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Kamil Zágoršek:

BRYOZOA FROM THE LANGHIAN (MIOCENE) OF THE CZECH REPUBLIC

**PART II: SYSTEMATIC DESCRIPTION OF THE SUBORDER ASCOPHORA LEVINSEN, 1909
AND PALEOECOLOGICAL RECONSTRUCTION OF THE STUDIED PALEOENVIRONMENT**

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Cover photo: *Calloporina decorata* (REUSS, 1847). Colony from section Sedlec pole (specimen P 01471) showing autozoecia with ovicells and long avicularia.

BRYOZOA FROM THE LANGHIAN (MIOCENE) OF THE CZECH REPUBLIC PART II: SYSTEMATIC DESCRIPTION OF THE SUBORDER ASCOPHORA LEVINSEN, 1909 AND PALEOECOLOGICAL RECONSTRUCTION OF THE STUDIED PALEOENVIRONMENT

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Abstract: A total of 158 species of Bryozoa were found and identified from the sediments of 34 sections, all of Langhian (Early Badenian) age, from the Czech Republic. Bryozoan species belonging to the suborder Ascophora LEVINSEN, 1909 are described in detail and illustrated. Among them are 12 new species *Umbonula granulata* sp. n., *Ferganula rousinoviensis* sp. n., *Microporella berningi* sp. n., *Cribellopora hluchovensis* sp. n., *Cribellopora trasoni* sp. n., *Buffonellaria kuklinskii* sp. n., *Buffonellaria holubicensis* sp. n., *Reteporella hluchovensis* sp. n., *Reteporella vladkae* sp. n., *Reteporella ruzenkae* sp. n., *Rhynchozoon oslavanensis* sp. n., *Rhynchozoon krouzkovensis* sp. n. The type of environment which may have led to the mass occurrence of Bryozoa is proposed.

■ Bryozoa, Langhian, taxonomy, systematic

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Introduction

Due to technical reasons, this publication was divided into two parts. This is the second part containing mainly a detailed systematic description of bryozoan species belonging to the Suborder Ascophora, paleoecology and conclusions.

Miocene marine sediments in the Czech Republic are found in the area of the former Central Paratethys (among others Piller et al.; 2007). Remains of two marine basins may be found in Czech Republic: the Vienna Basin and the Carpathian Foredeep. Bryozoans from the Vienna Basin were discussed in Zágoršek et al. (2007), from the Carpathian Foredeep were discussed in Holcová and Zágoršek (2008).

Material and methods

The bryozoans from the washed residuum, in fractions larger than 200 µm were studied using the methods described by Zágoršek and Vávra (2000). Illustrations were made using the scanning electron microscope (SEM) JSM-6400 Jeol type in the Paleontological Department of Vienna University or Hitachi S3700N in the National Museum Prague.

Results

Altogether 158 species were identified from 34 sections; 6 of them are from the Vienna Basin (Mikulov, Mušlov, Sedlec, Hlohovec, Nesyt and Podivín) and 23 are from the Carpathian Foredeep Basin (Podbřežice, Oslavany, Židlo-

chovice, Holubice, Rebešovice, Přemyslovice, Terešov, Kroužek, Kralice nad Oslavou, Rousínov pumpa, Slavkov sv. Urban, Vranová Lhota, Vápno, Blučina, Kleneč, Žatčany, Služín, Vyškov, Nosislav, Hlubočany, Ptení, Rájec-Jestřebí, Dolní Netčice, Hrušovany Hluchov and borehole VK-1 Vranovice. In addition museum material from five localities (Olomoučany, Čížovec, Drnovice, Boskovice and Mohyla míru) was also studied. Detail description and list of found species are listed in first part of this work (Zágoršek, 2010).

Systematic part

The systematic arrangement of the described bryozoans mainly follows the bryozoan web page (www.bryozoa.net) edited by Phil Bock (last update 2010) based on Bassler (1953) and Hayward and Ryland (1998 and 1999). Cheilostomatous systematic also takes into account the data from Gordon (1984, 1986 and 1989), Tilbrook (2006) and my own investigations.

The description of the studied species is organized as follows:

Synonymy refers to the specimens already described and relevant to the entire taxa. If the specimen represents holotype the prefix * was given, when the specimen itself was studied the prefix “v.” was given before the year of publication.

The details about types (number(s), storage institution, type locality) are given, when the type material was studied.

M a t e r i a l: The total number of recently collected samples from Moravian sections is given. Each of the listed

specimens has been studied in details by means of the SEM, photographed and stored in the National Museum Prague. According to these samples, tables 1 to 15 was prepared (Zágoršek, 2010) which summarizes the details of the distribution of all determined species from the studied sections. Additional studied material from sections in Moravia, stored within the original Reuss collection in the Natural History Museum Vienna, is also included.

D i a g n o s i s : A short description of the studied species, of visible characteristics and details of observable morphological features are given.

R e m a r k s : Differences between studied material and similar species and specimens such as the type material, illustrations in literature are given here. Also the variability of specimens, new generic attributions, or any other problems of taxonomy are discussed.

The authors of taxonomic names higher than species were not included in the reference list.

Phylum **Bryozoa** EHRENBERG, 1831
Class **Gymnolaemata** ALLMAN, 1896
Order **Cheilostomata** BUSK, 1852
Suborder **Ascophora** LEVINSEN, 1909
Infraorder **Acanthostega** LEVINSEN, 1902
Superfamily **Cribrillinoidea** HINCKS, 1879
Family **Cribrillinidae** HINCKS, 1879
Genus **Gephyrotes** NORMAN, 1903

Colony encrusting. Autozooecea oval with gymnocyst. Frontal wall formed by many costules, which are perforated by pores (pematidia). The pair of costules located below the aperture is bifurcated and forms a porous area (spiramen). Median area strongly porous. Aperture semilunar to oval. Oral spines present. Avicularia oral, paired and with pivot bar. Ovicell immersed with a nonporous frontal wall.

***Gephyrotes cf. fortunensis* POUYET, 2000**

Pl. 71, Fig. 1-3

- ?1988 *Gephyrotes* sp. – Moissette p. 112, Pl. 18, Fig. 8, 11
?2000 *Gephyrotes fortunensis* sp.n. – Pouyet p. 186, Fig. i-k
?2006 *Gephyrotes fortunensis* POUYET – Berning p. 53, Fig. 48, 49

M a t e r i a l : Only one specimen at the section Podbřežice was found.

D i a g n o s i s : Autozoid with a gymnocyst, laterally and proximally very prominent. Costae flat, fused medially but spaced proximally, 5-6 cover the frontal area of each autozoecium. Proximal margin of the aperture is formed by fused bifurcated costae. A pair of adventitious avicularia is associated with the aperture. Ovicell globular with a smooth (not perforated) frontal wall.

R e m a r k s : The characteristic features of *Gephyrotes* (HAYWARD et RYLAND, 1998) are visible on the studied specimen.

The described specimen is very similar to *Gephyrotes* sp. as described by Moissette (1988) in having a pair of avicularia associated with the aperture, and 5-6 pairs of fused costulae on its frontal wall. Specimens described by Berning (2006) are also very similar to the studied specimen, but the preservation of our specimen does not permit a precise determination.

Genus ***Puellina*** JULLIEN, 1886

Colony encrusting. Autozooecea oval with a costal frontal wall and with lateral costal fusions forming intercostal pores. Gymnocyst reduced or absent. Orifice semilunar with calcified margins, suboral lacuna and oral spines. Interzoecial avicularia present. Ovicell partly immersed with nonporous frontal wall.

***Puellina venusta* (CANU et BASSLER, 1925)**

Pl. 72, Fig. 1-4

- v. 1977 *Cribrilaria radiata* (MOLL, 1803) – Vávra p. 102 (cum sym.)
1989 ?*Puellina* (*Cribrilaria*) *venusta* (CANU et BASSLER, 1925) – Schmid p. 28, Pl. 7, Fig. 1-5 (cum syn.)

M a t e r i a l : Altogether 18 specimens were studied from different sections.

D i a g n o s i s : Frontal shield formed by 11-13 costae with 4 to 5 intercostal pores. Oral spines large, usually 5-6 around each aperture, ovicelled autozooecea always developing 4 oral spines. Avicularia drop-like, half the length of autozooecea with a wide gymnocyst and a palate usually tapering distally. Ovicell deeply immersed with a medial keel and a nonporous frontal wall.

R e m a r k s : Differs from the more common *Puellina* (*Cribrilaria*) *scripta* (REUSS, 1847) in having more costae (about 16) and larger avicularia with a large palate tapering usually laterally.

Schmid (1989) discussed in detail the taxonomy of this species and replaced the more common designation as *Cribrilaria radiata* (MOLL, 1803), by *Puellina venusta*. *Cribrilaria radiata* is usually used for recent specimens.

***Puellina* (*Cribrilaria*) *rarecostata* (REUSS, 1847)**

Pl. 73, Fig. 1-3

- v. *1847 *Cellepora rarecostata* m. – Reuss p. 83, Pl. 10, Fig. 4
1974 *Cribrilaria rarecostata* (REUSS) – David and Pouyet p. 135, Pl. 5, Fig. 4
1977 *Cribrilaria rarecostata* (REUSS) – Vávra p. 102 (cum syn.)

T y p e : No lectotype was established, there are two 'syntypes' redescribed by David and Pouyet (1974) stored in the Natural History Museum Vienna under the number 1847.38.76.

M a t e r i a l : Altogether 2 colonies were studied from the section Podbřežice.

D i a g n o s i s : Colony encrusting, autozooecea oval to hexagonal with semilunar orifice and five oral spines.

Frontal shield consists of 6 to 8 costae. No avicularia developed, ancestrula circular with 4 oral spines. Ovicell small, smooth.

Remarks: Number of costae and oral spines are identical with the type material. According to Bock (2010), the subgenus *Cribrilaria* CANU et BASSLER, 1929 may be treated as a subgenus of *Puellina*, and therefore this species is listed here within *Puellina*.

Infraorder **Hippothoomorpha** GORDON, 1989

Superfamily **Hippothooidea** BUSK, 1859

Family **Trypostegidae** GORDON, TILBROOK

et WINSTON, 2005

Genus ***Trypostega*** LEVINSSEN, 1909

Colony encrusting. Frontal wall perforated by many simple pores. Aperture keyhole-shaped ('cleithridiate') with sinus and prominent condyles. No oral spines. Heterozooecia with small orifices present. Ovicell hyperstomial, very large with a completely perforated frontal wall.

Remarks: According to Tilbrook (2006) *Trypostega* lack oral spines, but the very similar genus *Hippothoa* oppositely has developed many spines around aperture.

***Trypostega rugulosa* (REUSS, 1874)**

Pl. 74, Fig. 1-5

- v. *1874 *Lepralia rugulosa* m. – Reuss p. 169, Pl. 3, Fig. 2
- 1977 *Hippoporina rugulosa* (REUSS) – Vávra p. 107
- v. 2003 *Arthropoma rugulosa* (REUSS) – Zágoršek p. 175, pl. 28, fig. 3 (cum. syn.)
- 2006 *Trypostega rugulosa* (REUSS) – Berning p. 56, Fig. 55, 56 (cum syn.)

Type: Lectotype deposited in the Natural History Museum Vienna under the number 1878.11.65. (David and Pouyet, 1974).

Material: Altogether 7 specimens were studied in detail (2 specimens from Hlohovec, 3 specimens from Podbřežice, one from Přemyslovice, Rebešovice and Holubice).

Diagnosis: Colony encrusting, autozoocelia oval to elongate hexagonal, sometimes irregularly elongated. The frontal wall is smooth and shows a few regularly distributed large pores. Aperture keyhole-shaped ('cleithridiate') without oral spines. The distal part is large and semi-circular, the proximal part (sinus) small and wide. The condyles are distinct. Kenozooecia often developed, irregular. Heterozooecia rare, irregularly developed, situated between the autozoocelia, irregularly, of droplike shape, with a circular orifice. Ovicell large, globular; it has a porous frontal wall. Avicularia are unknown.

Remarks: Specimens found at Hlohovec have fewer frontal pores than the syntypes deposited in the Museum of Natural History in Vienna. The preservation of pores could however be caused by the fossilization process. The large ovicell – characteristic for this genus (Hayward and Ryland, 1999) – is identical with the syntypes, but *Trypostega* has to have heterozooecia with an orifice regularly interspersed

among autozoocelia (Hayward and Ryland 1999). The heterozooecia have been described here for the first time, orifices of heterozooecia have not been observed in this species. *Hippothoa* as re-described by Tilbrook (2006) has no heterozooecia. Another similar genus is *Arthropoma*, which differs however in having an ovicell with a nonporous frontal wall and a narrower sinus. Overall, *Trypostega* seems to be the most suitable for the species.

Family **Pasytheidae** DAVIS, 1934

Genus ***Unifissurinella*** POIGNANT, 1991

Colony erect flexible, articulated. Autozoocelia symmetrical, from lateral view approximately triangular. Frontal wall porous. Apertures circular with sinus and with a nonporous short peristome. Calcified stolon situated along dorsal wall. No avicularia, no ovicells.

***Unifissurinella boulangeri* POIGNANT, 1991**

Pl. 74, Fig. 6

- *1991 *Unifissurinella boulangeri* n. sp. – Poignant, p. 95, Pl. 1, Fig. 1-10
- v. 2000 *Unifissurinella boulangeri* POIGNANT, 1991 – Zágoršek p. 533, Pl. 7., Fig. 2 (cum syn.)

Type: Holotype deposited in the Muséum National d'Histoire Naturelle in Paris under the number NF 61360 (Poignant, 1991).

Material: Only one specimen has been found.

Diagnosis: Only one autozoecium has been found, triangular from lateral view with a terminal, small aperture. Frontal wall porous, but due to the preservation, pores are not visible. Dorsal wall with a calcified stolon, open on both sides.

Remarks: The preservation is poor, but the shape of the autozoecium and the position of the stolon on the dorsal side is very characteristic for this species. A detailed description is given by Zágoršek (2000). This is the first occurrence in the Miocene.

Infraorder **Umbonulomorpha** GORDON, 1989

Superfamily **Arachnopusioidea** JULLIEN, 1888

Family **Arachnopsiidae** JULLIEN, 1888

Genus ***Poricella*** CANU, 1904

Colony encrusting or erect. Autozoocelia with umbonuloid frontal wall with numerous marginal areolar pores and large proximal foramen. The foramen often subdivided to the many uncalcified foramina. Apertures large with lateral indentations, often with suboral umbo. Oral spines common. Avicularia interzooidal, large, very common. Ovicell frontal wall imperforate, slightly immersed, not closed by operculum.

Remarks: As already shown by Cook (1977) and Tilbrook et al. (2001) *Poricella* is a senior synonym of *Tre-*

mogasterina auctt (not Canu, 1911). Therefore all species (apart from type species of *Tremogasterina* CANU, 1911) formerly assigned to *Tremogasterina* are listed under the *Poricella*.

***Poricella areolata* (REUSS, 1874)**

Pl. 75, Fig. 1-3

- *1874 *Lepralia areolata* m. – Reuss p. 156, Pl. 4, Fig. 9-10
v. 1974 *Tremogasterina areolata* (REUSS, 1874) – David and Pouyet p. 112, Pl. 6, Fig. 7
1977 *Tremogasterina areolata* (REUSS, 1874) – Cook p. 128, Fig. 6
1977 *Tremogasterina areolata* (REUSS, 1874) – Vávra p. 85

Type: Lectotypes (two specimens) established by David and Pouyet (1974) deposited in the Natural History Museum Vienna under the collection of Karrer. Cook (1977) refers that she studied type, but she did not give any details (number of specimens etc.). So it is not clear, if these specimens are the original Reuss specimens or not.

Material: More than ten specimens only from the section Přemyslovice.

Diagnosis: Colony encrusting. Autozoecia oval, slightly elongated separated by deep grooves with rounded, prominently convex frontal wall. Marginal areolar pores are large, circular usually more than 20 around each autozoecium. Aperture elongated, with very wide sinus, cleithridiate. Condyles prominent. Oral spines present, usually four bases around aperture. A small proximal mucro situated in some autozoecia on frontal wall. One to four frontal foramina, semilunar to crescent-shaped present. The outer, convex margin of foramina may have small dentitions, the inner margin usually carries one large condyle. Rostra of interzooidal avicularia enlarged, rounded, occasionally truncate or pointed, chaotically orientated, with a pivotal bar. Vicarious avicularia not observed. Ovicell prominent, globular, slightly immersed to distal autozoecium, with non porous frontal.

Remarks: Vicarious avicularia have not been observed, even Cook (1977) refer to be often presented. Beside this feature, the studied specimens are identical with the lectotype. The usually number of foramina is two; rarely only one foramen is presented.

Superfamily **Adeonoidea** BUSK, 1884

Family **Adeonidae** BUSK, 1884

Genus ***Adeonellopsis*** MacGillivray, 1886

Colony erect, columnar or flat, bilaminar to multilaminar. Autozoecia with marginal pores and a large spiramen area (“cribrimorph area”) occupying almost the whole frontal wall. Avicularia are adventitious, either paired or single. Vicarious avicularia may also be present. Brooding autozoecia distinctly dimorphic, as large as the autozoecia, but rarely developed.

***Adeonellopsis coscinophora* (REUSS, 1847)**

Pl. 76, Fig. 1-4

- v. *1847 *Eschara coscinophora* m. – Reuss p. 67, Pl. 8, Fig. 20
v. 1862 *Eschara coscinophora* (REUSS) – Stoliczka p. 89, Pl. 2, Fig. 11
1862 *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 and Pouyet p. 201, Pl. 8, Fig. 3
1977 *Adeonellopsis coscinophora* (REUSS) – Vávra p. 148

Type: The holotype from the section (Rudelsdorf) is deposited in the Natural History Museum Vienna under the number 1878.11.125 (called ‘nelectotype’ by David and Pouyet (1974), who mentioned Podivín as a type locality).

Material: Altogether 7 specimens were studied from Moravia and 2 from the collection in Brno Natural History Museum (Moravské Zemské Muzeum) from a section at Drnovice.

Diagnosis: Autozoecia oval with thick, smooth remains of the frontal wall which is vaguely discernible in the distal part. Marginal areolar pores are rare, very small and arranged in a regular position around the autozoecium. Spiramen area oval, large and perforated by 8 to 10 pores, but sometimes also larger and perforated by up to 15 pores. Aperture oval, circular to semilunar. Avicularium placed proximally from the aperture, small, circular, but sometimes also drop-like, sharpening distally or laterally. Brooding zooids not known.

Remarks: *Adeonellopsis coscinophora* (REUSS, 1847) differs from other similar species in having a small avicularium always tapering distally, a large spiramen area and complete remains of the frontal wall. The size of the spiramen area and the tapering of avicularia may vary, but always complete remains of the frontal wall and a large spiramen area are present.

Genus ***Schizostomella*** CANU et BASSLER, 1927

Erect, bilaminar colony. Autozoecia with a sinus on the primary orifice. Frontal wall with marginal areolar pores only. Avicularia adventitious, located marginally on the frontal wall. No ovicells, but brooding gonozoecia present.

Remark: Until now a sinus on the primary orifice has never been described in this genus. *Schizostomella* is usually placed in the Adeonidae, the genera in which there is no sinus on the primary orifice, but a frontal spiramen (according to Hayward and Ryland, 1999). *Schizostomella grinzingsensis* (David and Pouyet, 1974) has without any doubt a shallow sinus on the primary orifice, and no spiramen was described by previous authors nor observed in our material. I did not have the opportunity to study the type species material: *Schizostoma crassa* CANU, 1908, deposited in NHM Paris, so I cannot state, if this species also developed a sinus on its primary orifice. The classification at family level therefore remains uncertain.

***Schizostomella grinzingensis* (DAVID et POUYET, 1974)**

Pl. 77, Fig. 1-4

- *1974 *Schizostomella grinzingensis* nov. sp. – David and Pouyet p. 203, Pl. 14, Fig. 7-8
v. 1977 *Schizostomella grinzingensis* DAVID et POUYET – Vávra p. 149

T y p e : The holotype is deposited in the Natural History Museum Vienna under the number 1878.11.124. (David and Pouyet, 1974)

M a t e r i a l : Altogether 21 specimens were studied, mainly from the borehole Vranovice VK-1.

D i a g n o s i s : Colony erect, bilaminar. Autozooeceia rectangular to trapezoidal with marginal areolar pores only. Aperture oval, large, smooth, no oral avicularia. Primary orifice with shallow sinus. Avicularia rarely developed on the proximal margin of the frontal wall, small, drop-like with a long palate tapering proximally (Pl. 77, Fig. 2). Secondary calcification well developed and hiding many structures, mainly avicularia. Gonozooecium unknown. Autozooeceia (interior view) may show pores on peristomes, which look like a frontal perforation. These pores are only marginal areolar pores spread over the inner side of the frontal wall.

R e m a r k : Colonies are often strongly calcified, so sometimes only the shapes of the autozooeceia are recognizable, no apertures are visible (Pl. 77, Fig. 1).

Very similar species is *Adeona cellulosa* (MacGillivray, 1869) as illustrated by Bock (2010). It has however smaller avicularia arranged more proximally, marginal areolar pores only and large oval apertures with smooth margins. *Schizostomella* has large gonozooecia (Bassler, 1953), which were not found in *Schizostomella grinzingensis* DAVID et POUYET, 1974. The avicularia in the type specimens are circular, however in the material described above they are more drop-like, tapering proximally.

Up till now, no sinus was described on the primary orifice. The species attribution of the studied specimens is clear (due to the presence of avicularia, general characteristics of the colony). Obviously nobody studied the internal structure of the autozooeceia until now.

Genus *Reptadeonella* BUSK, 1884

Encrusting colony. Primary aperture semicircular. Frontal wall with marginal areolar pores and a central spiramen. Avicularia adventitious, placed centrally on the frontal wall. No ovicells, but brooding gonozooecia present.

***Reptadeonella* cf. *violacea* (JOHNSTON, 1847)**

Pl. 78, Fig. 1-6

- v. 1977 *Reptadeonella violacea* (JOHNSTON, 1847) – Vávra p. 149 (cum syn.)
?1999 *Reptadeonella violacea* (JOHNSTON, 1847) – Hayward and Ryland p. 186, Fig. 70A, B, 71 (cum syn.)
? 2002 *Reptadeonella violacea* (JOHNSTON, 1847) – Hayward and McKinney p. 44, Fig. 19D-G (cum syn.)

M a t e r i a l : Altogether 10 specimens were studied from the borehole Vranovice VK-1 only.

D i a g n o s i s : Colony encrusting, multilaminar. Autozooeceia regularly hexagonal, rarely rather oval, with an umbonuloid frontal shield, marginal areolar pores are large. Primary orifice without a sinus, secondary aperture on a short peristome. Spiramen semilunar, with small condyles on the distal margin. Numerous, circular basal pore chambers are arranged in rows. Avicularia median, small, drop-like, tapering distally. Gonozooecia not observed.

R e m a r k : The fossil material is very similar to recent specimens as described by Hayward and Ryland (1999), but differs mainly in respect to the shape of the spiramen. The recent specimens have an almost circular shaped spiramen, but the fossil ones (studied specimens as well as specimens described by Vávra, 1977) often have a semilunar or even slightly curved spiramen, while some autozooeceia in the same colony may also have circular spiramina. Without knowing more about the intraspecific variability of this species, an exact determination of the fossil material is impossible.

Family *Adeonellidae* BUSK, 1884

Genus *Adeonella* BUSK, 1884

Colony erect, flat and bilaminar. Autozooeceial frontal wall well-developed, umbonuloid, smooth, with large marginal pores. The aperture has a crossbar structure, forming proximally a small spiramen and possessing a pair of small, oral avicularia. A median ascopore is not developed. Adventitious avicularia may be present. The brooding autozooeceia (gonozooecia) are a little larger than ordinary autozooeceia, but rare.

