark: *Reteporella* is a senior synonym of *Sertella* JULLIEN, 1903 (GORDON, 1989). *Retepora* is a preoccupied name for Cyclostomatous Bryozoa. Therefore, all the Cheilostomatida species of *Retepora* and *Sertella* are listed here under *Reteporella*

Reteporella tuberculata (REUSS, 1869a)
pl. 29, fig. 6

v.* 1869a *Retepora tuberculata* sp.n., REUSS p. 267, pl. 31,fig. 9, 10
1963 *Retepora tubercolata* (REUSS), BRAGA p. 36, Pl. 4, Fig. 5
v. 1963 *Sertella cellulosa* (LINNAEUS), MAŁECKI p. 126, Pl. 14, Fig. 8
v. 1988 *Sertella tuberculata* (REUSS), BRAGA & BARBIN p. 526, Pl. 9, Fig. 6
v. 2001b *Reteporella tuberculata* (REUSS), ZÁGORŠEK p. 557, Pl. 20. Fig. 1

Diagnosis: The colony is reticulating, forming nets. The branches are biserial or rarely triserial. The shape of the zooecia is indiscernible. They have a smooth frontal wall and rare, small marginal areolar pores. The aperture is circular to oval and has small condyles. The spiramen is large, remarkable. The avicularium is small, very rare. A peristome is not developed. The ovicell is globular, small, probably hyperstomial and has a frontal fissure. The dorsal surface of the colony is smooth, convex and has no avicularia.
Remark: Although no avicularia have been found among the studied material, due to the presence of other features this material belongs to this species. According to a recently made study of the originals of the MAŁECKI (1963), *Sertella cellulosa* (LINNAEUS) as he described it, belongs to *Reteporella tuberculata* (REUSS, 1869a).
Occurrence: Haselbach and Reingruberhöhe (sample RH 31 and SEIFERT's samples).
Distribution in time and space:

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Priabonian Vicentin (REUSS, 1869a), Poland (MAŁECKI, 1963), Romania (GHIURCA, 1987), Italy (BRAGA & BARBIN, 1988), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Reteporella simplex (BUSK, 1859)

pl. 30, fig. 3, 4

1859 *Retepora simplex* sp.n., BUSK p. 76, Pl. 12, Fig. 3
1884 *Retepora simplex* sp.n., BUSK p. 118, Fig. 28, Pl. 28. Fig. 4
v. 1869a *Retepora simplex* (BUSK), REUSS p. 266, Pl. 31, Fig. 7
1963 *Retepora simplex* (BUSK), BRAGA p. 36
? 1963 *Retepora simplex* BUSK, MAŁECKI p. 126, Pl. 13, Fig. 2
v. 1988 *Sertella simplex* (BUSK, 1859), BRAGA & BARBIN p. 526
v. 2001a *Reteporella simplex* (BUSK), ZÁGORŠEK p. 71, Pl. 34, Fig. 1

Diagnosis: The colony is erect, dichotomous and does not form nets. The elongated zooecia have a slightly convex frontal wall and are arranged in 3-4 longitudinal rows. The marginal areolar pores are very small and rare. The spiramen is small, drop-like and situated on the middle of the frontal wall. The aperture is very large, oval and with small condyles. Oral spines are developed, usually only one pair of them is situated distally from the aperture. The avicularium is large, frontal and has a pivot. The ovicell is hyperstomial, slightly prominent. The dorsal surface of the colony is smooth, nonporous.
Remarks: I have already mentioned (ZÁGORŠEK, 2001a) that BUSK (1859 and 1884) described two new species under the same name, they differ however in the presence of avicularia (the first one is without avicularia, the second one a has large frontal avicularium).
The Reingruberhöhe material shows same features of BUSK's second description, which are identical with Hungarian as well as REUSS's material. These species are perhaps conspecific and the presence or absence of frontal avicularia could be probably caused by preservation or ecological needs. The specimens described by MAŁECKI (1963) have mostly two oral avicularia, the shape of the zooecia is much longer and the apertures are much smaller than in *Retepora simplex* (BUSK, 1859). Therefore, it is not certain if these specimens also belong to this species.
Occurrence: Reingruberhöhe (samples RH 10+11 and RH 31).
Distribution in time and space:
Priabonian - Vicentin (REUSS, 1869a), Poland (MAŁECKI, 1963), Italy (BRAGA & BARBIN, 1988), Romania (GHIURCA, 1987), Hungary (ZÁGORŠEK, 2001a), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Austria (ZÁGORŠEK, 2001b)
Piacenzian - Italy (BRAGA & BARBIN, 1988), United Kingdom (MAŁECKI, 1963)

Reteporella subovata (STOLICZKA, 1862)

pl. 31, fig. 5

v.* 1862 *Eschara subovata* sp.n., STOLICZKA p. 87, Pl. 2, Fig. 9
v. 2001b *Reteporella subovata* (STOLICZKA), ZÁGORŠEK p. 558, Pl. 20, Fig. 2

Diagnosis: The colony is erect and not reticulate. The zooecia are circular to oval and arranged in 2 to 5 longitudinal rows. The aperture is circular, large and has condyles. The frontal wall is reduced, very short, smooth and convex. The marginal areolar pores are small and rare. The spiramen is small. The avicularium is small, circular without pivot and situated proximally from the aperture. The ovicell is hyperstomial or slightly recumbent, deeply immersed with a smooth frontal wall. The dorsal surface of the colony is smooth. Occasionally, small avicularia may be developed on the dorsal wall of the colony.
Remarks: Due to the presence of a unilamellar colony, a spiramen on the frontal wall and frontal avicularia this species is listed under *Reteporella*. The syntypes deposited in the Museum of Natural History in Vienna are almost identical with the described specimens. Some of the syntypes probably belong to a new species, because they have a porous frontal wall and much larger colonies. The ovicell has been found only among the Reingruberhöhe specimens. It is globular, deeply immersed, probably recumbent, but do not have preserved the frontal wall.
Occurrence: Haselbach and Reingruberhöhe (sample RH 31 and SEIFERT's samples).
Distribution in time and space:
Priabonian Germany (STOLICZKA, 1892), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)

Genus *Sparsiporina* D'ORBIGNY, 1852

The colony is erect, unilamellar and dichotomously branching. The branches are biserial to quadriserial. The frontal wall is nonporous except for the ascopore; the marginal pores are not developed. An oral spine is often present. The hyperstomial ovicell is immersed and has a porous frontal wall. The dorsal side of the colony is porous by visible lateral zooecial walls developed characteristical zigzag pattern.

Sparsiporina elegans (REUSS, 1848)

1848 *Retepora elegans* sp.n., REUSS p. 48, Pl. 6, Fig. 38
1891 *Retepora elegans* REUSS, WATERS p. 30, Pl. 4, Fig. 9, 10
1963 *Sparsiporina elegans* (REUSS), BRAGA p. 37
1975 *Sparsiporina elegans* (REUSS), BRAGA p. 147, Pl. 2, Fig. 7
1977 *Sparsiporina elegans* (REUSS, 1848), VÁVRA p. 146
1980 *Sparsiporina elegans* (REUSS), BRAGA p. 57, Fig. 42
v. 1988 *Sparsiporina elegans* (REUSS), BRAGA & BARBIN p. 526, Pl. 9, Fig. 8

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v. 2001b *Sparsiporina elegans* (REUSS), ZÁGORŠEK p. 558

Diagnosis: The colony has biserial branches, before the bifurcation the branches are triserial. The shape of the zooecia is indiscernible, longitudinal. The frontal wall is smooth and slightly porous by very small scattered pores. The apertures are circular to oval and have a large peristome. The oral spines are arranged distally from the aperture, there are about 3 - 6 spines around each aperture. The ascopore is circular and situated near to the proximal margin of the aperture. The ovicell is small and has a smooth slightly porous frontal wall. The dorsal side of the colony is fibrous, with visible elevated lateral zooecial walls forming typical zigzag pattern.
Remarks: The specimens from Waschberg zone exhibit all specific features of this species except for the ovicells, which are a little more immersed than described by BRAGA & BARBIN (1988), the frontal wall is not preserved. The illustration of REUSS (1848) however also shows more immersed ovicells, so probably it is only within species variation.
Occurrence: Haselbach and Reingruberhöhe (samples RH 10+11, RH 12, RH 31 and SEIFERT's samples).
Distribution in time and space:
Priabonian - Italy (WATERS, 1891, BRAGA & BARBIN, 1988), Hungary (ZÁGORŠEK, 2001a), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Austria (ZÁGORŠEK, 2001b)
Rupelian - Italy (BRAGA & BARBIN, 1988)

Genus *Schizotheca* HINCKS, 1877

The colony is encrusting. The frontal wall is convex and smooth imperforate except for a few marginal areolar pores. Condyles are well developed. The avicularia are vicarious. The ovicell has a nonporous frontal wall.

Schizotheca (?) *ternata* (REUSS, 1848)
pl. 30, fig. 7

1848 *Cellepora ternata* m, REUSS p. 91, Pl. 11, Fig. 5
v. 1874 *Lepralia ternata* (REUSS), REUSS p. 167, Pl. 3, Fig. 11, Pl. 7, Fig. 5
1974 *Gemelliporella ternata* (REUSS), DAVID & POUYET p. 178, Pl. 15, Fig. 7

Diagnosis: The zooecia are irregular in shape, mostly oval to rectangular. The marginal areolar pores are very rare, there are about 3-5 pores around each zooecium. The frontal wall is distally arising above the aperture and forming a characteristically developed rim carrying a small sinus and large condyles. The oral spines are well developed, usually 4 of them are situated on the distal margin of the aperture. The avicularia are suboral, small, without pivotal bar and situated on the margin of the rim. The ovicell is unknown.
Remarks: DAVID & POUYET (1974) listed this species among the genus *Gemelliporella* CANU & BASSLER, 1920. *Gemelliporella* should have a wide sinus and a proximal margin of the apertures without characteristic rim. On the other hand, *Schizotheca* should have vicarious avicularia (HAYWARD & RYLAND, 1979), but the present species has certainly suboral to oral avicularia. I have only a few specimens in my hand, so the exact genus attribution remains uncertain.
Occurrence: Reingruberhöhe (sample RH 31).
Distribution in time and space:
Tortonian - Austria & Hungary (REUSS, 1848, DAVID & POUYET, 1974)

Schizotheca (?) sp.
pl. 30, fig. 8

Diagnosis: The zooecia are irregular in shape, mostly oval to rectangular. The marginal areolar pores are big, about 8 - 10 of them situated around each zooecium. The frontal wall arises distally above the aperture and forms a characteristic developed rim carrying a small sinus and large condyles. Oral spines are usually not developed. The avicularia are suboral, small, without pivotal bar and situated on the margin of the rim. The ovicell is deeply immersed, the nature of the frontal wall is not known.
Remarks: The specimens show characteristic features, like big areolar pores, a rising rim carrying a small sinus, large condyles and small suboral avicularia, a combination that is not present in any known genus. The preservation and presence of only 3 specimens, however, does not allow us to state if it is a new genus or not. Most similar is *Schizotheca* that differs mainly in having vicarious avicularia instead of suboral (as exhibits the studied material) only. This difference is perhaps not sufficient to establish a new genus.
Occurrence: Reingruberhöhe (sample RH 31).

Superfamily Biporidae GREGORY, 1893
Family Batoporoidea NEVIANI, 1900

Genus *Batopora* REUSS, 1867

The colony is spherical to sub-conical and free, with zooecia arranged in more than one layer. The zooecia have terminal apertures and nonporous frontal walls. The aperture has a sinus pointed towards the periphery of the colony (to the older part). Terminal kenozooecia and avicularia are usually developed. The ovicell is hyperstomial and has a nonporous frontal wall.

Batopora multiradiata REUSS, 1869a
pl. 31, fig. 7

v.* 1869a *Batopora multiradiata* sp.n., REUSS p. 265, Pl. 31, Fig. 1-4
1976 *Batopora multiradiata* REUSS, 1869a, COOK & LAGAAIJ p. 350, Pl. 4, Fig. 4 - 6

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1980 *Batopora multiradiata* (REUSS), BRAGA p. 65, Fig. 61
v. 1988 *Batopora multiradiata* (REUSS), BRAGA & BARBIN p. 530, Pl. 12, Fig. 1, 2
? 1988 *Batopora multiradiata* (REUSS), BRAGA & BARBIN p. 530, Pl. 11, Fig. 4
v. 1992 *Batopora* cf. *multiradiata* (REUSS), ZÁGORŠEK p. 378, Fig. 7c, e
v. 2001a *Batopora multiradiata* REUSS, ZÁGORŠEK p. 73, Pl. 35, Fig. 2, 4, 6

Diagnosis: The colony is semi-globular to conical and composed of about 80 - 100 zooecia. The colonial base is flat, formed by dorsal walls of the youngest zooecia. It is slightly porous and is perforated by large circular pores and kenozooecia in the middle. The zooecia are arranged in 3 to 5 layers, tube-like.
The aperture is rhomboidal and terminal. A small drop-like kenozooecium is present around the apex, at the top of the conical colony. The intrazooecial avicularia are small, drop-like, with a pivot and with a palate tapering distally. The ovicell is unknown.
Remarks: The syntypes deposited in the Museum of Natural History in Vienna have a slightly larger diameter than the Reingruberhöhe specimens, but the shape of the colony and the features present on the zooecia are identical.
Occurrence: Haselbach and Reingruberhöhe (samples RH 12 and RH 31).
Distribution in time and space:
Priabonian - Vicentin (REUSS, 1869a), Romania (GHIURCA, 1987), Italy (BRAGA & BARBIN, 1988), Poland (MAŁECKI, 1963), Slovakia (ZÁGORŠEK, 1992), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Rupelian - Italy (BRAGA & BARBIN, 1988)

Batopora haselbachensis sp.n.

pl. 32, fig. 1–6

Diagnosis: The colony is free, discoidal to conical with a concave base. The zooecia are arranged only in one layer, tube-like and have a circular, terminal aperture. The small drop-like kenozooecium is situated around the apex. Intrazooecial avicularia are not observed. The colonial base is always concave, formed by dorsal walls of the zooecia, nonporous, only rare by some pores may occur between the zooecia. A central kenozooecium may be developed. The ovicell was not observed.
Holotype: The specimen (1329) depicted in pl. 32, fig. 2, from the locality Haselbach, deposited in the Institute of Paleontology of University Vienna, Austria.
Paratypes: 15 specimens from the locality Haselbach, deposited in the Institute of Paleontology of University Vienna, Austria.
Derivatio nominis: Due to its occurrence at Haselbach.
Locus typicus: Haselbach - Waschberg zone
Stratum typicum: Eocene - Priabonian.
Dimensions:
(in micro meters = μm; x = average, details in fig. 16):
diameter of the colony: 1265 x 1273 - 1382 x 1594; x = 1360 x 1417
height of the colony: 808
length of zooecia: x = 207
width of zooecia: x = 95
length of zooecial aperture: x = 86
width of zooecial aperture: x = 88
area of zooecial aperture: x = 6008
length of apical zooecia: x = 89
width of apical zooecia: x = 94
length of apical kenozooecia: x = 31
width of apical kenozooecia: x = 35
area of apical zooecia: x = 7200
length of avicularium: 45
width of avicularium: 51
distance between margin of the colony and uppermost edge of the dorsal side, measured in transverse section: 307
width of peristome: 121 147; x = 130
Description: The colony is free, discoidal to conical and composed of about 20-40 zooecia arranged only in one layer and budding from reverse side to the frontal side. The zooecia are tube-like, with a circular, terminal aperture and are surrounded by scattered marginal pores. A peristome is developed on the marginal zooecia. The aperture has a

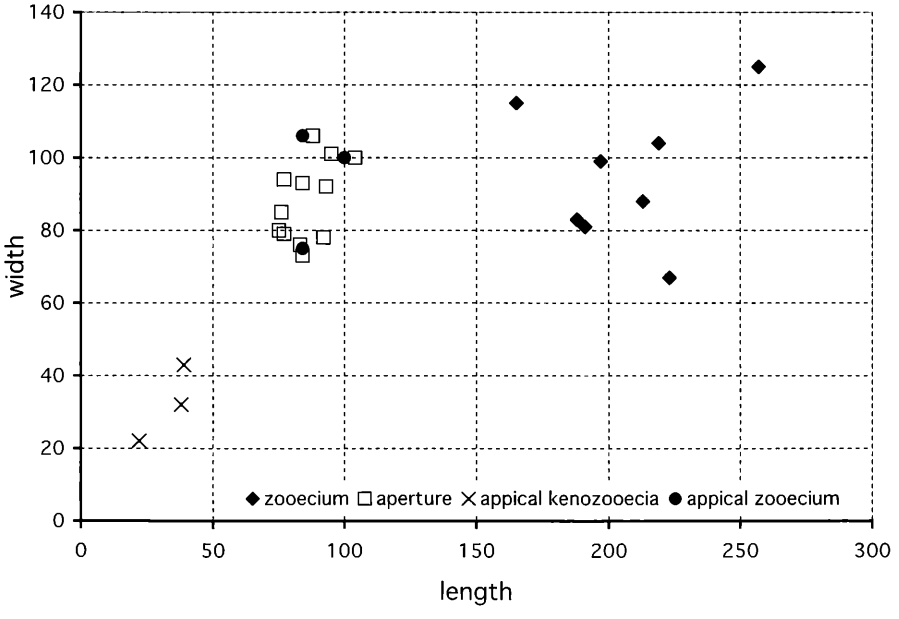

Figure 16: Chart of important measurements of *Batopora haselbachensis* sp.n. (values in μm).

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shallow sinus pointed towards the periphery of the colony. The apex of the colony is formed by circular zooecia surrounded sometimes by small drop-like kenozooecia. The base (the periphery late astogenetic region) is always concave, nonporous with dorsal walls of the zooecia being visible. The central part of the base is perforated by a large pore. Neither intrazooecial avicularia nor ovicell have been observed.

Comparison: *Batopora multiradiata* Reuss, 1869a is the most similar species to *Batopora haselbachensis* sp.n. It differs mainly in having 70-90 zooecia arranged in many layers and in having enlarged central kenozooecia. Very similar is also *Batopora rosula*, Reuss 1848, which however typically occurs only in Miocene sediments. *Batopora rosula*, Reuss 1848 has also zooecia in many layers and its base is strongly porous and/or granular. According to Braga (pers. com., 1999), *Batopora haselbachensis* sp.n. may be perhaps considered as an ancestor of *Batopora rosula*, Reuss 1848. *Stenosipora reussi* (Stoliczka, 1862) is also similar to *Batopora haselbachensis* sp.n. in having zooecia only in one layer and having a concave dorsal side. The zooecia of *Stenosipora reussi* (Stoliczka, 1862), however show relations to a different genus.

Remark: Because the aperture has a sinus, which is pointed towards the periphery of the colony and the colony has a conical shape, the described species is listed under *Batopora*.

Occurrence: Haselbach.

Genus *Lacrimula* Cook, 1966

The colony is free and conical, multilamellar. The apical region has prominent kenozooecial tubes. The circular apertures have a well-developed pair of condyles and a sinus. Vicarious avicularia may be present. The hyperstomial ovicell is prominent.

Lacrimula perfecta (Accordi, 1947)

1947 *Conescharellina perfecta* sp.n., Accordi p. 105, Pl. 1, Fig. 1-7

1947 *Conescharellina veronensis* sp.n., Accordi p. 108, Pl. 1, Fig. 8-10

1963 *Conescharellina perfecta* Accordi, Braga p. 44

1963 *Conescharellina veronensis* Accordi, Braga p. 44, Pl. 4, Fig. 10-12

1972 *Conescharellina perfecta* Accordi, Braga & Munari p. 123, Fig. 2

1972 *Conescharellina veronensis* Accordi, Braga & Munari p. 123, Fig. 2

1975 *Conescharellina perfecta* Accordi, Braga p. 147, Pl. 3, Fig. 12-14

1976 *Lacrimula perfecta* (Accordi), Cook & Lagaaij p. 358, Fig. 7A, Pl. 4, Fig. 3, Pl. 7, Fig. 1

1980 *Lacrimula perfecta* (Accordi), Braga p. 65, Fig. 74-77

v. 1988 *Lacrimula perfecta* (Accordi), Braga & Barbin p. 529, Pl. 12, Fig. 4, 5

v. 2001a *Lacrimula perfecta* (Accordi), Zágoršek p. 73, Pl. 35, Fig. 1, 3

Diagnosis: The colony is rooted, or free-living, of conical shape and has a flat base. The zooecia are tube-like with a terminal aperture. There is a maximum of 9 zooecial rows arranged radially from the apex to the base of the colony. The apical kenozooecial tube is very large, with numerous pores and a small apical pore. The zooecia have terminal and large apertures bearing a pair of small condyles. The avicularia are drop like and have a pivotal bar. The ovicell is rare, large and globular.

Remarks: The ovicell is not observed in the Reingruberhöhe specimens, however the other features (mainly the general shape of the colony and the avicularia with pivot) allow us to list them in the described species.

Occurrence: Haselbach and Reingruberhöhe (sample RH 9).

Distribution in time and space:

Priabonian Italy (Braga & Barbin, 1988), Slovakia (Zágoršek, 1992), Hungary (Zágoršek, 2001a)

Genus *Orbitulipora* Stoliczka, 1862

The colony is flat, characteristically bilamellar or discoidal, free. The frontal wall is nonporous or slightly perforated by small pores. The aperture is terminal, large and has a straight lower margin. The ovicell is recumbent. Avicularia are unknown.

Orbitulipora petiolus Lonsdale, 1850

pl. 31, fig. 6

v. 1862 *Orbitulipora Haidingeri* sp.n., Stoliczka p. 91,Pl. 3, Fig. 5

1867 *Orbitulipora petiolus* Lonsdale, Reuss p. 217, Pl. 1, Fig. 1, 2

1953 *Orbitulipora petiolus* Lonsdale, Bassler p. G230, Fig. 172/1

v. 1963 *Orbitulipora petiolus* Lonsdale, Małecki p. 137, Fig. 61, Pl. 25, Fig. 5

1966 *Orbitulipora petiolus* Lonsdale, Cheetham p. 105, Fig. 80

v. 1988 *Orbitulipora petiolus* Lonsdale, Braga & Barbin p. 530

Diagnosis: The colony is orbicular, bilamellar and discoidal with peduncle. The zooecia grow in regular concentric rows. The largest zooecia are arranged at the margin of the colony, the smaller in its centre. There are two layers of zooecia, connected by its dorsal parts. This connection line is calcified and forms a median lamella. The zooecia are circular. The frontal wall is nonporous and smooth. The aperture is large mostly oval and has a straight lower edge.