***Adeonella polystomella* (REUSS, 1847)**

Pl. 79, Fig. 1-5

- *v. 1847 *Eschara polystomella* m. – Reuss p. 70, Pl. 8, Fig. 27-28
1974 *Adeona polystomella* (REUSS) – David and Pouyet p. 200, pl. 6, fig. 2
v. 1977 *Adeona polystomella* (REUSS) – Vávra p. 147
1989 *Adeonella polystomella* (REUSS) – Schmid p. 34, pl. 9, fig. 3, 4, 6 (cum syn.)

T y p e : Lectotype is deposited in the Natural History Museum Vienna under the number 1847.38.62. (Vávra, 1977).

M a t e r i a l : Very abundant species, 5 specimens from the Vienna basin and 64 specimens from the Carpathian Foredeep were studied in detail. Most specimens were found at Vranovice, Kralice nad Oslavou and Holubice. Additionally 2 specimens from the Reuss collection stored in the Natural History Museum Vienna under the numbers 1859.50.973 and 1859.50.970 from a section at Sedlec were studied.

D i a g n o s i s : Erect, bilaminar colonies. Autozooeceia rhomboidal in the central part, longitudinal in the marginal part of the colony. Lateral tubercles sometimes preserved on the margin of the autozooeceia. Pair of small oral avicularia are situated on each side of the proximal margin of the aperture, one large median circular avicularium developed proximally from the paired avicularia. Internal brooding, no ovicell developed.

R e m a r k s : Studied specimens are identical with the type material. Autozoecia situated on the margin of the colony are usually much longer than those in the central part. Secondary calcification may change the general appearance of the colony considerably.

Genus *Laminopora* MICHELIN, 1842

Colony encrusting. Autozoecia elongated, with frontal wall perforated only by areolar pores. Apertures long with well pronounced, long sinus and prominent condyles. Avicularia oral, small and circular. Ovicell unknown.

***Laminopora cf. dubia* (BUSK, 1859)**

Pl. 80, Fig. 1-6

- ?v. *1859 *Flustra(?) dubia* n.sp. – Busk p. 132, pl. 1, fig. 3
1988 *Schizostomella(?) dubia* (BUSK, 1859) – Moissette p. 176, pl. 28, fig. 8
v. 2007 *Laminopora dubia* (BUSK, 1859) – Zágöršek et al. p. 212, Fig. 10A-C

T y p e : The probable holotype is stored in the NHM London under the number D 54018 (Taylor, 2008 – pers. com.).

M a t e r i a l : Altogether 17 specimens were studied from different localities.

D i a g n o s i s : Colonies erect, bilaminar, autozoecia arranged in regular longitudinal rows. Autozoecia oval with a flat perforated frontal wall and very long apertures (length about 100 µm). The sinus of the aperture is narrow, but long with prominent condyles. Areolar pores almost identical with frontal pores and also occurring distally from the aperture. Avicularia suboral, situated proximally, on right or left side of the aperture. No ovicells observed.

R e m a r k s : Thanks to Dr. Taylor (NHM London), I was able to study the possible type material in Busk's collection. The specimen (illustrated here on Pl. 80, Fig. 3 and 4 – documented by Taylor under the number pdt7587 and pdt7588) was probably illustrated by Busk (1859) in his plate 1, figure 3. This possible type has no preserved frontal wall and the lateral walls are badly preserved. The general appearance is however identical with our specimens as described here.

The species is perhaps bi-mineral, lateral walls are calcitic, frontal walls are probably aragonitic. Many authors (among others Moissette, 1988; Haddadi-Hamdane, 1996) use the name *Schizostomella(?) dubia* (BUSK, 1859) for colonies showing only lateral walls. Therefore, I retain this name and due to the preserved frontal wall the species is listed under *Laminopora*. Details regarding the generic attribution may be found in Zágöršek et al. (2007). As the types do not show the frontal wall, an exact determination is impossible.

Superfamily *Lepralielloidea* VIGNEAUX, 1949

Family *Lepraliellidae* VIGNEAUX, 1949

Genus *Celleporaria* LAMOUROUX, 1821

Colony encrusting, multilaminar, massive. Autozoecia erect with marginal areolar pores only. Primary aperture

without sinus, but often with condyles. Oral spines often present. Avicularia suboral and/or vicarious. Ovicell slightly immersed, with imperforate frontal wall.

***Celleporaria cornigera* (REUSS, 1874)**

Pl. 81, Fig. 1-6

- v. *1874 *Lepralia cornigera* m. – Reuss p. 157, Pl. 7, Fig. 11
v. 1977 *Celleporaria cornigera* (REUSS, 1874) – Vávra p. 154 (cum syn.)

T y p e : Holotype stored in the Natural History Museum Vienna under the number 1878.11.30.

M a t e r i a l : Altogether 7 specimens were studied mainly from the section Podbřežice.

D i a g n o s i s : Colony small, globular. Autozoecia erect, their shape hidden by frontal budding, areolar marginal pores very large. Primary aperture with straight proximal margin, no condyles visible. One suboral avicularium situated on a small umbo. Vicarious avicularia with pivotal bar, ligula lacking. Ovicell not visible on studied material.

R e m a r k s : The straight proximal margin of the primary aperture is very characteristic and together with the absence of condyles it clearly enables identification of this species.

***Celleporaria palmata* (MICHELIN, 1847)**

Pl. 82, Fig. 1-3

- *1847 *Cellepora palmata* sp.n. – Michelin p. 325, Pl. 78, Fig. 1a-b
1973 *Celleporaria palmata* (MICHELIN, 1847) – Pouyet p. 93
v. 1977 *Celleporaria palmata* (MICHELIN, 1847) – Vávra p. 155 (cum syn.)
1988 *Celleporaria palmata* (MICHELIN, 1847) – Moissette p. 184, Pl. 29, Fig. 4-8 (cum syn.)

M a t e r i a l : Altogether 4 specimens were studied, but perhaps even more, but due to the preservation, no exact determination was possible.

D i a g n o s i s : Colony small, globular. Autozoecia erect, the shape hidden by frontal budding, areolar marginal pores clearly visible. Primary aperture with a pair of condyles and a narrow lyrua. One suboral avicularium situated on a small umbo. Ovicell not found in the studied material.

R e m a r k s : *Celleporaria palmata* (MICHELIN, 1847) as re-described by Pouyet (1973) shows an identical development of the primary aperture and suboral avicularia.

***Celleporaria polythele* (REUSS, 1847)**

Pl. 83, Fig. 1-3

- v. *1847 *Cellepora polythele* m. – Reuss p. 77, Pl. 9, Fig. 18
1977 *Celleporaria polythele* (REUSS, 1847) – Vávra p. 155 (cum syn.)
v. 2004 *Cellepora polythele* REUSS, 1847 – Vávra p. 26, Fig. 1 (cum syn.)

T y p e : Lectotypes stored in the Natural History Museum Vienna under the number 1859.45.657 (Vávra, 2004).

M a t e r i a l : Altogether 10 specimens were studied, mainly from the section Hlohovec and 2 samples from

Vávra's collection stored in the Department of Palaeontology, Geozentrum (University of Vienna). An additional 5 specimens from the Reuss collection stored in the Natural History Museum Vienna under the numbers 1859.45.653, 1859.45.658, 1847.37.232, 1846.37.999 and 1867.11.144 from the section Hlohovec have also been investigated.

D i a g n o s i s : Colonies globular with prominent protuberances. Autozooezia indistinct, their shape hidden due to the frontal budding, marginal areolar pores only. Primary aperture without sinus, condyles very small. Suboral avicularium small. Vicarious avicularia were described by Vávra (2004), but not observed in the studied material. Ovicell globular, imperforate.

R e m a r k s : Although Vávra (2004) did not resolve the problem of generic attribution of this species, the clear absence of a sinus, the small condyles and the imperforate frontal wall of the ovicell clearly characterize the genus *Celleporaria*. The characteristic protuberances of this species are visible with the naked eye.

A detailed description and re-description is given by Vávra (2004).

Family **Bryocryptellidae** VIGNEAUX, 1949

Genus **Porella** GRAY, 1847

Colony encrusting or erect. Autozooezia with marginal areolar pores only. Primary orifice with lyrula. No oral spines. Avicularia adventitious, suboral, often hidden inside the peristome. Ovicell immersed, frontal wall not perforate.

Porella circumornata (REUSS, 1847)

Pl. 84, Fig. 1-5

- v. * 1847 *Cellepora circumornata* m. – Reuss p. 85, Pl. 10, Fig. 11
1977 *Smittina circumornata* (REUSS, 1847) – Vávra p. 141 (cum syn.)
1989 *Escharella? circumornata* (REUSS, 1847) – Schmid p. 37, Pl. 10, Fig. 7

T y p e : Holotype from Nussdorf is stored in the Natural History Museum Vienna under the number 1878.11.80 (Vávra, 1977).

M a t e r i a l : Altogether 7 specimens were studied from different sections.

D i a g n o s i s : Colony encrusting. Autozooezia hexagonal to oval with a flat frontal wall and very large marginal areolar pores. Aperture semilunar with straight proximal margin. Suboral avicularium small, hidden inside the aperture. Ovicell deeply immersed, with flat frontal wall.

R e m a r k s : Due to the presence of a small lyrula, a suboral avicularium and the absence of oral spines this species is listed under *Porella* GRAY, 1847 (as understood among others by Gordon, 1984 and Hayward and Ryland, 1999).

This species differs from *Porella regularis* (REUSS, 1874) mainly due to the deeply immersed ovicell and the slightly larger avicularia.

The type has a very well developed lyrula and a slightly smaller ovicell than the described material. Other features are identical.

Porella regularis (REUSS, 1874)

Pl. 85, Fig. 1-5

- v. * 1874 *Lepralia regularis* m. – Reuss p. 168, Pl. 2, Fig. 1
1974 *Hippadenella regularis* (REUSS, 1874) – David and Pouyet p. 177, Pl. 10, Fig. 5 (cum syn.)

T y p e : Lectotype stored in the Natural History Museum Vienna under the number 1878.11.60 (David and Pouyet, 1974)

M a t e r i a l : Altogether 19 specimens were studied, most of them with preserved ovicells.

D i a g n o s i s : Colony encrusting, rarely forming a multilayer masses. Autozooezia oval with 18-20 marginal areolar pores. Frontal wall convex, with slightly visible radial ribs. Primary orifice with a small lyrula. No oral spines. Avicularia adventitious, suboral, small with pivotal bar. Ovicell slightly immersed, globular, frontal wall not perforate.

R e m a r k s : Due to the presence of a small lyrula, a suboral avicularium and the absence of oral spines this species is listed under *Porella* GRAY, 1847. Ovicells were not known in this species until now. One studied specimen shows ovicells, with an endoecium at the proximal edge of the ovicell.

The type specimen shows a large spatulate avicularium, very similar to those usually developed in the genus *Umbo-nula*. Other features are identical with the described material.

Porella nuda (REUSS, 1874)

Pl. 85, Fig. 6

- v. * 1874 *Lepralia nuda* m. – Reuss p. 173, Pl. 6, Fig. 10
1974 *Smittina nuda* (REUSS, 1847) – David and Pouyet p. 190, Pl. 10, Fig. 8
1977 *Smittina nuda* (REUSS, 1847) – Vávra p. 142
1989 *Porella nuda* (REUSS, 1847) – Schmid p. 37, Pl. 10, Fig. 3, 8

T y p e : Holotype from Nussdorf stored in the Natural History Museum Vienna under the number 1878.11.79 (Vávra, 1977).

M a t e r i a l : Altogether 4 specimens were studied, but only one of them is well preserved.

D i a g n o s i s : Colony encrusting. Autozooezia elongate, hexagonal with a convex frontal wall and large marginal areolar pores. Lateral walls visible. Aperture oval. Suboral avicularium small, hidden inside the aperture. Ovicell not known.

R e m a r k s : Differs from *Porella circumornata* (REUSS, 1847) in its convex frontal wall, visible lateral walls and an oval aperture.

Genus **Reussia** NEVIANI, 1895

Colony erect, multilaminar or bilaminar. Autozooezia smooth, with a flat frontal wall and large marginal areolar pores. Aperture oval without sinus, primary orifice with a broad sinus. An oral, median avicularium may be present. Ovicell partly immersed into the distal part of the autozooe-cium with a slightly perforate frontal wall.

Remarks: Zágöršek (2003) stated that *Reussia* has ovicells with a nonporous frontal wall. The preservation of the type material and other available specimens does not allow observation of any pores on the frontal wall of the ovicell. Dennis Gordon however figured other material from the type locality (Bock, 2010), which clearly show perforation of the ovicell.

***Reussia regularis* (REUSS, 1865)**

Pl. 86, Fig. 1-5

- v. *1865 *Eschara regularis* m. – Reuss p. 185, Pl. 6, Fig. 13
- 1977 *Reussia regularis* (REUSS, 1865) – Vávra p. 140 (cum syn.)
- v. 2003 *Reussia regularis* (REUSS, 1865) – Zágöršek p. 156, Pl. 21, Fig. 3 (cum syn.)

Type: Lectotype from Söllingen stored in the Natural History Museum Vienna under the number 1865.3.16 (not 1859.50.975 as stated by David and Pouyet, 1974).

Material: Altogether 8 specimens were studied from different localities. The species is probably more common, but when the ovicells are lacking, any determination remains uncertain. Two additional specimens (one of them labelled as *Eschara hellerii*) from the Reuss collection and stored in the Natural History Museum Vienna under the number 1859.50.975 are from the section at Sedlec.

Diagnosis: Colony large, erect, bilaminar with oval cross section. Autozoecia elongate and laterally perforated by about 10 to 16 large, circular marginal areolar pores. Frontal wall slightly convex. Aperture oval to circular with a short peristome. Avicularia oral, small, circular arrangement on the proximal margin of the aperture. Ovicell small, no pores on frontal wall visible.

Remarks: The lateral walls in the type material are not prominent, the frontal wall is slightly convex. Eocene material shows prominent lateral walls, but this feature is missing in the studied material from the Miocene as well as in the specimen illustrated by Gordon (Bock, 2010). Studied specimens do not show any pores on the ovicell, a fact which may however be caused by preservation.

Family Exochellidae BASSLER, 1935

Genus *Escharoides* MILNE-EDWARDS, 1836

Colony encrusting with nonporous frontal wall and marginal areolar pores. Aperture with condyles and oral spines, sometimes with peristome. Avicularia adventitious, arranged laterally to the aperture and usually paired. Ovicell globular, immersed into the distal part of the autozoecium.

***Escharoides megalota* (REUSS, 1847)**

Pl. 87, Fig. 1-5

- v.* 1847 *Cellepora megalota* m. – Reuss p. 81, Pl. 10, Fig. 1
- 1974 *Escharoides megalota* (REUSS, 1847) – David and Pouyet p. 180, Pl. 10, Fig. 6
- 1989 *Escharoides megalota* (REUSS, 1847) – Schmid p. 33, Pl. 9, Fig. 1, 2, 5 (cum syn.)

Type: Syntypes deposited in the Natural History Museum Vienna under number 1867.40.187 (David and Pouyet, 1974).

Material: Altogether 32 specimens were investigated from many of the studied sections.

Diagnosis: Autozoecia oval with a smooth frontal wall. Marginal areolar pores are small, there are about 20-30 pores at the border of each autozoecium. Aperture oval with small condyles and with spines situated on the distal margin of the aperture. Peristome short. Avicularia oval with long, narrow palate always tapering distally. Ovicell immersed into the distal part of the autozoecium; globular, with small marginal areolar pores. Ectoecium perforated by small pores.

Remarks: The main distinction from *Escharoides coccinea* (ABILDGAARD, 1806) is the granular frontal wall; moreover the avicularia are smaller in *Escharoides megalota* (REUSS, 1847).

***Escharoides coccinea* (ABILDGAARD, 1806)**

Pl. 88, Fig. 1-3

- v. 1874 *Lepralia lima* nov. sp. – Reuss p. 160, Pl. 7, Fig. 4
- 1974 *Escharoides coccineus* (ABILDGAARD, 1806) – David and Pouyet p. 179 (cum syn.)
- v. 1977 *Escharoides coccinea* (ABILDGAARD, 1806) – Vávra p. 132 (cum syn.)
- 1999 *Escharoides coccinea* (ABILDGAARD, 1806) – Hayward and Ryland p. 112, Fig. 32
- v. 2003 *Escharoides coccinea* (ABILDGAARD, 1806) – Zágöršek p. 158, P. 23, Fig. 3 (cum syn.)

Material: Altogether 5 specimens were studied, mainly from the section at Podbřežice. Additional specimens from the Reuss collection are stored in the Natural History Museum Vienna under the number 1859.19.154 (as *Lepralia lima* – holotype) from the section of Sedlec.

Diagnosis: Autozoecia oval to triangular with strongly granulated frontal wall. The granules are sometimes arranged in ribs. Marginal areolar pores are intermediate in size, there are about 12-18 pores on the border of each autozoecium. Aperture oval with small condyles and with spines situated on the distal margin of the aperture. Non-ovicelled autozoecia have about 8 spines, ovicelled ones have about four spines. Peristome very short or absent with a prominent lyrula. Avicularia oval with long, narrow palate. Ovicell conspicuous, globular, with small marginal areolar pores. Ectoecium granular and perforated by very small pores.

Remarks: This species is relatively common in the Recent Mediterranean, there are no differences between fossil specimens and the illustration and description of recent ones (for example Hayward and Ryland, 1999). Also the type of *Lepralia lima* REUSS, 1974 shows identical features when compared with recent specimens, so I decided to list this material under the name of the recent species.

Family Escharellidae LEVINSSEN, 1909

Genus *Escharella* GRAY 1847

Colony encrusting. Frontal wall with marginal areolae only, orifice with lyrula and oral spines. Ovicell imperforate, no avicularia.

***Escharella tenera* (REUSS, 1874)**

Pl. 89, Fig. 1-6

- v.* 1874 *Lepralia tenera* m. – Reuss p. 167, Pl. 2, Fig. 4
1974 *Escharella tenera* (REUSS, 1874) – David and Pouyet p. 187, Pl. 9, Fig. 6 (cum syn.)
1977 *Escharella tenera* (REUSS, 1874) – Vávra p. 137 (cum syn.)

Type: Lectotype from Eisenstadt deposited in the Natural History Museum Vienna under the number 1878.11.58 (David and Pouyet, 1974)

Material: Altogether 22 specimens were studied, from almost all the studied sections.

Diagnosis: Colony encrusting, autozoocelia oval to hexagonal with a smooth, slightly convex, frontal wall. Marginal areolar pores large, about 30 pores are arranged on the border of each autozoocelium. Aperture oval to semilunar with 3-5 oral spines, sometimes not visible and with a short peristome (calcified lip). Lyrula large and rectangular. Ovicell deeply immersed into the distal part of the autozoocelium; it has a smooth, slightly granular frontal wall. In ovicelled autozoocelia the lateral lips of the orifice overlap the margin of the ovicell.

Remarks: Oral spines on the studied specimens are sometimes not visible which may be due to preservation. Similar features are also shown by the type material stored in the Natural History Museum Vienna. The type has a less convex frontal wall, but the other characteristics, especially the shape and position of ovicell, are identical.

***Escharella reussiana* (BUSK, 1859)**

Pl. 90, Fig. 1-6

- * 1859 *Lepralia reussiana* nov. sp. – Busk p. 53, Pl. 8, Fig. 2
1988 *Escharella reussiana* (BUSK, 1859) – Moissette p. 156, Pl. 25, Fig. 6, 9 (cum syn.)

Material: Altogether 4 specimens were studied, mainly from the section at Sedlec.

Diagnosis: Colony encrusting, autozoocelia oval, elongate with a smooth, or slightly granular, very convex, frontal wall. Marginal areolar pores small, about 40 pores are arranged on the border of each autozoocelium. Aperture oval to semilunar without spines and with a short peristome (calcified lip). Lyrula deeply immersed, small, sometimes not observable. Ovicell slightly immersed into the distal part of the autozoocelium; it has a smooth, frontal wall. In ovicelled autozoocelia the lateral lips of orifice may overlap the margin of the ovicell.

Remarks: The characteristic features are the elongate shape of the autozoocelia with their very convex frontal wall, small areolar pores and the absence of any oral spines.

***Escharella ovoidea* (REUSS, 1847)**

Pl. 91, Fig. 1-2

- v.* 1847 *Cellepora ovoidea* m. – Reuss p. 90, Pl. 11, Fig. 2
1977 *Escharella ovoidea* (REUSS, 1847) – Vávra p. 137 (cum syn.)

Type: Neotype stored in the Natural History Museum Vienna under the number 1859.50.760 (established by David and Pouyet, 1974).

Material: Altogether 3 specimens (only from the section Židlochovice) were studied.

Diagnosis: Colony encrusting, autozoocelia hexagonal with a smooth, slightly convex, frontal wall. Marginal areolar pores large, about 20 pores are arranged on the border of each autozoocelium. Aperture oval to semilunar with 4-6 oral spines and a short peristome (calcified lip). Lyrula large, rectangular. Ovicell recumbent on the distal part of the autozoocelium (never immersed into the distal part of the autozoocelium); it has a smooth, frontal wall.

Remarks: The characteristic features are the large areolar pores, the oral spines and the recumbent ovicell.

Family *Umbonulidae* CANU, 1904

Genus *Umbonula* HINCKS, 1847

Colony is encrusting or erect. Frontal wall convex, centrally imperforate with marginal areolar pores only. Suboral, medial avicularium is situated at the top of the umbo. Oral avicularia may also be present. Oral spines and lyrula absent. Ovicell globular with a perforate frontal wall.

***Umbonula macrocheila* (REUSS, 1847)**

Pl. 92, Fig. 1-6

- v.* 1847 *Escharella macrocheila* m. – Reuss p. 65, Pl. 8, Fig. 14
v. 1989 *Umbonula macrocheila* (REUSS, 1847) – Schmid p. 31, Pl. 8, Fig. 1-4 (cum syn.)
1997 *Umbonula macrocheila* (REUSS, 1847) – Pouyet p. 50, Pl. 4, fig. 10 and Pl. 5, Fig. 5 (cum syn.)
2003 *Umbonula macrocheila* (REUSS, 1847) – Zágöršek p. 160, Pl. 23, Fig. 5 (cum syn.)

Type: Holotype stored in the Natural History Museum Vienna under the number 1847.38.56 (confirmed by David and Pouyet, 1974).

Material: More than 100 specimens from all the studied sections were examined.

Diagnosis: Colony encrusting. Autozoocelia oval with convex, smooth frontal wall, characteristically with ribs extending from marginal areolar pores through the frontal wall and ending at the top of the umbo. Marginal areolar pores of medium size; there are about 10-15 pores on the border of each autozoocelium. Aperture large, oval with concave proximal margin. An adventitious avicularium, without pivotal bar, is situated in the middle of the frontal wall, proximally from the aperture, on the top of the umbo. It may be rarely developed as a giant avicularium with pivotal bar and an oval rostrum. No suboral avicularia. Ovicell partly immersed, globular with “U”-shaped pores arranged on its frontal wall.

Remarks: As shown by Schmid (1989) and Pouyet (1997) *Escharella macrocheila* REUSS, 1847 and *Cellepora endlicheri* REUSS, 1847 represent the same species. The variability of avicularia and also the general morphology were discussed by Schmid (1989).

***Umbonula* cf. *macrocheila* (REUSS, 1847)**

Pl. 93, Fig. 1-4

Material: Only one specimen with rather unusual features was found.

Diagnosis: Colony encrusting. Autozooezia oval with convex, smooth frontal wall, characteristically with ribs extending from marginal areolar pores through the frontal wall and ending at the top of the umbo. Marginal areolar pores of medium size, there are about 10-15 pores on the border of each autozooezium. Aperture large, oval with concave proximal margin. An adventitious avicularium, without pivotal bar, is situated in the middle of the frontal wall, proximally from the aperture, on top of the umbo. No suboral avicularia. Ovicell partly immersed, globular, with three longitudinal ridges.

Remarks: Very similar to *Umbonula macrocheila* (REUSS, 1847); it differs only with respect to the structures of the ovicell. *Umbonula macrocheila* (REUSS, 1847) has a “U”-shaped row of pores on its ovicell, while this specimen has three longitudinal ridges on the frontal wall of the ovicell (Pl. 92, Fig. 3 and 4). As only one specimen has been found, the establishment of a new species was not justified.

***Umbonula spinosa* (PROCHÁZKA, 1893)**

Pl. 94, Fig. 1-8

- v.* 1893 *Eschara spinosa* nov. spec. – Procházka p. 51 (67), Pl. 12, Fig. 5a-g
v. 1996 *Umbonula spinosa* (PROCHÁZKA) – Sváček p. 72, Fig. 1
v. 2009 *Umbonula spinosa* (PROCHÁZKA, 1893) – Zágoršek et al., p. 480 11D-G

Type: Neotype established by Zágoršek et al (2009) deposited in NM Prague under the number NM PM2-P 1354.

Material: Altogether 18 specimens were studied, all from the locality Kralice nad Oslavou.

Diagnosis: Colony erect, massive with an oval cross section. Autozooezia with small marginal areolar pores (about 10-15 pores on the border of each autozooezium). Frontal wall with one “usual” large umbo with a small, adventitious avicularium without pivotal bar and additional small, umbo-like tubercles, resembling short spines, without any avicularia. Primary orifice with a wide lyrula. Ovicell globular, deeply immersed with a slightly perforate ectoecium (Pl. 94, Fig. 2). From the interior the umbonuloid frontal wall is clearly recognizable (Pl. 94, Fig. 7-8).

Remarks: Detailed description and discussion is presented in Zágoršek et al. (2009)

***Umbonula granulata* sp. n.**

Pl. 95, Fig. 1-6

Diagnosis: Colony encrusting. Autozooezia rhomboidal with granular frontal wall. Marginal areolar pores small, about 10-15 on the border of each autozooezium. Aperture with a large lyrula. Avicularia of two types, small suboral and giant spatulate. No ovicell observed.

Holotype: The specimen illustrated in Pl. 95, Fig. 1 and 4-6, from the section Podbřežice, is deposited in the National Museum Prague under number PM2 – P 01903.

Paratypes: Altogether 4 specimens were studied from the locality Podbřežice, deposited in the National Museum Prague under numbers PM2 – P 01904-P 01907.

Derivatio nominis: Due to the granular frontal wall.

Locus typicus: section Podbřežice, sample Podbřežice village-1.

Stratum typicum: Langhian – Lower Badenian.

Measurements: (in micro meters = μm ; x = = average):

- length of autozooezia: 499-654; x = 614
width of autozooezia: 333-492; x = 396
length of autozooezial aperture: 152-231; x = 180
width of autozooezial aperture: 157-193; x = 176
length of suboral avicularium: 65-112; x = 85
width of suboral avicularium: 57-85; x = 72
length of spatulate avicularium: 275-299; x = 287
width of spatulate avicularium: 164-197; x = 181
diameter of areolar pore: 20-68; x = 48

Description: Colony encrusting. Autozooezia rhomboidal with flat, granular frontal walls. Granules small, regularly arranged in quincuncial pattern. Marginal areolar pores small, there are about 10-15 pores on the border of each autozooezium. Aperture large, oval with a large lyrula. Adventitious avicularia suboral or spatulate. Suboral avicularia with a pivotal bar (Pl. 95, Fig. 6); they are situated on the middle of the frontal wall, proximally from the aperture, at the top of the umbo. The spatulate avicularia are giant, with an oval rostrum and a pivotal bar (Pl. 95, Fig. 3). No ovicell observed.

Comparison: This new species is very similar to *Eschara chiragra* Manzoni, 1877 in having a granular frontal wall, but it differs in having giant avicularia and encrusting colonies (*Eschara chiragra* MANZONI, 1877 forms bilaminar colonies). *Umbonula spinosa* (PROCHÁZKA, 1893) resembles this new species in having the “spines” similar to granules around the autozooezia. The granules are however much smaller than the tubercles on *Umbonula spinosa* (PROCHÁZKA, 1893). There are no ridges on the frontal wall as in *Umbonula macrocheila* (REUSS, 1847) and the autozooezia in *Umbonula granulata* sp. n. are of a more rhomboidal shape.

Genus *Hippopleurifera* CANU et BASSLER, 1925

Colony encrusting. Frontal wall with two or more rows of areolar pores, central area nonporous, but sometimes very reduced. Apertures large, oval with prominent condyles. Oral spines present. Avicularia adventitious, situated laterally. Ovicell globular, slightly immersed.

***Hippopleurifera hypsostoma* (REUSS, 1874)**

Pl. 96, Fig. 1

- v.* 1874 *Lepralia hypsostoma* m. – Reuss p. 162, pl. 5, Fig. 9, 10
1977 *Hippopleurifera hypsostoma* (REUSS, 1874) – Vávra p. 112 (cum syn.)

Type: Lectotype from Podivín is deposited in the Natural History Museum Vienna under the number 1878.11.43 (defined by Vávra, 1977)

Material: Only one specimen from the section Hlohovec was found.

D i a g n o s i s : Colony encrusting. Autozoecia elongate with two rows of circular marginal areolar pores, very large nonporous frontal wall. Apertures with clearly visible condyles and oral spines. Avicularia small, oval, sometimes in pairs, situated in the middle of the frontal wall, close to the margin. Ovicell globular, its frontal wall unknown.

R e m a r k s : The main differences when compared with other species of *Hippopleurifera* are the elongate autozoecia and the position of the avicularia on the frontal wall.

***Hippopleurifera sedgwicki* (MILNE-EDWARDS, 1836)**

Pl. 96, Fig. 2-5

1970 *Hippopleurifera sedgwicki* (MILNE-EDWARDS, 1836) – David, Mongereau and Pouyet p. 127, Fig. 13, Pl. 5, Fig. 1,2 (cum syn.)

v. 1977 *Hippopleurifera sedgwicki* (MILNE-EDWARDS, 1836) – Vávra p. 113 (cum syn.)

M a t e r i a l : Altogether 23 specimens were studied from many different sections. The species is one of the most common in the Moravian part of the Carpathian Foredeep.

D i a g n o s i s : Colony encrusting, probably having grown on algae, back side of the colony always visible. Autozoecia oval with many rows of circular marginal areolar pores, the nonporous part of the frontal wall is very reduced. Apertures with clearly visible condyles and 3-5 oral spines. Avicularia small, oval, sometimes in pairs, situated proximo-laterally to the aperture with an oblique, tapering rostrum. Ovicell globular with two large circular windows on the ectoecium can be recognized only if the porous endoecium is at all visible. Back side of the colony with smooth dorsal walls and characteristic large, oval openings.

R e m a r k s : If no ovicell is present, the main differences when compared with *Hippopleurifera semicristata* (REUSS, 1847) are the smaller avicularia, the reduced frontal nonporous wall and the circular areolar pores.

***Hippopleurifera semicristata* (REUSS, 1847)**

Pl. 97, Fig. 1-7

v.* 1847 *Cellepora semicristata* m. – Reuss p. 82, Pl. 10, Fig. 3

1974 *Hippopleurifera semicristata* (REUSS, 1847) – David and Pouyet p. 153, Pl. 11, Fig. 7.

v. 1977 *Hippopleurifera semicristata* (REUSS, 1847) – Vávra p. 113 (cum syn.)

2006 *Hippopleurifera semicristata* (REUSS, 1847) – Berning p. 75, Fig. 84, 85 (cum syn.)

T y p e : Lectotype from Eisenstadt is deposited in the Natural History Museum Vienna under the number 1867.40.167 (established by David and Pouyet, 1974).

M a t e r i a l : A very common species, altogether more than 26 specimens from different sections were studied in detail. An additional 2 specimens from the Reuss collection stored in the Natural History Museum Vienna under the number 1859.45.655 from the section Hlohovec were examined.

D i a g n o s i s : Colony encrusting. Autozoecia oval with two (rarely three) rows of elongate marginal areolar

pores. Apertures with clearly visible condyles and 5-7 oral spines. Avicularia large, sometimes in pairs, situated proximo-laterally to the aperture with enlarged rostrum tapering distally. Ovicell globular with radial or irregularly arranged ribs on its frontal wall.

R e m a r k : *Hippopleurifera biariculata* (REUSS, 1847) is very similar to *Hippopleurifera semicristata* (REUSS, 1847) with respect to the development of the frontal wall. The lectotype of *Hippopleurifera biauriculata* (Natural History Museum Vienna 1859.50.748) from Eisenstadt is an erect, bilaminar colony without oral spines and ovicell, and moreover the avicularia are situated very closely and laterally to the aperture. *Hippopleurifera semicristata* (REUSS, 1847) has encrusting colonies with oral spines and avicularia situated more proximo-laterally to the aperture.

Family Metrarabdotosidae VIGNEAUX, 1949

Genus Metrarabdotos CANU, 1914

Erect, bilaminar colony. Autozoecia very elongate, with marginal areolar pores. Aperture with a rounded sinus and condyles. No oral spines. Avicularia oral, typically paired, but may be absent. Ovicell large, with marginal pores and a frontal wall formed by costules.

***Metrarabdotos maleckii* CHEETHAM, 1968**

Pl. 98, Fig. 1-6

* 1968 *Metrarabdotos maleckii* sp.n. – Cheetham p. 104, Pl. 14, Fig. 1-5 (cum syn.)

1974 *Metrarabdotos maleckii* CHEETHAM – David and Pouyet p. 208, Pl. 8, Fig. 5 (cum syn.)

v. 1977 *Metrarabdotos maleckii* CHEETHAM – Vávra p. 153 (cum syn.)

2003 *Metrarabdotos maleckii* CHEETHAM, 1968 – Zágoršek p. 161, pl. 23, Fig. 1 (cum syn.)

T y p e : Holotype from Eisenstadt deposited in USNM under the number 60579 (Cheetham, 1968).

M a t e r i a l : A very common species, more than 35 specimens from different sections were studied in detail.

D i a g n o s i s : Colony large, with 7 to 10 autozoecial rows on each side. Autozoecia elongate with a large aperture. Frontal wall slightly convex and smooth often with a narrower proximal part. Marginal areolar pores large, there are about 16-22 pores on the border of each autozoecium. The rows of marginal areolar pores are characteristically curved in the proximal part of the autozoecia (Pl. 98, Fig. 4). Aperture circular to laterally elongate, oval. Oral avicularia in pairs, circular (Pl. 98, Fig. 6). Ovicell rounded triangular, with radial ribs forming its frontal wall (Pl. 98, Fig. 3 and 5).

R e m a r k s : Ovicells are relatively rare, among the studied material only four colonies have ovicells. When no ovicells are present, the species is rather similar to *Reussia regularis* (REUSS, 1865), which differs in always having the same width of the frontal wall, while *Metrarabdotos maleckii* CHEETHAM, 1968 often has a narrower proximal part of the autozoecial frontal wall.

Infraorder **Lepraliomorpha** GORDON, 1989

Superfamily **Smittinoidea** LEVINSEN, 1909

Family **Smittinidae** LEVINSEN, 1909

Genus **Smittina** NORMAN, 1903

Colony erect or encrusting. Autozoecia with a perforate frontal wall. Aperture circular with lyrula and condyles, usually also a peristome. Oral spines may be present. Avicularia suboral, median and characteristically enclosed in the peristome. Adventitious avicularia may also occasionally be present. Ovicell deeply immersed with frontal pores.

***Smittina cervicornis* (PALLAS, 1766)**

Pl. 99, Fig. 1-6

- 1974 *Porella cervicornis* (PALLAS) – David and Pouyet p. 194 (cum syn.)
v. 1977 *Porella cervicornis* (PALLAS) – Vávra p. 139 (cum. syn.)
1989 *Porella cervicornis* (PALLAS) – Schmid p. 35, Pl. 10, Fig. 1 – 3 (cum syn.)
v. 2001 *Smittina cervicornis* (PALLAS) – Zágöršek p. 55, Pl. 18, Fig. 7, 9, 10
2002 *Smittina cervicornis* (PALLAS) – Hayward and McKinney p. 49, Fig. 22A-C (cum syn.)
v. 2003 *Smittina cervicornis* (PALLAS) – Zágöršek p. 163 (cum syn.)

M a t e r i a l: A very abundant species, it occurs in all studied sections. More than 60 specimens were examined in detail.

D i a g n o s i s: Colony erect, bilaminar with 6 to 7 autozoecial rows and an oval to circular cross section. Autozoecia elongate to oval with thin lateral walls. If secondary calcification is well developed, the shape of the autozoecia is irregular (Pl. 99, Fig. 1). Frontal wall strongly porous with large circular to polygonal pores. Aperture is large, oval to circular with large condyles and a wide lyrula, visible only from the interior of the autozoecia. Peristome wide and smooth, usually only slightly prominent, sometimes even immersed. Avicularium small, situated on the middle of the proximal margin of the aperture, sometimes inside the aperture. Ovicell is deeply immersed, it has a strongly perforated frontal wall.

R e m a r k s: Recent specimens (for example Hayward and McKinney, 2002) show the same development of their frontal wall with exactly the same position of the avicularia. The similarity with fossil material is really striking, no differences can be recognized. Therefore the fossils specimens are listed under this name.

Miocene specimens differ from Eocene ones in having large, usually polygonal (instead of oval), frontal pores. The ovicell of this species has not been illustrated in fossil material up to now.

Genus ***Parasmittina*** OSBORN, 1952

Colony erect or encrusting. Autozoecia with marginal pores only. Aperture circular with lyrula and condyles. Oral spines may be present. Avicularia adventitious and interzooidal, medial. Ovicell immersed, with frontal pores.

***Parasmittina cf. reticulata* (MACGILLIVRAY, 1842)**

Pl. 100, Fig. 1-4

- v.* 1847 *Cellepora trigonostoma* m. – Reuss p. 87, Pl. 10, Fig. 20
v.? 1974 *Smittina reticulata* (MACGILLIVRAY, 1842) – David and Pouyet p. 191, Pl. 7, Fig. 7

T y p e: Holotype from Eisenstadt is deposited in the Natural History Museum Vienna under the number 1867.40.262 (David and Pouyet, 1974).

M a t e r i a l: Altogether 3 colonies were studied from different sections.

D i a g n o s i s: Colony erect, bilaminar. Autozoecia elongate with large marginal areolar pores and sometimes also visible lateral walls. Apertures oval to circular with a large lyrula and a short peristome. Avicularia frontal, small always tapering proximally. No ovicells recognized.

R e m a r k s: The specimens are very similar to *Cellepora trigonostoma* REUSS, 1847 (and *Smittina reticulata* (MACGILLIVRAY, 1842) – which were synonymised by David and Pouyet (1974) – with respect to the shape of the autozoecia, the presence of a lyrula and the position and size of the avicularia. Because no ovicell has been found, the exact determination of the specimens remains uncertain.

Family **Bitectiporidae** MACGILLIVRAY, 1895

Genus ***Schizomavella*** CANU et BASSLER, 1917

Colony encrusting. Autozoecia with strongly perforated frontal wall. Apertures with prominent sinus and condyles. Oral spines may be present. Ovicell partly immersed, ectoecium with pores or with a frontal fissure. Avicularia adventitious.

***Schizomavella protuberans* (REUSS, 1847)**

Pl. 101, Fig. 1-5

- ?* 1847 *Cellepora protuberans* m. – Reuss p. 89, Pl. 10, Fig. 26
partim 1977 *Schizomavella tenella* (REUSS, 1847) – Vávra p. 126
2007 *Schizomavella protuberans* (REUSS, 1847) – Zágöršek et al. p. 211, Fig. 9A-B (cum syn.)

T y p e: The type material was not found in the Reuss collection of the Natural History Museum Vienna; perhaps it has been lost.

M a t e r i a l: A very common species; 67 specimens from different sections were studied in detail.

D i a g n o s i s: Colony encrusting, unilaminar with autozoecia arranged in more or less parallel rows. Autozoecia are rectangular in shape, with a strongly convex frontal wall. Frontal wall is perforated by large pseudopores (diameter about 25 µm). Lateral walls are narrow, but always visible between adjacent autozoecia, slightly raised above the frontal wall. Apertures with a sinus, oral spines may be present. Avicularia are adventitious, suboral with a pivotal bar; they are always situated proximally and very close to the aperture in a median position, tapering proximally and associated with a prominent umbo. The umbo is always nonporous, often very large. Ovicells are hypersto-

mial, their size is about half that of an autozoecium. Ovicell walls consist of two parts. Frontal part of the ovicell wall is flat, nonporous, smooth, and slightly granular with scattered pores occurring on its proximal margin. Lateral part of the ovicell wall is convex, smooth, without any pores. Sometimes these two parts are not distinguishable, due to preservation.

Remarks: *Schizomavella protuberans* (REUSS, 1847) and *Schizomavella tenella* (REUSS, 1847) were synonymised by Schmid (1989). However Zágoršek et al. (2007) suggested keeping these species separate due to the presence of different structures in the ovicells. For detailed discussion of this species see Zágoršek et al. (2007).

***Schizomavella tenella* (REUSS, 1847)**

Pl. 102, Fig. 1-4

v.* 1847 *Cellepora tenella* m. – Reuss p. 89, Pl. 11, Fig. 16
partim 1977 *Schizomavella tenella* (REUSS, 1847) – Vávra p. 126
2007 *Schizomavella tenella* (REUSS, 1847) – Zágoršek et al.
p. 211, Fig. 8A-B (cum syn.)

Type: Holotype deposited in the Natural History Museum Vienna under the number 1846.37.998 (identified by David and Pouyet, 1974).

Material: 40 specimens studied in detail; plus an additional one showing a different arrangement of the avicularia.

Diagnosis: Colony encrusting, unilaminar with autozoecia arranged in parallel rows. Autozoecia are rectangular to oval, with a flat frontal wall. Frontal wall is perforated by small pseudopores (diameter about 10 µm). Lateral walls are wide, always very prominent and raise between adjacent autozoecia. Apertures have a wide sinus, oral spines are absent. Avicularia are adventitious, suboral with a pivotal bar, they are always situated proximally and very close to the aperture in a median position, tapering proximally and associated with a small umbo. The umbo is always nonporous. Ovicells are hyperstomial, large, about half to one third of the size of the autozoecia, with a strongly porous frontal wall. The pores which perforate the ovicells have the same diameter as those perforating the frontal wall.

Remarks: Only one specimen from the section Kralice nad Oslavou shows a different position of the avicularia: close to the lateral walls (Pl. 102, Fig. 4). Due to the presence of all other characteristic features, mainly the identical structure of the ovicells (porous frontal wall), and this specimen is also identified as *Schizomavella tenella* (REUSS, 1847). For a detailed discussion of this species see Zágoršek et al. (2007).

Superfamily **Schizoporelloidea** JULLIEN, 1883

Family **Schizoporellidae** JULLIEN, 1883

Genus **Schizoporella** HINCKS, 1877

Colony encrusting or erect with an encrusting base; colony usually bilaminar. Autozoecia have a strongly perforated frontal wall and a significant sinus. Oral spines

missing. Avicularia mostly suboral or oral, sometimes paired. Ovicell is prominent, slightly immersed, with a porous frontal wall and rarely with an umbo or ridges on the ovicell.

***Schizoporella tetragona* (REUSS, 1847)**

Pl. 103, Fig. 1-6

v.* 1847 *Cellepora tetragona* m. – Reuss p. 78, Pl. 9, Fig. 19
1989 *Schizoporella tetragona* (REUSS, 1847) – Schmid p. 43,
Pl. 12, Fig. 8 (cum syn.)

Type: The holotype was identified by David and Pouyet (1974 called ‘hololectotype’); it is deposited in the Natural History Museum Vienna under the number 1867.40.35.

Material: Very abundant, occurs in almost all the studied sections. More than 100 specimens were studied in detail.

Diagnosis: Colony encrusting, sometimes forming a multilayer overgrowth upon each other. Autozoecia tetragonal to square-shaped or oval with polygonal pores on the frontal wall. No umbo on the frontal wall. Aperture on a short peristome usually situated on one of the distal corners of the autozoecium; aperture with a wide sinus. Primary orifice circular. Avicularia suboral, usually situated on the autozoecial frontal wall, in the corner opposite to the aperture, small with a pivotal bar. Ovicell unknown.

Remarks: The shape of the autozoecia may vary within the colony from distinctly tetragonal to oval. The characteristic features are the asymmetrically placed aperture with its wide sinus, the absence of any umbo and the small suboral avicularium.

***Schizoporella dunkeri* (REUSS, 1847)**

Pl. 104, Fig. 1-5

v.* 1847 *Cellepora dunkeri* m. – Reuss p. 90, Pl. 10, Fig. 27
1989 *Schizoporella dunkeri* (REUSS, 1847) – Vávra p. 116
(cum syn.)
2006 *Schizoporella dunkeri* (REUSS, 1847) – Berning p. 84,
Fig. 94, 96, 99, 100, 104 (cum syn.)

Type: Lectotype was selected by David and Pouyet (1974); it is deposited in the Natural History Museum Vienna under the number 1846.37.996.

Material: Only 11 specimens were found in the studied sections.

Diagnosis: Colony encrusting. Autozoecia oval with oval pores on its frontal wall. Frontal wall convex, a small umbo formed close to the proximal edge of the aperture. Aperture on a short peristome usually situated symmetrically in the middle of the distal margin of the frontal wall with a long but very narrow sinus. Avicularia suboral, large, situated in an additional chamber, with pivotal bar. Sometimes two avicularia, situated on both sides of the aperture. Ovicell unknown.

Remarks: The characteristic features are the aperture with its narrow sinus, the presence of an umbo and the large suboral avicularium.

***Schizoporella? geminipora* (REUSS, 1847)**

Pl. 105, Fig. 1-7

- v.* 1847 *Vaginopora geminipora* m. – Reuss p. 74, Pl. 9, Fig. 3-4
v.* 1974 *Schizoporella geminipora* (REUSS) – David and Pouyet
p. 158, Pl. 8, Fig. 4 (cum syn.)
1977 *Schizoporella geminipora* (REUSS) – Vávra p. 117 (cum
syn.)
v. 1989 *Schizoporella geminipora* (REUSS) – Schmid p. 38, Pl. 11,
Fig. 2-4
1997 *Schizoporella geminipora* (REUSS) – Pouyet p. 53 (cum syn.)

Type: Lectotype (defined by David and Pouyet, 1974) is deposited in the Natural History Museum Vienna under the number 1846.37.992.

Material: Common species; more than 40 specimens from different sections were studied in detail. An additional 3 specimens from the Reuss collection stored in the Natural History Museum Vienna under the numbers 1878.11.112, 1878.11.143 and 1878.11.86 (which is the type of *Lepralia crassa* – see David and Pouyet, 1974) from the sections Podivín (listed under the old name Kostel) and Sedlec (listed under the old name Porztech) were included in our studies.

Diagnosis: Colony unilaminar, probably encrusting a soft surface. Dorsal side of the colony is formed by dorsal walls of autozoecia with a central un-calcified area. Autozoecia oval to rectangular, indistinct, with a strongly porous frontal wall. Aperture circular with a sinus. Avicularium on the frontal wall, usually arranged laterally to the aperture, with a pivotal bar. Brooding autozoecia (intra-zoecial ovicells) are much larger than autozoecia, usually with two avicularia.

Remarks: The species was traditionally listed as *Schizoporella*, a genus with avicularia adjacent to the aperture and a recumbent, prominent, globular or spherical ovicell with a porous frontal wall (as defined by Hayward and Ryland, 1999). In *Schizoporella? geminipora* (REUSS, 1847) the avicularia are situated more on the frontal wall (even close to the aperture); the zoarium always develops only a unilaminar colony with characteristic smooth dorsal walls with large oval openings. This development of the dorsal side of the colony lead Vávra (1984) to suggest that this species was growing on algal stems and it may therefore be an indicator of posidonia-like meadows. Moreover, the presence of intrazoecial ovicells clearly separates these two genera.