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Taxa from Waschberg zone	Molasse zone	Buda marl	Southern Alps	Western Carpathians	Outer Carpathians	Transylvanian basin
Adeonella minor (REUSS)	#	#	#	#	#	#
Adeonella ornatissima (STOLICZKA)	#				#	
Adeonellopsis coscinophora (REUSS)		#	#	#	#	
Adeonellopsis giampietroi ZÁGORŠEK		#				
Adeonellopsis porina (ROEMER)	#	#	#	#	#	#
Adeonellopsis sp.						
***Adeonellopsis triporica* sp.n.**	#					
Aimulosia manzonii (NEVIANI)						#
Alderina subtilimargo (REUSS)	#	#	#	#	#	#
Amphiblestrum appendiculata (REUSS)	#	#	#	#	#	#
Arthropoma rugulosa (REUSS)	#				#	
Arthropoma sparsipora (REUSS)		#	#	#	#	
Aviculiera hungarii ZÁGORŠEK		#				
***Aviculiera austriensis* sp. n.**	#					
Aviculiera sp.						
***Babickella janensis* gen. nov. sp. n.**						
Bactridium hagenowi REUSS	#	#	#	#		#
***Batopora haselbachensis* sp.n.**						
Batopora multiradiata REUSS	#	#	#	#	#	#
Biflustra savartii texturata (REUSS)	#	#	#		#	#
Bobiesipora fasciculata (REUSS)	#	#				
Caberoides continua (WATERS)				#		
Calpensia gracilis (MUNSTER)		#	#		#	
Calpensia polysticha (REUSS)	#	#	#	#	#	#
Castanopora megacephala (REUSS)					#	
Cellaria reussi d'ORBIGNY	#	#	#	#		#
Celleporaria conglomerata (GOLDFUSS)			#	#		#
Celleporaria globularis (BRONN)	#	#	#		#	#
***Chlidoniopsis vavrai* sp. n.**						
Chlidoniopsis vindobonensis (REUSS)		#	#	#	#	
***Costatimorpha algella* gen. nov. sp. n.**						
Crassimarginatella macrostoma (REUSS)	#	#	#	#	#	#
Crisia eburnea (LINNAEUS)	#	#				#
Crisia elongata MILNE EDWARDS	#	#	#	#	#	
Crisia hoernesii REUSS	#	#	#	#		#
Crisidmonea tripora (CANU & BASSLER)						
Cyclicopora laticella CANU & BASSLER		#		#	#	
Cystisella midwayanica CANU & BASSLER						
Diaperoecia sparsa (REUSS)					#	#
Diastopora flabellum REUSS	#				#	
Diplosolen brendolensis (WATERS)	#					
Disporella coronula (REUSS)	#	#	#	#		#
Disporella goldfussi (REUSS)					#	
Disporella grignonensis MILNE EDWARDS	#	#	#	#	#	#
Disporella radiata (SAVIGNY-AUDOUIN)	#	#		#	#	#
Disporella verrucosa PHILIPPI					#	
Ditaxiporina septentrionalis (WATERS)	#	#	#			
Escharella cheilopora (REUSS)						
Escharella grotriani (STOLICZKA)	#	#		#	#	
Escharella tenera (REUSS)	#	#		#	#	
Escharoides coccinea (ABILDGAARD)	#	#	#	#	#	#
Escharoides crenilabris (REUSS)		#		#		
Escharoides mamillata (WOOD)						
Exidmonea atlantica D, M & P	#	#	#	#	#	#
Exidmonea giebeli (STOLICZKA)	#	#	#	#	#	#
Exidmonea hoernesi (STOLICZKA)	#	#	#	#	#	#
Exochoecia compressa (REUSS)	#	#	#	#	#	#
Filisparsa tenella STOLICZKA	#				#	#
Foveolaria vibracula ZÁGORŠEK		#				#
Galeopsis cf. *subquadrangularis* (REUSS)	#					
Gephyrotes convexa CANU & BASSLER		#				

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Taxa from Waschberg-Zone	MZ	BM	S-Alps	W-Carp.	O-Carp.	Transs.-Basin
Gigantopora duplicata (REUSS)	#	#	#	#		#
Gigantopora lyratostoma (REUSS)	#	#	#	#		#
Gordoniella diporica ZÁGORŠEK	#	#				
***Gordoniella longituda* sp. n.**						
Hemicyclicopora parajuncta CANU & BASSLER						
Herentia hydmanii (JOHNSTON)	#	#				
Heteropora subreticulata REUSS	#	#	#	#	#	#
Hippomenella bragai ZÁGORŠEK	#			#		
Hippomenella megalota REUSS						
Hippomonavella bisulca	#					
Hippomonavella exarata (REUSS)	#	#	#	#		
Hippomonavella stenosticha (REUSS)		#	#	#		
Hornera concatenata REUSS	#		#	#	#	#
Hornera frondiculata MONGERAU	#	#	#	#	#	#
Hornera simplicissima BRAGA & BARBIN	#		#		#	
Hornera verrucosa REUSS	#				#	#
Houzeauina parallela (REUSS)		#	#			
***Idmidronea uniporica* sp.n.**						
Iodictyum rubetschii (REUSS)		#				
Kionidella excelsa KOSCHINSKY	#	#	#	#	#	#
Lacrimula perfecta (ACCORDI)		#	#			
Lagenicella helmbergii ZÁGORŠEK	#					
Lagenipora ampullacea (ROEMER)						
Lagenipora tuba (MANZONI)						
Lagenipora urceolaris GOLDFUSS						
Lichenopora turbinata DEFRANCE					#	
Lunulites quadrata (REUSS)		#	#	#	#	#
Margaretta ceroides (ELLIS-SOLANDER)	#	#	#	#	#	#
Mecynoecia geinitzi REUSS	#				#	#
Mecynoecia proboscidea (MILNE EDWARDS)	#	#	#	#	#	#
Mecynoecia pulchella (REUSS)	#		#	#	#	#
Meniscopora syringopora (REUSS)	#	#	#	#	#	
Metradolium obliquum CANU & BASSLER	#					
Metrarabdotos maleckii CHEETHAM	#	#		#	#	#
Micropora ? sp.						
Micropora hexagona (ZÁGORŠEK)	#	#		#		
Mollia patellaria (MOLL)					#	
Nematifera susannae ZÁGORŠEK	#	#		#		
Ogivalina dimorpha (CANU)	#	#				
Oncousoecia biloba (REUSS)	#	#	#		#	#
Onychocella subpyriformis (d'ARCHIAC)	#	#	#	#	#	#
Orbitulipora petiolus LONSDALE		#	#	#	#	
***Otiochmella discoida* gen. nov. sp. n.**						
Plagiosmittia denticulifera CANU & BASSLER						
Polyascosoecia cancellata CANU	#	#	#	#	#	#
Porella clavula (CANU & BASSLER	#	#	#			#
Poricellaria complicata (REUSS)	#	#				
Porina coronata (REUSS)	#	#	#	#	#	#
Porina duplicata (REUSS)		#	#		#	
Prenantia phymatopora (REUSS)	#	#	#	#		#
Puellina (*Cribrilaria*) *radiata* (MOLL)	#	#	#	#	#	#
Pyripora huckei BUGE						
Reteporella simplex (BUSK)	#	#	#	#	#	
Reteporella subovata (STOLICZKA)	#	#	#	#		
Reteporella tuberculata (REUSS)	#	#	#	#	#	#
Reussia (*Smittina*) *regularis* (REUSS)	#	#	#	#	#	
Rosseliana rosselii (AUDOUIN)	#	#	#	#	#	
Schizomavella larva (REUSS)		#	#			#
Schizoporella cf. *geminipora* (REUSS)			#			
Schizoporella dunkeri (REUSS)		#			#	
Schizotheca (?) sp.						
Schizotheca (?) *ternata* (REUSS)						

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Taxa from Waschberg-Zone	MZ	BM	S-Alps	W-Carp.	O-Carp.	Transs.-Basin
Scrupocellaria gracilis REUSS			#		#	#
Smittina cervicornis (PALLAS)	#	#	#	#	#	#
Smittoidea angulata BRONN		#				
Smittoidea excentrica (Reuss)	#	#			#	#
Smittoidea perforata (CANU & BASSLER)						
Smittoidea sp.						
Sparsiporina elegans (REUSS)	#	#	#	#	#	
Steginoporella cucullata (REUSS)	#	#				#
Steginoporella elegans chattiensis P.& D.	#	#			#	#
Steginoporella firma (REUSS)			#	#		
Steginoporella haidingeri (REUSS)	#	#	#	#	#	
***Steginoporella reingruberhohensis* sp. n.**	#					
Stenosipora simplex (KOSCHINSKY)	#	#		#	#	
***Tayloripora ovicellata* sp. n.**						
Teichopora cf. *clavata* GREGORY						
Tervia serrata (REUSS)	#	#	#	#	#	#
Trochiliopora beyrichii (REUSS)	#	#	#	#	#	#
***Trochiliopora planiformis* sp. n.**						
Tubucella mammillaris (MILNE EDWARDS)	#	#		#		
Tubucella papillosa (REUSS)	#	#	#	#	#	#
Tychinella schreibersi (REUSS)	#	#	#	#		#
Umbonula macrocheila (REUSS)						#
Umbonulla monoceros (REUSS)		#				
Unifissurinella boulangeri POIGNANT	#					
Vavropora pupuliformis ZÁGORŠEK	#	#				
Vibracella trapezoidea (REUSS)		#	#	#	#	#
Vincularia subsymmetrica (CANU)			#			#
Ybselosoecia typica (MANZONI)			#		#	#
Zuzanella kovaci ZÁGORŠEK	#					
Total number of taxa 153	87	90	71	68	72	62
Number of species not occurring in WZ	34	43	32	30	40	29
Total number of species in each locality	121	133	103	98	112	91
Similarity coeficient	46,5	45,9	38,4	37,2	37,3	34,1

Table 2: Comparison between Waschberg Zone (WZ) and other areas in Alpine Carpathians region.

The ovicell is recumbent, usually developed on the margin of the colony and has a nonporous frontal wall.

Remarks: CHEETHAM (1966) pointed out, that *Orbitulipora petiolus* LONSDALE, 1850 has deeply immersed hyperstomial ovicells, however in the studied material ovicells seem more likely to be recumbent.

To solve the problem a thin section is needed, which due to the mode of preservation is not possible with Reingruberhöhe material.

Occurrence: Reingruberhöhe (samples RH 9 and RH 31).

Distribution in time and space:

Bartonian - Belgium (CHEETHAM, 1966)

Priabonian Germany (STOLICZKA, 1892), Italy (BRAGA & BARBIN, 1988), Poland (MAŁECKI, 1963), United Kingdom (CHEETHAM, 1966), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a)

Rupelian - Germany (REUSS, 1867), Italy (BRAGA & BARBIN, 1988), Belgium (BASSLER, 1953)

Tortonian - (BASSLER, 1953)

Genus *Bactridium* REUSS, 1848

The colony is erect, very narrow with two alternating rows of zooecia. The aperture is keyhole shaped, without oral spines, but it has developed condyles. The frontal wall is strongly porous. The avicularium is small and situated on the frontal wall. The ovicell is unknown.

Remarks: CANU & BASSLER (1917) established a new genus *Hippozeugosella* with the type species *Bactridium hagenowi* REUSS, 1848. They argued that *Hippozeugosella* has hyperstomial ovicells. Later BASSLER (1953) put *Hippozeugosella* within the synonymy of *Bactridium*, but did not mention ovicells. I believe that *Bactridium hagenowi* REUSS, 1848 has no ovicells. GORDON (pers. com., 1999) argued that, according to the specific growth pattern of the *Bactridium* colony, the family to which it could belong was uncertain.

***Bactridium hagenowi* REUSS, 1848**

pl. 30, fig. 6

Family Incertae sedis

v.* 1848 *Bactridium hagenowi* sp.n., REUSS p. 57, Pl. 5, Fig. 28

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v. 1869a *Bactridium hagenowi* REUSS, REUSS p. 266, Pl. 31, Fig. 5-6
1891 *Bactridium hagenowi* REUSS, WATERS p. 7, Pl. 1, Fig. 18-19
v. 1988 *Bactridium hagenowi* REUSS, BRAGA & BARBIN p. 524, Pl. 8, Fig. 3
v. 2001a *Bactridium hagenowi* REUSS, ZÁGORŠEK p. 74, Pl. 31, Fig. 4-6

Diagnosis: The colony is bifoliate, with two rows of zooecia facing laterally. The zooecia are elongated, joint by dorsal walls and therefore yield a zigzag pattern on the lateral wall. The frontal wall is concave and perforated by many large pores.
The aperture is circular and has developed spines on the wide but short peristome. The avicularium is very small and rare, situated approximately in the middle of the frontal wall and has a pivot bar. The dorsal surface of the colony has visible lateral walls of the zooecia and marginal areolar pores. The marginal areolar pores are developed only in the middle part of the colony, the marginal part is smooth and nonporous.
Remarks: The described specimens are identical with the syntypes deposited in the Museum of Natural History in Vienna.
The holotype has small avicularia in the frontal wall, but some of the syntypes exhibit no avicularia at all. However, the material described by WATERS (1891) contains large avicularia on the frontal wall. The absence or presence of avicularia could be probably caused by different ecological conditions, and therefore by only a within species variability.
Occurrence: Reingruberhöhe (sample RH 1).
Distribution in time and space:
Priabonian Vicentin (REUSS, 1869a), Romania (GHIURCA, 1987), Italy (BRAGA & BARBIN, 1988), Slovakia (ZÁGORŠEK & KÁZMÉR, 2000), Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Rupelian - Italy (BRAGA & BARBIN, 1988)

Genus *Herentia* GRAY, 1848

The colony is encrusting. The frontal wall is centrally nonporous, there are only a few marginal areolar pores. The aperture has a sinus and oral spines. The avicularia are vicarious, oval, single and situated on the frontal wall. The ovicell is deeply immersed, hyperstomial or recumbent with a nonporous frontal wall.
Remarks: SCHMID (1989) argued that *Herentia* GRAY, 1848 differs from *Escharina* MILNE EDWARDS, 1836 and it is to be regarded as a valid genus. *Herentia* differs from *Escharina* mainly in having only one avicularium with oval palate and a deeply immersed ovicell. For details of the description of differences between these two genera, see SCHMID (1989).

Herentia hydmanii (JOHNSTON, 1847)
pl. 26, fig. 5

? 1891 *Schizoporella phymatopora* (REUSS), WATERS p. 28
? 1920 *Schizolavella phymatopora* (REUSS), CANU & BASSLER p. 358
non 1988 *Escharina* (*Schizolavella*) *phymatopora* (REUSS), BRAGA & BARBIN p. 523, Pl. 8, Fig. 2
v. 1989 *Herentia hydmanii* (JOHNSTON), SCHMID pp. 45, Pl. 13, Fig. 1, 2, 4
v. 2001a *Herentia hydmanii* (JOHNSTON), ZÁGORŠEK p. 74, Pl. 36, Fig. 4

Diagnosis: The zooecia are oval to rectangular and have circular apertures. The aperture has a sinus and rare oral spines (about 2 to 3 oral spines in each zooecium). The frontal wall is smooth, slightly convex or flat, with about 8 to 14 marginal areolar pores. The avicularium is circular, without a pivot and situated on the frontal wall, near the lateral wall of the zooecium. The ovicell is globular, immersed with a slightly granular frontal wall.
Remarks: Specimens depicted in BRAGA & BARBIN (1988) have about 14 marginal areolar pores, the aperture has a wide, but short peristome and has developed a small globular ovicell. Because of the presence of a globular ovicell, these specimens may probably belong to a new species of the genus *Herentia* GRAY, 1848. WATERS (1891) as well as CANU & BASSLER (1920) do not figure their specimens, however BRAGA & BARBIN, 1988 listed them within the synonyms of their species; According to the descriptions it could be *Herentia hydmanii* (JOHNSTON).
Descriptions as well as illustration of *Herentia hydmanii* (JOHNSTON) by SCHMID (1989) shows all important features as are to be seen in my specimens.
Occurrence: Reingruberhöhe (samples RH 10+11 and SEIFERT's samples).
Distribution in time and space:
Priabonian - Italy (WATERS, 1891)?, Hungary (ZÁGORŠEK, 2001a), Austria (ZÁGORŠEK, 2001b)
Burdigalian France (DAVID, MONGEREAU & POUYET, 1972)
Tortonian - Austria (SCHMID, 1989)
Zanclean - France (BUGE, 1957)
Quaternary & Recent - Atlantic (HAYWARD & RYLAND, 1979), Mediterranean (BUGE, 1957)

5. Comparison

The bryozoan association described from the Waschberg Zone is the richest known Upper Eocene locality in the Alpine-Carpathians region.
Tertiary bryozoa from the Alpine-Carpathians region were first studied by REUSS (1848), since when several Upper Eocene localities dominated of bryozoan colonies have been described. Apart from the fauna described

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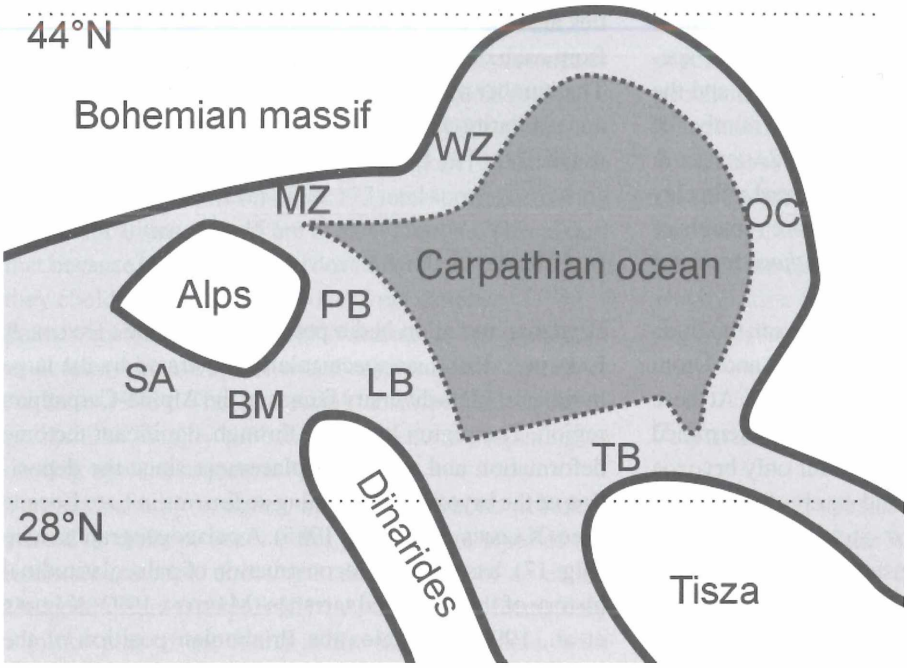

Figure 17: Position of Late Eocene bryozoan faunas within the Eocene paleogeographic pattern of the Alpine-Carpathian region. Localities: SA = Southern Alps, LB = Liptov basin, PB = Podhale basin (together Western Carpathians), OC = Outer Carpathians (Poland), TB = Transylvanian basin (Romania), BM = Buda marl, MZ = Molasse zone, WZ = Waschberg zone. According to ZÁGORŠEK & KÁZMÉR (2000) modified.

here, from the Waschberg Zone, they are located mainly in the Southern Alps (Italy), Liptov and Podhale basins (Slovakia), Outer Carpathians (Poland), Transylvanian basin (Romania), Buda Hills (Hungary) and the Molasse zone (Austria).

The best-known association is from the Southern Alps, where Brendola, Brentonico, Val di Lonte, and Pannone localities have been studied since 1848, (REUSS, 1848, 1869a, WATERS, 1891, BRAGA, 1963, 1966, BRAGA & BARBIN, 1988). Up to now more than 100 bryozoa species have been reported from these localities (ZÁGORŠEK & KÁZMÉR, 2000). The host sediment is an easily washable clay with only bryozoa fragments, rare brachiopods of the genus *Argyrotheca* and very rare remains of echinoids.

The Hybica and Štrba localities (Liptov basin, Slovakia), which yielded altogether 95 bryozoan species, have been systematically studied in the last few years (ZÁGORŠEK, 1992, 1994, 1997). However, a description of all the species discovered in these studies is not finished yet. The Bryozoa marl from these localities is lithified, and several chemical methods have to be used to dissolve it. The washed residue contains bryozoa, fragments of molluscs, remains of echinoids and fragments of the brachiopod *Argyrotheca*.

The localities in the Podhale basin (Partizánska Ľupča, Východná, Rajecké Teplice and Poluvsie) have been studied together with the Liptov basin fauna. Bryozoa occur here as common allochems within the Discocyclina marl or fine-grained sandstone as a member of the flysch sequences. Altogether 47 different species have been described. The dominant fossils in these localities are large foraminifera and/or calcareous algae (ZÁGORŠEK, 1992, 1994, 1996).

MAŁECKI (1963) described a rich bryozoan fauna from the outer Carpathians in southeastern Poland. The richest association was collected in the Skalnik limestone, which is a calcareous, fine-grained sandstone situated within the flysch Menilite Formation. According to LESZCZYNSKI & MALIK (1996), the Skalnik limestone represents a turbiditic sedimentary body that originated by underwater slumping from the shallow shelf to the deep flysch basin. During a recent investigation, MAŁECKI's original collection was checked by the author. Altogether 108 species could be determined; algal and foraminifera remains dominate the sediment.

Only a poor description, without any illustrations, is available for the material from the Cluj-Napoca–Brebi localities

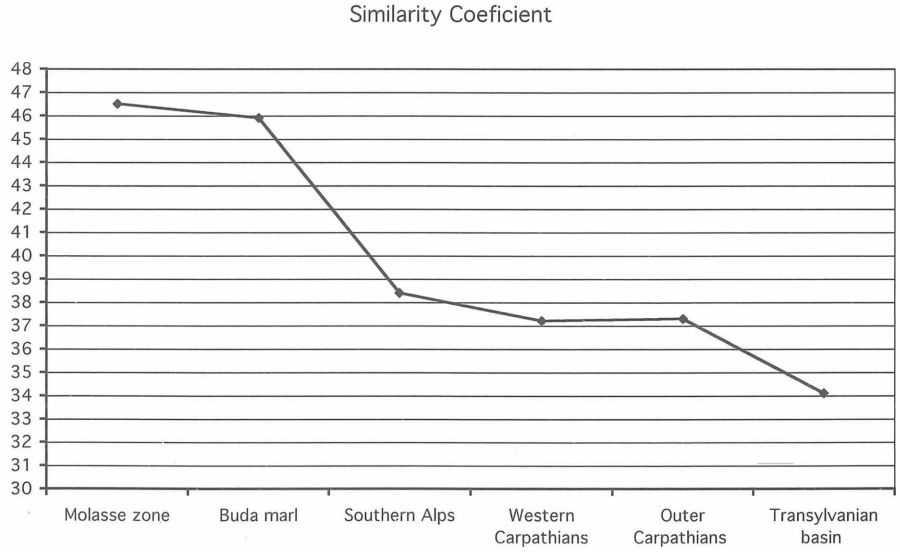

Figure 18: Similarity coefficient between Waschberg zone bryozoans and bryozoan faunas from other Eocene areas within Alpine-Carpathians region.

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(Transylvanian basin, Romania) (PERGENS, 1887; KOCH, 1894, GHIURCA, 1987). To estimate the number of species is very hard, because of the old descriptions and the many synonyms used. Checking carefully, the number of known species might be perhaps 91 species (ZÁGORŠEK & KÁZMÉR, 2000). The host rock is an easily washable clay with bryozoa, fragments of molluscs and rare remains of echinoids. Shells of the brachiopod *Argyrotheca* have not been found.

Recently, a detailed description of the fauna from the Buda marls from localities at Mátyáshegy, Úrhida, and Ürom (Hungary) has been published (ZÁGORŠEK, 2001a). At these localities 126 species of bryozoa have been determined and described. In the sediment, there occur only bryozoa fragments, remains of echinoids and rarely *Argyrotheca* shells.

The bryozoan-bearing sediments usually occur in deepening-upward sequences. The succession starts with bioclastic limestone with coral limestone and/or corallinacean algae and larger foraminifers, up to 100 m thick, overlain by *Discocyclina* limestone and marl. The bryozoan sediment (marl, calcareous sandstone or bioclastical marl) is up to 20 m thick. The succession is usually topped by the Globigerina marl (KÁZMÉR, MONOSTORI & ZÁGORŠEK, 1993, ZÁGORŠEK. & KÁZMÉR, 2001).

Eocene bryozoan marls from the Molasse Zone in western Austria were found only in the deep boreholes Helmberg-1 and Perwang-1 (ZÁGORŠEK, 2001b, 2002). These have an exceptional sedimentary succession in comparison to other known localities, starting with a biostrome of larger foraminifers intercalated with build-ups of corallinacean algae. Their total thickness is up to 25 m. Above the corallinacean algae build-ups, there is a layer of bryozoan marl about 6 m thick, topped again by an algal bioherm (RASSER, GYÖRGY & BÁLDI-BEKE, 1999). The *Globigerina* marl is missing in this succession. Due to the complicated tectonic position, it is rather unclear if the lack of the *Globigerina* marls is caused by the tectonics, or by the original sedimentary conditions.

The fauna from the Waschberg Zone was compared by the similarity coefficient "Sk" as a percentage of joint species from all known species. The similarity coefficient between locality A and locality B was calculated as

$$Sk = (100 \times C)/D$$

Where the C is a number of species common to both locality A and B and the D is the total number of species occurring at locality A or B.

The most similar bryozoan association to that studied from the Waschberg Zone are localities in the Premolasse Zone – Helveticum (borehole Helmberg-1), where the host rock is a bryozoan marl. The bryozoan fauna from localities in the Buda Hills, mainly from Mátyáshegy – Budapest are also very similar. Both these localities have almost half of their species in common with the Waschberg Zone. Other localities are also very similar, almost one third of the species from each of them occurs also in the Waschberg Zone.

The number of common species, number of joint species and similarity coefficients for each of the localities is given in tab. 2 (p. 107 ff.).

6. Interpretations

Bryozoan radiation had a peak in the Eocene (TAYLOR & LARWOOD, 1990), as spectacularly illustrated by the large number of high-diversity faunas in the Alpine-Carpathian region. The region has gone through significant tectonic deformation and terrane displacement since the deposition of the bryozoan-containing sediments in Late Eocene time (KÁZMÉR & KOVÁCS, 1985). A palaeogeographic map (Fig. 17), based on the reconstruction of palaeolatitudinal history of the displaced terranes (MÁRTON, 1993; KÁZMÉR et al., 1999) illustrates the Priabonian position of the bryozoan faunas. According to this paleogeographic reconstruction (ZÁGORŠEK & KÁZMÉR, 2000), localities in the Waschberg zone were situated on the north margin of the Carpathian ocean during the Eocene. The closest area is recently represented by localities Helmberg-1 and Perwang-1, which, during the Eocene were situated to the west of the original position of Waschberg zone. The other localities (Southern Alps, Liptov and Podhale basins, Outer Carpathians (Poland) and Buda Hills) were situated south from the Molasse zone and Waschberg zone around the Alps during the Eocene. Transylvanian basin (Romania) was situated far away to the south from the Carpathian ocean. Outer Carpathians localities were on the opposite side of the Carpathian ocean. (fig. 17).

Similarity indices suggest that the similarity of the faunas is independent of their regional environmental conditions, and is probably determined by large-scale dispersal history rather than by the distance. The associations in nearby localities are therefore more similar than in far-away localities, even when the sediments are more similar with these of the more distant locality (fig. 17). The fauna from the Waschberg Zone is more similar to those from Molasse zone (Helmberg-1 and Perwang-1) than to Slovakia or Poland, although these localities have a more similar sediment (calcareous sandstone) and therefore probably also represent a more similar environment.