The ovicells were not described in the lectotype (David and Pouyet, 1974) or in other specimens. It was believed, that no ovicells were developed. The large brooding zoecium (Pl. 105, Fig. 1 and 3) suggests internal brooding or an intrazoecial ovicell; this can be regarded as an important reason for establishment of a new genus, separating this taxon from the traditional assignment to *Schizoporella*. Moreover, no other species of *Schizoporella* shows such a characteristic development of the dorsal walls and position of the avicularia more on the frontal wall than near the aperture. However, more brooding specimens should be studied to decide for the new genus.

Genus *Schizolepralia* ŽAGORŠEK, 2001

Colony erect, multilaminar, with oval cross section. Autozoecia long, oblong with strongly porous frontal walls.

Aperture with a definite sinus. Neither oral spines, nor oral avicularia. An adventitious avicularium (sometimes with a pivot) is located in the middle of the frontal wall, near to one of the margins (left or right). Ovicell deeply immersed, small, with nonporous, convex, smooth frontal wall.

***Schizolepralia polyomma* (REUSS, 1847)**

Pl. 106, Fig. 1-5

- v.* 1847 *Eschara polyomma* m. – Reuss p. 71, Pl. 8, Fig. 33
1977 *Escharina polyomma* (REUSS) – Vávra p. 122 (cum syn.)
1997 *Escharina polyomma* (REUSS) – Pouyet p. 58, Pl. 5,
Fig. 9, 11 (cum syn.)

Type: Lectotype from Eisenstadt deposited in the Natural History Museum Vienna under the number 1867.40.291 (established by David and Pouyet, 1974).

Material: Altogether 19 specimens were studied in detail, more specimens were found at different localities however.

Diagnosis: Autozoecia in 5-7 longitudinal rows with a strongly perforate frontal wall, separated by shallow grooves. Aperture with a long sinus, pronounced condyles and a short peristome. Primary orifice with a very narrow sinus. Avicularia drop-like, tapering laterally, sometimes with a pivotal bar. Ovicell unknown. Back side of the autozoecia strongly porous; chamber for adventitious avicularia can be observed.

Remarks: *Escharina* has only marginal areolar pores (Hayward and Ryland, 1999). The presence of adventitious avicularia on a perforated frontal wall and the sinus of the aperture clearly identify this species to be from the genus *Schizolepralia*.

The type has smaller avicularia, smaller pores and the shape of the autozoecia cannot be clearly recognized, when secondary calcification is more developed. It is however almost identical in shape of the aperture, position of avicularia and when less calcified also in the shape of the autozoecia.

Genus *Schizobrachiella* CANU et BASSLER, 1920

Colony encrusting. Autozoecia oval with perforate frontal wall. Aperture with sinus and prominent condyles. No oral spines. Ovicell deeply immersed, strongly porous. Avicularia may be present, adventitious.

***Schizobrachiella? granosoporosa* (REUSS, 1874)**

Pl. 107, Fig. 1-2

- v.* 1874 *Lepralia granoso-porosa* m. – Reuss p. 178, pl. 7, Fig. 8
1977 *Schizobrachiella granosoporosa* (REUSS, 1874) – Vávra
p. 124 (cum syn.)

Type: The holotype is deposited in the Natural History Museum Vienna within the Karrer collection from Baden. No inventory number provided (Vávra, 1977).

Material: Only 2 specimens from the borehole Vranovice VK-1 were identified.

Diagnosis: Autozoecia oval, separated by shallow grooves. Apertures cleithridiate, large with a wide sinus

and well developed condyles. Neither ovicells, nor avicularia known.

Remarks: Hayward and Ryland (1999) stated that avicularia have to be present in this genus, but according to Gordon (pers. comm., 2004) even the type material does not always have avicularia. Because no ovicells have been observed in this species, the genus attribution remains uncertain.

Genus *Ferganula* PHEOPHANOVA, 1965

Colony encrusting. Autozoecia hexagonal to oval, growing in rows. Frontal wall perforated by numerous pores, no lateral marginal areolar pores. Aperture with a well developed shallow sinus, no oral spines. Avicularia small, sub-oral, sometimes absent. Ovicell small, deeply immersed into the distal part of the autozoecia, its frontal wall possesses pores.

Remarks: A similar genus – *Stylopoma* LEVINSEN, 1909 as revised by Tilbrook et al. (2001) – has a frontal shield evenly perforated by numerous pores, with a marginal series of larger pores, it has a very narrow sinus, often vicarious avicularia and a very prominent, globular ovicell. Similar genus is also *Calyptotheca* HARMER, 1957 as re-described by GORDON (1989) differs however in having dimorphic apertures and much larger ovicells.

Ferganula rousinovensis sp. n.

Pl. 108, Fig. 1-6

Diagnosis: Encrusting colony, autozoecia oval to hexagonal, growing in more or less regular rows with visible lateral walls. Frontal wall heavily perforated by pores. Apertures with sinus and clearly visible condyles. No avicularia. Ovicell small, semilunar, deeply immersed into the distal part of the autozoecia, with a strongly porous frontal wall.

Holotype: The specimen illustrated in Pl. 108, Fig. 1-3, from the section Rousínov pumpa, deposited in the National Museum Prague under the number PM2 – P 01591.

Paratypes: 7 specimens from the section Rousínov pumpa, deposited in the National Museum Prague under numbers PM2 – P 01592 to P 01598.

Derivatio nominis: Due to the name Rousínov, the type locality of this taxon.

Locus typicus: Rousínov pumpa.

Stratum typicum: Langhian – Lower Badenian.

Measurements: (in micrometers = μm ; \bar{x} = average):

length of autozoecia: 333-842; \bar{x} = 613

width of autozoecia: 249-588; \bar{x} = 375

length of aperture: 76-216; \bar{x} = 154

width of aperture: 99-229; \bar{x} = 156

length of ovicell: 220-250; \bar{x} = 234

width of ovicell: 410-416; \bar{x} = 414

diameter of frontal pores: 17-25; \bar{x} = 21

length of kenozoecia: 90-562; \bar{x} = 326

width of kenozoecia: 45-182; \bar{x} = 114

Description: Colony encrusting, autozoecia growing in regular rows. Autozoecia oval to hexagonal, separated by clearly visible lateral walls. Frontal wall slightly convex, perforated by numerous, small pores of identical size (no visible difference between pores situated more cen-

trally or more laterally). Apertures with a shallow sinus and a narrow, extensively calcified lip. Condyles clearly visible. Ovicell small, semilunar, deeply immersed into the distal part of the autozoecia, with porous frontal wall. Its pores may be larger than the pores on the frontal wall. Kenozoecia drop-like, narrow and long, rarely distributed among autozoecia. No avicularia observed.

Comparison: A similar species is *Ferganula sumsarica* PHEOPHANOVA, 1966, which also does not develop avicularia, but has a less porous frontal wall and a less prominent sinus. Similar ovicells have been described in *Ferganula turkestanensis* PHEOPHANOVA, 1966, a taxon which however has a pair of small avicularia.

Remarks: Due to the presence of a perforated frontal wall, a shallow sinus and a deeply immersed small ovicell perforated by numerous pores and due to the absence of any oral spines, this species belongs to *Ferganula* as described by Pheophanova (1966).

Occurrence: Podbrzežice, Hluchov and perhaps also in Romania (section at Girbova de Sus in Transylvania).

Ferganula sp. 1

Pl. 109, Fig. 1

Material: One specimen from the borehole at Přemyslovice.

Diagnosis: Encrusting colony, autozoecia elongate, growing in regular rows. Frontal wall perforated by pores of identical size. Lateral walls visible, slightly elevated above the frontal wall. Apertures with a narrow sinus and clearly visible condyles. A pair of very small avicularia situated in the middle of the frontal wall, close to the lateral wall. No ovicell.

Remarks: The presence of a pair of small avicularia is reminiscent of *Ferganula turkestanensis* PHEOPHANOVA, 1966, which has however more hexagonal shaped autozoecia and a very broad sinus. While only one specimen has been found, the establishment of a new species was not justified.

Ferganula sp. 2

Pl. 109, Fig. 2-4

Material: One specimen from Židlochovice

Diagnosis: Encrusting colony, autozoecia oval, growing in irregular rows. Frontal wall perforated by many small pores of identical size. Lateral walls visible, slightly elevated above the frontal wall. Apertures with a shallow, broad sinus and clearly visible condyles. Large avicularia situated close to the lateral wall, often near the aperture with a long rostrum tapering laterally. No ovicell.

Remarks: The studied avicularia are very characteristic, but I have only one specimen – not enough to establish a new species. Colony resemble specimen of *Schizomavella tenella* (REUSS, 1847) from Kralice nad Oslavou showing the avicularia close to the lateral walls (Pl. 102, Fig. 4). However, due to the presence of globular ovicells in this specimen, it is identified as *Schizomavella tenella* (REUSS, 1847).

Family **Margarettidae** HARMER, 1957

Genus *Margaretta* GRAY, 1843

Colony erect, articulated. Autozoecia elongate with a strongly porous frontal wall. Aperture is circular, situated

on a short peristome with a well defined ascopore. Oral spines and avicularia are not developed. Ovicell peristomial.

***Margaretta cereoides* (ELLIS et SOLANDER, 1786)**

Pl. 110, Fig. 1-4

- v. 1974 *Margaretta cereoides* (ELLIS et SOLANDER) – David and Pouyet p. 196, Pl. 10, Fig. 7
v. 1977 *Margaretta cereoides* (ELLIS et SOLANDER) – Vávra p. 143 (cum syn.)
1989 *Margaretta cereoides* (ELLIS et SOLANDER) – Schmid p. 52, Pl. 15, Fig. 4, 5, 7, 8 (cum syn.)
v.2003 *Margaretta cereoides* (ELLIS et SOLANDER) – Zágoršek p. 172 (cum syn.)

M a t e r i a l: A common species, altogether 39 specimens from different sections were studied in detail. Additional specimens from the Reuss collection stored in the Natural History Museum Vienna under the numbers 1859.50.976 and 1859.45.665 from the section at Sedlec.

D i a g n o s i s: Columnar colony with a circular cross-section. Autozoecia arranged in 4 to 8 longitudinal rows, separated by shallow grooves, elongated oval with a strongly porous, slightly convex frontal wall. Aperture circular to oval and situated on a short peristome. Ascopore median, circular, small and usually only slightly larger than the regular pores on the frontal wall. Ovicell has not been observed.

Family Myriaporidae GRAY, 1841

Genus *Myriapora* DE BLAINVILLE, 1830

Colony erect, irregularly branching. Autozoecia with porous frontal and also lateral walls. Aperture with distinct condyles and sinus. No oral spines, no avicularia. Ovicell deeply immersed.

***Myriapora truncata* (PALLAS, 1766)**

Pl. 111, Fig. 1-4

- v. 1977 *Myriapora truncata* (PALLAS, 1766) – Vávra p. 161 (cum syn.)
2006 *Myriapora truncata* (PALLAS, 1766) – Berning p. 90, Fig. 108-110 (cum syn.)

M a t e r i a l: Common and well defined species, so only 8 specimens were studied in detail. Three additional specimens from the Reuss collection stored in the Natural History Museum Vienna under the numbers 1859.50.970 (labelled as *Vaginopora polystigma*) and 1859.19.157 from sections at Podivín and Sedlec were included in our studies.

D i a g n o s i s: Autozoecial apertures cleithriate, with a very broad sinus and clearly visible condyles. Ovicell deeply immersed, almost indistinct, with porous frontal wall. Aperture in ovicelled autozoecium larger than in regular autozoecia.

R e m a r k s: Paleoenvironmental conditions indicated by *Myriapora truncata* (PALLAS, 1766) were discussed in detail by Berning (2007).

Family Escharinidae TILBROOK, 2006

Genus *Escharina* MILNE-EDWARDS, 1836

Colony encrusting. Frontal wall with marginal areolar pores only, orifice with a well developed sinus and oral spines. Ovicell imperforate, avicularia may be present.

***Escharina otophora* (REUSS, 1847)**

Pl. 112, Fig. 1-2

- v.* 1847 *Cellepora otophora* m. – Reuss p. 90, Pl. 11, Fig. 1
1974 *Escharina otophora* (REUSS, 1847) – David and Pouyet p. 165, Pl. 11, Fig. 9
1977 *Escharina otophora* (REUSS, 1847) – Vávra p. 122 (cum syn.)

T y p e: Holotype from Eisenstadt deposited in the Natural History Museum Vienna under the number 1859.50.785 (identified by David and Pouyet, 1974)

M a t e r i a l: Only 4 specimens were found in the studied sections.

D i a g n o s i s: Colony encrusting with sub-hexagonal autozoecia. Frontal wall slightly granular, convex with small marginal areolar pores. Aperture with a small, narrow sinus, distally having around 5 oral spine bases. Avicularia small, suboral with a well defined pivotal bar. Ovicell deeply immersed, globular without areolar pores. Ovicelled autozoecia usually have a pair of small, triangular avicularia.

Genus *Herentia* GRAY, 1847

Colony encrusting. Frontal wall flat, nonporous centrally, large, scattered marginal areolar pores present. Aperture with a sinus, sometimes with oral spines. Avicularium interzoecial, single, situated on the frontal wall. Ovicell small, deeply immersed with a nonporous frontal wall.

***Herentia hyndmanni* (JOHNSTON, 1847)**

Pl. 112, Fig. 3-4

- v. 1989 *Herentia hyndmanni* (JOHNSTON, 1847) – Schmid p. 45, Pl. 13, Fig. 1, 2, 4 (cum syn.)
2008 *Herentia hyndmanni* (JOHNSTON, 1847) – Berning et al. p. 1516, Fig. 1 (cum syn.)

T y p e: Lectotype deposited in the NHM London under the number 1847.9.16.156 (Berning et al., 2008)

M a t e r i a l: In detail only 5 specimens were studied, but the species is more common.

D i a g n o s i s: Autozoecia hexagonal with a flat or slightly convex frontal wall. Apertures with a short, short sinus. Avicularia large, circular with a pivotal bar. Ovicell small, semilunar.

R e m a r k s: Berning et al. (2008) do not refer to the fossil species of *Herentia*, but Schmid (1989) clearly shows, that the Miocene specimens can be included in this species.

Family **Lanceoporidae** HARMER, 1957

Genus **Emballotheca** LEVINSEN, 1909

Colony encrusting or erect. Autozooezia with perforated frontal wall. Aperture with a lyrula on its convex proximal margin and large condyles. Avicularia adventitious, spatulate. Ovicells immersed, with porous frontal wall.

Emballotheca seriata (REUSS, 1874)

Pl. 113, Fig. 1-5

- v.* 1874 *Lepralia seriata* m. – Reuss p. 172, Pl. 2, Fig. 12
1974 *Hippoporina rarepunctata* (REUSS, 1847) – David and Pouyet p. 174, Pl. 6, Fig. 5
non 1974 *Hippoporina rarepunctata* (REUSS, 1847) – David and Pouyet p. 174, Pl. 8, Fig. 7

Type: Holotype from Baden deposited in the Natural History Museum Vienna under the number 1878.11.36 (identified by David and Pouyet, 1974).

Material: Quite common species; altogether 25 specimens were studied in detail from different sections.

Diagnosis: Colony encrusting. Autozooezia with strongly porous frontal shield and wide semilunar apertures with a wide lyrula. A pair of large, prominent, long but narrow condyles situated on the margin of the apertures. Lateral walls clearly visible. Avicularia adventitious, rare, spatulate, large, situated on the frontal wall with prominent, long palate. Ovicell large, partly immersed into the dorsal part of the autozooezium, no frontal wall preserved.

Remark: David and Pouyet (1974) listed this species among the synonyms of *Hippoporina rarepunctata* (REUSS, 1847). However, the type material shows clear differences: *Cellepora rarepunctata* REUSS, 1847 has no lyrula, no avicularia and small ovicells when compared with *Lepralia seriata* REUSS, 1874.

Emballotheca exhibits the same development of its frontal wall, avicularia, condyles and ovicells. According to Gordon (1984), the general characteristics of *Emballotheca* also correspond with the studied specimens.

Family **Phoceanidae** VIGNEAUX, 1949

Genus **Phoceana** JULLIEN, 1903

Colonies erect. Autozooezia elongated in regular longitudinal rows with marginal areolar pores. Aperture on a peristome, without condyles and spines but with lyrula. Small tooth situated on the lyrula growing together with the peristome and forming an elongated ridge on the proximal margin of the peristome and tapering distally (inside the peristome). No avicularia.

Phoceana tubulifera (REUSS, 1847)

Pl. 114, Fig. 1-6

- v.* 1847 *Eschara tubulifera* m. – Reuss p. 67, Pl. 8, Fig. 19
?1867 *Eschara tubulifera* nov. sp. – Heller p. 116, Pl. 3, Fig. 3-4
1977 *Phoceana tubulifera* (REUSS, 1847) – Vávra p. 139 (cum syn.)
?2002 *Phoceana tubulifera* (HELLER, 1867) – Hayward and McKinney p. 51, Fig. 23A-D

Type: Types deposited in the Natural History Museum Vienna under the number 1859.50.746 (Lectotype chosen by Vávra, 1977).

Material: A common species, easily misinterpreted as *Smittina cervicornis*; 20 specimens were studied in detail.

Diagnosis: Colony bilaminar, large with a median lamella. The cross section circular to oval. Autozooezia in 6 to 10 longitudinal rows with perforated frontal wall. Non-porous area of frontal wall very small, restricted to the proximal margin of the aperture. Peristome short, aperture circular. A ridge is situated medially inside the aperture, sometimes very wide.

Remarks: From a general view, this species may sometimes look like *Smittina cervicornis*, but it always differs with respect to the avicularia: they are inside the aperture.

The recent specimens (Hayward and McKinney, 2002) are almost identical with fossil material, but the frontal wall has a large nonporous area. Hayward and McKinney (2002) however attributed this species to Heller (1867) and they did not discuss Reuss' (1847) paper. Vávra (pers. comm., 2008) studied Heller's (1867) type material deposited in Innsbruck and he synonymised *Eschara tubulifera* HELLER, 1867 with *Smittina cervicornis*. It is unclear, whether Hayward and McKinney (2002) also studied the type material, or only synonymised Heller's species according to the illustration and therefore, the determination of Heller's specimen remains uncertain. Nevertheless, Reuss' (1847) description is the older one, thus his name has priority.

Family **Microporellidae** HINCKS, 1879

Genus **Microporella** HINCKS, 1877

Colony encrusting. Aperture semilunar, ascopore very distinct at the top of a short umbo. Frontal wall porous. Oral spines present. Avicularia adventitious, with a pivotal bar. Ovicell prominent, slightly immersed or recumbent.

Microporella crenilabris (REUSS, 1847)

Pl. 115, Fig. 1-5

- v.* 1847 *Cellepora crenilabris* m. – Reuss p. 88, Pl. 10, Fig. 22
?1847 *Cellepora pleuropora* m. – Reuss p. 88, Pl. 10, Fig. 21
v. 1874 *Cellepora pleuropora* REUSS, 1847 – Reuss p. 153 Pl. 4, Fig. 12
1974 *Microporella ciliata* (PALLAS, 1766) – David and Pouyet p. 182, Pl. 7, Fig. 5. (cum syn.)
v. 1989 *Microporella ciliata* (PALLAS, 1766) – Schmid p. 49, Pl. 14, Fig. 4-7 (cum syn.)
?1999 *Microporella ciliata* (PALLAS, 1766) – Hayward and Ryland p. 296, Fig. 134C, D and 136
?2006 *Microporella* aff. *ciliata* (PALLAS, 1766) – Berning p. 105, Fig. 128-130

Type: The holotype from Eisenstadt is deposited in the Natural History Museum Vienna under the number 1867.40.177 (identified by David and Pouyet, 1974).

Material: A common species, altogether more than 30 specimens were studied in detail. An additional 4 speci-

mens from the Reuss collection stored in the Natural History Museum Vienna under the number 1878.11.29 from sections at Podivín and Hlohovec (labelled as *Lepralia microstoma*) and a specimen of *Cellepora pleuropora* (number 1878.11.19) from Eisenstadt figured by Reuss (1874) were included in our studies too.

D i a g n o s i s : Autozooezia hexagonal to oval, with a convex, porous frontal wall, clearly separated from each other. Aperture oval, slightly semilunar with 5-6 oral spines. Ascopore large, crescent-shaped, situated on the top of a small umbo. Avicularia single, lateral, with a short rostrum usually tapering laterally. Ovicell prominent, with a flat, porous frontal wall.

R e m a r k s : The type of *Cellepora crenilabris* REUSS, 1847 is completely identical with the studied material. David and Pouyet (1974) synonymised this species with *Microporella ciliata* (PALLAS, 1766). Kuklinski and Taylor (2008) established a neotype of *Microporella ciliata* (PALLAS, 1766), which differs from the studied material in having a more immersed ovicell, and less protruding avicularia.

David and Pouyet (1974) also listed in their synonymy *Cellepora pleuropora* REUSS, 1847, but I could not find the types, only the specimen illustrated by Reuss (1874). Therefore I referred to the holotype of *Cellepora crenilabris* REUSS, 1847 to describe this Miocene species.

Berning (2006) argues, that recent *Microporella ciliata* (PALLAS, 1766) differs from this Miocene species in producing ovicells which are wider than long. His figure 130 shows characters very similar to the Miocene specimens described here and may also belong to this species.

Kuklinski and Taylor (2008) suggested a thorough study of morphological variation within and between populations, coupled with molecular data to determine the true species characters and geographical distribution of this species – a study which would be far beyond the scope of this paper. It seems, that Reuss' species corresponds more with the morphological features of the Miocene material than to those of the recent taxon.

***Microporella berningi* sp. n.**

Pl. 116, Fig. 1-5

non 1999 *Microporella appendiculata* (HELLER, 1867) – Hayward and Ryland p. 294, Fig. 134A, B and 135

2006 *Microporella* aff. *appendiculata* (HELLER, 1867) – Berning p. 103, Fig. 131

D i a g n o s i s : Autozooezia oval, with flat frontal wall. Aperture semilunar with five oral spines. Ascopore crescent shaped. Nonporous area is developed between the ascopore and proximal margin of the aperture. Avicularia in pairs, suboral, tapering distally. Ovicell very small, deeply immersed with a nonporous frontal wall.

H o l o t y p e : The specimen illustrated on Pl. 116, Fig. 1-2, from the section Holubice, deposited in the National museum Prague under the number PM2 – P 01695.

P a r a t y p e s : Three specimens from the locality Židlochovice, deposited in the National Museum Prague under numbers PM2 – P 01696 to P 01698.

D e r i v a t i o n o m i n i s : In honour of Björn Berning (Oberösterreichisches Landesmuseum Linz, Austria), who was the first biologist to recognize this new species.

L o c u s t y p i c u s : Holubice, section A.

S t r a t u m t y p i c u m : Langhian – Lower Badenian.

M e a s u r e m e n t s : (in micro meters = μm ; \bar{x} = average)

length of autozooezia: 436-565; \bar{x} = 510

width of autozooezia: 347-620; \bar{x} = 429

length of aperture: 81-98; \bar{x} = 90

width of aperture: 102-134; \bar{x} = 120

length of ovicell: 75-115; \bar{x} = 95

width of ovicell: 190-266; \bar{x} = 225

length of avicularium: 74-104; \bar{x} = 89

width of avicularium: 44-83; \bar{x} = 61

diameter of ascopore: 16-46; \bar{x} = 27

diameter of oral spine: 35-40; \bar{x} = 37

D e s c r i p t i o n : Autozooezia oval to irregular in shape, separated from each other by shallow grooves. Frontal wall flat or slightly convex, strongly porous. Aperture semilunar with 5 to 7 oral spines. Ascopore crescent-shaped, situated close to the proximal margin of the aperture, very small. Usually as large as the regular frontal pores, sometimes smaller. There are no frontal pores between the ascopore and the proximal margin of the aperture. Avicularia in pairs, suboral, tapering distally. Ovicell very small, deeply immersed into the distal part of the autozooezium with a short, indistinct umbo on the central part of the ovicell.