This rule can probably be explained by the predominance of Cheilostomatida in the studied areas, which commonly developed ovicells during the Late Eocene. The number of ovicells increases the probability of survival of larvae, because ovicells store the larvae during their ontogenetic development. On the other hand, the larvae cannot swim (or float) across long distances and that perhaps limited the dispersal of these bryozoans. BRAGA (1987) also argued that although dispersal of deep-water bryozoan faunas was unlimited, i.e. not disturbed by any geographic barrier, their lecithotrophic larvae, however, could not survive

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long-distance planktonic transport.
This suggestion could also be confirmed by the presence of Cyclostomatida, which developed gonozooecia (ovicells) only very rarely. For example, from the 75 joint species between Helmberg-1 and the Waschberg Zone, 21 belong to Cyclostomatida, however of the 173 total species occurring in both localities only 35 are cyclostomatous. This means that because Cyclostomatida does not developed ovicells, they could not easily spread over long distances.
Faunas hosted by bryozoan rich sediments represent cool or at least a non-tropical water environment (TAYLOR & ALLISON, 1998). The succession described at the Reingruberhöhe locality probably represents a deepening or cooling upward sequence.
The sedimentary complex in Reingruberhöhe probably started in shallow, warm water, with a large input of terrigenous material, enabling sedimentation of so-called Hauptsandstein (samples RH 1x). Bryozoans forms only a minor part of the fauna in the Hauptsandstein, with molluscs, echinoids and other fauna dominant, for which the Reingruberhöhe is well known among hobby collectors. These conditions were very stable and allowed the deposition of thick layers of Hauptsandstein with short interruptions. During one of the interruption, the depth, temperature and other conditions became extremely suitable for bryozoa and they grew in large quantities and created the so-called bryozoan layer (samples RH 3x). As already discussed, this condition could have been caused by the input of cooler water by upwelling, in a time of global climate deterioration (ZÁGORŠEK, 1996b) and/or by filling the ecological niches of decimated larger foraminifer faunas on the same shelves (KÁZMÉR, 1999). Perhaps temperature or eutrophic conditions disabled algae from overgrowing bryozoans, allowing bryozoans to create cool water limestone similar to those described on the southern slope of Australia (BONE & JAMES, 1993).
The transgression started later and when the increase of water depth terminated, algal balls with encrusting bryozoans developed (samples RH 2x) on the uppermost part of the profile. This part of the profile almost has the character of a hardground. It is perhaps the result of a lack of input of terrestrial material, which may have been caused by a high energy water current, or by a highstand during sea level changes (so-called flooding surface in sequence stratigraphy terminology). Suitable conditions may also be produced by the upwelling of the cold water during a general cooling of the climate (ZÁGORŠEK, 1996b). Anyway, the temperature of water during sedimentation of the upper part of the profile (samples RH 2x) should be higher than during the deposition of the bryozoan layer (sample RH 3x) because algae developed small build-ups (so-called algal balls).
Generally, the Reingruberhöhe section represents an environment of decreasing sedimentation rates (from high – Hauptsandstein, to low – hardground) and an increase in organic productivity in probably cool water conditions.
This conclusions could be proven by an additional study of foraminifers and perhaps also by sedimentological and geochemical research.
The situation in Haselbach was probably different. The dominant species in this section is *Batopora haselbachensis* sp.n. According to living needs of the similar genus *Lacrimula*, it can be assumed, that the original environment of the Haselbach localities was very shallow warm water, with a dominance of green algae, which *Batopora* needs for its life (BRAGA & MUNARI, 1972).

7. Summary

Altogether 153 species of bryozoa have been determined from sediment of the Waschberg Zone, of which 117 are cheilostomatous, and 36 belong to the order Cyclostomatida. Twelve new species were found and described in detail.
The richest association was found in samples coming from the loose rocks of the Reingruberhöhe locality (samples RH 3x), from which 91 species have been determined. All determined species occurring in the studied samples are given in tab. 1 (p. 103 ff.).
The succession described at the Reingruberhöhe locality perhaps represents a deepening or cooling upward sequence, with development of hardground-like structures at its top. The environment of the Haselbach locality was more warm and shallow water with a dominance of green algae.

8. Acknowledgements

The study of Eocene Bryozoa from the Waschberg Zone (Austria) was initiated by Prof. Norbert VÁVRA in 1993. He was looking for somebody and enlisted me to describe and document the rich Bryozoa material collected by him and by Dr. SEIFERT from Eocene sediments of Austria. To fulfill this aim it would not have been possible without the kind support of the FWF (Fonds zur Förderung der Wissenschaftlichen Forschung, Austria). The FWF enabled me through project M517-GEO to study this material, collect new material and finish the manuscript during my stay at the Institute of Palaeontology (University of Vienna, Austria).
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10. Alphabetic Index of Genera

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PLATE 1

Fig. 1. *Crisia elongata* MILNE EDWARDS, 1838. Compare the width of the colony (here about 3 zooecial tubes) with other species of Crisia. The scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 2. *Crisia hoernesi* REUSS, 1848. Width of the colony is here about 5 zooecial tubes. The scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 3. *Crisia eburnea* (LINNAEUS, 1758). Colony is very narrow, here only width of the two zooecial tubes. The scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 4. *Diaperoecia sparsa* (REUSS, 1848). Detail showing the long, circular zooecial tubes, with smooth frontal walls and long, slightly laterally curved peristome. Locality: Reingruberhöhe.

Fig. 5. *Diastopora flabellum* REUSS, 1848. General view of the bilamellar, rounded square colony. Locality: Reingruberhöhe.

Fig. 6. *Diastopora flabellum* REUSS, 1848. Detail showing short, tube-like zooecia. Locality: Reingruberhöhe.

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PLATE 1

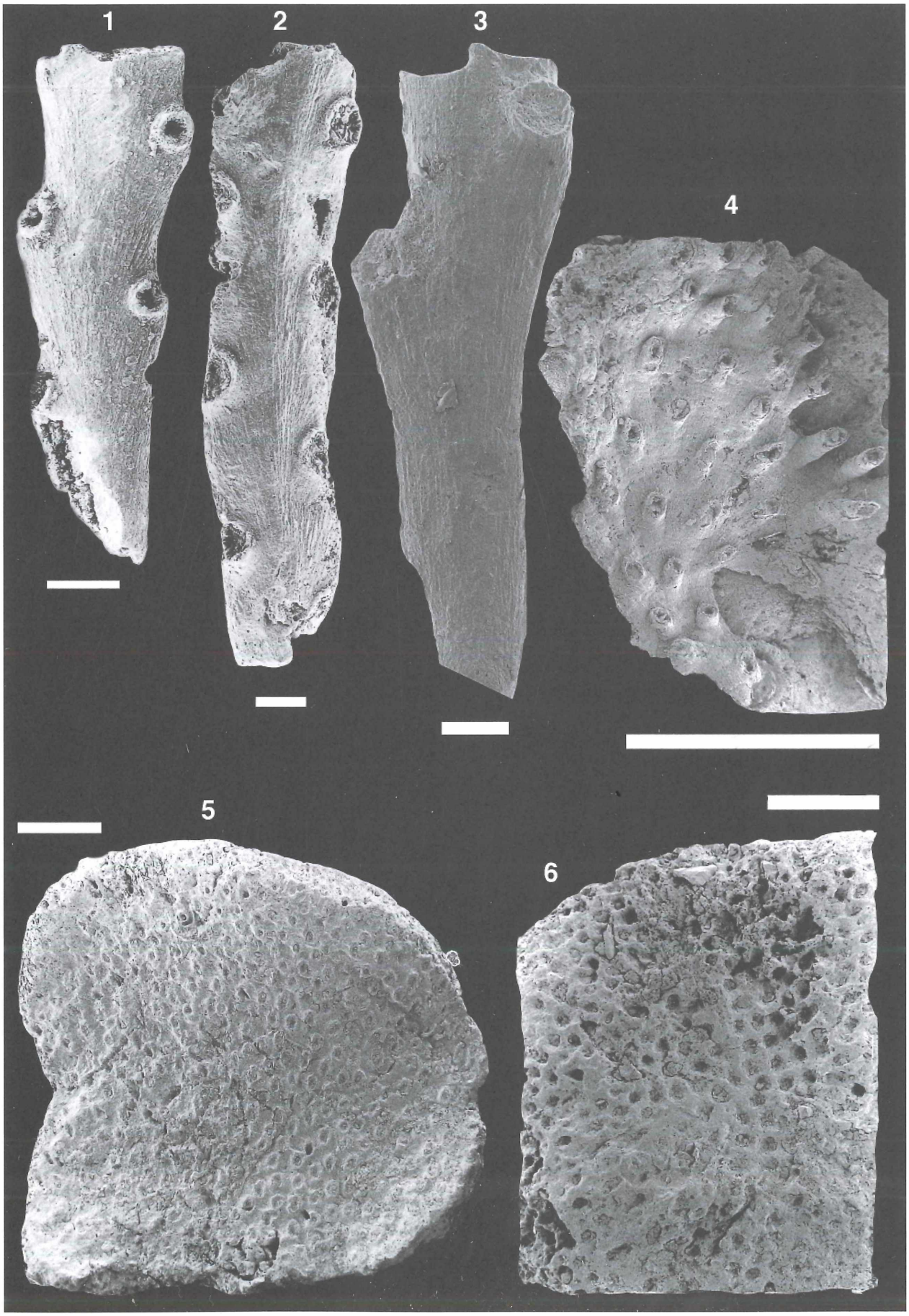

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PLATE 2

Fig. 1. *Exidmonea atlantica* DAVID, MONGEREAU & POUYET, 1972. Frontal view showing 3-4 zooecial tubes in alternately arranged fascicles. Locality: Reingruberhöhe.

Fig. 2. *Exidmonea atlantica* DAVID, MONGEREAU & POUYET, 1972. Lateral view showing 5 zooecia in each fascicular row and slightly ribbed dorsal side. Locality: Reingruberhöhe.

Fig. 3. *Exidmonea hoernesi* (STOLICZKA, 1862). Lateral view showing fascicles with 4-5 zooecia and strongly porous frontal wall. Locality: Reingruberhöhe.

Fig. 4. *Exidmonea giebeli* (STOLICZKA, 1862). Frontal view showing zooecia in fascicular row arranged parallel one to one another. Locality: Reingruberhöhe.

Fig. 5. *Exidmonea giebeli* (STOLICZKA, 1862). Frontal view showing zooecia in fascicles arranged obliquely. Locality: Reingruberhöhe.

Fig. 6. *Filisparsa tenella* STOLICZKA, 1862. Frontal view showing 5 zooecial tubes not arranged in fascicles. Locality: Reingruberhöhe.

Fig. 7. *Mecynoecia proboscidea* (MILNE EDWARDS, 1838). General view showing colony with very long zooecial tubes. Locality: Reingruberhöhe.

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PLATE 2

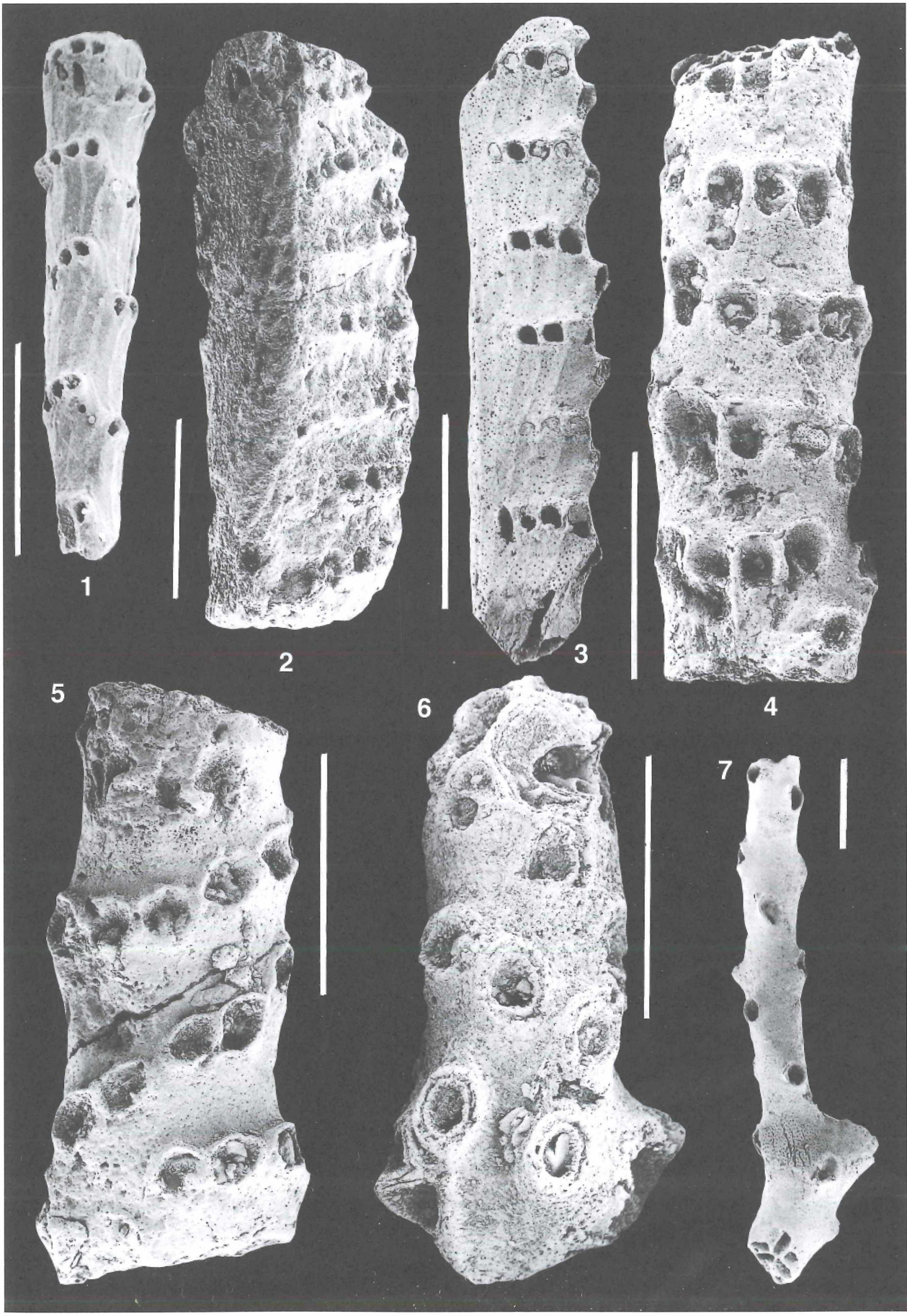

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PLATE 3

Fig. 1. *Tayloripora ovicellata* sp.n. Holotype with visible dorsal gonozooecium and long zooecial tubes. Locality: Reingruberhöhe.

Fig. 2. *Tayloripora ovicellata* sp.n. Holotype from the other side showing parallel kenozooecia closed by diaphragms. Locality: Reingruberhöhe.

Fig. 3. *Tayloripora ovicellata* sp.n. Paratype showing surface of the gonozooecium and diaphragms closing dorsal parallel kenozooecia. Locality: Reingruberhöhe.

Fig. 4. *Tayloripora ovicellata* sp.n. Paratype showing well developed gonozooecium, zooecia in alternating fascicles and diaphragms closing dorsal parallel kenozooecia. Locality: Reingruberhöhe.

Fig. 5. *Tayloripora ovicellata* sp.n. Dorsal view of the paratype showing parallel kenozooecia closed by diaphragms and internal structures in the gonozooecium. Locality: Reingruberhöhe.

Fig. 6. *Tayloripora ovicellata* sp.n. Detail of the paratype figured in Fig. 5 showing oeciopore in the gonozooecium. Locality: Reingruberhöhe.

Fig. 7. *Tayloripora ovicellata* sp.n. Paratype developing two gonozooecia. Locality: Reingruberhöhe.

Fig. 8. *Tayloripora ovicellata* sp.n. Dorsal view of the paratype showing diaphragms closing dorsal parallel kenozooecia. Locality: Reingruberhöhe.

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PLATE 3

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PLATE 4

Fig. 1. *Idmidronea uniporica* sp.n. Lateral view of the holotype showing porous frontal part with zooecia (left) and dorsal side formed by thin, narrow long kenozooecia (right). Locality: Reingruberhöhe.

Fig. 2. *Idmidronea uniporica* sp.n. Frontal view of the paratype showing alternately arranged zooecial tubes. Locality: Reingruberhöhe.

Fig. 3. *Idmidronea uniporica* sp.n. Lateral view showing two zooecia in each fascicle, one zooecium opens frontally, the second laterally. Locality: Reingruberhöhe.

Fig. 4. *Crisidmonea tripora* (Canu & Bassler, 1926). Lateral view showing large gonozooecium, situated on the frontal side of the colony with strongly porous frontal wall. Locality: Reingruberhöhe.

Fig. 5. *Ybselosoecia typica* (Manzoni, 1878). Frontal view showing chaotically arranged zooecia with long peristomes. Locality: Reingruberhöhe.

Fig. 6. *Ybselosoecia typica* (Manzoni, 1878). Frontal view with visible gonozooecium and oeciopore. Gonozooecium flat, with smooth surface, the oeciopore as large as aperture, situated in the centre of the gonozooecium. Locality: Reingruberhöhe.

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PLATE 4

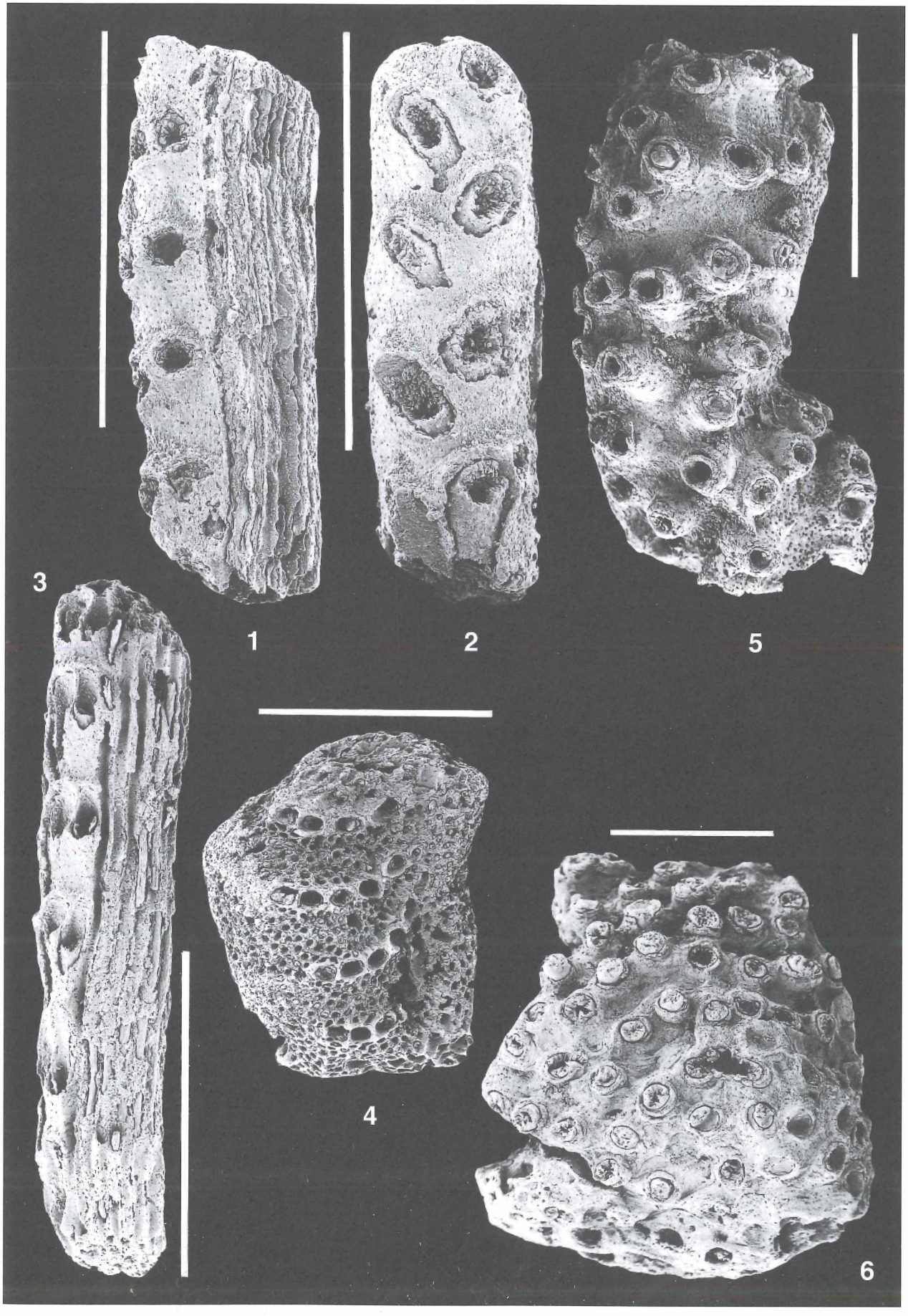

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PLATE 5

Fig. 1. *Oncousoecia biloba* (REUSS, 1848). Frontal view showing gonozooecium with nonporous frontal wall. Oeciopore, situated on the lower left margin of the gonozooecium (between two zooecial tubes), without peristome. Locality: Haselbach.

Fig. 2. *Mecynoecia pulchella* (REUSS, 1848). General view showing the colony with 12 narrow zooecial tubes around colonial axis. Locality: Reingruberhöhe.

Fig. 3. *Bobiesipora fasciculata* (REUSS, 1848). Dorsal view showing typical pores surrounded by a narrow and low rim. Scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 4. *Mecynoecia geinitzi* (REUSS, 1872). Oblique view showing rhombic zooecial tubes and budding edge. Locality: Reingruberhöhe.

Fig. 5. *Hornera verrucosa* REUSS, 1866. General view showing smooth, smaller vacuoles located distally from the aperture, larger ones situated proximally and anastomosing nervi. Scale bar = 100 μm. Locality: Haselbach.

Fig. 6. *Hornera concatenata* REUSS, 1869a. General view showings a small vacuole situated proximally from the aperture and linear, non-anastomosing, smooth nervi. Scale bar = 100 μm. Locality: Reingruberhöhe.

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PLATE 5

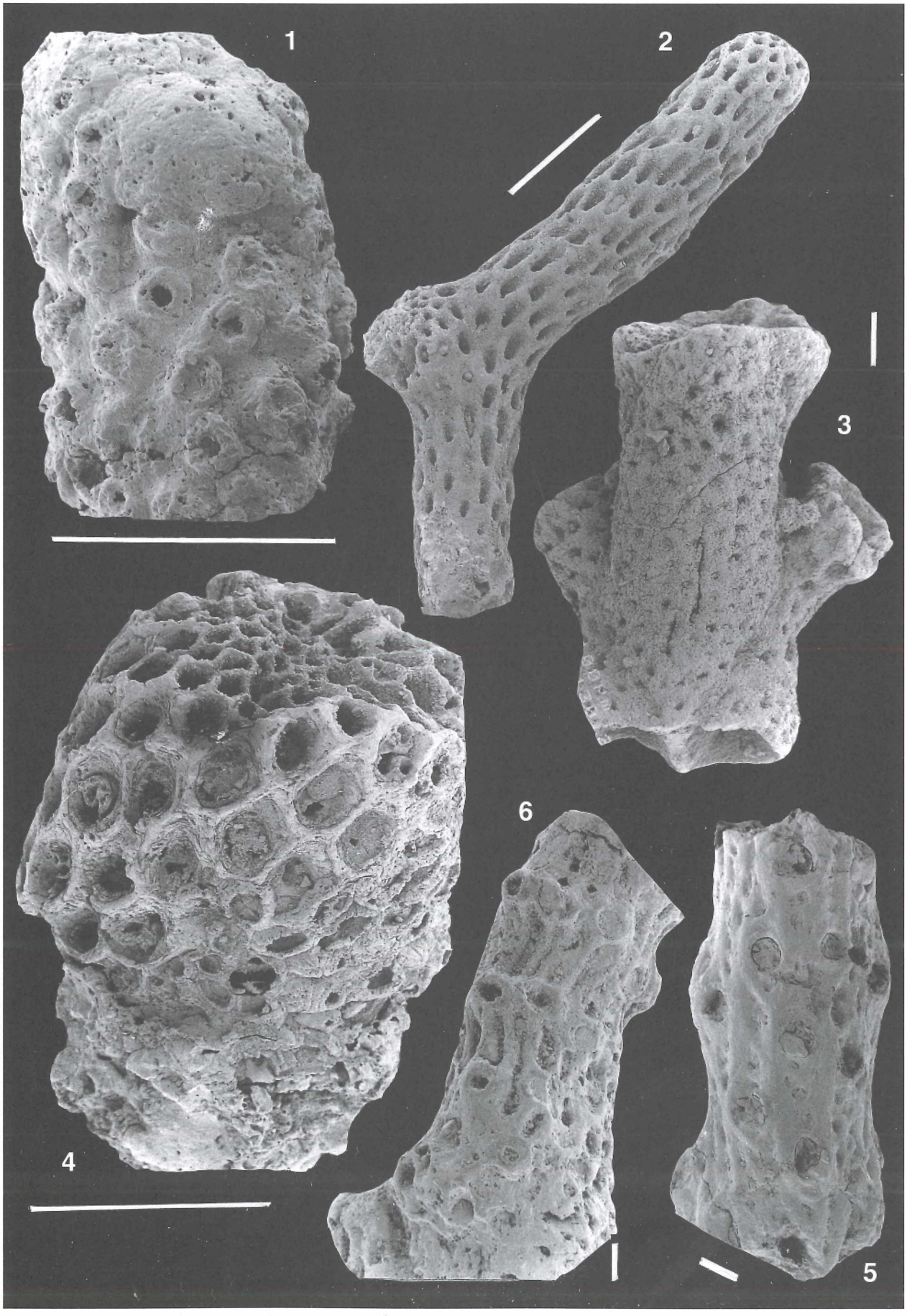

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PLATE 6

Fig. 1. *Mecynoecia geinitzi* (REUSS, 1872). General view showing zooecia in regular rows. Locality: Reingruberhöhe.

Fig. 2. *Mecynoecia geinitzi* (REUSS, 1872). General view showing porous frontal walls, with slightly elongated lateral parts. The little depressed, nonporous area, which might be a gonozooecium, occurs in the middle of the colonial stem. Locality: Reingruberhöhe.