C o m p a r i s o n : This species is very similar to *Microporella ciliata* (PALLAS, 1766) as revised by Kuklinski and Taylor (2008). It has however a very large ovicell with a porous frontal wall.

Another very similar species is *Microporella appendiculata* (HELLER, 1867), which was synonymised by Geraci (1977) with *Microporella marsupiata* HINCKS, 1880. Recent specimens of *Microporella appendiculata* (HELLER, 1867) differ from *Microporella berningi* sp. n. in having a prominent ovicell with a transverse rib (Hayward and Ryland, 1999). *Microporella marsupiata* HINCKS, 1880 differs from our new species in having large ovicells and 7 to 9 oral spines. Hayward and Ryland (1999) however did not discuss Geraci's (1977) paper so it is unclear if *Microporella marsupiata* HINCKS, 1880 and *Microporella appendiculata* (HELLER, 1867) are synonyms or not. This cannot be decided on the basis of pictures only and I do not have access to the type specimens of these species. These two species clearly differ from *Microporella berningi* sp. n.

R e m a r k s : Berning's specimens (2006) are identical with the Moravian material in also having a deeply immersed ovicell with nonporous frontal wall and a nonporous area between the ascopore and the proximal margin of the aperture.

O c c u r r e n c e : Sections at Holubice and Židlochovice

Genus *Calloporina* NEVIANI, 1895

Colony encrusting. Autozooezia with marginal areolar pores and semicircular apertures. Ascopore prominent, situ-

ated at a considerable distance from the aperture. Oral spines present. Avicularia paired, suboral. Ovicell with a subsiding, narrow endoecial rim.

***Calloporina decorata* (REUSS, 1847)**

Pl. 117, Fig. 1-3

v.* 1847 *Cellepora decorata* m. – Reuss p. 89, Pl. 10, Fig. 25
1989 *Calloporina decorata* (REUSS, 1847) – Schmid p. 51, Pl. 15, Fig. 1-3 (cum syn)

Type: Holotype identified by David and Pouyet (1974) as specimen 1859.50.769 from Eisenstadt deposited in the Natural History Museum Vienna.

Material: Only 6 specimens were found in the studied sections.

Diagnosis: Colony encrusting, Autozoecia rectangular, hexagonal with two rows of marginal areolar pores. Aperture semilunar with a straight proximal margin and oral spines. Avicularium large, suboral, always tapering distally, with a pivotal bar. Ovicells with a non-calcified horseshoe-shaped distal margin, endoecium strongly porous.

Remarks: Autozoecia grow very regularly and develop large avicularia and ovicells with a horseshoe-shaped porous endoecium resulting in a very decorative budding pattern.

Genus ***Fenestulina*** JULLIEN, 1888

Encrusting, aperture semicircular, ascopore small, frontal wall smooth, perforated only on its distal half, ovicell prominent with marginal areolar pores. Ascopore small, with reniform rim and crescentic lumen. No avicularia.

***Fenestulina* sp.**

Pl. 118, Fig. 1-3

Material: Only one specimen from Kralice nad Oslavou has been found in the studied sections.

Diagnosis: Autozoecia regularly hexagonal to oval shaped, aperture semicircular with a straight proximal margin and a short peristome. Frontal pores indistinct, perhaps due to the preservation. Ascopore small, shape not distinguishable. No ovicell.

Remarks: Due to the presence of a semicircular aperture, a small ascopore and a few frontal pores the specimen may be listed under *Fenestulina* as understood by Hayward and Ryland (1999). However due to the preservation and the lack of an ovicell, the exact determination remains uncertain.

Family **Crepidacanthidae** LEVINSEN, 1909

Genus ***Crepidacantha*** LEVINSEN, 1909

Colony encrusting. Autozoecia with marginal areolar pores only and a trifoliate aperture. Avicularia small, paired, suboral. Ovicell slightly immersed with a porous endoecium visible on the frontal wall.

***Crepidacantha odontostoma* (REUSS, 1874)**

Pl. 119, Fig. 1-3

v.* 1874 *Lepralia odontostoma* m. – Reuss p. 156, Pl. 4, Fig. 8
1954 *Crepidacantha odontostoma* (REUSS, 1874) – Brown p. 258
1974 *Hippoporina odontostoma* (REUSS, 1874) – David and Pouyet p. 175, Pl. 7, Fig. 3
1977 *Hippoporina odontostoma* (REUSS, 1874) – Vávra p. 126

Type: Holotype deposited in the Natural History Museum Vienna under the number 1878.11.26, rediscovered by David and Pouyet (1974).

Material: Only one colony from the section Kralice nad Oslavou II has been found.

Diagnosis: Colony encrusting, autozoecia rhomboidal with marginal areolar pores only. Orifice trifoliate, with very narrow marginal slits. Avicularia small, paired, suboral with a pivotal bar. Ovicells small, globular, partly immersed. The frontal wall with window of non-calcified ectoecium, where porous endoecium is visible.

Remarks: The type specimen shows identical features with those of the studied colony. David and Pouyet (1974) listed this species under the generic name *Hippoporina*. *Hippoporina* has a porous frontal wall, a sub-circular orifice and a large ovicell (Hayward and Ryland, 1999). Due to the presence of a trifoliate orifice and a porous window on the endoecium in the ovicell, this species belongs to *Crepidacantha* as described by Gordon (1984) and Bock (2010).

Reuss' (1874) specimens show all the characteristic features visible on the studied colony. The only slight difference exists with respect to the width of the lateral slits of the trifoliate orifice. In Reuss' colonies a few autozoecia have wider lateral slits than the autozoecia from Kralice nad Oslavou. This feature may perhaps vary also due to preservation.

Family **Lacernidae** JULLIEN, 1888

Genus ***Cribellopora*** GAUTIER, 1957

Colony encrusting. Autozoecia with scattered pores, usually clustered in a quincuncial pattern. Aperture with well developed sinus and a few oral spines. No avicularia. Ovicell deeply immersed, large with marginal pores and a nonporous frontal wall.

***Cribellopora latigastra* (DAVID, 1949)**

Pl. 120, Fig. 1-7

v. 1874 *Lepralia goniostoma* REUSS – Reuss p. 176, Pl. 2, Fig. 6, Pl. 3, Fig. 3
v. 1974 *Cribellopora latigastra* (DAVID, 1949) – David and Pouyet p. 161, Pl. 8, Fig. 1
1977 *Cribellopora latigastra* (DAVID, 1949) – Vávra p. 120 (cum. syn.)

Type: Holotype from Gard et de l'Hérault (France) deposited in the NHM Paris (David, 1949).

Material: Altogether 12 specimens from different sections were studied. Additional specimens from the Reuss

collection stored in the Natural History Museum Vienna under the number 1875.35.43 from the section Hlohovec were included in our investigations.

Diagnosis: Colony encrusting. Autozoecia with large scattered cribellate frontal pores, most of them consisting of 4 small pores only. Orifice circular with a wide sinus, no oral spines. Ovicell flat with a smooth, nonporous frontal wall and with one row of marginal cribellate pores.

Remarks: Studied specimens are identical with the illustration and description given by David and Pouyet (1974) and also with the Reuss material deposited in the Natural History Museum Vienna under the numbers 1860.33.9 and 1878.11.87.

***Cribellopora hluchovensis* sp. n.**

Pl. 121, Fig. 1-4

Diagnosis: Colony encrusting. Autozoecia hexagonal or oval with small frontal pores. Lateral walls distinct. Aperture oval to circular with a wide sinus, no oral spines. Ovicell flat with a smooth, nonporous frontal wall.

Holotype: The specimen illustrated on Pl. 121, Fig. 1-3 from the section Hluchov, deposited in the NM Prague under the number PM2-P 01504

Paratypes: Four specimens from the section Hluchov deposited in the NM Prague under the numbers PM2-P 01506 – P 01507

Derivatio nominis: Due to the occurrence in the section at Hluchov.

Locus typicus: Hluchov

Stratum typicum: Langhian – Lower Badenian.

Measurements: (in micro meters = μm ; $x =$ = average)

- length of autozoecia: 466-739; $x = 566$
- width of autozoecia: 307-545; $x = 406$
- length of autozoecial aperture: 107-169; $x = 133$
- width of autozoecial aperture: 106-157; $x = 125$
- length of ovicell: 277-393; $x = 324$
- width of ovicell: 321-391; $x = 358$

Description: Colony encrusting, usually covering large areas on bivalve fragments. Autozoecia regularly hexagonal or oval, slightly longer than wide, separated by deep furrows. Frontal wall convex, smooth, slightly perforated by frontal pores. Lateral walls narrow, distinct, visible mostly on the proximal half of the autozoecia, sometimes around the whole autozoecia, inside the furrows. Aperture oval to circular with a wide sinus. No oral spines observed. Ovicell flat, deeply immersed into the distal part of the autozoecium with a smooth, nonporous frontal wall. The marginal pores on the ovicell are not clearly visible due to preservation, but probably do exist.

Comparison: Differs from *Cribellopora latigastrea* (DAVID, 1949) in having small frontal pores, distinct lateral walls and a narrower sinus. The shape of the frontal pores is not visible due to preservation. It differs from *Cribellopora trasoni* sp. n. in having a wide sinus and smaller frontal pores.

Remark: Due to the presence of frontal pores, rows of marginal pores on the ovicell and a broad sinus this

species belongs to *Cribellopora* as described by Gordon (1984).

Occurrence: Only in the section at Hluchov.

***Cribellopora trasoni* sp. n.**

Pl. 122, Fig. 1-3

Diagnosis: Colony encrusting. Autozoecia oval with small cribellate frontal pores. Lateral walls indistinct. Aperture semilunar with a very narrow sinus, no oral spines. Ovicell flat with a smooth, nonporous frontal wall.

Holotype: The specimen illustrated on Pl. 122, Fig. 2-3 from the section Kralice nad Oslavou, deposited in the NM Prague under the number PM2-P 01505

Paratypes: The specimen from the section Kralice nad Oslavou, deposited in the NM Prague under the number PM2-P 01924

Derivatio nominis: Derived from the name Třasoň, a student who studied the section at Kralice nad Oslavou.

Locus typicus: Kralice nad Oslavou, sample-4, which corresponds to sample KRA-S 3 (Zágoršek et al., 2009).

Stratum typicum: Langhian – Lower Badenian..

Measurements: (in micro meters = μm ; $x =$ = average):

- length of autozoecia: 604-719; $x = 677$
- width of autozoecia: 455-515; $x = 475$
- length of autozoecial aperture without sinus: 102-129; $x = 114$
- length of autozoecial aperture with sinus: 147-182; $x = 167$
- width of autozoecial aperture: 146-156; $x = 150$
- length of ovicell: 257-373; $x = 302$
- width of ovicell: 311-387; $x = 349$

Description: Colony encrusting, autozoecia grow in rather regular rows. Autozoecia usually oval or slightly hexagonal, longer than wide, separated by deep furrows. Frontal wall convex, smooth, slightly perforated by scattered, cribellate frontal pores. Lateral walls indistinct. Aperture semilunar to semicircular with a very narrow sinus, preserved almost as only a slit. No oral spines observed. Ovicell flat, slightly immersed into the distal part of the autozoecium with a smooth, nonporous frontal wall. Marginal pores on the ovicell not developed.

Comparison: This species differs from *Cribellopora latigastrea* (DAVID, 1949) in having small frontal pores, ovicells without lateral pores and a very narrow sinus. The exact shape of the frontal pores is – due to the preservation – not clearly visible, but they are smaller than in *Cribellopora latigastrea*. *Cribellopora hluchovensis* sp. n. also has a wide sinus and ovicells with lateral pores.

Remark: Due to the presence of cribellate frontal pores, a narrow sinus and absence of oral spines this species belongs to *Cribellopora* as described by Gordon (1984).

Occurrence: Only in the section at Kralice nad Oslavou.

***Cribellopora* sp.**

Pl. 122, Fig.4

M a t e r i a l : 4 specimens from different sections.

D i a g n o s i s : Colony encrusting. Autozooezia oval, chaotically growing, with large cribellate frontal pores. Orifice circular to oval with a broad sinus, no oral spines. Ovicell flat with a smooth, nonporous frontal wall and with one row of (simple) marginal pores.

R e m a r k s : Due to preservation and lack of better material, I am unable to identify this material at species level. The specimens differ from *Cribellopora hluchovens* sp. n. in having a broad sinus and large cribellate frontal pores and from *Cribellopora latigast* (DAVID, 1949) in having only one row of simple pores around the ovicell.

Superfamily **Mamilloporoidea** CANU et BASSLER, 1927

Family **Ascosiidae** JULLIEN, 1883

Genus ***Kionidella*** KOSCHINSKY, 1885

Colony columnar, free. Autozooezia with terminal apertures, medially situated, large condyles, autozooezia budding in radial rows from the columnar axis. Avicularia are usually paired and situated on both sides of the aperture. Ovicell hyperstomial with a porous frontal wall.

***Kionidella moravicensis* PROCHÁZKA, 1893**

Pl. 123, Fig. 1-5

- *1893 *Kionidella moravicensis* nov. sp. – Procházka p. 54, Pl. 12, Fig. 8a-d
v.1996 *Kionidella moravicensis* PROCHÁZKA – Sváček: 73, obr. 5
v.2009 *Kionidella moravicensis* PROCHÁZKA, 1893 – Zágöršek, et al. p. 482, Fig. 11H-J

T y p e : The type material has not been found, a neotype, established by Zágöršek et al. (2009), is stored in NM Prague under the numbers PM2-P 01391.

M a t e r i a l : 7 specimens from the section at Kralice nad Oslavou were studied in detail.

D i a g n o s i s : Colonies conical, with autozooezia budding in a spiral arrangement. Autozooezia globular, subhexagonal to oval. Aperture '8'-shaped, the proximal and distal parts are approximately of equal size and oval shape; the condyles are arranged in the middle of aperture. Avicularia are large, circular to oval with a pivot and usually arranged on one side of the aperture; ovicelled autozooezia rarely with two avicularia. The ovicell is globular, small, deeply immersed with a strongly porous frontal wall.

R e m a r k s : For a detailed description and discussion see Zágöršek et al. (2009).

Superfamily **Celleporoidea**

Family **Celleporidae** JOHNSTON, 1838

Genus ***Buffonellaria*** CANU et BASSLER, 1927

Colony flattened, encrusting, or erect, unilaminar or bilaminar. Autozooezia with marginal areolar pores, a sinus

and lateral avicularia. No oral spines developed except for the ancestrula and during early ontogeny of the autozooezia. Ovicell with a non-calcified central part of the ectoecium and a slightly ribbed endoecium. Secondary calcification very often developed.

R e m a r k : *Buffonellaria* was revised in detail by Berning and Kuklinski (2008).

***Buffonellaria kuklinski* sp. n.**

Pl. 124, Fig. 1-6

D i a g n o s i s : Colony erect, bilaminar. Autozooezia with marginal areolar pores. Primary orifice with a wide sinus. Avicularia of two types, lateral suboral and adventitious, the frontal ones larger than the suboral avicularia. Ovicell with a slightly ribbed, semilunar endoecium. Secondary frontal hypercalcification often occurring.

H o l o t y p e : The specimen illustrated on Pl. 124, Fig. 1, from the section at Podbřežice, deposited in the National Museum Prague under the number PM2 – P 01460.

P a r a t y p e s : Five specimens from the section at Podbřežice deposited in the National Museum Prague under the numbers PM2 – P 01461 to PM2 – P 01465.

A d d i t i o n a l m a t e r i a l : 44 specimens, mainly from the sections at Podbřežice and Kralice nad Oslavou.

D e r i v a t i o n o m i n i s : In honour of Piotr Kuklinski (Department of Marine Ecology Institute of Oceanology Polish Academy of Sciences Warsaw) who studied the genus *Buffonellaria* in detail.

L o c u s t y p i c u s : Podbřežice, sample P1 (Zágöršek and Holcová, 2005).

S t r a t u m t y p i c u m : Langhian – Lower Badenian.

M e a s u r e m e n t s : (in micro meters = μm ; \bar{x} = average):

- length of autozooezia: 385-509; \bar{x} = 443
- width of autozooezia: 236-350; \bar{x} = 278
- length of autozooezial aperture: 94-130; \bar{x} = 118
- width of autozooezial aperture: 98-121; \bar{x} = 105
- length of ovicell: 125-185; \bar{x} = 151
- width of ovicell: 163-203; \bar{x} = 178
- length of oral avicularium: 60-88; \bar{x} = 72
- width of oral avicularium: 40-53; \bar{x} = 46
- length of adventitious avicularium: 98-110; \bar{x} = 104
- width of adventitious avicularium: 56-58; \bar{x} = 57

D e s c r i p t i o n : Colony flattened, erect, bilaminar with an encrusting base. Autozooezia with scattered marginal areolar pores arranged chaotically. Primary orifice with a wide sinus. Avicularia of two types, suboral and adventitious. Lateral suboral avicularia situated proximally from the aperture, usually single, rarely paired, tapering distally with a pivotal bar. Adventitious avicularia situated on the frontal wall within a small chamber, usually tapering proximally, always larger than the suboral avicularia. Ovicell deeply immersed, with a slightly ribbed, semilunar endoecium. The number of ribs varies from 10 to 20. Secondary frontal hypercalcification often occurring; in this case the secondary apertures are semilunar and the ovicells are more immersed.

C o m p a r i s o n : This species is similar to *Buffonellaria jensi* BERNING et KUKLINSKI, 2008 in having an iden-

tical sinus shape, one oral and one frontal avicularium, but it differs in having less areolar pores, and more ribs on the endoecium.

The specific features include the wide sinus in the primary orifice, two types of avicularia, the adventitious avicularia situated in a small chamber and moreover the ovicell has a slightly ribbed endoecium.

O c c u r r e n c e : Sections at Podbřežice and at Kralice nad Oslavou.

***Buffonellaria holubicensis* sp. n.**

Pl. 125, Fig. 1-6

D i a g n o s i s : Colony erect, bilaminar. Autozoecia with marginal areolar pores. Primary orifice with a narrow sinus. Small suboral avicularia are immersed inside the peristomes, large adventitious avicularia have a very long rostrum-palate. Ovicell deeply immersed, with a slightly ribbed endoecium, longer than wide. Secondary frontal hypercalcification often developed peristome above the aperture, but adventitious avicularia clearly visible.

H o l o t y p e : The specimen illustrated on Pl. 125, Fig. 5-6, from the locality Holubice, deposited in the National Museum Prague under numbers PM2 – P 01469.

P a r a t y p e s : 3 specimens from Holubice and Podbřežice deposited in the National Museum Prague under numbers PM2 – P 01466 to P 01468

A d d i t i o n a l m a t e r i a l : 18 specimens, mainly from the section at Holubice

D e r i v a t i o n o m i n i s : Due to the occurrence in the section at Holubice.

L o c u s t y p i c u s : Holubice, sample A/2.

S t r a t u m t y p i c u m : Langhian – Lower Badenian.

M e a s u r e m e n t s : (in micro meters = μm ; x = = average):

- length of autozoecia: 480-564; x = 524
- width of autozoecia: 251-357; x = 308
- length of autozoecial aperture: 98-112; x = 106
- width of autozoecial aperture: 84-91; x = 87
- length of ovicell: 89-130; x = 113
- width of ovicell: 110-140; x = 124
- length of oral avicularium: 185-217; x = 193
- width of oral avicularium: 75-103; x = 87
- length of adventitious avicularium: 198-291; x = 237
- width of adventitious avicularium: 88-130; x = 110

D e s c r i p t i o n : Colony flattened, bilaminar, rising from an encrusting base. Autozoecia with chaotically arranged marginal areolar pores growing in an irregular growth pattern. Primary orifice with a narrow sinus. Secondary apertures oval to circular. Small suboral avicularia immersed, situated inside the peristome, large adventitious avicularia with very long rostrum-palate tapering proximo-laterally. Ovicell deeply immersed, with a slightly ribbed endoecium, much longer than wide. Secondary frontal hypercalcification does not change the shape of the adventitious avicularia, they are often clearly visible.

C o m p a r i s o n : Differs from *Buffonellaria kuklinskii* sp. n. in having a narrower sinus, a circular secondary aperture, clearly visible, large adventitious avicularia and

a deeper immersed ovicell with a longer than wide endoecium area.

O c c u r r e n c e : Podbřežice and Holubice.

Genus *Turbicellepora* RYLAND, 1963

Colony encrusting, multilaminar, nodular or massive. Autozoecia with marginal areolar pores only. Lateral, suboral avicularium, additional vicarious avicularia may be present. Ovicell slightly immersed, irregularly perforated.

R e m a r k : The main difference between *Celleporina* GRAY, 1847 and *Turbicellepora* RYLAND, 1963 is the frontal shield of the ovicell. *Celleporina* has an endoecium reduced to the radial ribs on part of the frontal wall only, while *Turbicellepora* has an ectoecium perforated by a few large pores. The other differences include the position of the oral avicularia (*Celleporina* typically has a pair of oral avicularia situated on the peristome, *Turbicellepora* has only one suboral, laterally placed avicularium. Because only one poorly preserved ovicell has been found in the described taxa, the avicularia was mainly used as a distinctive feature at genus level.

***Turbicellepora coronopus* (WOOD, 1844)**

Pl. 126, Fig. 1-5

- * 1844 *Cellepora coronopus* sp.n. – Wood p. 18.
- 1952 *Osthimosia coronopus* – Lagaaij p. 137
- v. 1974 *Turbicellepora coronopus* (WOOD, 1844) – David and Pouyet p. 212 – 213
- v. 1977 *Turbicellepora coronopus* (WOOD, 1844) – Vávra p. 157 (cum syn.)
- 1978 *Turbicellepora coronopus* (WOOD) – Hayward p. 575 – 577, Fig. 13 (cum syn.)
- ?1988 *Turbicellepora coronopus* (WOOD) – Moissette p. 188, Pl. 30, Fig. 7, 8
- non 1997 *Turbicellepora coronopus* (WOOD) – Pouyet p. 80, Pl. 8, Fig. 10-12

T y p e : Lectotype chosen by Lagaaij (1952) from the Wood coll. in NHM London (number B 1606) illustrated by Busk (1859) on his Pl. 9, Fig. 1a from Sutton (Suffolk, England, Great Britain), Coralline Crag, Pliocene

M a t e r i a l : Altogether 8 samples were studied from different localities and from material stored in the Natural History Museum Vienna under the number 1859.50.758.

D i a g n o s i s : Colonies usually large, columnar. Autozoecia usually wider than long. Primary apertures almost circular (163 μm long and 150 μm wide) with a distinct sinus. Suboral avicularia single, large (98 μm long and 56 μm wide), situated on a long umbo. Vicarious avicularia spatulate (spoon-shaped), very large (289 μm long and 186 μm wide) with rounded palate foramen. Pivotal bar with a large ligula. Ovicell small, immersed, with convex frontal wall perforated by scattered large pores.

R e m a r k s : Often reported from the Miocene of different countries, but only, when a “V”-shaped sinus, vicarious avicularia with a ligula on the pivotal bar, and ovicells with a perforated frontal wall are observed, is determination reliable. For example: Moissette (1988) does not describe any ligula on the pivotal bar, so his determination remains

uncertain. Similarly Pouyet (1997) illustrated vicarious avicularia without any ligula, so her specimens can not belong to this species.

Family **Hippoporidridae** VIGNEAUX, 1949

Genus **Hippoporella** CANU, 1917

Colony encrusting. Autozooezia with marginal areolar pores. Aperture large, primary orifice with lyrula. Avicularia suboral, situated medially on the proximal edge of the aperture; paired ones situated distally from the aperture, on a short peristome (lips). Ovicell immersed, with a porous frontal wall.

The problem with respect to the type species of this genus was already discussed by Harmer (1957); I agree with his statement.