Fig. 3. *Mecynoecia geinitzi* (REUSS, 1872). Detail showing porous frontal walls and circular apertures. Locality: Reingruberhöhe.

Fig. 4. *Mecynoecia geinitzi* (REUSS, 1872). General view showing a little depressed, nonporous area in the middle of the colonial stem. This area might be regarded as a gonozooecium. Locality: Reingruberhöhe.

Fig. 5. *Hornera concatenata* REUSS, 1869a. General view showing small vacuoles and linear, smooth nervi without ribs. Locality: Reingruberhöhe.

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PLATE 6

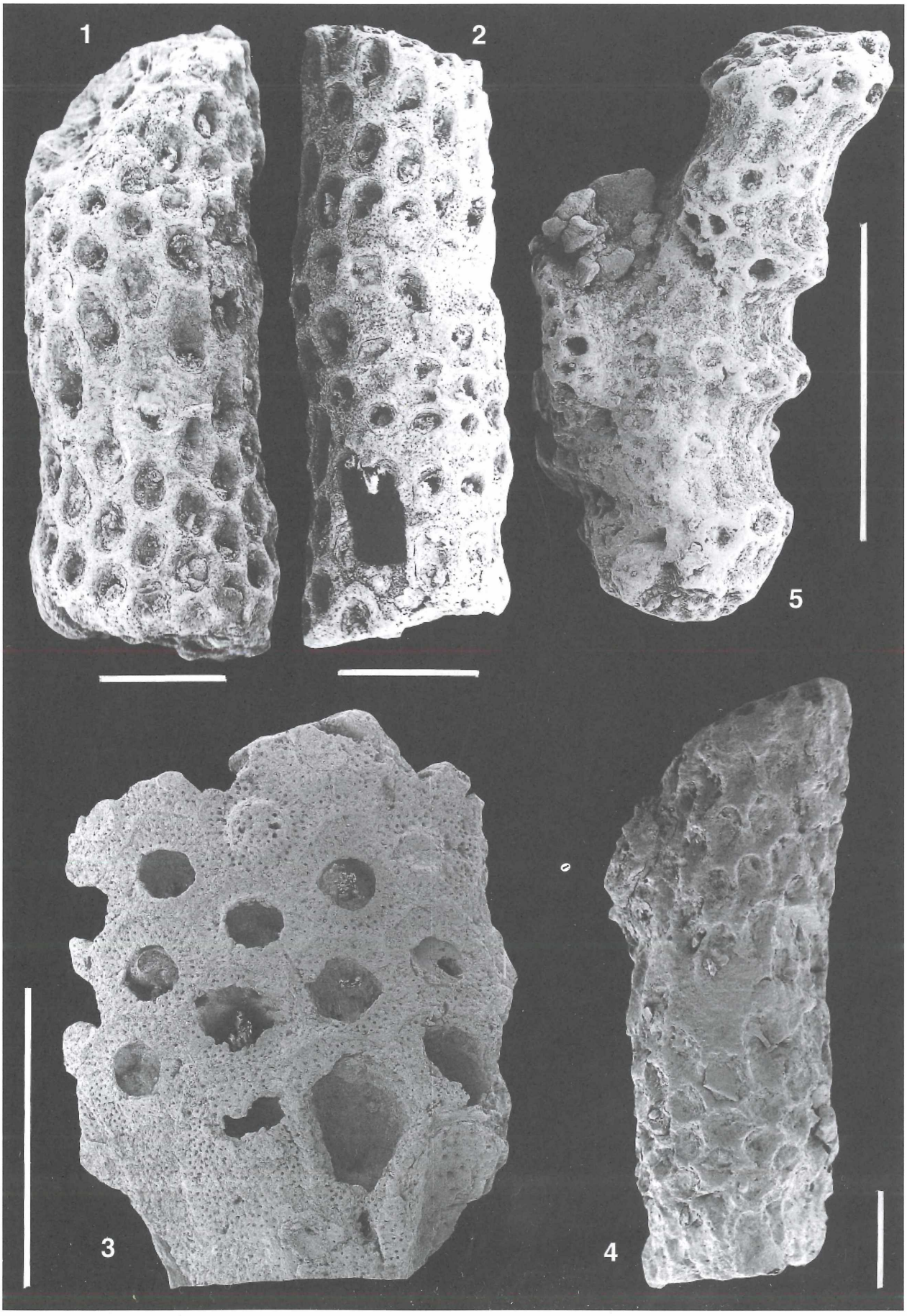

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PLATE 7

Fig. 1. *Hornera simplicissima* BRAGA & BARBIN, 1988. Frontal view showing very long zooecial tubes with very small vacuoles. Locality: Reingruberhöhe.

Fig. 2. *Hornera simplicissima* BRAGA & BARBIN, 1988. General view showing linear nervi and no developed vacuoles. Locality: Reingruberhöhe.

Fig. 3. *Nematifera susannae* ZÁGORŠEK, 1992. General view showing long zooecia, with large orifices and slightly convex, densely perforated frontal wall. A salient thread marks the lateral walls. Locality: Reingruberhöhe.

Fig. 4. *Hornera concatenata* REUSS, 1869a. A view showing small vacuoles on frontal side. Locality: Reingruberhöhe.

Fig. 5. *Hornera verrucosa* REUSS, 1866. General view showing abundant vacuoles, smaller vacuoles located distally from the aperture, larger ones situated proximally. Locality: Reingruberhöhe.

Fig. 6. *Diplosolen brendolensis* (WATERS, 1892). Lateral view showing zooecial tubes arranged in curving fascicles. Locality: Reingruberhöhe.

Fig. 7. *Polyascosoecia cancellata* CANU, 1920. Frontal view of bifurcated colony showing very abundant, large mesopores. Locality: Haselbach.

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PLATE 7

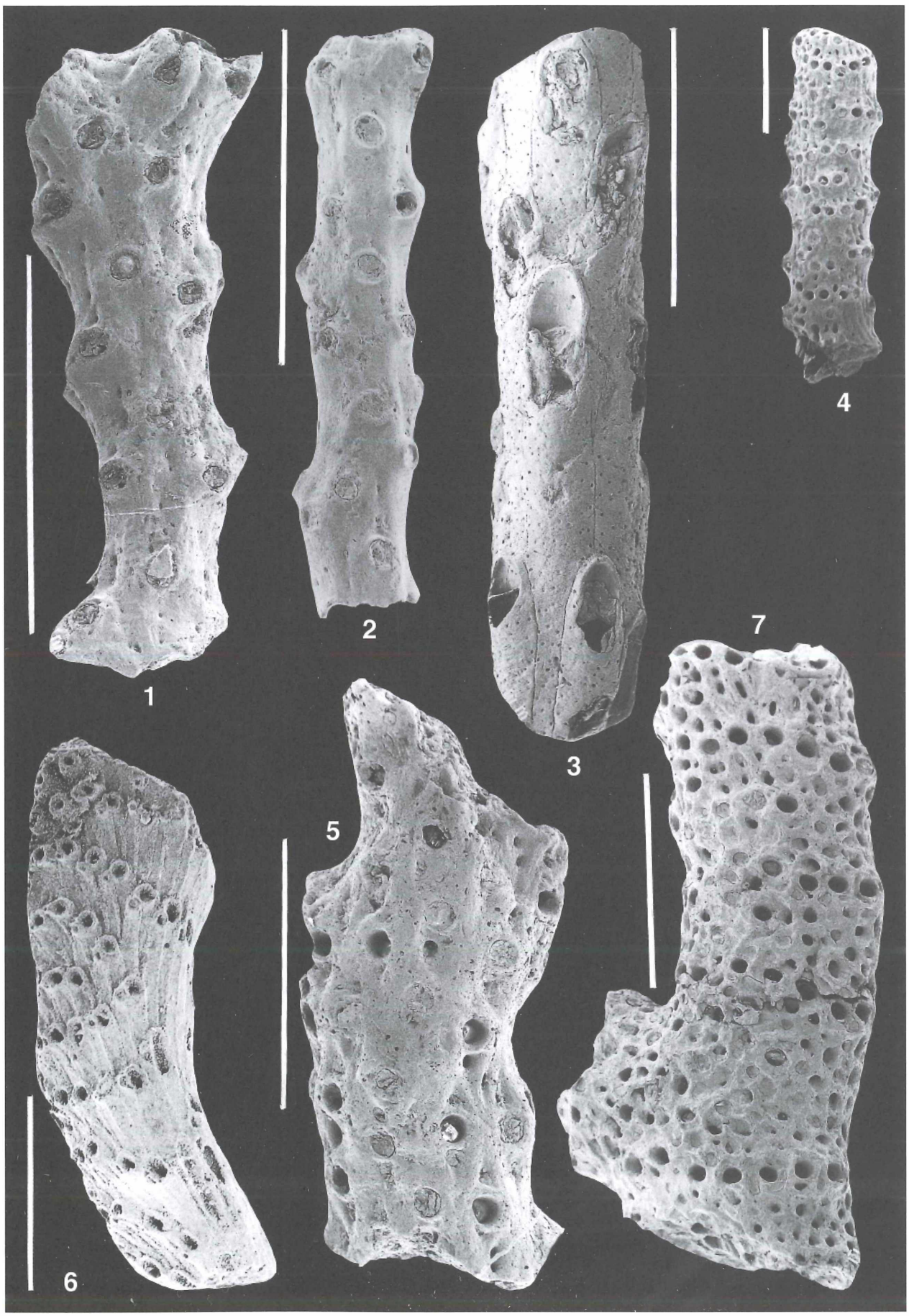

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PLATE 8

Fig. 1. *Lichenopora turbinata* DEFRANCE, 1823. Lateral view of pedunculate conical colony with a nonporous basal wall. Locality: Reingruberhöhe.

Fig. 2. *Disporella grignonensis* MILNE EDWARDS, 1838. Frontal view showing large, nonporous central area and uniserial, short fascicles. Locality: Reingruberhöhe.

Fig. 3. *Disporella coronula* (REUSS, 1848). Frontal view showing a concave colonial centre, with cancelli and zooecia in triserial to multilaminar fascicles. Locality: Reingruberhöhe.

Fig. 4. *Disporella radiata* (SAVIGNY-AUDOUIN, 1826). Frontal view showing a very small central area and triserial, narrow, very long fascicles. Locality: Reingruberhöhe.

Fig. 5. *Disporella* cf. *verrucosa* (PHILIPPI, 1843). Frontal view showing large, convex central area and biserial fascicles. Locality: Reingruberhöhe.

Fig. 6. *Disporella goldfussi* (REUSS, 1864a). Frontal view showing a very large gonozooecium. Locality: Reingruberhöhe.

Fig. 7. *Disporella goldfussi* (REUSS, 1864a). Lateral view showing monoserial fascicles and a flat, large central area. Locality: Reingruberhöhe.

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PLATE 8

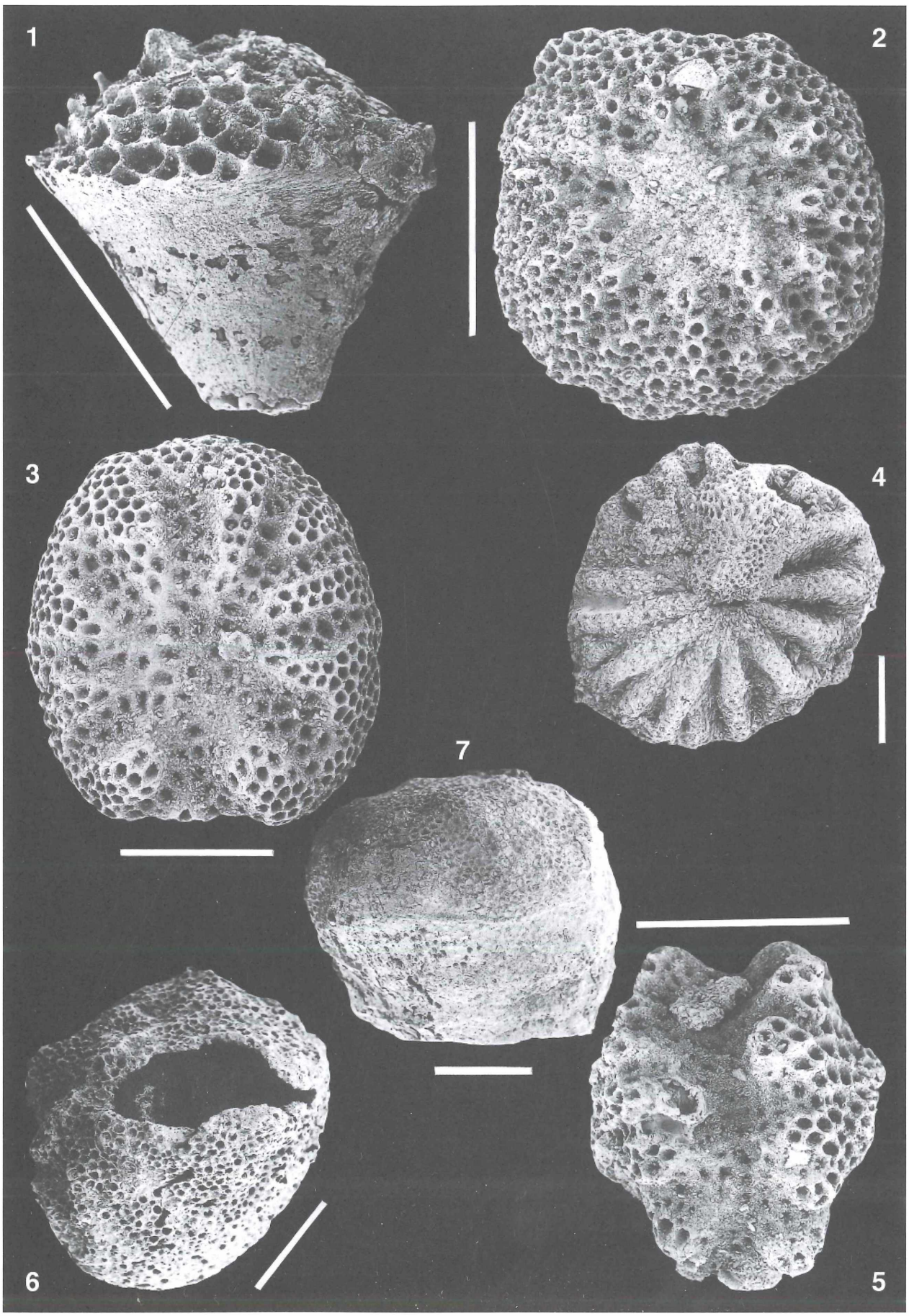

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PLATE 9

Fig. 1. *Trochiliopora beyrichi* (REUSS, 1851). Oblique to frontal view showing a large gonozooecium occupying almost the whole central area. Locality: Reingruberhöhe.

Fig. 2. *Trochiliopora beyrichi* (REUSS, 1851). Lateral view showing prominent, multilaminar fascicles and the depressed colonial centre. Locality: Reingruberhöhe.

Fig. 3. *Trochiliopora planiformis* sp.n. Holotype. Oblique view showing prominent, multilaminar fascicles and a large gonozooecium with oval oeciopore. Locality: Reingruberhöhe.

Fig. 4. *Trochiliopora planiformis* sp.n. Paratype. Frontal view showing prominent, multilaminar fascicles and a large gonozooecium with oval oeciopore. Locality: Reingruberhöhe.

Fig. 5. *Trochiliopora planiformis* sp.n. Paratype. Frontal view showing prominent, multilaminar fascicles and flat central area. Locality: Reingruberhöhe.

Fig. 6. *Trochiliopora planiformis* sp.n. Paratype. Lateral view showing colony shape; erect, pedunculate from encrusting base. Locality: Reingruberhöhe.

Fig. 7. *Trochiliopora planiformis* sp.n.. Detail of holotype showing large, oval oeciopore. Scale bar = 100 μm. Locality: Reingruberhöhe.

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PLATE 9

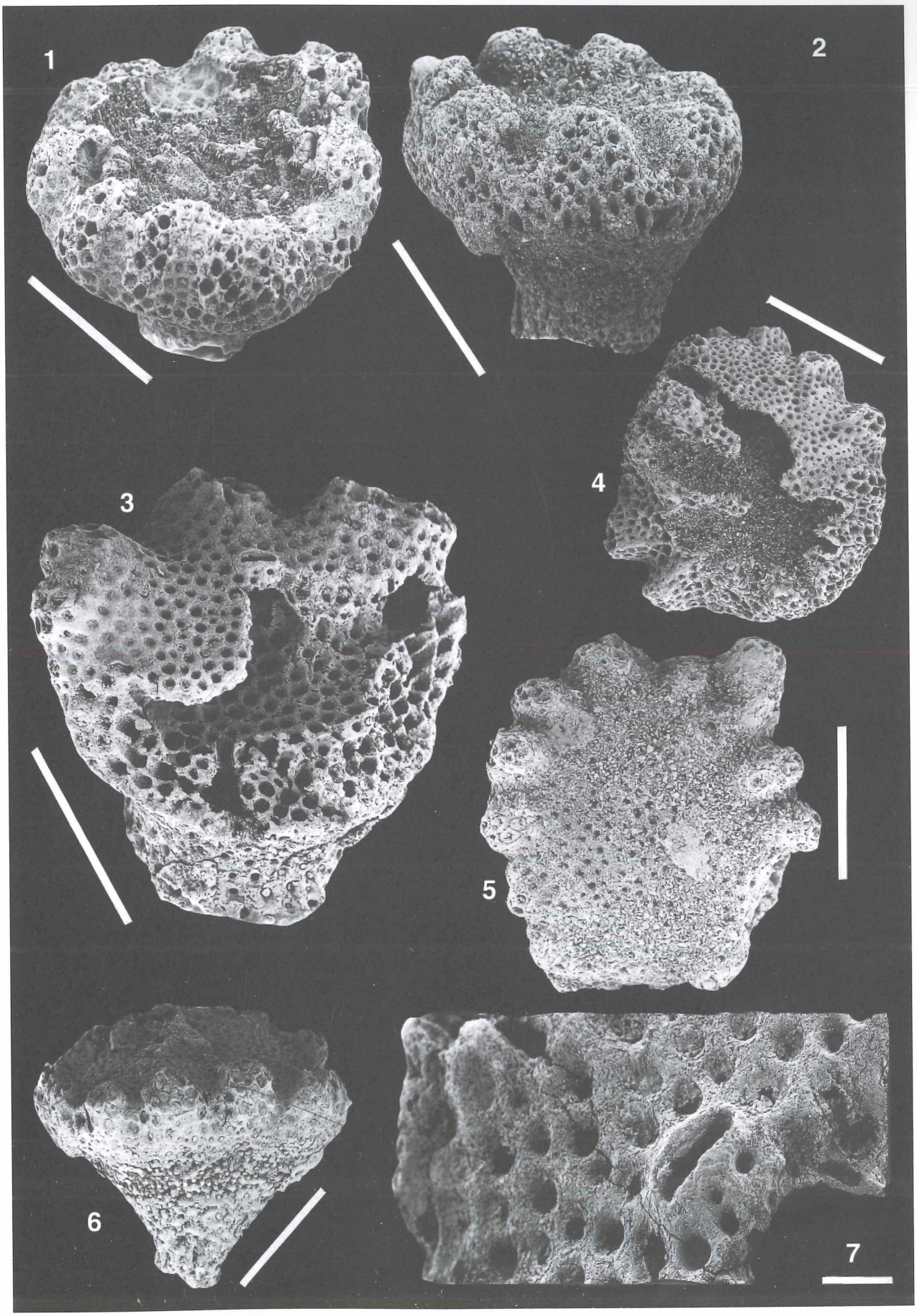

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PLATE 10

Fig. 1. *Pyripora huckei* BUGE, 1973. General view showing colony with regular uniserial longitudinal rows of zooecia placed one after the other, laterally branched at right angle. Locality: Reingruberhöhe.

Fig. 2. *Pyripora huckei* BUGE, 1973. Detail showing convex, nonporous gymnocyst and oval, very large opesium. Scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 3. *Crassimarginatella macrostoma* (REUSS, 1848). General view showing zooecia arranged in regular rows with large opesia and reduced gymnocyst. Locality: Haselbach.

Fig. 4. *Alderina subtilimargo* (REUSS, 1864a). General view showing chaotically growing zooecia with large opesia. Locality: Reingruberhöhe.

Fig. 5. *Amphiblestrum appendiculatum* (REUSS, 1848). General view showing chaotically grown zooecia. Locality: Reingruberhöhe.

Fig. 6. *Amphiblestrum appendiculatum* (REUSS, 1848). Detail showing zooecia with a very short cryptocyst and well developed tube-like avicularia. Locality: Reingruberhöhe.

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PLATE 10

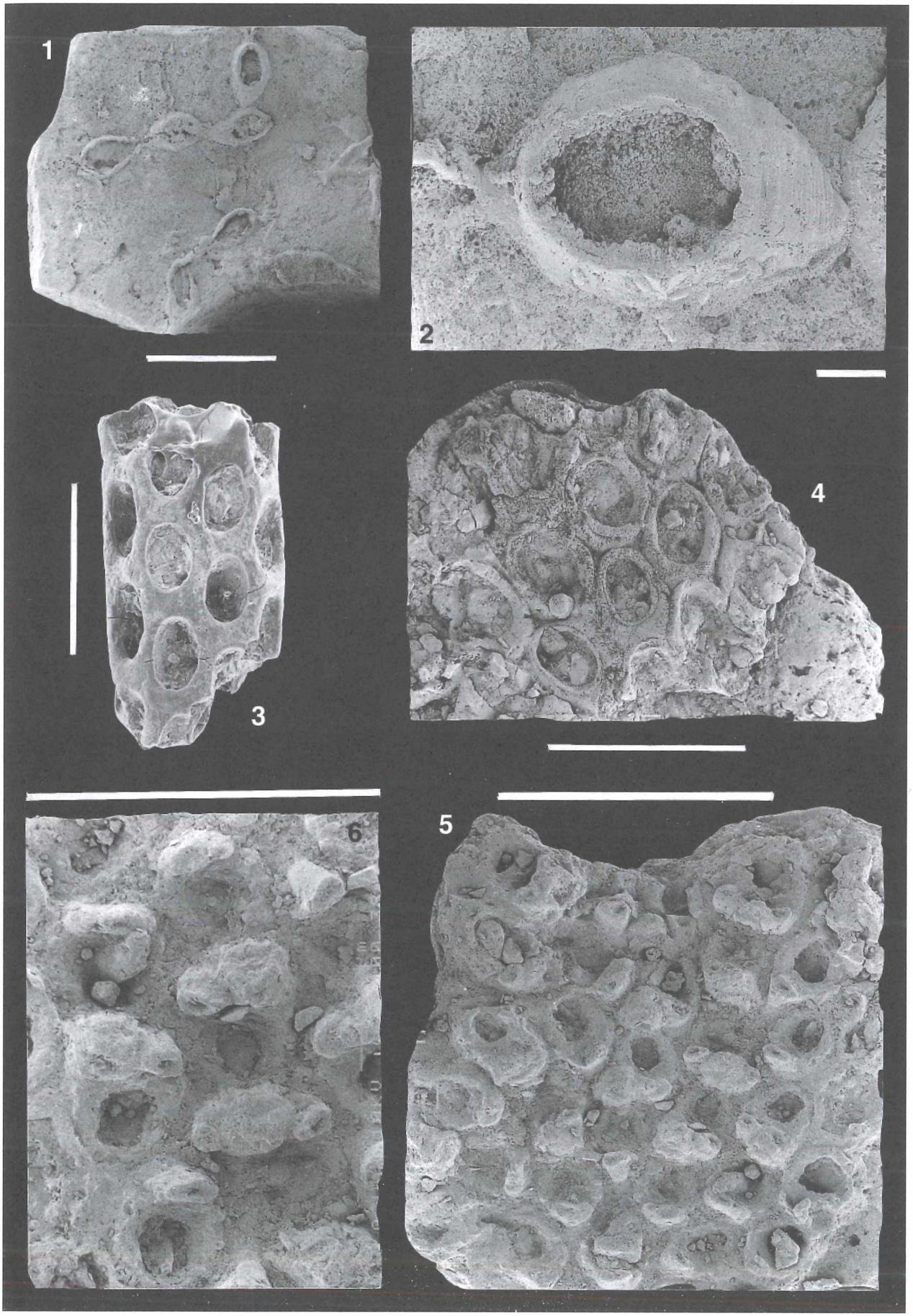

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PLATE 11

Fig. 1. *Foveolaria vibraculata* ZÁGORŠEK, 2001a. General view showing large, square shape opesia and large avicularia with small opesia. Locality: Reingruberhöhe.

Fig. 2. *Foveolaria vibraculata* ZÁGORŠEK, 2001a. General view showing two pairs of small pores situated on the proximal margin of the mural rim, narrow furrows separating neighbouring zooecia and globular ovicells with large semilunar oeciopore. Locality: Reingruberhöhe.

Fig. 3. *Crassimarginatella macrostoma* (REUSS, 1848). General view showing zooecia arranged in regular rows with large opesia and well developed mural rim. Locality: Reingruberhöhe.

Fig. 4. *Ogivalina dimorpha* (CANU, 1907). Frontal view of two ordinary zooecia with well-developed cryptocyst. Locality: Reingruberhöhe.

Fig. 5. *Vincularia subsymmetrica* (CANU, 1907). Poorly preserved colony showing zooecia with small opesium and well-developed large cryptocyst. Scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 6. *Micropora*? sp. Detail of three preserved zooecia showing two semilunar narrow long slits and well developed oral spines. Locality: Reingruberhöhe.

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PLATE 11

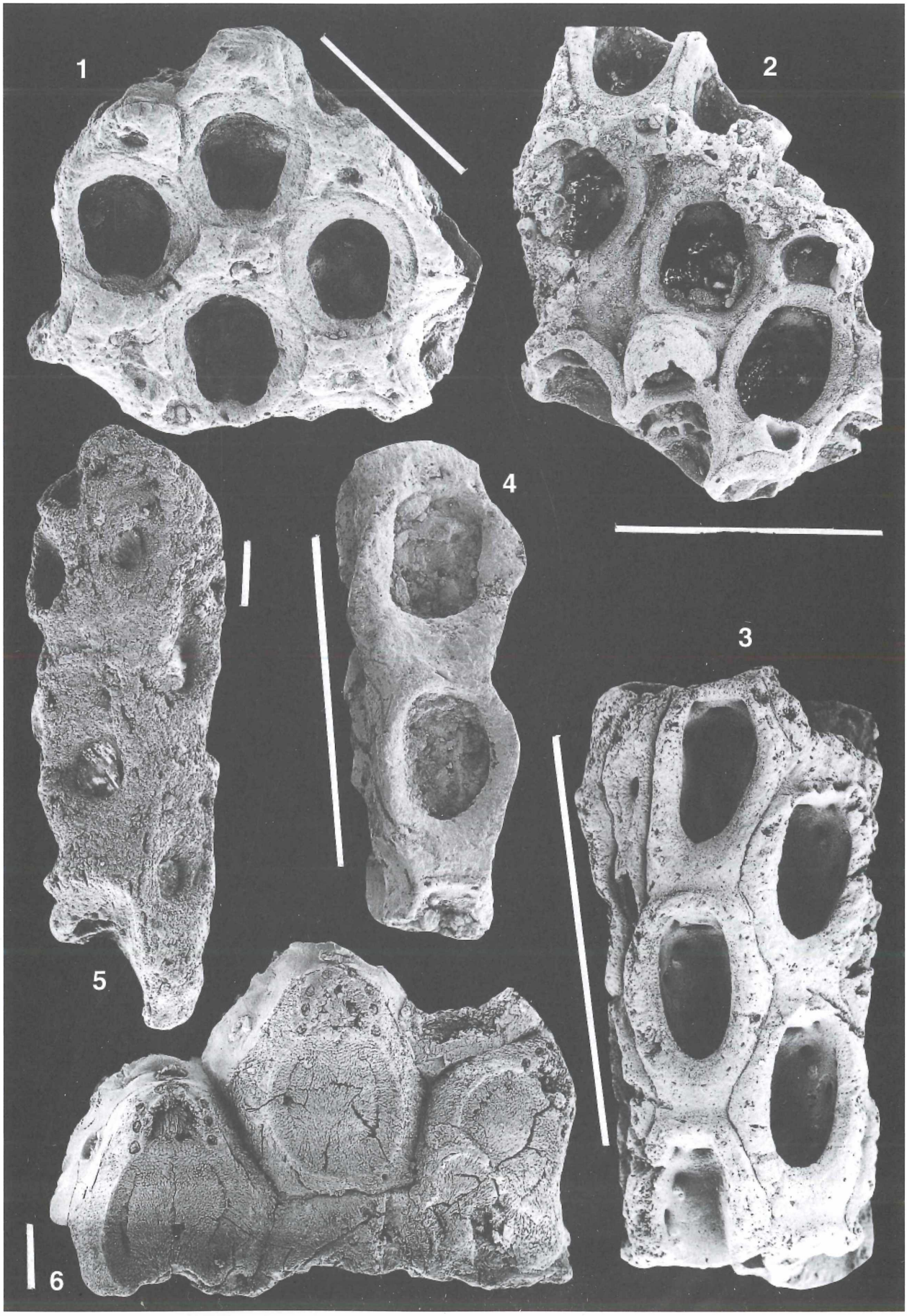

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PLATE 12

Fig. 1. *Micropora hexagona* (ZÁGORŠEK, 1994). General view showing recumbent ovicell with a flat frontal wall and opesiules unequal in size. Locality: Reingruberhöhe.

Fig. 2. *Scrupocellaria brendolensis* WATERS, 1891. Proximally from the apertures, there are visible small, oval to drop-like avicularia. Scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 3. *Scrupocellaria gracilis* REUSS, 1869a. Frontal surface of the colony is smooth, no avicularia are developed. Scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 4. *Biflustra savartii texturata* (REUSS, 1848). General view of a multilaminar colony. Locality: Reingruberhöhe.

Fig. 5. *Rosseliana rosselii* (AUDOUIN, 1826). View showing the semilunar opesia with the large space for parietal muscles, in the proximal corners. Locality: Reingruberhöhe.

Fig. 6. *Mollia patellaria* (MOLL, 1803) View showing small, circular opesia with large rounded corners for parietal muscles. Locality: Reingruberhöhe.

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PLATE 12

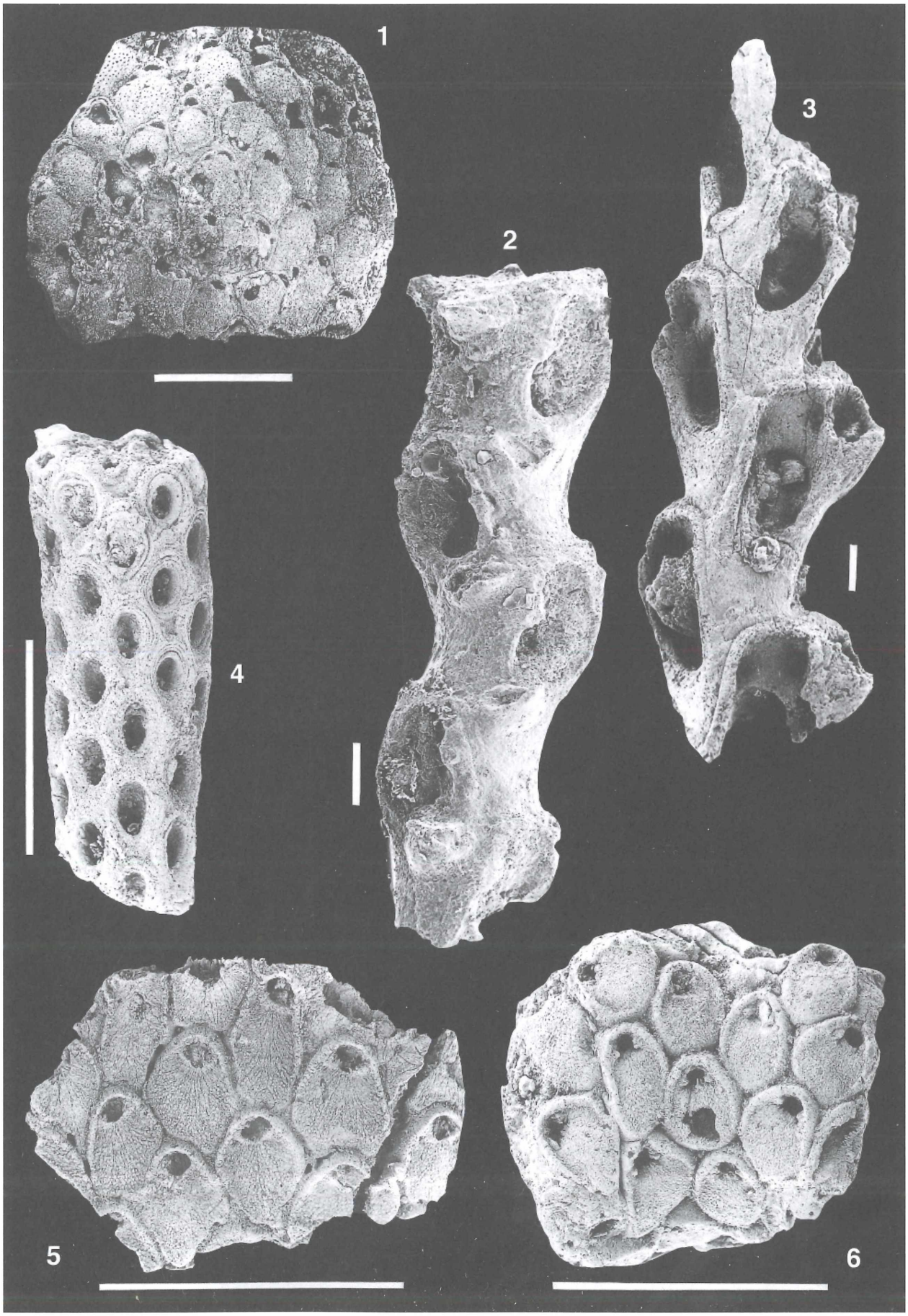

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PLATE 13

Fig. 1. *Calpensia gracilis* (MÜNSTER, 1826). Detail showing the elongated zooecia, with porous cryptocyst and two small opesiules. Locality: Reingruberhöhe.

Fig. 2. *Calpensia polysticha* (REUSS, 1848). Erect colony, having zooecia extremely elongated, with strongly porous cryptocyst and wide, smooth lateral walls (mural rim). Locality: Reingruberhöhe.

Fig. 3. *Aviculiera austriensis* sp.n. Holotype showing flat, bifurcated colony and location of the avicularia. Scale bar = 1 mm. Locality: Reingruberhöhe.

Fig. 4. *Aviculiera hungarii* ZÁGORŠEK, 2001a. Colony showing bifurcated longitudinal rows of zooecia. The avicularia are situated on the zooecium, which is bifurcated. Scale bar = 1 mm. Locality: Reingruberhöhe.

Fig. 5. *Aviculiera austriensis* sp.n. Detail of the paratype showing avicularia with pivotal bar and small opesiules.

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PLATE 13

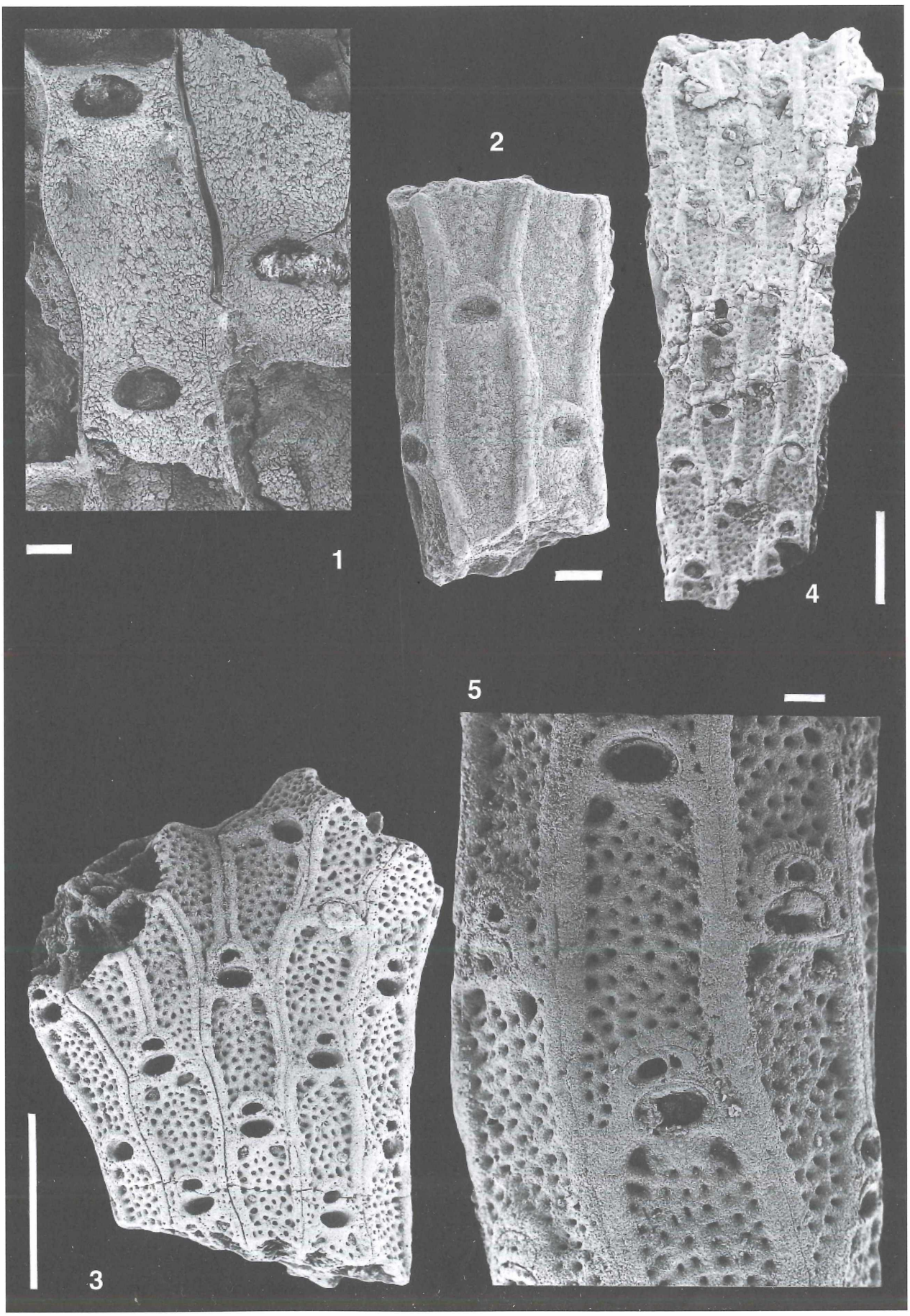

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PLATE 14

Fig. 1. *Poricellaria complicata* (REUSS, 1869a). Colony with a visible pair of the slit-like long opesiules and large adventitious, drop-like avicularium. Locality: Reingruberhöhe.

Fig. 2. *Onychocella subpyriformis* (D'ARCHIAC, 1846) The part of the colony showing hexagonal to oval zooecia and avicularium with palate sharpening distally and usually curved laterally. Scale bar = 1 mm. Locality: Reingruberhöhe.

Fig. 3. *Vibracella trapezoidea* (REUSS, 1848). Fragment of the colony showing rectangular zooecia, with large lunar opesia and with avicularium situated on the vicarious cell with oval orifice. Scale bar = 1 mm. Locality: Reingruberhöhe.

Fig. 4. *Otiochmella discoida* sp.n. Holotype showing discoidal colony and arrangement of the avicularia within the zooecia. Scale bar = 1 mm. Locality: Haselbach.

Fig. 5. *Otiochmella discoida* sp.n. Detail of the paratype showing circular to oval zooecia with small opesia and rhombic adventitious avicularia, which are usually situated between four zooecia. The avicularia are rhombic to oval in shape and taper distally and proximally. Locality: Haselbach.

Fig. 6. *Otiochmella discoida* sp.n. Paratype with ovicell. The ovicell is situated on the topmost part of the figure. It is probably endozooecial and has large opesia. Locality: Haselbach.

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PLATE 14

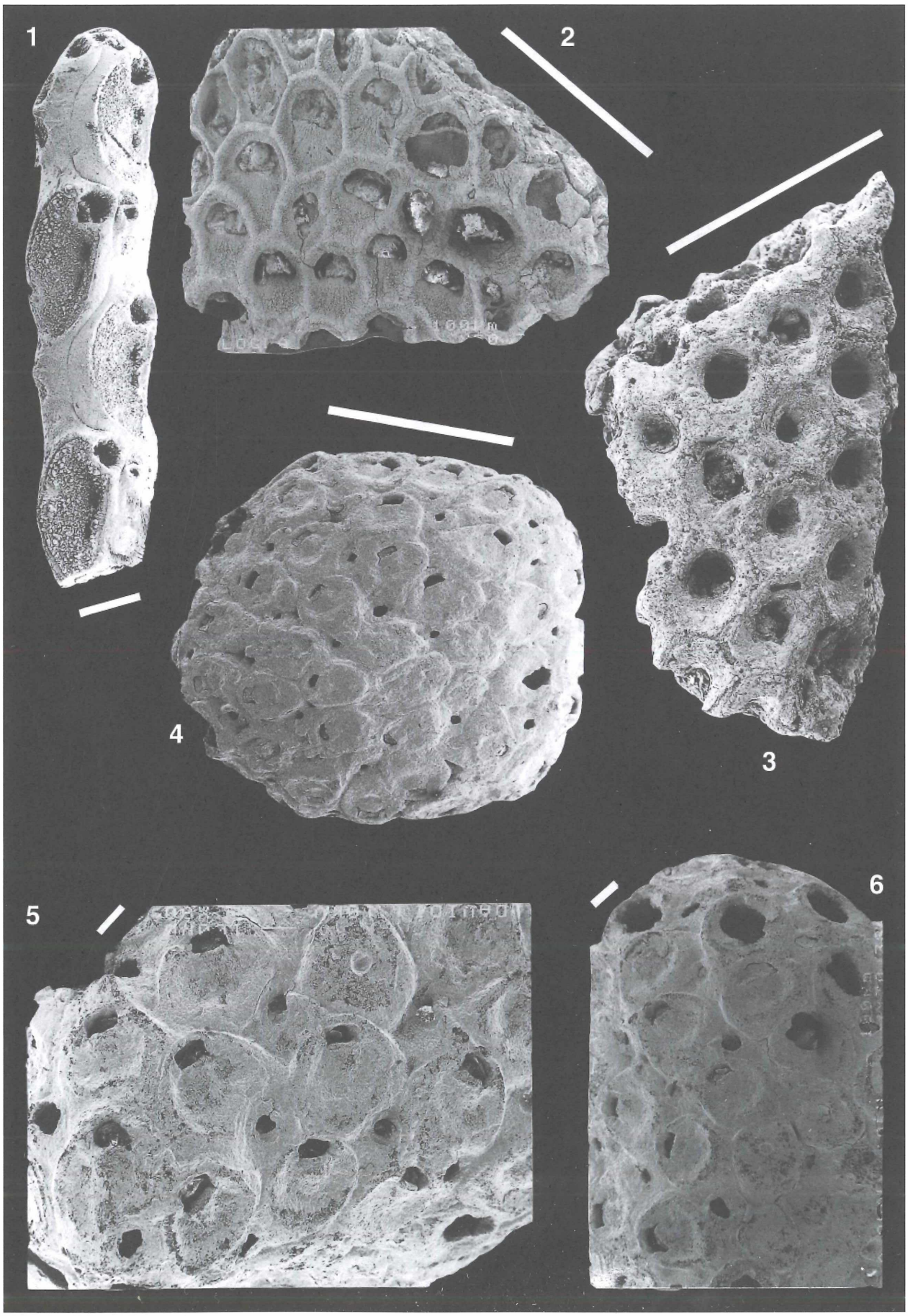

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PLATE 15

Fig. 1. *Steginoporella haidingeri* (REUSS, 1848). General view showing arrangement of the zooecia and B-zooecium (on the lower end of the colony), which is significantly larger than autozooecia and has enlarged proximo lateral corners for parietal muscles and a smooth, large palate. Locality: Reingruberhöhe.

Fig. 2. *Steginoporella firma* (REUSS, 1869a). Detail of the colony showing regular rows of the zooecia and small B-zooecia with flat, short and narrow palate. Locality: Reingruberhöhe.

Fig. 3. *Steginoporella reingruberhohensis* sp. n. Paratype showing autozooecia with large pores and deeply immersed cryptocyst. Locality: Reingruberhöhe.

Fig. 4. *Steginoporella reingruberhohensis* sp. n. Holotype showing much larger B-zooecium with large concave palate and circular, big opesium. Locality: Reingruberhöhe.

Fig. 5. *Cellaria reussi* D'ORBIGNY, 1851. General view showing arrangement of the drop-like shaped zooecia in four longitudinal rows. Locality: Haselbach.

Fig. 6. *Babickella janensis* sp.n. Holotype showing arrangement of 6 zooecia, where towards the margin of the preserved stem the size decreases. Scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 7. *Babickella janensis* sp.n. Paratype showing unequal size of the zooecia. Scale bar = 100 μm. Locality: Reingruberhöhe.

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PLATE 15

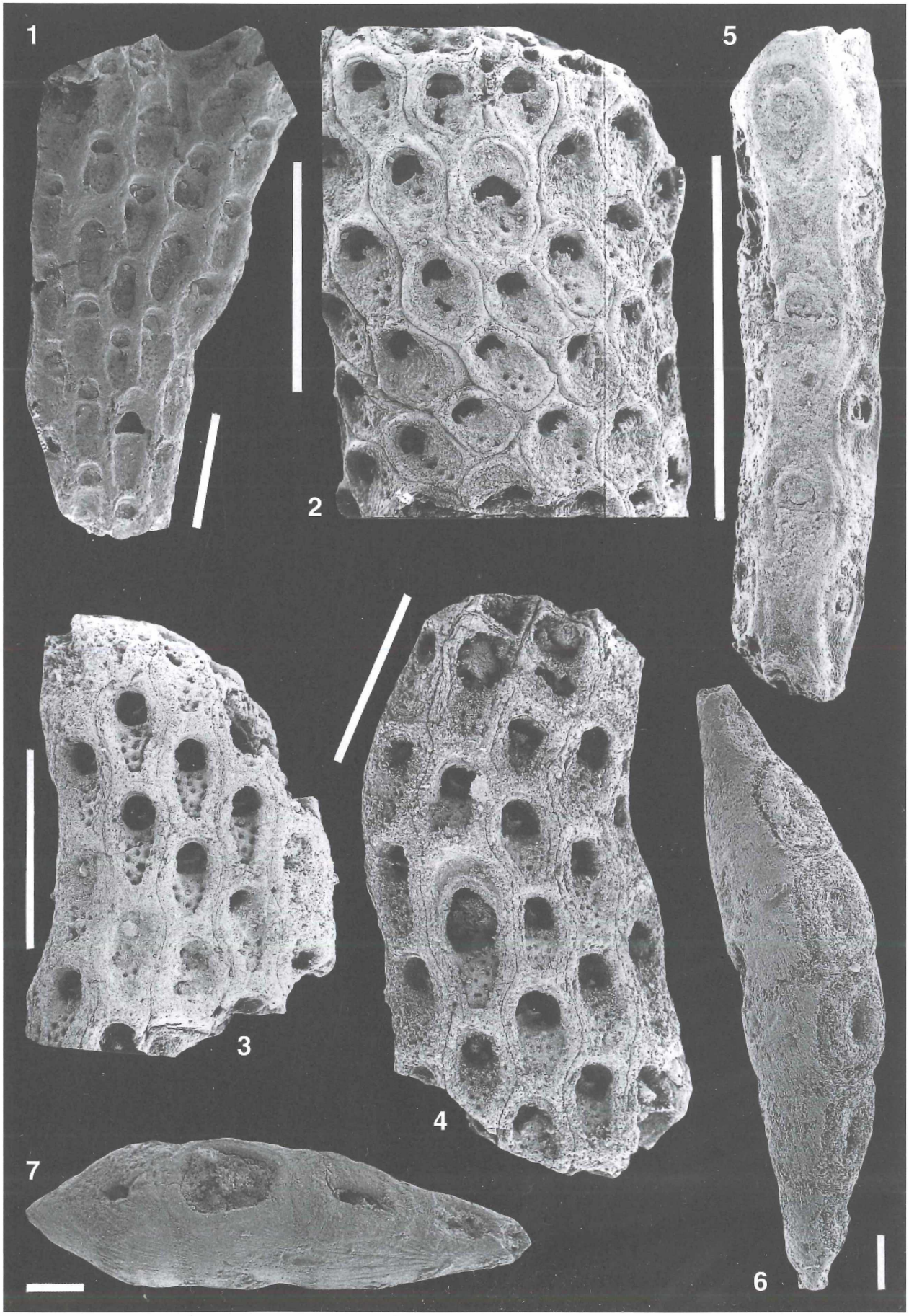

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PLATE 16

Fig. 1. *Puellina* (*Cribrilaria*) *radiata* (MOLL, 1803). General view showing locally developed oral spines, a large, intrazooecial avicularium, with long, acute palate and hyperstomial ovicell, with smooth, nonporous frontal wall. Locality: Reingruberhöhe.

Fig. 2. *Gephyrotes convexa* CANU & BASSLER, 1920. Detail of the colony showing costules with two pores on both of its ends and slightly separated aperture with oral spines. Locality: Reingruberhöhe.

Fig. 3. *Gordoniella longituda* sp. n. Holotype showing the costae perforated by a large pore on its median end. Locality: Reingruberhöhe.

Fig. 4. *Gordoniella longituda* sp. n. Paratype showing the shape of the zooecia and wide apertural bar. Locality: Reingruberhöhe.

Fig. 5. *Castanopora megacephala* (REUSS, 1848). Detail of one zooecium with small globular, hyperstomial ovicell and perforated costae. Locality: Reingruberhöhe.

Fig. 6. *Castanopora megacephala* (REUSS, 1848). Fragment of the colony showing large oval aperture, with wide oral bar, the costae with very wide lateral costal fusions and with perforation by small narrow slits. Locality: Reingruberhöhe.