Hippoporella bicornis CANU et LECOINTRE, 1927

Pl. 127, Fig. 1-5

- * 1927 *Hippoporella bicornis* sp.n. – Canu and Lecointre p. 81, Pl. 14, Fig. 11, 12 and Pl. 20, Fig. 4
1997 *Hippoporella bicornis* CANU et LECOINTRE, 1927 – Pouyet p. 63, pl. 6, Fig. 6-8 (cum syn.)

Material: Altogether 7 specimens were studied from different sections

Diagnosis: Autozooezia oval with 18-20 marginal areolar pores. Aperture triangular with a straight proximal margin, small condyles and a small lyrula. The median avicularium is small, circular. Paired avicularia are oval, situated on lips, raised laterally from the aperture. Ovicell immersed with frontal wall slightly perforated by 7-9 pores.

Remarks: A characteristic feature is the presence of lips (an incomplete peristome) laterally from the aperture with a pair of small avicularia and a very slightly perforated frontal wall of ovicells.

Family **Cheiloporinidae** BASSLER, 1936

Genus **Hagiosynodos** BISHOP et HAYWARD, 1989

Colony encrusting. Frontal wall perforated by many pores. Aperture with large condyles and with characteristically enlarged proximo-lateral corners. No oral spines. Small suboral avicularia may be present. Ovicell deeply immersed into the distal part of the autozooezium, ovicell with porous frontal wall.

Remark: Bishop and Hayward (1989) placed *Hagiosynodos* in Hippoporidridae VIGNEAUX, 1949, but recently Hayward and McKinney (2002) listed the *Hagiosynodos* in the family Cheiloporinidae BASSLER, 1936.

Hagiosynodos campanulata (CIPOLLA, 1921)

Pl. 128, Fig. 1-4

- ?v. 1874 *Lepralia sulcifera* m. – Reuss p. 176, Pl. 8, Fig. 8
? 1974 *Hippoporina sulcifera* (REUSS, 1874) – David and Pouyet p. 176, Pl. 7, Fig. 4
2006 *Cheiloporina campanulata* (CIPOLLA, 1921) – Berning p. 96, Fig. 121, 122 (cum syn.)

Material: Altogether 8 specimens were studied from different localities.

Diagnosis: Oval elongated autozooezia. Frontal wall perforated by 25-35 large pores. Avicularia in pairs, very small, almost indistinct, placed very close to the margin of the aperture. Ovicell small, immersed, very strongly, but irregularly perforated by smaller pores than the frontal wall. No ribs, no umbo on the ovicell.

Remarks: *Lepralia sulcifera* REUSS, 1874 was re-described as *Hippoporina sulcifera* (REUSS, 1874) by David and Pouyet (1974); it is very similar when compared with the described species, but no ovicell was preserved in this specimen. Therefore, an exact determination of Reuss' species is impossible.

Hagiosynodos campanulata (CIPOLLA, 1921) differs from *Hippopodinella lata* (BUSK, 1856) as described by Schmid (1989) as well as from *Hagiosynodos lata* as described by Hayward and Ryland (1999). Recent species and Schmid's specimens show prominent ribs on the ovicell as well as smaller frontal pores and larger avicularia situated on small umbones.

Cheiloporina as originally described by Canu and Bassler (1923), has an endozooezical ovicell; this means: no separation between the ovicell and the distal autozooezium. *Hagiosynodos campanulata* shows the distinct shape of the ovicell, even when deeply immersed. A second characteristic feature of the genus *Cheiloporina* is a considerable difference between ovicelled and non-ovicelled autozooezia. The ovicelled autozooezia have an aperture almost twice the size of the aperture in the non-ovicelled ones (Canu and Bassler, 1923). None of these features are visible in *Hagiosynodos campanulata*, making an attribution to the genus *Cheiloporina* improbable. *Hagiosynodos* is a genus more similar to our material: due to the presence of the characteristic shape of the aperture, the small avicularia and the porous frontal wall of the ovicell. Another similar genus is *Hippopodina* LEVINSEN, 1909 (revised by Tilbrook, 1999), which differs however mainly in having adventitious avicularia associated with the aperture.

Hagiosynodos latus (BUSK, 1856)

Pl. 128, Fig. 5-6

- v. 1977 *Hippopodinella lata* (BUSK, 1856) – Vávra p. 150 (cum syn.)
1989 *Hippopodinella lata* (BUSK, 1856) – Schmid p. 47, Pl. 13, Fig. 7
1997 *Hagiosynodos latus* (BUSK, 1856) – Pouyet p. 76, Pl. 8, Fig. 8
2006 *Hagiosynodos latus* (BUSK, 1856) – Berning p. 97, Fig. 123, 124 (cum syn.)

Material: Only one specimen from Podbřežice was found. An additional 2 specimens from the Reuss collection stored in the Natural History Museum Vienna under the number 1878.11.76 from a section at Podivín were included in our studies.

Diagnosis: Oval to circular autozooezia. Frontal wall perforated by 15-25 small pores. Apertures with a wide nonporous lip. Avicularia situated on small umbones, close to the aperture. Ovicell not observed.

Remarks: Even though no ovicell was found in this specimen, the presence of avicularia on small umbones and the nonporous lip around the apertures permitted us to identify this species.

Family **Hippopodinidae** LEVINSEN, 1909

Genus **Saevitella** BOBIES, 1956

Colony encrusting. Autozoecia with perforated frontal wall. Aperture circular, with short but wide peristome with slightly visible condyles. Dimorphism in apertures common. Oral spines, lyrula and avicularia absent. Ovicell deeply immersed perforated.

Remarks: Bobies (1956) proposed family Phylactelliporidae Bassler, 1953 for this genus, due to the general similarities with Phylactella HINCKS, 1879. A lyrula was described (but not illustrated) also by David and Pouyet (1974), which proof the family attribution. However, no lyrula was visible on type material illustrated by Gordon (in Bock, 2010). Due to the presence of perforated frontal wall both of autozoecia and ovicell, absence of oral spines and lyrula and dimorphic apertures, the genus is listed within family Hippopodinidae LEVINSEN, 1909 (Bock, 2010).

Saevitella inermis BOBIES, 1956

Pl. 129, Fig. 1-2

v.* 1956 *Saevitella inermis* – Bobies p. 251, Pl. 8, Fig. 21-22
1977 *Saevitella inermis* BOBIES – Vávra p. 151 (cum syn.)

Type: Holotype deposited in the Natural History Museum Vienna under the number 121/1955.

Material: One colony form section Pratecký vrch – Mohyla míru and three additional specimens from Poland Korytnica clay.

Diagnosis: Autozoecia oval to elongated tetragonal, much longer than wide, separated by deep grooves. Frontal wall perforated by 25-35 large pores. Apertures clearly dimorphic; Nonovicelled autozoecia with circular aperture with a wide nonporous lip forming very short, but complete peristome. Proximal margin of the apertures slightly curved. Condyles observable, but very small. Ovicell deeply immersed in distal autozoecium, globular with frontal wall perforated by slightly smaller pores than the frontal ones. Apertures on ovicelled autozoecia more rectangular with straight proximal margin and larger diameter than apertures in nonovicelled autozoecia. Also the peristome on ovicelled autozoecia is not complete, on distal part the peristome is not developed, there are clear narrow furrow between ovicells and peristome.

Family **Phidoloporidae** GABB et HORN, 1862

Genus **Reteporella** BUSK, 1884

Colony erect, unilaminar, dichotomously branching or reticulating. Autozoecia arranged in alternating longitudinal rows with apertures on one side only. The frontal wall is nonporous and has rare marginal pores. Peristome charac-

teristically perforated by a spiramen. Oral spines may be present. Adventitious avicularia are usually situated on the frontal wall. Ovicell immersed into the distal part of the autozoecium. Dorsal side of the colony smooth, often with small avicularia.

Reteporella cf. beaniana (KING, 1846)

Pl. 130, Fig. 1-6

? 1999 *Reteporella beaniana* (KING, 1846) – Hayward and Ryland p. 368 (cum syn.)

Material: Altogether 9 well-preserved specimens were studied from different sections.

Diagnosis: Colony reticulating, forming a net with fenestulae. Branches biserial or triserial. Frontal wall smooth with large areolar pores. Aperture is circular, hidden in a short peristome, no basal pseudo-spiramen formed. Suboral avicularia are small, oval, with a pivotal bar; avicularia situated on the proximal margin of the aperture. Additional oval avicularia situated on the frontal wall, usually slightly larger than the suboral avicularia. The same type of avicularia, but slightly smaller, also occurs on the dorsal side of the branches. Additional large avicularia are often situated on the margins of a branching area. Ovicells are deeply immersed; they show a wide, open frontal fissure.

Remarks: Characteristic features are the presence of small avicularia on the dorsal side of the colony, small frontal avicularia, large areolar pores and the wide frontal fissure on the ovicell.

Although the species is reported only from recent seas, the similarity is too large to ignore. The only differences between recent material as described by Hayward and Ryland (1999) and our fossil material exist with respect to the development of oral spines. Recent specimens have a single spine on each side of the aperture which were not observed in the fossil material. All other features of the species as described by Hayward and Ryland (1999) are observable in the studied material.

Reteporella hluchovensis sp. n.

Pl. 131, Fig. 1-4

Diagnosis: Colony robust, reticulating, forming 'nets'. Branches with four to six rows of autozoecia. Frontal wall smooth with very small areolar pores. Aperture is circular, hidden in a short peristome, basal pseudo-spiramen formed. Avicularia suboral, hidden. The ovicells are almost entirely immersed into the dorsal part of the autozoecia, frontal wall of the ovicells are very narrow, the whole frontal area occupied by a wide frontal fissure.

Holotype: The specimen illustrated on Pl. 131, Fig. 1-2, from the locality Hluchov, deposited in the National Museum Prague under the number PM2 – P 01775.

Paratypes: 2 specimens from the locality Hluchov, deposited in the National Museum Prague under numbers PM2 – P 01776 and P 01777.

Additional material: 8 specimens from the locality Hluchov, deposited in the National museum Prague within the bryozoan collection.

Derivatio nominis: Due to the occurrence in the section at Hluchov.

Locus typicus: Hluchov.

Stratum typicum: Langhian – Lower Badenia.

Measurements: (in micro meters = μm ; x = average):

diameter of branch: 672-926; x = 765

length of fenestrulae: 580-876; x = 680

width of fenestrulae: 231-330; x = 288

length of autozooezia: 456-492; x = 468

width of autozooezia: 147-165; x = 153

length of autozooezial aperture: 88-121; x = 108

width of autozooezial aperture: 68-106; x = 89

length of sinus: 34-38; x = 36

width of sinus: 10-13; x = 12

Description: Colony robust, reticulating, branches wide, fenestrulae narrow and short. Autozooezia in four to six longitudinal rows. Frontal wall smooth with very small areolar pores. Aperture circular, hidden in a short peristome, basal pseudo-spiramen formed. Avicularia deeply immersed into the peristome, relatively hidden, almost not visible. The ovicells are almost entirely immersed into the dorsal part of autozooezia, frontal walls of ovicells very narrow, whole frontal area occupied by a wide frontal fissure. Dorsal side of the colony without any avicularia.

Comparison: This species differs from *Reteporella* cf. *beaniana* (KING, 1846) by the almost complete absence of any avicularia on dorsal side and formation of rather robust colonies. The ovicells with their wide frontal fissure are however rather similar. Characteristic features are the robust colonies, the deeply immersed ovicells with their wide frontal fissures, the hidden avicularia on the frontal side and also absence of avicularia on the dorsal side of the colony branches.

Occurrence: Also in the section at Podbrěžice, sample P-6.

***Reteporella kralicensis* ZÁGORŠEK, HOLCOVÁ
et TRÁSOŇ, 2008**

Pl. 132, Fig. 1-6

v.*2008 *Reteporella kralicensis* sp.n. – Zágoršek et al. p. 843, Fig. 7

Type: Holotype deposited in the National museum Prague under the number PM2 – P 01306.

Material: Altogether 41 specimens have been studied in detail.

Diagnosis: Colony reticulating, forming probably net-like colonies, however fenestrulae have not been found. Branches biserial or triserial. Frontal walls smooth with small areolar pores. Aperture is circular, hidden in a short peristome, consisting of two proximo-lateral flaps forming a basal pseudo-spiramen. Pair of oral spines situated on the margin of the aperture. Avicularia are polymorphic, two different types can be observed, situated only frontally however. Small avicularia are immersed into the frontal wall, large avicularia forming separate polymorphs. Avicularia on the dorsal side are rare, usually situated near a bifurcation; they are large with a long, triangular palate. Ovicells deeply immersed with a wide, open frontal fissure.

Remarks: Avicularia on the dorsal side have not been reported from the type material, however the features on the frontal side of the branch clearly identify the specimens. Characteristic features of this species are the large frontal avicularia forming separate polymorphs and the wide frontal fissure on the ovicell.

***Reteporella vladkae* sp. n.**

Pl. 133, Fig. 1-6

v.* 2009 *Reteporella* sp. – Zágoršek et al. p. 482, Fig. 10G

Diagnosis: Net-like colonies with narrow, biserial or triserial branches and large fenestrulae. Frontal wall smooth with large areolar pores. Aperture is circular, hidden, a pseudo-spiramen is not formed. Suboral avicularia are small, deeply immersed, frontal avicularia rare, dorsal avicularia absent, additional large avicularia on branching areas. Dorsal side without any avicularia. Ovicells deeply immersed with a very narrow, almost closed frontal fissure.

Holotype: The specimen from the section at Kralice nad Oslavou, illustrated on Pl. 133, Fig. 1-2 is deposited in the National Museum Prague under the number PM2 – P 01782.

Paratypes: 4 specimens from the section at Kralice nad Oslavou, are deposited in the National Museum Prague under numbers PM2 – P 01783 to P 01786

Additional material: 10 specimens from the section at Kralice nad Oslavou are deposited in the National Museum Prague.

Derivatio nominis: Derived from the name Vladka, in honour of Dr. Vladimíra Jašková from the Prostějov museum who helped me very much in my fieldwork.

Locus typicus: Kralice nad Oslavou, sample KRA-S: (Zágoršek et al., 2009).

Stratum typicum: Langhian – Lower Badenian.

Measurements: (in micro meters = μm ; x = average):

diameter of branch: 445-668; x = 546

length of fenestrula: 1583

width of fenestrula: 586

length of autozooezia: 483-508; x = 498

width of autozooezia: 164-227; x = 197

length of autozooezial aperture: 95-111; x = 105

width of autozooezial aperture: 100-110; x = 105

length of ovicells: 174-216; x = 193

width of ovicells: 52-60; x = 56

length of suboral avicularia: 67-94; x = 77

width of suboral avicularia: 44-82; x = 58

length of dorsal avicularia: 242-244; x = 243

width of dorsal avicularia: 51-52; x = 52

diameter of dorsal pores: 19-36; x = 25

Description: Colony delicate, branches narrow, fenestrulae wide and long. Branches biserial, rarely with three rows of autozooezia. Autozooezial frontal walls smooth with large areolar pores. Apertures circular, hidden in deep peristomes, pseudo-spiramen not formed. Suboral avicularia small, deeply immersed, situated at the proximal margin of the aperture, oval with a pivotal bar. Rarely an identical type of avicularia may be situated on the frontal

wall also. Dorsal side without any avicularia. Large avicularia situated on the lateral sides of the branch margin, usually in the area of branch bifurcation. This avicularia are very narrow and long with a pivotal bar. Ovicells deeply immersed with a very narrow, almost closed frontal fissure.

C o m p a r i s o n : The species is similar to *Reteporella* cf. *beaniana* (KING, 1846) with respect to the position and shape of the suboral avicularia, the size of areolar pores and the general shape of the colony (delicate branches and large fenestrulae); it differs however mainly in having a very narrow frontal fissure on the ovicell and by the absence of any dorsal avicularia. Also the shape of avicularia, which are situated near a bifurcation, is different, they are very narrow in *Reteporella vladkae* sp. n.

Reteporella vladkae sp. n. differs from other species by the absence of avicularia on the dorsal side of the colony, by the small frontal avicularia and the very narrow frontal fissure on the ovicell.

O c c u r r e n c e : Only in the section at Kralice nad Oslavou

***Reteporella ruzenkae* sp. n**

Pl. 134, Fig. 1-3

D i a g n o s i s : Colony robust, branches with six to eight rows of autozoecia. Frontal wall smooth with scattered small areolar pores. Apertures circular, very large, with delicate condyles. No pseudo-spiramen. Avicularia only frontal. Ovicells immersed, no frontal wall preserved. Dorsal side smooth, without any avicularia.

H o l o t y p e : The specimen illustrated on Pl. 134, Fig. 2-3, from the locality Holubice, deposited in the National Museum Prague under number PM2 – P 01788.

P a r a t y p e s : 2 specimens from the locality Holubice, deposited in the National Museum Prague under the numbers PM2 – P 01787 and P 01925.

A d d i t i o n a l m a t e r i a l : 2 specimens from the localities Hlohovec and Kralice nad Oslavou, deposited in the National Museum Prague within the bryozoan collection.

D e r i v a t i o n o m i n i s : Derived from the nick name of Růžena – Růženka, in honour of Dr. Růžena Gregorová from MZM Brno, who supported my fieldwork.

L o c u s t y p i c u s : Holubice, sample A/2

S t r a t u m t y p i c u m : Langhian – Lower Badenian.

M e a s u r e m e n t s : (in micro meters = μm ; x = average):

- diameter of branch: 643-1312; x = 1025
- length of autozoecia: 578-666; x = 612
- width of autozoecia: 144-219; x = 193
- length of autozoecial aperture: 115-135; x = 126
- width of autozoecial aperture: 105-120; x = 113
- length of avicularia: 90-92; x = 91
- width of avicularia: 47-60; x = 54

D e s c r i p t i o n : Colony robust, reticulating, branches wide, fenestrulae not preserved. Autozoecia in six to eight longitudinal rows, oval, separated by very thin furrows. Frontal walls smooth, flat, with scattered large areolar pores. Apertures circular, very large, slightly longer than

wide with delicate, small condyles. No pseudo-spiramen developed. Suboral avicularia absent, frontal avicularia rare, small, oval, no pivot bar observed. Ovicells immersed, no frontal wall preserved. Dorsal side smooth, without any avicularia.

C o m p a r i s o n : This species is similar to *Reteporella hluchovensis* sp. n. with respect to the generally robust shape of the colony and the rare development of avicularia, it differs however in the absence of suboral avicularia and pseudo-spiramen.

Even though the ovicells' frontal walls were not preserved, characteristic features such as the absence of suboral avicularia and pseudo-spiramen, as well as the presence of very large, circular apertures with clearly visible condyles clearly distinguish this species from others known from the Miocene.

O c c u r r e n c e : Also in the sections at Kralice nad Oslavou and at Hlohovec.

***Reteporella* sp.**

Pl. 135, Fig. 1-6

- v. 1977 *Sertella* sp. – Vávra p. 145 (cum syn.)
- 1925 *Sertella gigantea* nov. spec. – Kühn p. 26, Pl. 2, Fig. 3, 4, Text fig 6
- 1988 *Sertella cellulosa* LINNAEUS, 1767 – Moissette p. 167 (cum syn.)
- 2006 *Reteporella* sp. – Berning p. 128

M a t e r i a l : More than 100 specimens from almost all studied sections. Kühn's material is stored in the collections of the Geological Bundesanstalt (Vienna, Austria) number. 2007/208/4).

D i a g n o s i s : Colony robust, reticulating, branches wide, fenestrulae long and narrow. Autozoecia in four to six longitudinal rows. Frontal wall smooth with scattered large, areolar pores. Aperture circular, hidden in a short peristome. Basal pseudo-spiramen forming a short open sinus. Suboral avicularia rare, immersed into the proximal margin of the autozoecia. Frontal avicularia rare, small, oval with pivotal bar. Ovicell immersed with a wide frontal fissure. Dorsal side with small avicularia usually situated on the margin of the branch. No large avicularia at bifurcation of branches.

R e m a r k s : The usually poor preservation and absence of characteristic features do not allow precise determination of many colonies of *Reteporella*. A few authors refer these material to *Reteporella cellulosa* LINNAEUS, 1767 or *Sertella cellulosa* LINNAEUS, 1767 (e.g. Moissette, 1988), but this species is not well established (Harmer, 1933 and Gordon, 1989). Here I follow the opinion of Vávra (1977) and Berning (2006), who prefer to summarize all such material as *Reteporella* sp.

Kühn's material is very badly preserved, the only visible feature are the larger branches of the colony. Detailed study of the type material does not allow definition of any characteristic feature, so this species has to be included within *Reteporella* sp. only.

Genus *Iodictyum* HARMER, 1933

Colony unilaminar, often branching and forming nets. Frontal wall nonporous with rare marginal pores. Aperture

with well defined condyles inside the peristome. Avicularia frontal vicarious, or missing. Oral spines unknown. Ovicell recumbent, usually closed by a lamella with a median keel.

***Iodictyum rubeschii* (REUSS, 1847)**

Pl. 136, Fig. 1-5

- v.* 1847 *Retepora rubeschii* m. REUSS p. 48, Pl. 6, Fig. 35-37
1977 *Iodictyum rubeschii* (REUSS, 1847) – Vávra 146 (cum syn.)
1989 *Iodictyum rubeschii* (REUSS, 1847) – Schmid p. 54, Pl. 16, Fig. 1-5 (cum syn.)
v. 2003 *Iodictyum rubeschii* (REUSS, 1847) – Zágöršek p. 180, Pl. 30, Fig. 5 (cum syn.)

T y p e : Holotype from Nussdorf deposited in the Natural History Museum Vienna under the number 1847.37.243 (identified by David and Pouyet, 1974)

M a t e r i a l : More than 20 specimens from different sections studied in detail.

D i a g n o s i s : Autozooezia oval, elongate, irregular, separated by thin grooves and arranged in 3 to 4 longitudinal rows. Aperture very large, semilunar, with a secondary sinus and a short peristome. Frontal wall smooth, flat, sometimes slightly convex, rarely perforated. Avicularia small, rare and arranged on the frontal wall, without a pivotal bar. Ovicell partly immersed, small, slightly prominent, no frontal wall preserved. Dorsal side of the colony smooth with additional rare avicularia.

Genus *Stephanollona* DUVERGIER, 1920

Colony encrusting. Frontal wall with marginal areolar pores only. Primary orifice with a sinus, oral spines may be present. Avicularia adventitious, situated laterally from the aperture with a large palate. Sometimes paired. Ovicell slightly immersed or recumbent, with an unperforated frontal wall.

***Stephanollona pauper* (REUSS, 1874)**

Pl. 137, Fig. 1-6

- v.* 1874 *Lepralia pauper* m. – Reuss p. 164, Pl. 5, Fig. 4
v.* 1974 *Hippoporella pauper* (REUSS, 1874) – David and Pouyet p. 173, Pl. 7, Fig. 8
1977 *Hippoporella pauper* (REUSS, 1874) – Vávra p. 130 (cum syn.)
non 1989 *Hippoporella pauper* (REUSS, 1874) – Schmid p. 48, Pl. 14, Fig. 1-3
2006 “*Hippoporella*” *pauper* (REUSS, 1874) – Berning p. 124, Fig. 164-166 (cum syn.)

T y p e : Holotype deposited in the Natural History Museum Vienna under the number 1878.11.49 and illustrated by David and Pouyet (1974).

M a t e r i a l : More than 30 specimens from different sections studied in detail. An additional 3 specimens from the Reuss collection stored in the Natural History Museum Vienna under the number 1878.11.36 from the section Baden.

D i a g n o s i s : Autozooezia with well developed marginal pores. Primary orifice with a wide sinus, aperture small,

slightly cleithriate. Secondary aperture with sinus. Oral spines very large, autozooezia without ovicells have 4 spines, ovicelled ones 2 spines only. Large, spatulate adventitious avicularia with a pivotal bar and a large rostrum situated laterally from the aperture. A second, small, suboral avicularium may be present. Ovicell globular with a wide frontal fissure not immersed into the distal part of autozooezium.