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PLATE 16

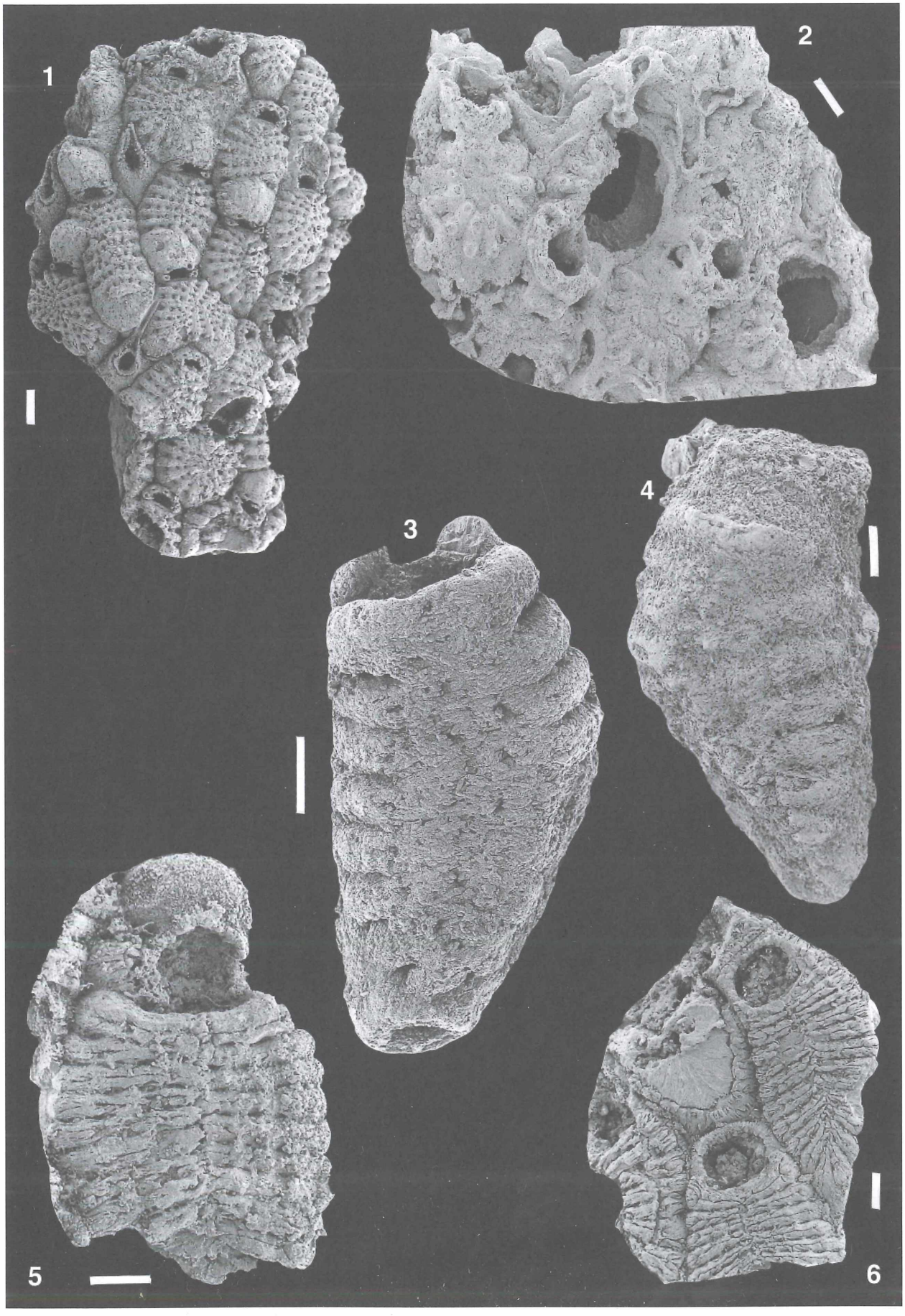

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PLATE 17

Fig. 1. *Vavropora pupuliformis* ZÁGORŠEK, 2001a. Fragment of the colony showing the pairs of the costae forming the zigzag median lamella and being perforated by a small pore. Distally from the zooecia, there are large, interzooecial avicularia, with narrow, acute, long palate directed laterally (to the left). Locality: Reingruberhöhe.

Fig. 2. *Ditaxiporina septentrionalis* (WATERS, 1891). Details showing the arrangement of the zooecia and suboral, large and paired avicularia. Locality: Reingruberhöhe.

Fig. 3. *Caberoides continua* (WATERS, 1891) General view of the colony showing shallow, narrow pore-chambers situated on both sides of the zooecium and a small cribrimorph area. Locality: Reingruberhöhe.

Fig. 4. *Unifissurinella boulangeri* POIGNANT, 1991. View of the dorsal side of the zooecium showing the calcified stolon and the distal opening. Locality: Reingruberhöhe.

Fig. 5. *Unifissurinella boulangeri* POIGNANT, 1991. Lateral view showing the triangular shape of the zooecia, the strongly porous, convex frontal wall and proximally extending nonporous, tubular portion. Locality: Reingruberhöhe.

Fig. 6. *Unifissurinella boulangeri* POIGNANT, 1991. Frontal view showing circular apertures with cardelles, a shallow sinus and lacking oral spines. Locality: Reingruberhöhe.

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PLATE 17

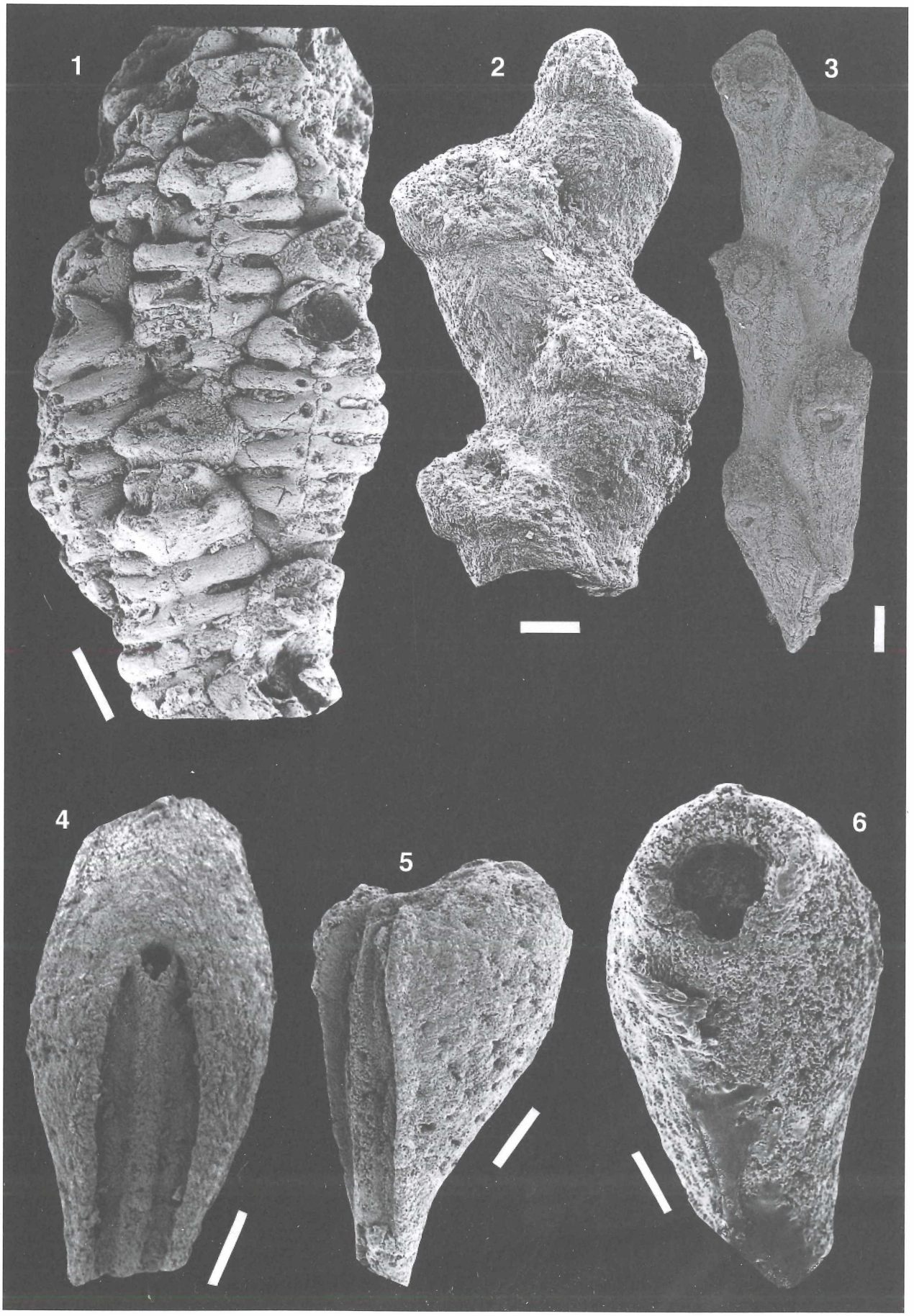

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PLATE 18

Fig. 1. *Costatimorpha algella* sp.n. Holotype showing the shape of the zooecia and disto-lateral processes probably carrying avicularia. Locality: Reingruberhöhe.

Fig. 2. *Costatimorpha algella* sp.n. Paratype showing costal area, circular apertures and lateral communication pore situated at the proximal end of the zooecium. Locality: Reingruberhöhe.

Fig. 3. *Costatimorpha algella* sp.n. Dorsal view of the paratype showing development of slight ribs. Locality: Reingruberhöhe.

Fig. 4. *Costatimorpha algella* sp.n. Frontal view of the paratype showing disto-lateral processes carrying avicularia and large hole, which remains if the small costal shield has been destroyed. Locality: Reingruberhöhe.

Fig. 5. *Costatimorpha algella* sp.n. Paratype showing a small costal shield and disto-lateral processes with avicularia. Locality: Reingruberhöhe.

Fig. 6. *Costatimorpha algella* sp.n. Paratype showing development of the costal shield and lateral communication pores situated at the proximal end of the zooecium. Locality: Reingruberhöhe.

Fig. 7. *Costatimorpha algella* sp.n. Detail of the small costal shield showing smooth spines without lacunae, lumen pores nor infracostal windows. Locality: Reingruberhöhe.

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PLATE 19

Fig. 1. *Adeonella minor* (REUSS, 1869a). Fragment of the colony showing marginal areolar pores, a very small spiramen and two small oral avicularia. Locality: Haselbach.

Fig. 2. *Adeonella ornatissima* (STOLICZKA, 1862). Detail showing rhomboidal zooecia in the middle and longitudinal zooecia at the margin of the colony. The zooecia have semilunular apertures, a large spiramen and two small, circular, oral avicularia. Locality: Reingruberhöhe.

Fig. 3. *Adeonellopsis porina* (ROEMER, 1863) Fragment of the colony showing zooecia with mural rim prominent only around the aperture and a small, slit like spiramen. The avicularia are large circular to drop-like, without pivot. The direction of the palate is lateral Locality: Reingruberhöhe.

Fig. 4. *Adeonellopsis porina* (ROEMER, 1863) General view showing arrangement of the zooecia and the presence of the mural rim only around the aperture. Locality: Reingruberhöhe.

Fig. 5. *Adeonellopsis giampietroi* ZÁGORŠEK, 2001a. Detail of the colony showing elongated zooecia, each with thick, smooth mural rim, parietal marginal areolar pores and large avicularium with flat palate tapering laterally. Scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 6. *Adeonellopsis* sp. Colony showing arrangement of the zooecia with a large spiramen and small avicularia tapering distally. Among the zooecial rows, there are rows of large holes, which might be perhaps regarded as gonozooecia. Scale bar = 100 μm. Locality: Haselbach.

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PLATE 19

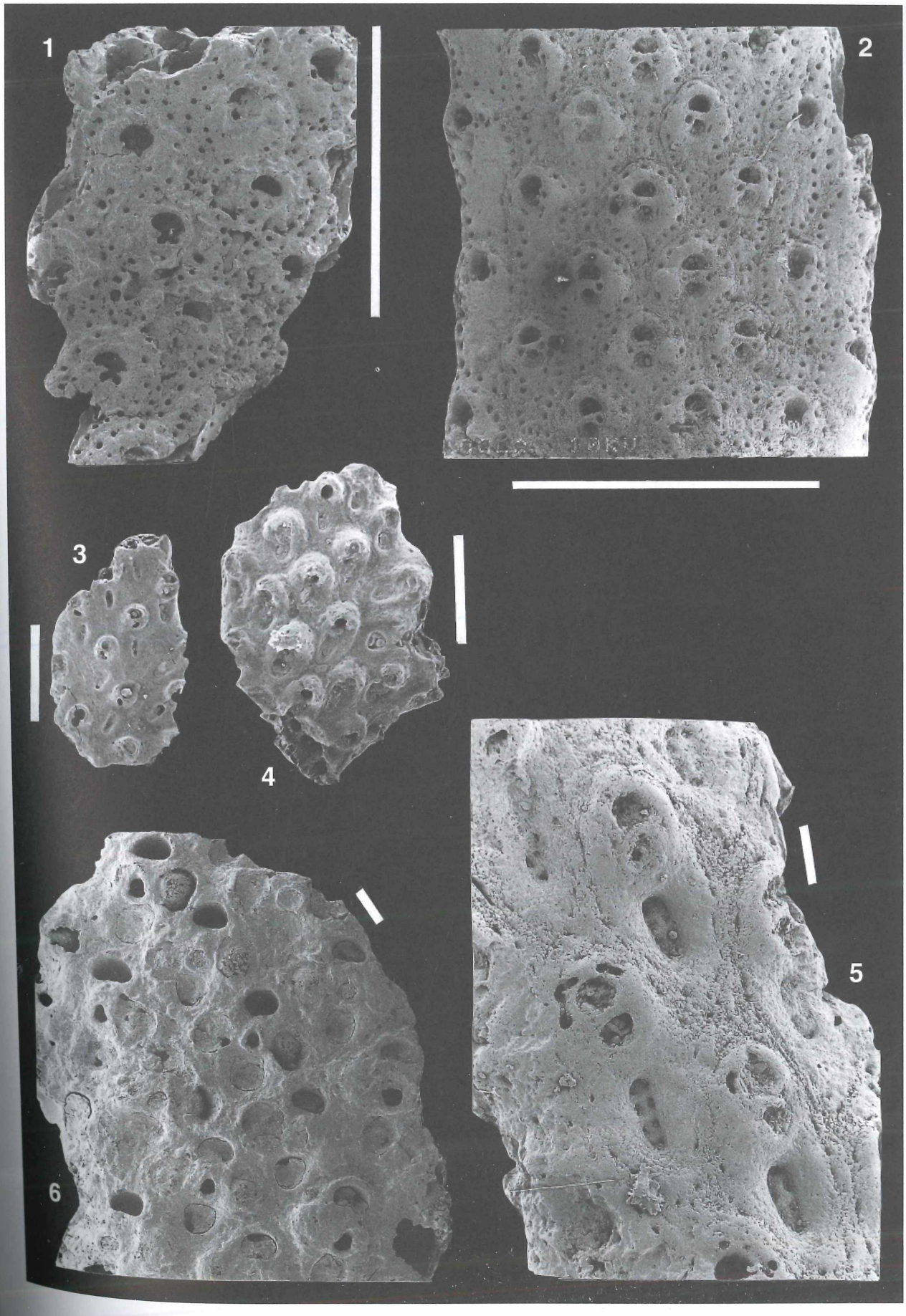

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PLATE 20

Fig. 1. *Adeonellopsis triporica* sp.n. Holotype showing arrangement of the zooecia and approximately equal size of the aperture, avicularium and spiramen. Locality: Reingruberhöhe.

Fig. 2. *Adeonellopsis triporica* sp.n. Paratype showing small marginal areolar pores and small spiramen perforated by a few large pores. Locality: Reingruberhöhe.

Fig. 3. *Adeonellopsis triporica* sp.n. Paratype showing spiramen smaller than the apertures and small marginal areolar pores. Locality: Reingruberhöhe.

Fig. 4. *Adeonellopsis coscinophora* (Reuss, 1848). General view showing zooecia with small avicularia and a large spiramen area perforated by many small pores. Locality: Reingruberhöhe.

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PLATE 20

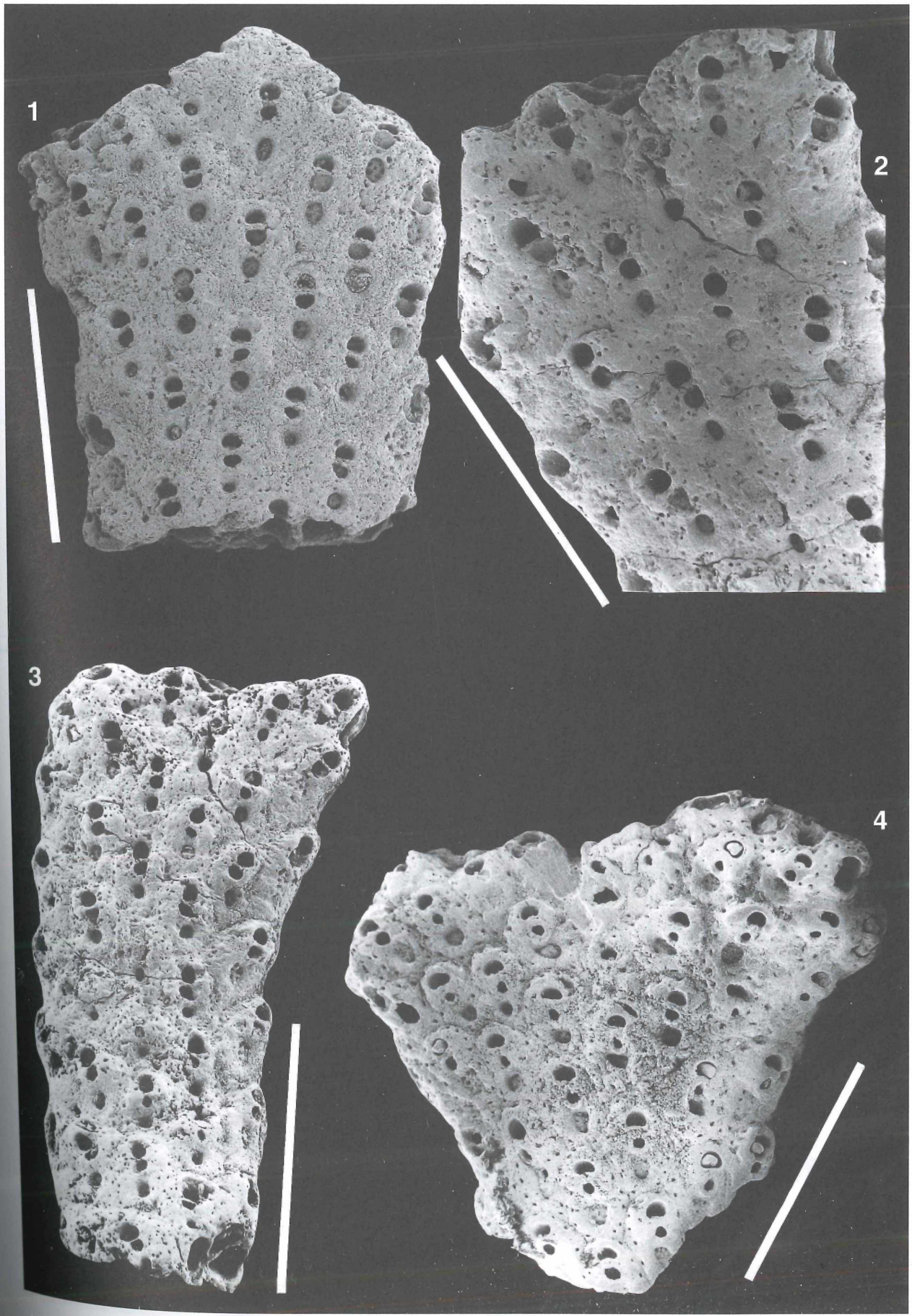

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PLATE 21

Fig. 1. *Meniscopora syringopora* (REUSS, 1848). General view showing zooecia with characteristically developed large, circular marginal areolar pores and small, oral avicularium. Locality: Reingruberhöhe.

Fig. 2. *Porella clavula* (CANU & BASSLER, 1920). Part of the colony showing zooecia with elevated lateral walls, marginal areolar pores and frontal, suboral avicularia situated on the prominent chamber. Locality: Reingruberhöhe.

Fig. 3. *Reussia regularis* (REUSS, 1866). General view of the colony showing arrangement of the zooecia, which have wide, smooth, prominent lateral walls and a frontal wall with big, circular marginal areolar pores. Locality: Reingruberhöhe.

Fig. 4. *Escharoides mamillata* (WOOD, 1844). Detail of the colony showing the zooecia with granular frontal wall, globular, immersed ovicells and a pair of avicularia located very near to the aperture, on the peristome. The three adventitious avicularia with pivotal bars are situated around the upper-most zooecia. Locality: Reingruberhöhe.

Fig. 5. *Escharella tenera* (REUSS, 1874). General view of a fragment of the colony showing oval to hexagonal zooecia with a smooth, slightly convex, frontal wall and large marginal areolar pores. Locality: Reingruberhöhe.

Fig. 6. *Teichopora* cf. *clavata* GREGORY, 1893. General view of the colony showing arrangement of the zooecia with large avicularia and marginal areolar pores. Locality: Reingruberhöhe.

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PLATE 21

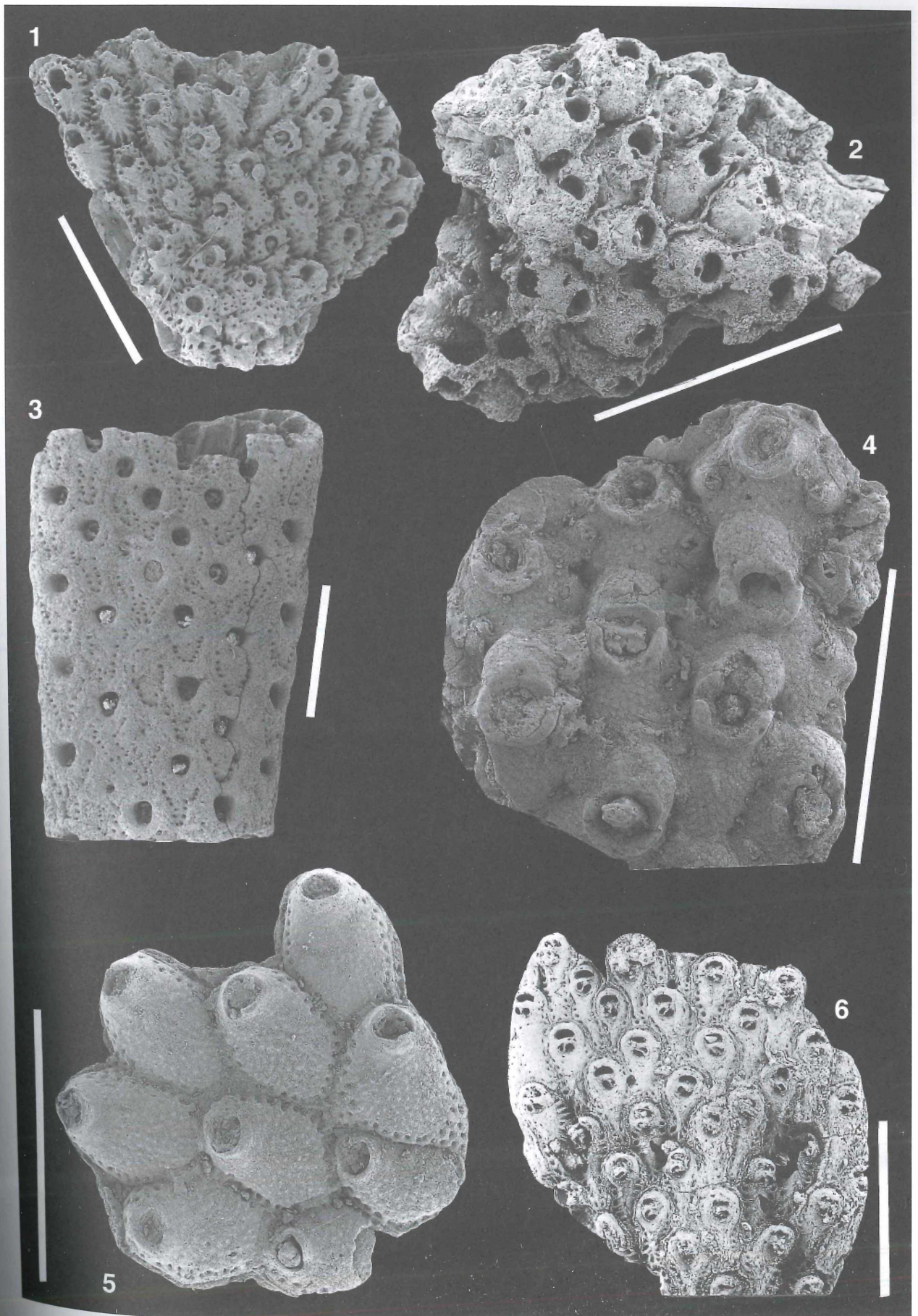

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PLATE 22

Fig. 1. *Hemicyclicopora parajuncta* CANU & BASSLER, 1917. General view showing arrangement of the zooecia in longitudinal rows. The zooecia are drop-like, narrow with a smooth, nonporous and convex frontal wall. Locality: Reingruberhöhe.

Fig. 2. *Hemicyclicopora parajuncta* CANU & BASSLER, 1917. Detail showing very small marginal pores and a deeply immersed, very small hyperstomial ovicell. Locality: Reingruberhöhe.

Fig. 3. *Chlidoniopsis vindobonensis* (REUSS, 1848). Lateral view of to the zooecium showing the long peristome, a long stolon and lateral ornamentation consisting of small pores. Locality: Reingruberhöhe.

Fig. 4. *Chlidoniopsis vavrai* sp.n. Lateral view of the holotype showing characteristically developed hump on the dorsal wall, a short stolon, and a well developed ornamentation consisting of two rows of large pores. The distal most marginal areolar pore developed on the dorsal wall is much larger than the rest of the pores. Locality: Reingruberhöhe.

Fig. 5. *Chlidoniopsis vavrai* sp.n. Lateral view of the paratype showing prominent hump, a very long stolon and the absence of a peristome. Locality: Reingruberhöhe.

Fig. 6. *Chlidoniopsis vavrai* sp.n. Lateral view of the paratype showing short hump, well-developed lateral ornamentation and the absence of any stolon. Locality: Reingruberhöhe.

Fig. 7. *Chlidoniopsis vavrai* sp.n. View of the dorsal wall of the paratype showing the large pore, where probably a stolon was attached connecting this zooecium to the distal neighbour. Well-developed marginal areolar pores belong to the dorsal wall. Locality: Reingruberhöhe.

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PLATE 22

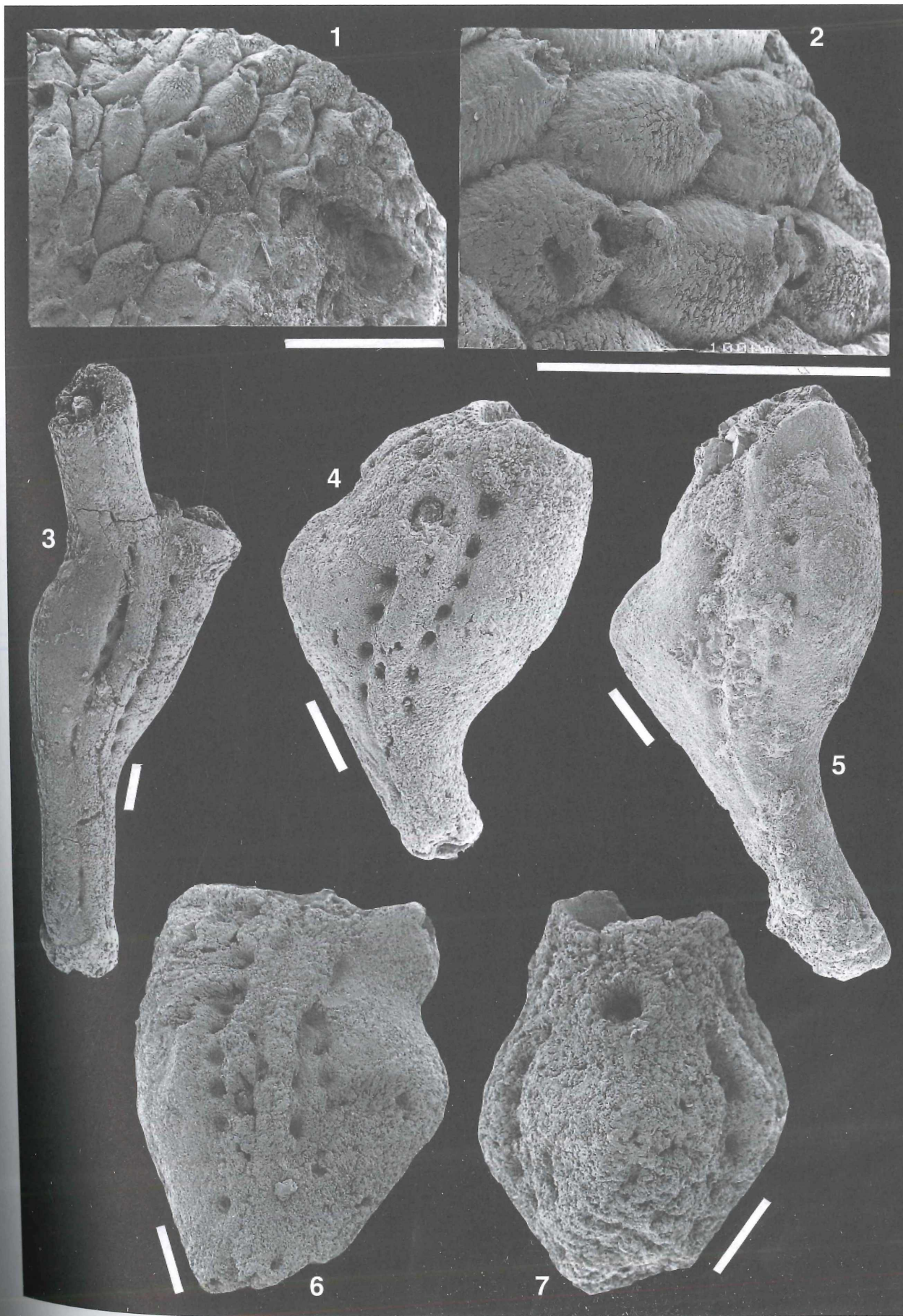

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PLATE 23

Fig. 1. *Metrarabdotos maleckii* CHEETHAM, 1968. General view showing elongated zooecia having circular apertures with a sinus, big marginal areolar pores, but no oral avicularia. Locality: Reingruberhöhe.

Fig. 2. *Prenantia phymatopora* (REUSS, 1869a). Fragment of the colony showing elongated hexagonal zooecia, with a strongly porous frontal wall, slightly elevated lateral walls and an oval aperture, with a small pseudosinus. Locality: Reingruberhöhe.

Fig. 3. *Escharoides coccinea* (ABILDGAARD, 1806). General view showing chaotically grown zooecia with well developed oral spines, marginal areolar pores and avicularia situated at the top of a small chamber, which is bordered by 5-8 marginal areolar pores. Locality: Reingruberhöhe.

Fig. 4. *Cystisella midwayanica* CANU & BASSLER, 1917. General view of the colony showing a strongly convex frontal wall with a very long and narrow avicularium. Locality: Reingruberhöhe.

Fig. 5. *Umbonula macrocheila* (REUSS, 1848). General view of an erect colony showing arrangement of the zooecia with marginal areolar pores and small adventitious circular avicularium without pivotal bar situated on the proximal margin of the aperture, on the top of a short umbo. Locality: Reingruberhöhe.

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PLATE 23

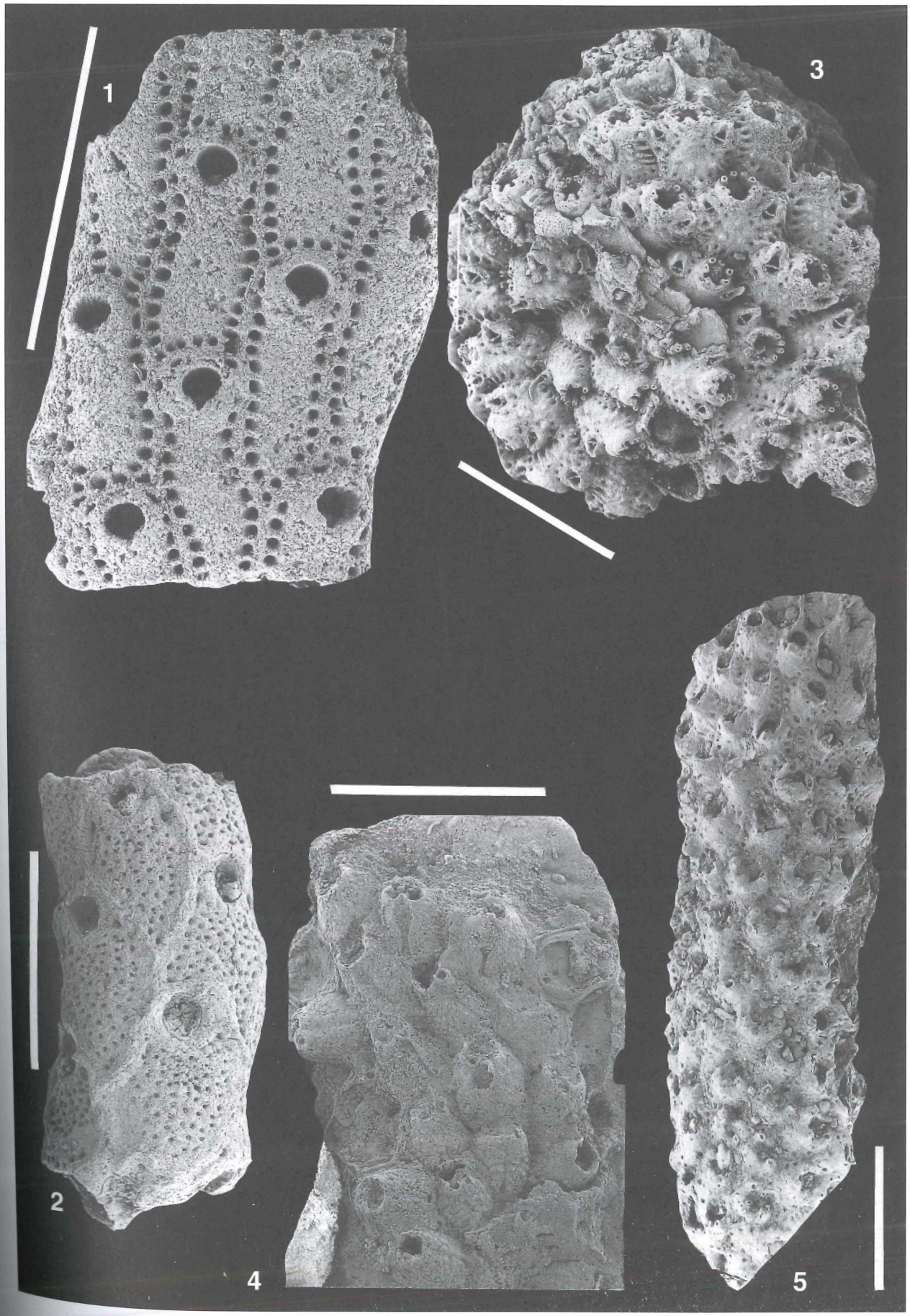

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PLATE 24

Fig. 1. *Plagiosmittia denticulifera* CANU & BASSLER, 1920. General view showing rhomboidal zooecia with a strongly perforated frontal wall, a large avicularium situated in the middle of the proximal margin of the peristome and a deeply immersed ovicell with a strongly porous frontal wall. Locality: Reingruberhöhe.

Fig. 2. *Zuzanella kovaci* ZÁGORŠEK, 2001b. General view of an encrusting colony showing zooecia with well developed, very large marginal areolar pores, deeply immersed oral avicularia and a deeply immersed ovicell, with a porous frontal wall. Locality: Reingruberhöhe.

Fig. 3. *Smittoidea angulata* BRONN, 1838. An encrusting colony showing hexagonal zooecia separated from others by a narrow calcitic elevation and developing very large marginal areolar pores. Locality: Reingruberhöhe.

Fig. 4. *Smittoidea excentrica* (REUSS, 1864a). General view of the erect colony showing circular avicularia situated on the strongly convex avicularian chamber. Locality: Reingruberhöhe.

Fig. 5. *Smittoidea perforata* CANU & BASSLER, 1935. Detail of the encrusting colony showing drop-like avicularia situated in the middle of the frontal wall and a large, hyperstomial ovicell, with a slightly porous frontal wall. Locality: Reingruberhöhe.

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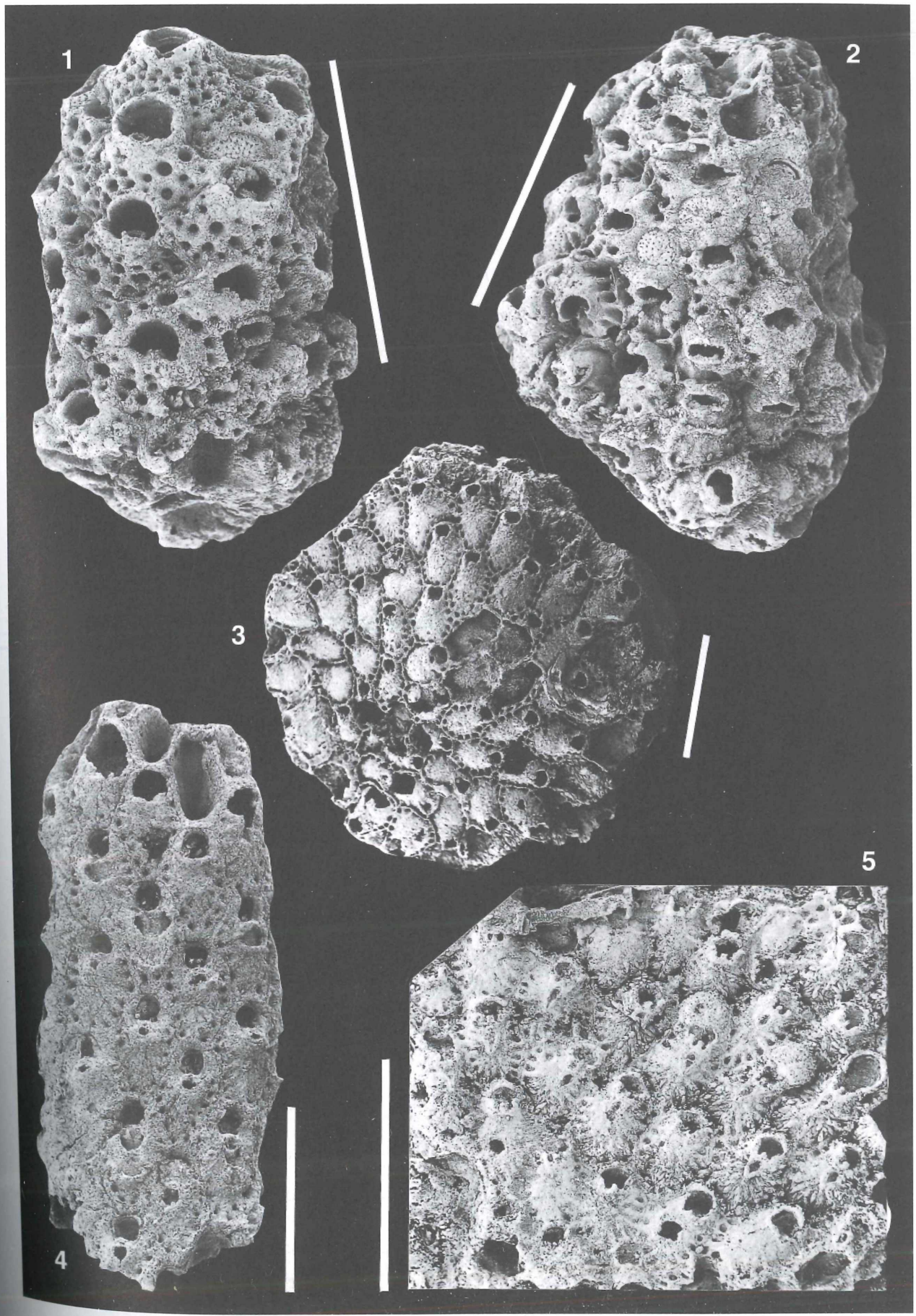

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PLATE 25

Fig. 1. *Hippomonavella bisulca* (REUSS, 1869a). Detail of the colony showing drop-like zooecia with flat, nonporous frontal wall bordered by big marginal areolar pores and an oval to circular aperture with prominent condyles. Locality: Reingruberhöhe.

Fig. 2. *Hippomonavella exarata* (REUSS, 1848). General view showing arrangement of the zooecia with marginal areolar pores, elevated lateral walls and a slightly convex, nonporous frontal wall. Locality: Reingruberhöhe.

Fig. 3. *Hippomonavella exarata* (REUSS, 1848). Detail showing a few circular apertures with concave proximal margin and condyles and large avicularium developing a chamber on the frontal wall. Locality: Reingruberhöhe.

Fig. 4. *Metradolium obliquum* CANU & BASSLER, 1920. General view showing arrangement of zooecia. Locality: Reingruberhöhe.

Fig. 5. *Metradolium obliquum* CANU & BASSLER, 1920. Detail showing circular, large, deeply immersed aperture with a very narrow semilunar, unsymmetrical spiramen and suboral, large avicularium tapering usually laterally. Locality: Reingruberhöhe.

Fig. 6. *Hippomonavella stenosticha* (REUSS, 1848). General view showing elongated zooecia with a slightly convex, nonporous frontal wall and with large marginal areolar pores. The aperture is oval to circular with condyles but without peristome. Locality: Reingruberhöhe.

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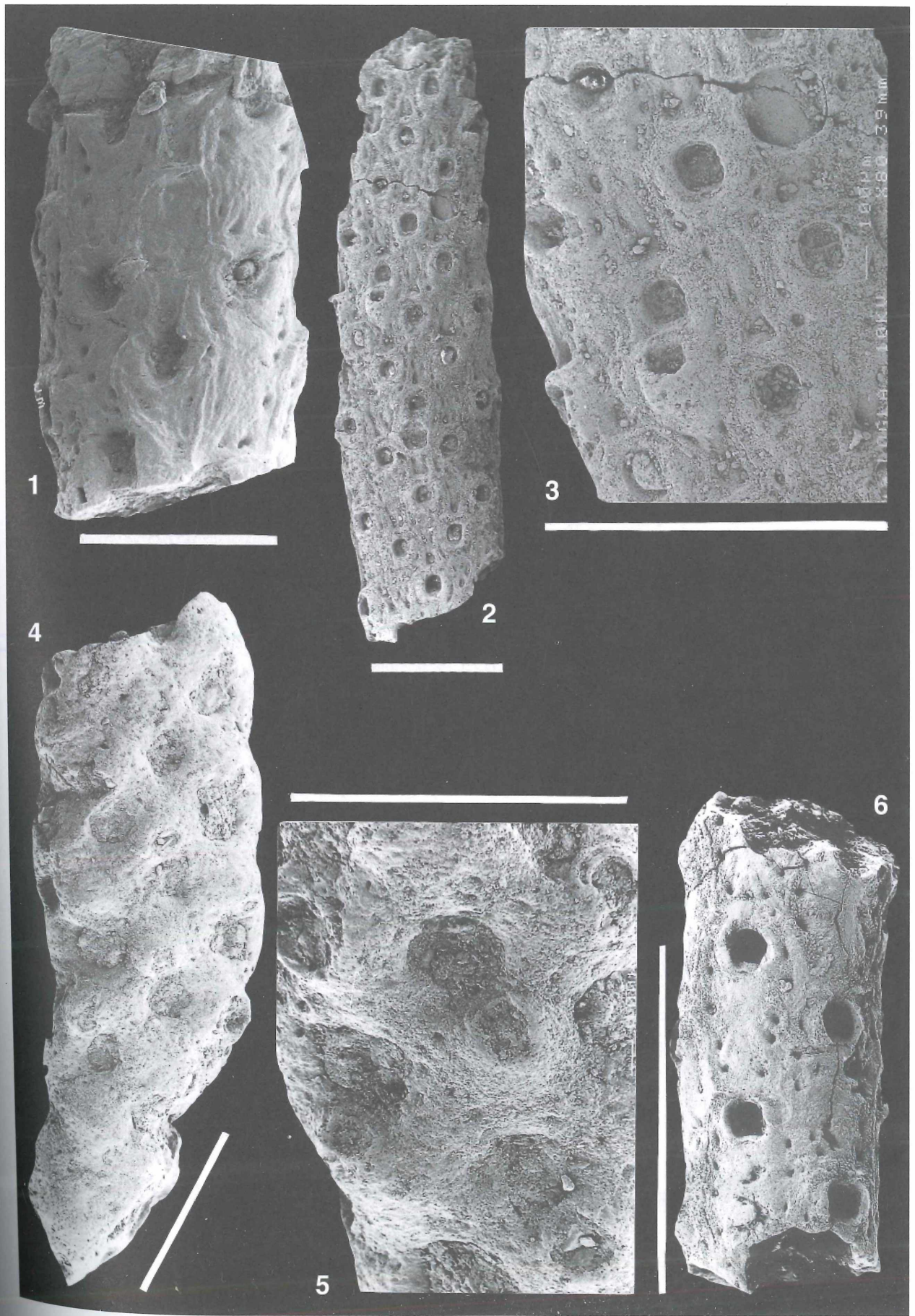

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PLATE 26

Fig. 1. *Schizoporella dunkeri* (REUSS, 1848). An ovicelled colony showing development of the hyperstomial, globular, large ovicell and one large avicularium. Locality: Reingruberhöhe.

Fig. 2. *Schizoporella dunkeri* (REUSS, 1848). The non ovicelled colony showing development of one smaller avicularium and the small but prominent sinus. Locality: Reingruberhöhe.

Fig. 3. *Lagenicella helmbergensis* ZÁGORŠEK, 2001b. Fragment of the colony showing the long nonporous peristome and deeply immersed ovicell with porous frontal wall. Locality: Reingruberhöhe.

Fig. 4. *Schizoporella* cf. *geminipora* (REUSS, 1848). The unilamellar colony showing a remarkable small sinus and large avicularia situated on the frontal wall. Locality: Reingruberhöhe.

Fig. 5. *Herentia hydmanii* (JOHNSTON, 1847). Fragment of the colony showing aperture with sinus and oral spines and circular avicularium situated on the frontal wall, near the lateral wall of the zooecium. Scale bar = 100 μm. Locality: Reingruberhöhe.

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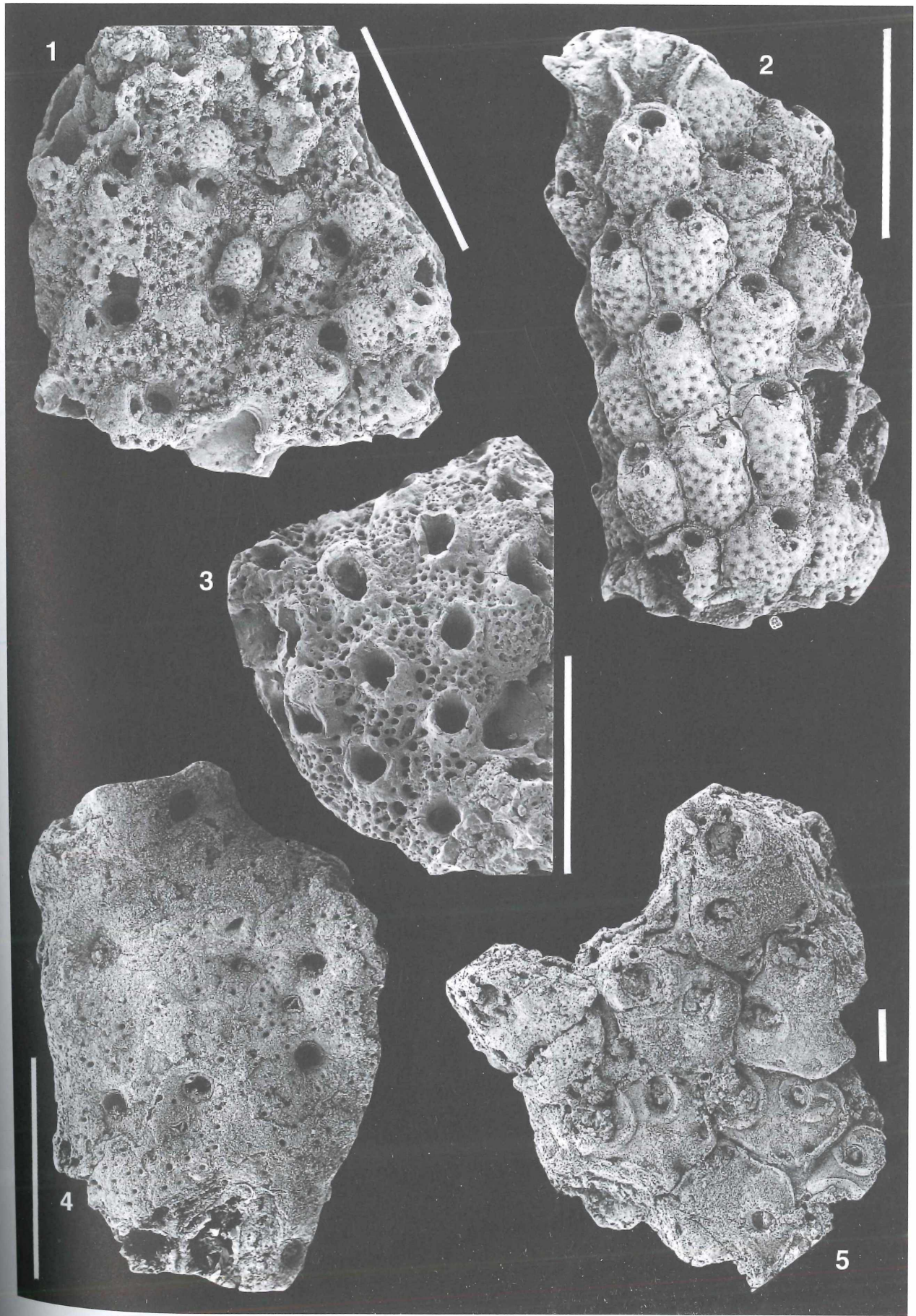

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PLATE 27

Fig. 1. *Hippomenella megalota* REUSS, 1848. General view of the colony showing arrangement of the zooecia marginally perforated by two parallel rows of areolar pores. Locality: Reingruberhöhe.

Fig. 2. *Hippomenella megalota* REUSS, 1848. Detail showing oral spines, large avicularium with incomplete pivotal bar and spheroidal, hyperstomial ovicell bordered by areolar pores. Scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 3. *Porina duplicata* (REUSS, 1869a). General view showing arrangement of the zooecia and circular, large avicularium situated proximally from the aperture. The ascopore is very small, slightly larger than the regular pores and is situated proximally from the avicularium. Locality: Reingruberhöhe.

Fig. 4. *Gigantopora duplicata* (REUSS, 1848). Erect colony showing zooecia arranged in regular rows and developing a long but very narrow peristomial spiramen and one large oral avicularium with pivotal bar. Locality: Reingruberhöhe.

Fig. 5. *Gigantopora lyratostoma* (REUSS, 1866). Fragment of the encrusting colony showing few chaotically grown zooecia with a well developed large avicularium and a small globular ovicell with porous frontal wall. Locality: Reingruberhöhe.