R e m a r k s : The type has 4 oral spines, small avicularia, clearly visible marginal areolar pores, but no ovicell and large adventitious avicularia. David and Pouyet (1974) and also Berning (2006) already described ovicells and large adventitious avicularia and added these features to the description of the species.

Stephanollona has been discussed in detail by Gordon (1994). He argued that the characteristic features of the genus are the presence of condyles, marginal areolar pores, oral spines, large adventitious avicularia and small globular ovicells. Because of the presence of large adventitious avicularia, a sinus, oral spines and small globular ovicells in *Lepralia pauper* REUSS, 1874, this species is listed in the genus *Stephanollona*.

The species *Stephanollona pauper* differs from *Schizotheca fissa* in having adventitious avicularia (*Schizotheca fissa* has vicarious avicularia) and a wide sinus. *Schedocleidochasma incisa* differs from *Stephanollona pauper* in having a cleithriate aperture, small avicularia and no oral spines.

Schmid (1989) described specimens with very prominent cleithriate apertures and with no adventitious avicularia or oral spines. These specimens resemble *Schedocleidochasma incisa* (REUSS, 1874).

Berning (2006) illustrated a specimen of “*Hippoporella*” *pauper* with large spatulate adventitious avicularia, oral spines and also ovicells with two slits at their margin. The confusion about types was discussed by Berning (2006). I agree with him and understand the species in the same manner as he does. However, he suggested a new genus for this species. I believe that *Stephanollona* completely covers all the features visible in *S. pauper*.

Genus *Schizotheca* HINCKS, 1877

Colony encrusting. Autozooezia oval with marginal areolar pores and a smooth frontal wall. Apertures with a prominent pseudo-sinus, primary orifice oval with condyles. Avicularia vicarious. Ovicell with a frontal fissure, and a nonporous frontal wall, not immersed.

***Schizotheca cf. fissa* (BUSK, 1856)**

Pl. 138, Fig. 1-6

- ?* 1856 *Lepralia fissa* n.sp. – Busk p. 308, Pl. 9, Fig. 8-10
1989 *Schizotheca fissa* (BUSK, 1856) – Schmid p. 55, pl. 16, Fig. 6-9 (cum syn.)
? 1999 *Schizotheca fissa* (BUSK, 1856) – Hayward and Ryland p. 382, Fig. 180D, 181

M a t e r i a l : A very common species, 47 samples from different sections were studied in detail.

D i a g n o s i s : Autozooezia in a linear series, oval to hexagonal. Frontal wall convex, smooth, with small areolar pores. Primary orifice with a small sinus, aperture with a median pseudo-sinus and six oral spines. Vicarious avicularia large, half the size of the autozooezia with a large palate and a pivotal bar, often immersed between autozooezia. Additional small adventitious avicularia may be present on the frontal wall. Ovicell not immersed, globular with a wide triangular frontal fissure.

R e m a r k s : Although this is originally a recent species, all features as described by Hayward and Ryland (1999) have been also observed in the studied material. There are two differences which may indicate that the fossil specimens are different from the recent ones. The first is the presence of adventitious avicularia; which are not described from recent material. The second difference concerns the shape of the triangular frontal fissure of the ovicell. The recent material has a much narrower fissure than the fossil ones, while Schmid's material (1989) shows the same width of the fissure as the studied material. To decide if these differences are sufficient to establish a new species requires a detailed revision of the genus, which is beyond the scope of this paper.

Genus *Schedocleidochasma* SOULE, SOULE
et CHANEY, 1991

Colony encrusting. Autozooezia with small marginal areolar pores only. Apertures rounded cleithridiate, with well developed condyles. Avicularia small, single or paired. Ovicell globular, with a nonporous frontal wall but with two marginal slits.

Schedocleidochasma incisa (REUSS, 1874)

Pl. 139, Fig. 1-9

- v.* 1874 *Lepralia incisa* m. – Reuss p. 168, Pl. 3, Fig. 4
1974 *Bufonellodes incisa* (REUSS) – David and Pouyet p. 170, Pl. 9, Fig. 3.
1977 *Buffonellodes incisa* (REUSS) – Vávra p. 128 (cum syn.)
2006 *Schedocleidochasma incisa* (REUSS, 1874) – Berning p. 130, fig. 173-175 (cum syn.)

T y p e : Holotype from Eisenstadt deposited in the Natural History Museum Vienna under the number 1878.11.61 and figured by David and Pouyet (1974).

M a t e r i a l : Very common, 42 specimens from different sections were studied in detail.

D i a g n o s i s : Autozooezia oval, separated by deep grooves. Frontal wall convex, smooth with small, indistinct marginal pores. Aperture large, cleithridiate with large condyles. Oral spines indistinct, small, usually not well developed. Avicularia small, adventitious, situated on the frontal wall, with a pivotal bar. Ovicells globular, recumbent on the distal part of the autozooezium, with two short lateral fissures.

R e m a r k s : The type shows slightly larger lateral fissures on the ovicell, all other features are identical. The specimens are also almost identical with the re-description of this species by Berning (2006), The only differences con-

cern the preservation of the lateral fissures of the ovicells and oral spines, which are both less prominent in the studied material.

Genus *Rhynchozoon* HINCKS, 1895

Colony encrusting, often multilamellar (growing in superimposed layers). Frontal wall convex, centrally imperforate with marginal areolar pores only. Aperture suborbicular to cleithridiate, primary orifice with a denticulate distal margin, sinus and condyles. Peristome with an asymmetrical pseudo-sinus and a suboral avicularium. Adventitious avicularia may be present. Ovicell prominent with nonporous frontal wall.

Rhynchozoon monoceros (REUSS, 1847)

Pl. 140, Fig. 1-6

- v.* 1847 *Cellepora monoceros* m. – Reuss p. 80, Pl. 9, Fig. 24
1974 *Umbonula monoceros* (REUSS) – David and Pouyet p. 145, Pl. 12, Fig. 2
1977 *Umbonula monoceros* (REUSS) – Vávra p. 110 (cum syn.)
v. 1989 *Umbonula monoceros* (REUSS) – Schmid p. 32, Pl. 8, Fig. 5, 6 (cum syn.)
v. 2001 *Umbonula monoceros* (REUSS) – Zágöršek p. 54, 28, Fig. 7
v. 2003 *Umbonula monoceros* (REUSS) – Zágöršek p. 160 (cum syn.)
? 2006 *Rhynchozoon monoceros* (REUSS) – Berning p. 129, Fig. 169-172

T y p e : Holotype deposited in the Natural History Museum Vienna under the number 1847.38.73 (Vávra, 1977)

M a t e r i a l : A very common species, 59 specimens from different sections were studied in detail.

D i a g n o s i s : Autozooezia with a drop-like shape, with a convex, granular frontal wall separated by distinct grooves. Marginal areolar pores rare and small. Aperture semicircular to oval with very small condyles. Peristome long, protruding above the aperture. Suboral avicularia small, circular with a pivotal bar, situated asymmetrically relative to the aperture. Two oral spines situated on the distal margin of the aperture. Adventitious avicularia absent. Ovicell prominent, globular, recumbent on the distal part of the autozooezium.

R e m a r k s : Berning (2006) described adventitious avicularia which are not present either in the types nor in the studied material, so it remains unclear whether his material also belongs to this species.

The presence of semicircular apertures, the asymmetrical position of avicularia and the small ovicells clearly affiliate this species to the genus *Rhynchozoon*.

Rhynchozoon oslavanensis sp. n.

Pl. 141, Fig. 1-2

D i a g n o s i s : Autozooezia hexagonal to oval, with a flat, smooth frontal wall. Marginal areolar pores prominent. Aperture semilunar to oval with a fine denticulate distal margin. Peristomes short. Suboral avicularia large, drop-like with prominent pivotal bar. Oral spines paired. Adventitious avicularia absent. Ovicell flat, globular, recumbent.

H o l o t y p e : The specimen illustrated in Pl. 141, Fig. 1, from the section Oslavany, deposited in the National Museum Prague under the number PM2 – P 01807

P a r a t y p e : The specimen from the section Podbřežice, deposited in the National Museum Prague under the number PM2 – P 01808.

D e r i v a t i o n o m i n i s : Due to its occurrence in the section at Oslavany.

L o c u s t y p i c u s : Oslavany, sample OsII-1.

S t r a t u m t y p i c u m : Langhian – Lower Badenian.

M e a s u r e m e n t s : (in micro meters = μm ; x = average):

length of autozoecia: 466-505; x = 487

width of autozoecia: 383-394; x = 388

length of autozoecial aperture: 49-72; x = 60

width of autozoecial aperture: 120-154; x = 132

length of avicularium: 102-110; x = 106

width of avicularium: 73-100; x = 83

diameter of avicularium chamber: 206-227; x = 217

D e s c r i p t i o n : Autozoecia hexagonal to oval, with a flat, smooth frontal wall, separated by narrow grooves. Marginal areolar pores large, 14-16 at the border of each autozoecium. Aperture semilunar to oval with a fine denticulate distal margin. Peristome short. Suboral avicularia large, drop-like with prominent pivotal bar. Oral spines rare, usually two, situated on the distal margin of the aperture. Adventitious avicularia absent. Ovicell flat, large, globular, and slightly recumbent on the proximal part of the distal autozoecium.

C o m p a r i s o n : Differs from *Rhynchozoon monoceros* (REUSS, 1847) in having large and abundant areolar pores and larger apertures and shorter peristomes bearing larger avicularia. Also the size of the ovicell in *Rhynchozoon oslavanensis* sp. n. is much larger than in *Rhynchozoon monoceros* (REUSS, 1847)

***Rhynchozoon krouzkovensis* sp. n.**

Pl. 141, Fig. 3-4

D i a g n o s i s : Autozoecia oval to hexagonal, with very large marginal areolar pores. Aperture semilunar to oval. Peristomes short forming an asymmetrical pseudo-spiramen. Small but prominent umbo situated on the proximal margin of the peristome. Suboral avicularia small, drop-like. Oral spines present, 2-4 on distal margin. Adventitious avicularia absent. Ovicell unknown.

H o l o t y p e : The specimen illustrated in Pl. 141, Fig. 4, from the section Rousínov – Kroužek, deposited in the National Museum Prague under the number PM2 – P 01810.

P a r a t y p e s : Specimen from the section Rousínov – Kroužek, deposited in the National Museum Prague under the number PM2 – P 01809.

D e r i v a t i o n o m i n i s : Due to the occurrence in the section at Rousínov – Kroužek.

L o c u s t y p i c u s : Kroužek, sample Kr-3.

S t r a t u m t y p i c u m : Langhian – Lower Badenian.

M e a s u r e m e n t s : (in micro meters = μm ; x = average):

length of autozoecia: 282-388; x = 318

width of autozoecia: 152-260; x = 211

length of autozoecial aperture: 58-80; x = 69

width of autozoecial aperture: 92-116; x = 108

diameter of avicularium chamber: 54-88; x = 74

diameter of marginal areolar pore: 20-34; x = 27

D e s c r i p t i o n : Autozoecia oval to hexagonal, with a flat, smooth frontal wall, separated by very narrow grooves. Marginal areolar pores very large but rare, only 2-4 pores on the border of each autozoecium, arranged chaotically. Apertures semilunar to oval with dentition on the distal margin. Peristomes short forming an asymmetrical pseudo-spiramen. Small but prominent umbo situated on the proximal margin of the peristome, opposite to the pseudo-spiramen. Suboral avicularia small, drop-like without a pivotal bar. Oral spines sometimes developed, 2-4 on the distal margin. Adventitious avicularia absent. Ovicell unknown.

C o m p a r i s o n : This species differs from *Rhynchozoon monoceros* (REUSS, 1847) in having a much smaller umbo with a suboral avicularium and asymmetrical pseudo-spiramen. *Rhynchozoon oslavanensis* sp. n. differs in having much deeper grooves and by the peristomes which do not form a pseudo-spiramen.

Rhynchozoon krouzkovensis sp. n. differs from any other *Rhynchozoon* species in having very large and rare areolar pores, shorter peristomes forming an asymmetrical pseudo-spiramen and by its small avicularia.

***Rhynchozoon* sp.**

Pl. 142, Fig. 1-6

M a t e r i a l : Altogether only two specimens were found.

D i a g n o s i s : Autozoecia oval indistinct, with a flat, smooth frontal wall not separated by grooves. Marginal areolar pores small, 3-5 on the border of each autozoecium. Apertures semilunar with a very wide sinus and with a prominent denticulate distal margin, but with denticles also on the proximal margin. Condyles prominent. Peristomes short. Suboral avicularia small, drop-like without a pivotal bar. Oral spines not observed. Large adventitious avicularia present, situated on the frontal wall with a prominent pivotal bar. Ovicell not observed.

R e m a r k s : Differs from other *Rhynchozoon* species in having very large apertures, distally distinctly denticulate, an indistinct shape of the autozoecia and the presence of large adventitious avicularia. Only two specimens have been found, neither of which had ovicells developed; therefore the features observed were not sufficient to establish a new species.

Superfamily Batoporoidea

Family Batoporidae NEVIANI, 1901

Genus *Batopora* REUSS, 1867

Colony free, spherical to sub-conical, with autozoecia arranged in more than one layer. Autozoecia with margin-

al areolar pores (nonporous central part of the frontal wall) and terminal apertures. Apertures with sinus pointed towards the periphery of the colony (to the older part). Terminal kenozoecia and avicularia usually present. Ovicell hyperstomial with a nonporous frontal wall.

***Batopora rosula* REUSS, 1847**

Pl. 83, Fig. 4

- v.* 1847 *Cellepora rosula* m. – Reuss p. 78, pl. 9, fig. 17
1877 *Batopora rosula* (REUSS) – Manzoni p. 54, pl. 2, fig. 6
1976 *Batopora rosula* (REUSS) – Cook and Lagaaij p. 351, pl. 3, fig. 2,3, pl. 4, fig. 1,2
v. 1977 *Batopora rosula* (REUSS) – Vávra p. 161

Type: Lectotype deposited in the Natural History Museum Vienna under the number 1852.I(or L).1140. (David and Pouyet, 1974).

Material: Altogether 3 specimens were studied, each from a different section.

Diagnosis: Small conical colonies. Autozoecia with circular, terminal apertures with a shallow sinus and small lateral areolar pores. A drop-like kenozoecium is situated at the apex, on the top of the conical colony. Ovicell and avicularia were not found.

Remarks: Only a few not well-preserved colonies have been found. The preservation of the typical general shape of the colony as well as the circular autozoecia with their lateral areolar pores however allow a precise determination.

Unassigned genus of the Ascophora

Genus ***Hippomenella*** CANU et BASSLER, 1917

Colony erect or encrusting. Frontal wall with numerous marginal pores, central area nonporous. Aperture with a wide, but short sinus (poster). Oral spines present. Avicularia adventitious. Ovicell prominent, nonporous.

***Hippomenella mucronelliformis* (WATERS, 1899)**

Pl. 143, Fig. 1-4

- 1992 *Hippomenella mucronelliformis* (WATERS, 1899) – Pouyet et Moissette p. 62, Pl. 9, Fig. 9

Material: Altogether 4 specimens were studied, all from the section at Kralice nad Oslavou.

Diagnosis: Colony encrusting. Autozoecia oval. Frontal wall with two rows of marginal pores, central area nonporous, slightly granular, with a small umbo. Apertures narrow, longer than wide. Number of oral spines varies from 5-7. Avicularia rare, large with rostrum tapering laterally. Ovicell prominent, globular, not immersed.

Remarks: The species is up to now known only from the Pliocene of d'Altavilla (Italy) but the characteristic features are identical with the specimens from Kralice nad Oslavou (small umbo on frontal wall, two rows of marginal pores and prominent globular ovicell).

Discussion and summary

A rapid increase in the abundance of Bryozoa was firstly recognized in Eocene age sediments from the Liptov basin (Slovakia) (Zágoršek, 1996) and was informally termed a „bryozoan event“. The environmental reconstruction suggested a deeper shelf with upwelling of cooler water inside a subtropical basin.

Sediments rich in bryozoa were later observed in many Miocene age localities of the Central Paratethys. Generally shallow water in a warm climate has been suggested for these associations (Zágoršek and Holcová 2005; Zágoršek et al., 2007).

Definition of a Bryoevent

Bryoevents represent a short period of time with a sudden and massive occurrence of a highly diverse Bryozoan fauna within a sedimentary sequence, not caused by sedimentary or tectonic processes. A bryoevent generally includes an autochthonous accumulation of material, with probably transport across a very short distance only.

The layer in which a bryoevent is recognized, is characterized by an almost isochronous, sharp boundary between a sediment without any bryozoa and a sediment with a diverse bryozoan fauna. Bryozoans are sometimes rock-forming elements in these layers and representatives of other faunal elements are relatively rare, usually only a few fragments of balanids, echinoids and bivalves may occur.

A bryoevent started in the Miocene of Moravia in the zone M6 between first occurrence (FO) of *Orbulina suturalis* and last occurrence (LO) of *Praeorbulina circularis*, this means at about 14.8 – 14.58 Ma (Zágoršek and Holcová, 2005).

This isochronous event may be correlated with a marine transgression of warm waters to the Central Paratethys. Bryozoans settled only within a narrow, shallow water interval of the basin accompanied by epiphytic (*Asterigerinata* and *Lobatula*) and large (*Amphistegina* and *Elphidium*) foraminifers. Local changes in salinity, oscillations of sea level, energy of water and/or dysoxic events change the species pattern of the bryozoan association, but in only a few cases bryozoa disappear completely (Zágoršek and Holcová, 2005).

The successions of bryozoan faunas are always very similar and therefore an idealized “profile” may be constructed.

1) First layers (if preserved) represent the sediments of a transgression without any micro- and macro- fauna.

2) These layers may be followed by a sediment with a cibicidoides-dominated association which suggest a high productivity environment (Holcová and Zágoršek, 2008). No molluscs or other common fossils are known to occur below the bryoevent itself.

3) A first, pioneer bryozoan association is characterized by low diversity, with erect Cyclostomata such as *Tervia*, *Idmidronea* and/or *Exidmonea*, sometimes together with Reteporids, being the dominant taxa. The accompanying fauna is represented by highly diversified foraminifers, mainly suspension feeders (Holcová and Zágoršek, 2008), molluscs and echinoid fragments. Such an environment

may be represented by the sections at Přemyslovice and the lower part of the section at Kralice and Oslavou (Zágoršek et al., 2008)

4) The climax of bryozoans, characterized by high diversity (50 up to 100 bryozoan species) followed this pioneer association. This now forms the “main body of the Bryoevent”, during which cheilostomatous encrusters and erect rigid growth forms like *Adeonella*, *Cellaria*, *Pleuroinea*, *Margaretta* and *Schizoporella? geminipora* dominated. Other macrofossils are rare, only infrequent fragments of echinoids or balanids may be found. Typically only herbivore foraminifers (*Asterigerinata* and *Elphidium* together with an *Amphistegina* association) occur in this interval (Holcová and Zágoršek, 2008). The isotopic composition of bryozoan skeletons shows higher $\delta^{13}\text{C}$ values than in the upper part of the sequence with a terminal bryozoan association. Most of the studied sections belong to this interval, in particular the sections at Podbřežice, Holubice, Sedlec etc..

5) A terminal bryozoan association is characterized by a lower diversity of rigid, large, cheilostomatous colonies of *Smittina*, *Metrarabdotos* and/or *Celleporids*. The terminal association differs from the main Bryoevent by a large biomass of lower diversity. The accumulations of celleporids are massive, but the number of determined species is distinctly lower than in the main Bryoevent body and consists of about 20-30 species only. The dominant fossils are usually molluscs and fragments of Rhodophyta, which may even form a limestone sediment, the so-called “Lithothamnium limestone”. Often indicators of low oxygen content (*Cassidulina* and *Bolivina* associations) may be present (Holcová and Zágoršek, 2008). The isotopic composition of bryozoan skeletons shows lower $\delta^{13}\text{C}$ value than those from the previous, climax bryozoan association. A terminal association may be found in the sections at Hlohovec, Mikulov and in the upper part of the section Podbřežice and the borehole Přemyslovice.

6) A short interval without bryozoans may occur between stages 3 and 5.

Four different bryozoan clusters have been recognized and a detailed scenario for their development was suggested (Holcová and Zágoršek, 2008): *Reteporella* – *Hornera verrucosa* (RH) assemblage, indicative of a high-energy environment, *Buffonellodes* – *Rhynchozoon* (BR) assemblage, occurred on a carbonate substratum with seagrass meadows, influenced by the Middle Miocene warm-water incursion. *Smittina* – *Metrarabdotos* (SM) assemblage, indicative of toleration of a suboxic zone in the sediment. *Schizomavella tenella* – *Schizoporella tetragona* (SS) assemblage, recorded in almost all shallow water environments. This cluster probably represents species with a high potential for adaptation. Exceptionally deeper-water conditions were inferred in one section, and were represented by a *Tervia irregularis* dominated assemblage

Oscillations of salinity, a high-energy environment as well as the presence of seagrass meadows can be expected where RH and SS clusters occur. Seagrass meadows on carbonate substrates were inhabited by BR and SS clusters. A muddy bottom with suboxic conditions in the sediment covered by well-aerated bottom water with seagrass meadows is characterized by the occurrence of SM cluster.

Palaeoecology

Two paleoenvironmental changes may explain the replacement of coral and algal accumulations by bryozoans. The general opinion regards such bryozoan accumulations as indicators of short-time climate deteriorations: as one example Okamura (1988) may be mentioned, who demonstrated that cool water caused a large diversity of bryozoans in recent seas.

A second factor may be well-founded in changes of trophic conditions. Algae and corals are adapted to oligotrophic conditions, while bryozoans prefer mesotrophic or eutrophic conditions (McKinney and Jackson, 1989).

Both factors are combined by the upwelling theory (Zágoršek, 1996), which suggests an input of cooler waters rich in nutrients into a tropical (subtropical) environment. This input caused a lowering of the temperature of the bottom sea water, and also an eutrophication of the bottom environment – this would be very suitable for bryozoans.

Hohenegger et al. (2008) show short term climatic oscillation cause by orbital cycles. These oscillations lead to changes in oxygen content and the amount of nutrients in the lower Badenian in the Carpathian Foredeep (Gonera et al., 2003) and may help to explain the conditions leading to the Bryozoan event.

The temporal disappearance of Bryozoa may be caused by a decrease of oxygen content in the sediment (as shown by the occurrence of *Cassidulina* and *Bolivina* associations), resulting in the amount of nutrients being too high to be consumed by the benthos.

The theory may also be supported by the occurrence of Lunulitiform bryozoans which prefer a continental shelf with an input of suspension material and a rather high turbidity (Geronimo et al., 1992).

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Explanation of the plates

PLATE 71

Gephyrotes cf. *fortunensis* POUYET, 2000

Fig. 1-3: The only one preserved specimen from section Podbrežice, specimen P 01606. Fig. 1: General growth pattern, Fig. 2: Pair of avicularia and construction of frontal wall and Fig. 3: Details of apertures.

All scale bars 100 µm.

PLATE 72

Puellina venusta (CANU et BASSLER, 1925)

Fig. 1-2: Encrusting colony from section Podbrežice, specimen P 01761. Fig. 2: Details showing avicularia and ovicell.

Fig. 3: Another colony with a well preserved avicularium. Section Podbrežice, specimen P 01762.

Fig. 4: Colony showing ovicells and well preserved oral spines. Section Podbrežice, specimen P 01763.

All scale bars 100 µm.

PLATE 73

Puellina (Cribrilaria) rarecostata (REUSS, 1847)

Fig. 1: Part of the encrusting colony showing a well-preserved ovicell and oral spines. Section Podbřežice, specimen P 01759.

Fig. 2-3: Another encrusting colony from section Podbřežice, specimen P 01760. Fig. 3: Details showing construction of frontal wall and oral spines.

All scale bars 100 µm.