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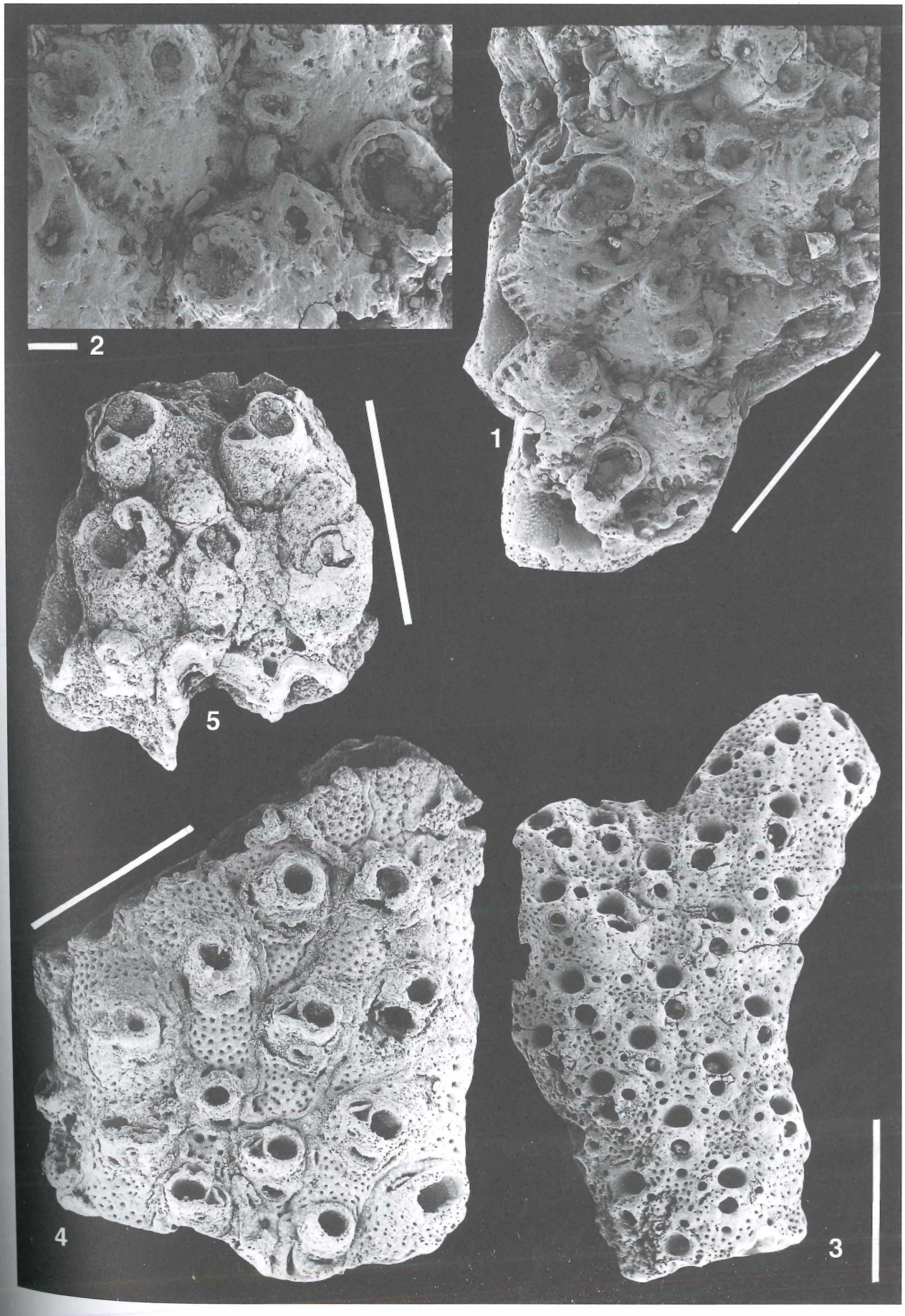

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PLATE 28

Fig. 1. *Arthropoma sparsipora* (REUSS, 1869a). General view of a fragment of the colony showing hexagonal shape of the zooecia with smooth frontal wall regularly perforated by many small, simple pores. Scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 2. *Tubucella papillosa* (REUSS, 1848). General view of an erect colony showing arrangement of the zooecia that has a nonporous peristome and strongly porous frontal wall. Locality: Reingruberhöhe.

Fig. 3. *Arthropoma rugulosa* (REUSS, 1874). Fragment of the colony showing irregular shape of the zooecia, which have rarely developed a large smooth ovicell. Locality: Reingruberhöhe.

Fig. 4. *Aimulosia manzonii* (NEVIANI, 1896). General view of the colony showing arrangement of the zooecia, which have a convex, nonporous frontal wall. Scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 5. *Aimulosia manzonii* (NEVIANI, 1896). Detail showing the prominent ovicell with granular frontal wall, characteristically recumbent on the distal zooecium and small avicularia situated on the proximal margin of the aperture. Scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 6. *Kionidella excelsa* KOSCHINSKY, 1885. General view of a complete colony showing regularly arranged zooecia with paired avicularia and remarkable cardelles. Locality: Reingruberhöhe.

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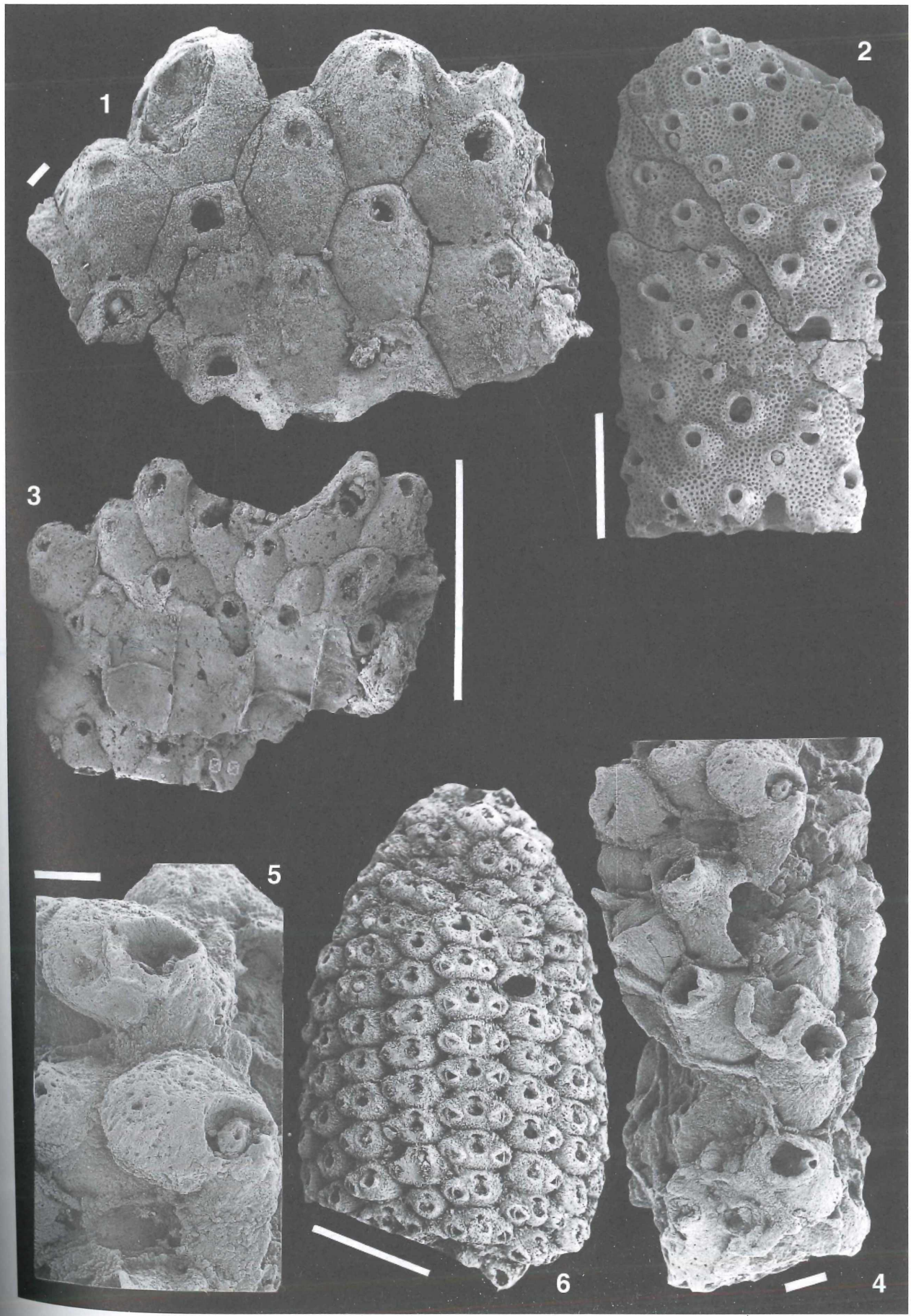

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PLATE 29

Fig. 1. *Stenosipora simplex* (KOSCHINSKY, 1885). Fragment of the colony showing the terminal, elliptical aperture, with two low cardelles and one large lateral avicularium. Locality: Haselbach.

Fig. 2. *Celleporaria globularis* (BRONN, 1837). General view showing globular shape of the colony and zooecia with small areolar pores. Between the zooecia, there are arranged large intrazooecial avicularia. Locality: Reingruberhöhe.

Fig. 3. *Galeopsis* cf. *subquadrangularis* (REUSS, 1869a). General view showing arrangement of the zooecia and a few ovicelled zooecia. Locality: Reingruberhöhe.

Fig. 4. *Galeopsis* cf. *subquadrangularis* (REUSS, 1869a). Detail showing the large aperture, with circular spiramen and a pair of small circular avicularia. The marginal pores are large and rare. Locality: Reingruberhöhe.

Fig. 5. *Celleporaria conglomerata* GOLDFUSS, 1827 sensu BRAGA & BARBIN, 1988. General view showing zooecia with terminal, circular apertures bearing a very small pseudosinus. Locality: Reingruberhöhe.

Fig. 6. *Reteporella tuberculata* (REUSS, 1869a). General view showing reticulated shape of the colony and circular apertures with small condyles and a large spiramen. Locality: Reingruberhöhe.

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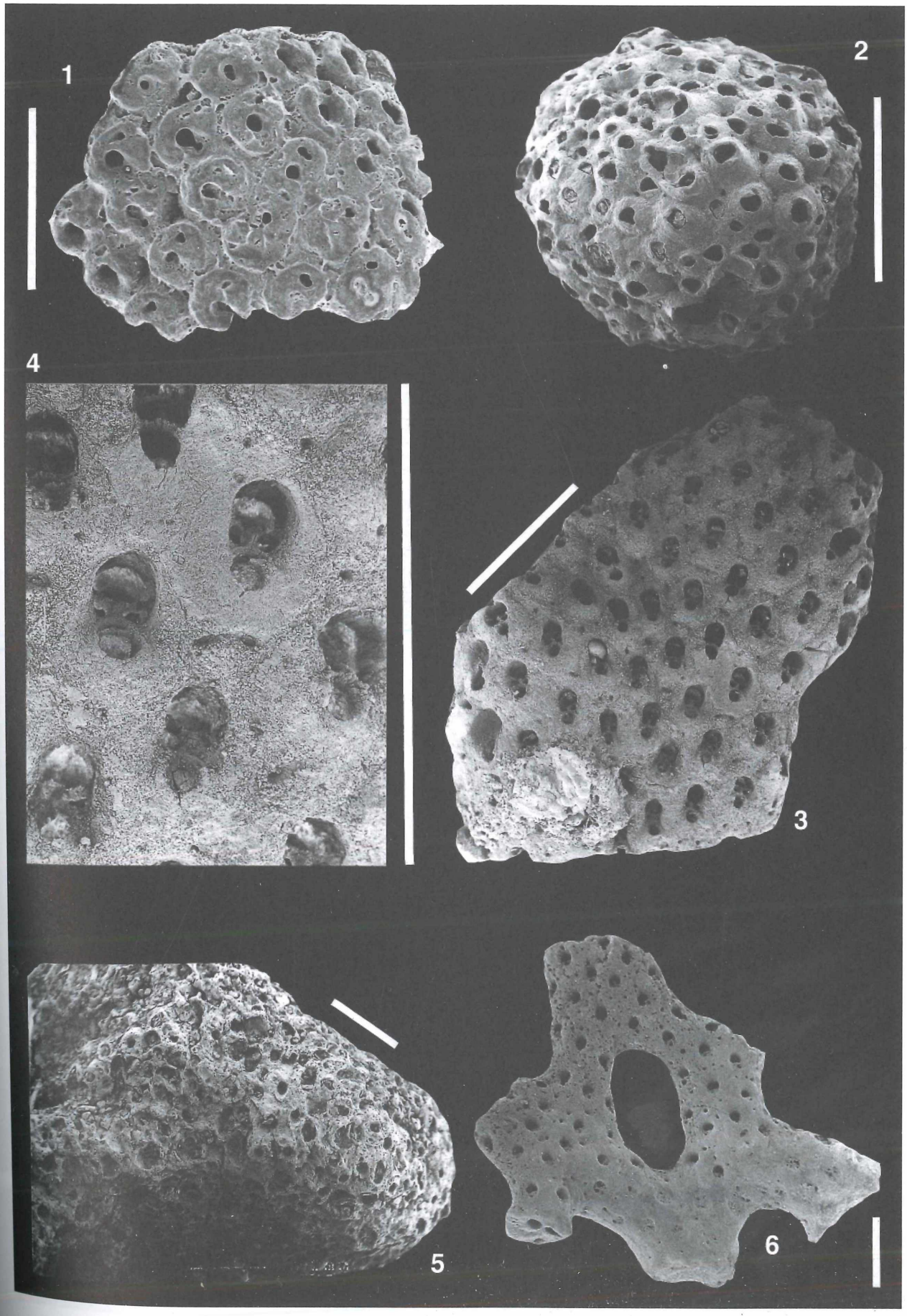

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PLATE 30

Fig. 1. *Escharella cheilopora* (Reuss, 1848). The encrusting colony showing ancestrula (in the centre), zooecia with well developed triangular lyrula and with 2 to 4 oral spines around each aperture. Locality: Reingruberhöhe.

Fig. 2. *Aviculiera* sp. Encrusting colony showing rhomboidal zooecia, imperforate cryptocyst with two long slits - opesiules - and a large adventitious, drop-like avicularium with pivot. Locality: Reingruberhöhe.

Fig. 3. *Reteporella simplex* (Busk, 1859). General view showing branching colony and zooecia in three longitudinal rows. Locality: Reingruberhöhe.

Fig. 4. *Reteporella simplex* (Busk, 1859). Detail of the colony showing zooecia with small and rare marginal areolar pores, a drop-like spiramen and the slightly prominent, hyperstomial ovicell with its smooth, nonporous frontal surface. Scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 5. *Iodictyum rubeschii* (Reuss, 1848). Detail of the colony showing longitudinal zooecia with smooth, flat frontal wall and small and drop-like sinus. Scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 6. *Bactridium hagenowi* Reuss, 1848. The bifoliate colony showing elongated zooecia joint by dorsal walls with perforated frontal wall and a well developed sinus. Scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 7. *Schizotheca* (?) *ternata* (Reuss, 1848). Detail of the encrusting colony showing zooecia with very rare marginal areolar pores and the frontal wall distally arising above the aperture and forming characteristically developed brim carrying small sinus, large condyles and well developed oral spines. Locality: Reingruberhöhe.

Fig. 8. *Schizotheca* (?) sp. Encrusting colony showing zooecia with large marginal areolar pores and the brim carrying a small sinus, which characteristically arises above the aperture. Locality: Reingruberhöhe.

Unless otherwise indicated, all scale bars = 1 mm.

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PLATE 30

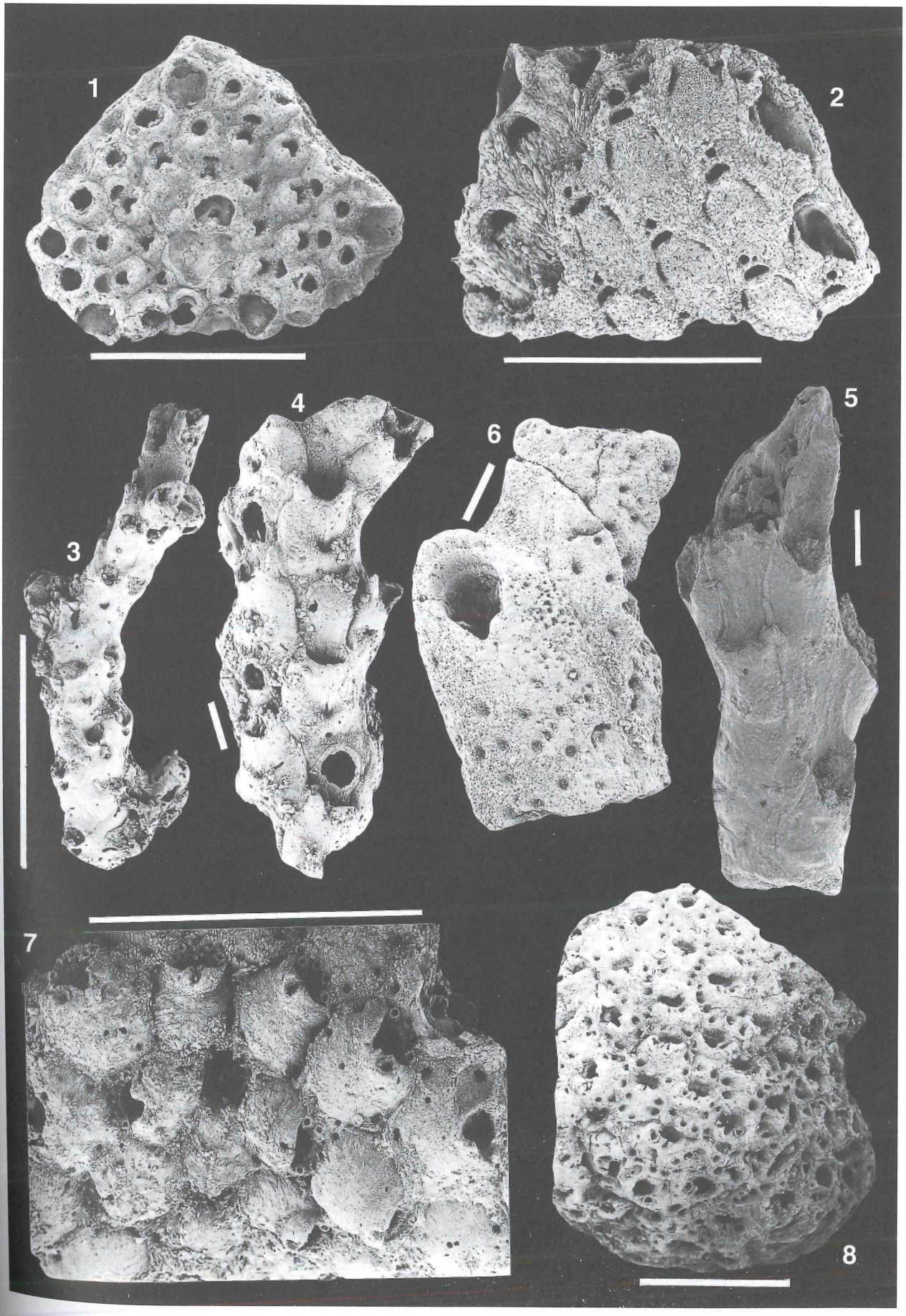

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PLATE 31

Fig. 1. *Lagenipora ampullacea* (ROEMER, 1863). Detail showing well developed peristome with median, large proximally tapering avicularia. Scale bar = 100 μm. Locality: Reingruberhöhe.

Fig. 2. *Lagenipora ampullacea* (ROEMER, 1863). General view showing large, bottle-shaped zooecia bordered by prominent marginal pores. In the middle is the globular, hyperstomial ovicell, with a nonporous frontal wall. Locality: Reingruberhöhe.

Fig. 3. *Lagenipora urceolaris* GOLDFUSS. General view showing bottle-shaped, large zooecia, rare, indistinct and small marginal pores and a well developed, smooth peristome. Locality: Reingruberhöhe.

Fig. 4. *Lagenipora* cf. *tuba* (MANZONI, 1875). Detail of poorly preserved specimen showing elongated zooecia with immersed proximal part and a well developed peristome with spinous projections and with a pair of small avicularia. Locality: Reingruberhöhe.

Fig. 5. *Reteporella subovata* (STOLICZKA, 1862). General view showing circular aperture with cardelles, rare and small marginal areolar pores and deeply immersed hyperstomial or probably recumbent ovicell. Locality: Reingruberhöhe.

Fig. 6. *Orbitulipora petiolus* LONSDALE, 1850. General view showing arrangement of the zooecia and large mostly oval aperture, with straight lower edge. Locality: Reingruberhöhe.

Fig. 7. *Batopora multiradiata* REUSS, 1869a. General view showing arrangement of the zooecia with terminal apertures and the porous base of the colony. Locality: Reingruberhöhe.

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PLATE 31

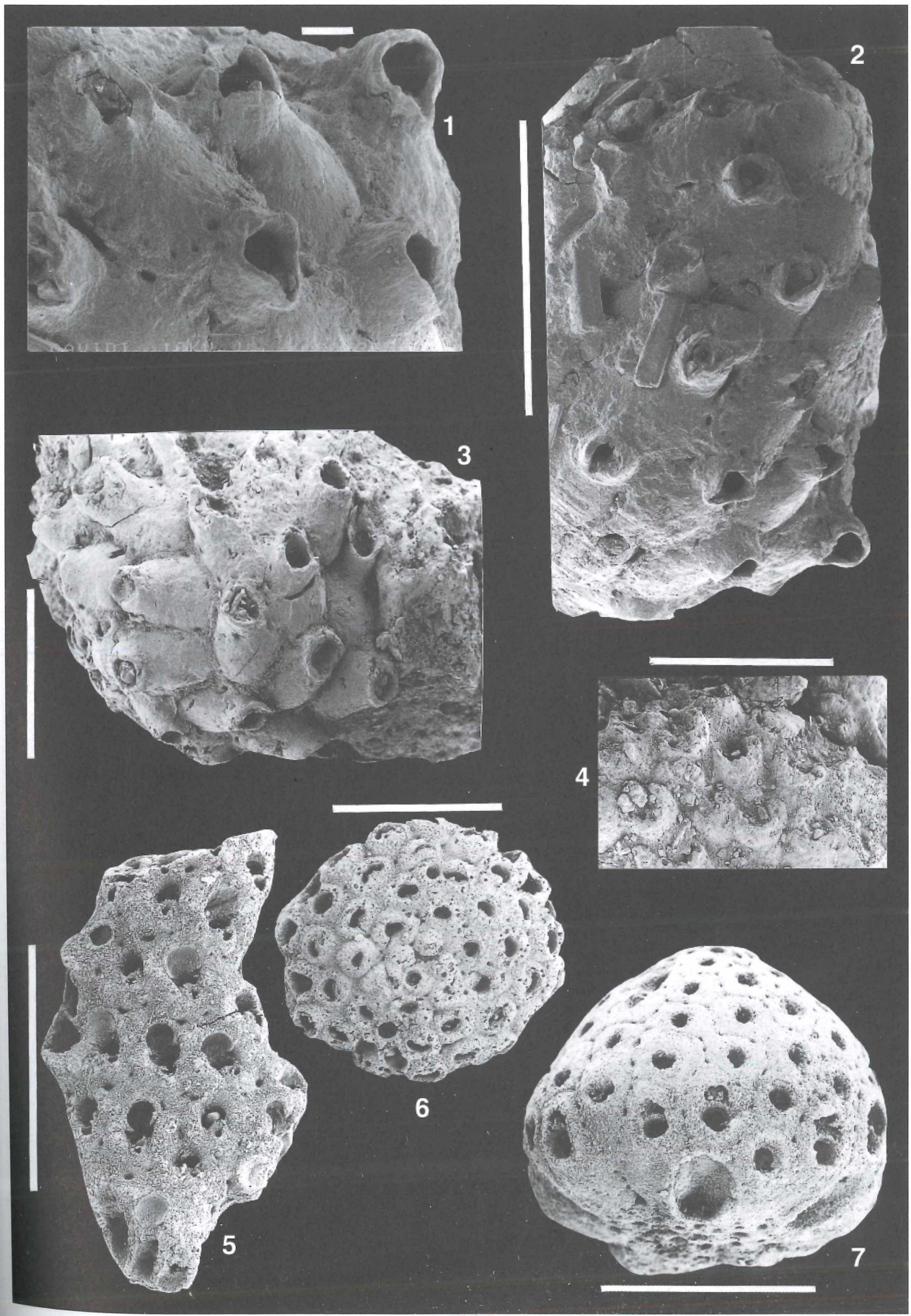

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PLATE 32

Fig. 1. *Batopora haselbachensis* sp.n. Holotype showing apical part of the colony with small drop-like kenozooecium and zooecia with terminal aperture. Locality: Haselbach

Fig. 2. *Batopora haselbachensis* sp.n. Paratype showing arrangement of the zooecia and development of the short peristome. Locality: Haselbach

Fig. 3. *Batopora haselbachensis* sp.n. Paratype showing slightly porous concave base of the colony. Locality: Haselbach

Fig. 4. *Batopora haselbachensis* sp.n. Section of the paratype showing tubular zooecia arranged in rows and strongly concave base of the colony. Locality: Haselbach

Fig. 5. *Batopora haselbachensis* sp.n. Apical view of the paratype showing development of the shallow sinus inside the aperture. Locality: Haselbach

Fig. 6. *Batopora haselbachensis* sp.n. Paratype showing apical kenozooecia and rare, scattered marginal areolar pores. Locality: Haselbach

All scale bars = 100 μm.

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PLATE 32