PLATE 74

Trypostega rugulosa (REUSS, 1874)

Fig. 1-2: The largest colony preserved, from section Podbřežice specimen P 01890. Fig. 1: General view. Scale bar 1 mm. Fig. 2: Detail showing a large ovicell and irregular kenozoocelia.

Fig. 3-4: Another specimen from section Podbřežice, specimen P 01891. Fig. 3: General view. Scale bar 1 mm. Fig. 4: Detail showing small heterozoecium (lower right corner) with circular orifice.

Fig. 5: Detail of regularly growing autozoocelia with keyhole-shaped (cleithriate) apertures. Borehole Přemyslovice Py4, specimen P 01892.

Unifissurinella boulangeri POIGNANT, 1991

Fig. 6: Poorly preserved specimen with characteristic shape of autozoocelia. Section Židlochovice, specimen P 01913. Scale bars 100 µm unless indicated otherwise.

PLATE 75

Poricella areolata (REUSS, 1874)

Fig. 1: The largest colony preserved, from section Přemyslovice P 01935 showing large apertures, small suboral umbo, globular immersed ovicells and two semilunar foramina on frontal wall.

Fig. 2: Another specimen (number P 01936) from section Přemyslovice showing chaotic arrangement of avicularia with rounded, enlarged rostra. Scale bar 1 mm.

Fig. 3: Small colony from section Přemyslovice (specimen P 01937) showing chaotic growth of autozoocelia and large marginal areolar pores.

Scale bars 100 µm unless indicated otherwise.

PLATE 76

Adeonellopsis coscinophora (REUSS, 1847)

Fig. 1: General view of the colony showing the regular rows of autozoocelia. Section Podbřežice vesnice, specimen P 01441.

Fig. 2-3: Colony from borehole Vranovice VK-1, specimen P 01442. Fig. 2: Detail showing laterally tapering of avicularia and porous spiramen area.

Fig. 4: Colony with large spiramen area and small avicularia. Borehole Vranovice VK-1, specimen P 01443.

All scale bars 100 µm.

PLATE 77

Schizostomella grinzingensis DAVID et POUYET, 1974

Fig. 1: Well calcified colony with massive secondary calcification almost obliterating the autozoocelia. Borehole Vranovice VK-1, specimen P 01846. Scale bar 1 mm.

Fig. 2: Details of a less calcified colony with well-preserved autozoocelial apertures and a small avicularium (lowermost edge). Borehole Vranovice VK-1, specimen P 01847.

Fig. 3: Large colony showing secondary calcification of the older (proximal) part and well-preserved autozoocelia in the younger (distal) part of the colony. Section Podbřežice, specimen P 01847. Scale bar 1 mm.

Fig. 4: Detail of the dorsal side of the autozoocelia showing the distribution of marginal areolar pores and the shallow sinus of the primary aperture. Borehole Vranovice VK-1, specimen P 01849.

Scale bars 100 µm unless indicated otherwise.

PLATE 78

Reptadeonella cf. violacea (JOHNSTON, 1847)

Fig. 1 and 4: Well-preserved colony, specimen P 01765. Scale bar 1 mm. Fig. 4: Detail showing a small avicularium tapering distally.

Fig. 2: Lateral view of autozoocelia showing rows of pore chambers, specimen P 01766.

Fig. 3: Oblique view showing the thickness of autozoocelia and frontal budding of new autozoocelia, specimen P 01767.

Fig. 5: Part of a colony showing the regular growth pattern of autozoocelia, specimen P 01768. Scale bar 1 mm.

Fig. 6: Details of autozoocelia showing semilunar spiramina and rows of marginal areolar pores, specimen P 01769.

All specimens from borehole Vranovice VK-1.

Scale bars 100 µm unless indicated otherwise.

PLATE 79

Adeonella polystomella (REUSS, 1847)

Fig. 1: Colony with characteristically preserved autozoocelia: short and wide in the central part of the colony, long and narrow in the marginal part of the colony. Section Podbřežice, specimen P 01440.

Fig. 2: Part of a colony showing very wide autozoocelia (almost rhomboidal) with well-preserved lateral tubercles. Section Podbřežice, specimen P 01436.

Fig. 3: Colony with rather elongated autozoocelia. Borehole Přemyslovice Py4, specimen P 01437. Scale bar 1 mm.

Fig. 4: Part of a colony with very elongated autozoocelia, but with clearly visible pairs of oral avicularia and marginal areolar pores. Section Kralice nad Oslavou, specimen P 01439.

Fig. 5: Detail of an autozoocelium showing a small avicularium situated on the frontal wall. Section Kralice nad Oslavou, specimen P 01438.

Scale bars 100 µm unless indicated otherwise.

PLATE 80

Laminopora cf. dubia (BUSK, 1859)

Fig. 1-2: Well-preserved colony from section Podbřežice, specimen P 01290. Fig. 2: Detail showing preserved frontal wall and the deep aperture sinuses.

Fig. 3-4: Possible holotype of *Flustra dubia* BUSK, 1859, NHM London collection, specimen D 54018 (original photo by Dr. Taylor photo pdt7588 and pdt7587). Fig. 3: detail showing only the more general features of specimens, compare with the specimen illustrated in Fig. 5.

Fig. 4: General view showing an identical distribution of autozooezia as in the specimens from section Mikulov (Fig. 5).

Fig. 5-6: Another specimen with preserved autozooezial frontal wall showing marginal pores and aperture sinus. Section Mikulov, specimen P 01661

Scale bars 100 µm unless indicated otherwise.

PLATE 81

Celleporaria cornigera (REUSS, 1874)

Fig. 1: Colony with clearly visible avicularium (left edge) situated on an enlarged umbo. Section Židlochovice, specimen P 01490.

Fig. 2: Fragment of a colony showing autozooezia with lateral umbones and marginal areolar pores. Section Podbřežice, specimen P 01491.

Fig. 3-5: Colony illustrated under a different angle showing the shape of the autozooezia, apertures and avicularia on small umbones. Section Podbřežice, specimen P 01492. Fig. 5: Detail showing avicularia with a pivotal bar lacking a ligula. Scale bar 100 µm.

Fig. 6: Part of a colony showing chaotic growth arrangement and apertures with straight proximal margins. Section Podbřežice, specimen P 01493.

Scale bars 1 mm unless indicated otherwise.

PLATE 82

Celleporaria palmata (MICHELIN, 1847)

Fig. 1-2: Colony showing frontal budding of autozooezia from borehole Vranovice VK-1, specimen P 01494.

Fig. 2: Details of aperture showing the characteristic primary aperture with a pair of condyles and a narrow lyrula. Scale bar 100 µm.

Fig. 3: Another colony showing the apertures on umbones from section Podbřežice, specimen P 01495.

Scale bars 1 mm unless indicated otherwise.

PLATE 83

Celleporaria polythete (REUSS, 1847)

Fig. 1: Dorsal side of a colony showing the attachment point and characteristic prominent protuberances. Section Hlohovec, specimen No. 3560/6

Fig. 2: Frontal view of a colony showing characteristic prominent protuberances. Section Hlohovec, specimen No. 3560/7

Fig. 3: Lateral view of a 'double colony'. Section Hlohovec, specimen No. 3560/8

Batopora rosula REUSS, 1847

Fig. 4: Small conical colony showing the shallow sinus of the aperture and small lateral areolar pores. Section Kralice nad Oslavou, specimen P 01496.

All scale bars 1 mm.

PLATE 84

Porella circumornata (REUSS, 1847)

Fig. 1: Part of a colony showing the suboral avicularium and deeply immersed ovicells. Section Holubice, specimen P 01739.

Fig. 2: Fragment of a colony with clearly visible areolar pores. Section Nesyd, specimen P 01740.

Fig. 3: Part of a colony showing deeply immersed ovicells. Section Holubice, specimen P 01741.

Fig. 4: Detail of a few autozooezia showing the key-hole shape of the avicularium. Borehole Přemyslovice Py4, specimen P 01742.

Fig. 5: Details of autozooezium showing the pivotal bar of the avicularium. Borehole Vranovice VK-1, specimen P 01743.

All scale bars 100 µm.

PLATE 85

Porella regularis (REUSS, 1874)

Fig. 1-2: General view of a colony from section Židlochovice, specimen P 01744. Fig. 1: Scale bar 1 mm. Fig. 2: Details showing the globular ovicells.

Fig. 3: Details showing the circular shape of the avicularia. Section Sedlec, specimen Pc01745.

Fig. 4: Detail of five autozooezia showing the marginal areolar pores. Section Židlochovice, specimen P 01746.

Fig. 5: Part of a colony showing its budding pattern and large globular ovicells. Section Židlochovice, specimen P 01747.

Porella nuda (REUSS, 1874)

Fig. 6: The only one well-preserved colony from section Podbřežice, specimen P 01748.

Scale bars 100 µm unless indicated otherwise.

PLATE 86

Reussia regularis (REUSS, 1865)

Fig. 1: Part of a colony showing bifurcation. Section Rousínov pumpa, specimen P 01794. Scale bar 1 mm.

Fig. 2-5: Well-preserved colony from section Kralice nad Oslavou, specimen P 01795. Fig. 2: General view. Scale bar 1 mm. Fig. 3: Detail of the ovicell. Fig. 4: Details of three autozooezia with an ovicell showing the small oral avicularium. Fig. 5: Details of the colony illustrated under a different angle showing the oral avicularia.

Scale bars 100 µm unless indicated otherwise.

PLATE 87

Escharoides megalota (REUSS, 1847)

Fig. 1: Part of a colony showing the chaotic growth pattern of autozooezia and large avicularia. Section Podbřežice, specimen P 01570.

Fig. 2: Detail of autozooezia showing large avicularia, a deeply immersed ovicell with perforated frontal wall and oral spines. Section Podbřežice, specimen P 01571.

Fig. 3: Part of a colony with deeply immersed ovicell with perforated frontal wall. Section Podbřežice, specimen P 01572.

Fig. 4: Detail showing perforation of the ovicell's frontal wall. Section Židlochovice, specimen P 01573.

Fig. 5: Detail showing autozooezia with smaller avicularia. Section Podbřežice, specimen P 01574.

All scale bars 100 µm.

PLATE 88

Escharoides coccinea (ABILDGAAED, 1806)

Fig. 1: Details showing ovicelled autozooezia with four oral spines and a large lateral avicularium. Section Podbřežice, specimen P 01569.

Fig. 2: Part of a colony showing oral spines and lyrula. Section Podbřežice, specimen P 01568.

Fig. 3: Part of a colony showing regular growth budding in oblique rows, and characteristic granular frontal walls. Section Židlochovice, specimen P 01567.

All scale bars 100 µm.

PLATE 89

Escharella tenera (REUSS, 1874)

Fig. 1-3: Large colony from borehole Přemyslovice Py-4, specimen P 01561. Fig. 1: General view showing budding pattern. Scale bar 1 mm. Fig. 2: Details showing immersed ovicell and the characteristic lyrula of the apertures. Fig. 3: Details showing the arrangement of marginal areolar pores and ovicells.

Fig. 4: Part of a colony with clearly visible ovicells and lyrula in the apertures. Section Podbřežice, specimen P 01562.

Fig. 5: Detail of another colony with a more rectangular shape of autozooezia. Section Kralice nad Oslavou, specimen P 01563.

Fig. 6: Detail of colony showing autozooezia with short peristomes and deeply immersed ovicells. Kralice nad Oslavou, specimen P 01564.

Scale bars 100 µm unless indicated otherwise.

PLATE 90

Escharella reussiana (BUSK, 1859)

Fig. 1: Complete colony from the section Sedlec, specimen P 01558. Scale bar 1 mm.

Fig. 2: Part of the colony showing arrangement of ovicells and slightly granular frontal wall. Section Sedlec. b), specimen P 01559

Fig. 3: Detail of a few autozooezia showing the small areolar pores. Section Podbřežice, specimen P 01560.

Fig. 4-5: Detail of autozooezia with ovicell. Section Sedlec, specimen P 01558.

Fig. 6: The best preserved part of the colony showing the small areolar pores, an immersed ovicell and short peristomes. Section Sedlec, specimen P 01559.

Scale bars 100 µm unless indicated otherwise.

PLATE 91

Escharella ovoidea (REUSS, 1847)

Fig. 2: Part of a colony showing an ovicell and four oral spines around each aperture, Section Židlochovice, specimen P 01513.

Fig. 1: Part of a colony showing the rectangular shape of autozooezia and a large lyrula in the aperture. Section Židlochovice, specimen P 01514.

All scale bars 100 µm.

PLATE 92

Umbonula macrocheila (REUSS, 1847)

Fig. 1: Fragment of a colony showing a regular budding pattern and a large avicularium. Section Podbřežice, specimen P 01906. Scale bar 1 mm.

Fig. 2: Part of a colony with clearly visible large avicularia. Section Podbřežice, specimen P 01907. Scale bar 1 mm.

Fig. 3: Detail of a colony showing an ovicelled autozooezium and the characteristically arranged frontal wall. Section Hlohovec, specimen P 01908.

Fig. 4: Detail of the ovicell showing perforations on its frontal wall. Section Sedlec, specimen P 01909.

Fig. 5-6: Interior view of a specimen from section Podbřežice, specimen P 01910. Fig. 5 showing marginal areolar pores, Fig. 6 showing the margin of an umbolunoid frontal shield.

Scale bars 100 µm unless indicated otherwise.

PLATE 93

Umbonula cf. macrocheila (REUSS, 1847), specimen P 01902 from section Židlochovice.

Fig. 1: General view of the colony, scale bar 100 µm.

Fig. 2: Close-up showing regular growth of autozooezia. Scale bar 100 µm.

Fig. 3 and 4: Details of ovicell showing three longitudinal ridges. Scale bars 10 µm.

PLATE 94

Umbonula spinosa (PROCHÁZKA, 1893)

Fig. 1 to 3: Neotype from section Kralice nad Oslavou, specimen P 01354. Scale bar 1 mm.

Fig. 2: Detail showing the ovicell with its porous ectoecium and “spines” – tubercles around the autozooezia.

Fig. 3: Lateral view showing many small tubercles around autozooezia resembling short spines.

Fig. 4: Specimen P 01357 from section Kralice nad Oslavou showing regular growth of the autozooezial rows and a large avicularium. Scale bar 1 mm.

Fig. 5 and 6: Detail of specimen P 01365 from Kralice nad Oslavou showing small tubercles around autozooezia and apertures.

Fig. 7 and 8: Interior view of specimen P 01358 from Kralice nad Oslavou showing the umbonuloid frontal wall and the primary orifice with its wide lyrula.

Scale bars 100 µm unless indicated otherwise.

PLATE 95

Umbonula granulata sp. n.

Fig. 1 and 4-6: Holotype from section Podbřežice, deposited in the NM Prague under the number P 01903. Fig. 1: General view. Scale bar 1 mm.

Fig. 2: Paratype P 01904 from section Podbřežice showing regular growth of rhomboidal autozooezia.

Fig. 3: Part of a colony showing spatulate avicularia. Section Podbřežice, specimen P 01905.

Fig. 4: Detail of the holotype showing the granular frontal wall and marginal areolar pores.

Fig. 5: General view of the holotype from a different angle showing the position of suboral avicularia.

Fig. 6: Detail of suboral avicularium showing the pivotal bar.

Scale bars 100 µm unless indicated otherwise.

PLATE 96

Hippopleurifera hypostoma (REUSS, 1874)

Fig. 1: View of a colony showing elongated autozooezia and position of the avicularia in the middle of the frontal wall. Section Hlohovec, specimen P 01620.

***Hippopleurifera sedgwicki* (MILNE-EDWARDS, 1836)**

Fig. 2: General view of the specimen P 01621 from the section Podbřežice. Scale bar 1 mm.

Fig. 3: Colony with clearly visible ovicells. Section Podbřežice, specimen P 01622.

Fig. 4: Detail of the ovicells showing windows in the ectoecium and perforated endoecium. Section Podbřežice, specimen P 01623.

Fig. 5: Underside view of a colony showing the characteristic development of dorsal walls with their large oval openings. Section Podbřežice, specimen P 01624. Scale bar 1 mm.

Fig. 6: Detail of a colony of *Hippopleurifera semicristata* (REUSS, 1847) showing lateral suboral avicularium and oral spines around the aperture. Section Kralice nad Oslavou, specimen P 01625.

Scale bars 100 µm unless indicated otherwise.

PLATE 97

***Hippopleurifera semicristata* (REUSS, 1847)**

Fig. 1: Fragment of a colony showing large suboral avicularia. Section Kralice nad Oslavou, specimen P 01626.

Fig. 2: Part of a colony with clearly visible ovicells and growth pattern of autozoecia. Section Kralice nad Oslavou, specimen P 01627. Scale bar 1 mm.

Fig. 3-4: Colony with well preserved ovicells. Section Podbřežice, specimen P 01628. Fig. 4: Detail showing oral spines and structures of frontal wall of the ovicell.

Fig. 5-6: Colony from section Podbřežice, specimen P 01629. Scale bar 1 mm. Fig. 6: Details showing oral spines and a suboral avicularium.

Fig. 7: Smaller colony showing regular growth pattern of autozoecia. Section Kralice nad Oslavou, specimen P 01630. Scale bar 1 mm.

Scale bars 100 µm unless indicated otherwise.

PLATE 98

***Metrarabdotos maleckii* CHEETHAM, 1968**

Fig. 1 and 3: One of the best preserved colonies from section Podbřežice, specimen P 01683. Fig. 1: Scale bar 1 mm.

Fig. 3: Details of the ovicell.

Fig. 2: Part of a colony with well-preserved ovicells. Section Židlochovice, specimen P 01684.

Fig. 4: Colony without ovicell but with characteristically curved rows of marginal areolar pores in proximal part of the autozoecia. Section Mikulov, specimen P 01685. Scale bar 1 mm.

Fig. 5: Details of the ovicell from section Podbřežice, specimen P 01686.

Fig. 6: Details of the autozoecia showing two small oral avicularia. Section Oslavany, specimen P 01687.

Scale bars 100 µm unless indicated otherwise.

PLATE 99

***Smittina cervicornis* (PALLAS, 1766)**

Fig. 1: General view of a colony showing the characteristic irregular shape of the autozoecia with significant secondary calcification. Section Mikulov, specimen P 01855. Scale bar 1 mm.

Fig. 2 and 5: Part of a colony showing the perforated frontal wall of the ovicells and the position of suboral avicularia. Section Podbřežice, specimen P 01856.

Fig. 5: Detail of an ovicelled autozoecium showing the perforation of the frontal wall of the ovicell.

Fig. 3: Colony with regular growth pattern of autozoecia from section Kralice nad Oslavou, specimen P 01381.

Fig. 4: Details showing suboral avicularia with pivotal bars situated inside the aperture. Section Hluchov, specimen P 01857.

Fig. 6: Anterior view of autozoecia showing the perforated frontal wall, the wide lyrula and large condyles. Section Rousínov pumpa, specimen P 01859.

Scale bars 100 µm unless indicated otherwise.

PLATE 100

***Parasmittina cf. reticulata* (MAC GILLIVRAY, 1842)**

Fig. 1-2: Colony from section Holubice, specimen P 01926.

Fig. 1: General view showing a branching colony and the arrangement of autozoecia. Scale bar 1 mm.

Fig. 2: Detail of a few autozoecia showing the lyrula inside the aperture and a small avicularium situated on the frontal wall tapering directly proximally.

Fig. 3-4: Specimen P 01926 from section Oslavany. Fig. 3: Details of autozoecium showing marginal areolar pores and frontal avicularium tapering directly proximally. Fig. 4: Part of a flat colony with regularly budding elongated autozoecia with visible lateral walls.

Scale bars 100 µm unless indicated otherwise.

PLATE 101

***Schizomavella protuberans* (REUSS, 1847)**

Fig. 1: Part of a colony showing the regular growth pattern of autozoecia. Section Podbřežice, specimen P 01829.

Fig. 2: Encrusting colony with irregular growth pattern of autozoecia and with well-preserved ovicells. Section Sedlec, specimen P 01278.

Fig. 3: Small part of a colony showing wider autozoecia. Section Holubice, specimen P 01830.

Fig. 4: Details of ovicelled autozoecia showing a less perforated autozoecial frontal wall and the smooth frontal wall of the ovicell. Section Holubice, specimen P 01832.

Fig. 5: Details of autozoecia with ovicells showing its smooth frontal wall. Section Podbřežice, specimen P 01831.

All scale bars 100 µm.

PLATE 102

***Schizomavella tenella* (REUSS, 1847)**

Fig. 1: Large encrusting colony from section Sedlec, specimen P 01262. Scale bar 1 mm.

Fig. 2: Details of an ovicelled autozoecium showing perforated frontal wall of ovicell. Section Sedlec, specimen P 01260.

Fig. 3: Part of a colony showing enlarged lateral walls of autozoecia and position of avicularium. Section Podbřežice, specimen P 01834.

Fig. 4: Part of an encrusting colony showing the hexagonal shape of autozoecia with well-preserved lateral

walls but with avicularia situated on the margin of the autozoecia. Section Kralice nad Oslavou, specimen P 01833.

All scale bars 100 µm.

PLATE 103

Schizoporella teragona (REUSS, 1847)

Fig. 1-2: Large and very well preserved colony from section Sedlec, specimen P 01841. Fig. 1 showing the regular growth pattern of the autozoecia. Scale bar 1 mm.

Fig. 2: Detail of bifurcating rows of autozoecia also showing the very regular rectangular shape of autozoecia.

Fig. 3: Detail of the colony from section Mikulov MK4, specimen P 01842 showing the position of the avicularium.

Fig. 4: Dorsal view of a large colony showing a multilayered growth pattern of frontally budding autozoecia. Section Sedlec, specimen P 01843. Scale bar 1 mm.

Fig. 5: Detail of the dorsal view of the autozoecia showing perforated frontal wall and circular primary orifice. Section Sedlec, specimen P 01844

Fig. 6: Part of a colony with regular growth pattern of autozoecia from Mikulov, specimen P 01845. Scale bar 1 mm.

Scale bars 100 µm unless indicated otherwise.

PLATE 104

Schizoporella dunkeri (REUSS, 1847)

Fig. 1 and 3: Large multilayered colony from section Podbřežice, specimen P 01835. Fig. 1: General view. Scale bar 1 mm.

Fig. 3: Detail of the autozoecia showing their irregular shape and the deep, narrow sinus.

Fig. 2: Small encrusting colony showing large suboral avicularia. Section Holubice, specimen P 01836.

Fig. 4-5: Another encrusting colony from section Kralice nad Oslavou, specimen P 01837.

Fig. 4: Showing the oval shape of autozoecia and their irregular growth pattern. Scale bar 1 mm.

Fig. 5: Detail of autozoecia showing the position and size of avicularia.

Scale bars 100 µm unless indicated otherwise.

PLATE 105

Schizoporella? geminipora (REUSS, 1847)

Fig. 1 and 3: Colony with a large brooding zoecium. Section Holubice, specimen P 01838. Fig. 1: General view. Scale bar 1 mm.

Fig. 3: Detail of the brooding zoecium.

Fig. 2: Dorsal side of the colony with characteristic arrangement, smooth dorsal walls with large uncalcified openings. Section Kralice nad Oslavou, specimen P 01370. Scale bar 1 mm.

Fig. 4: Part of a colony showing the deep, narrow sinus of the autozoecia. Section Kralice nad Oslavou, specimen P 01375.

Fig. 5: Part of a colony showing the position of avicularia and their pivotal bar. Section Podbřežice, specimen P 01839.

Fig. 6: Colony from section Kralice nad Oslavou, specimen P 01372 showing rhomboidal shape of autozoecia and avicularia situated on the margin of the frontal wall.

Fig. 7: Oval autozoecia, from section Židlochovice, specimen P 01840 showing two avicularia around the autozoecia.

Scale bars 100 µm unless indicated otherwise.

PLATE 106

Schizolepralia polyomma (REUSS, 1847)

Fig. 1: Fragment of an erect colony showing very wide lateral walls and large frontal pores. Section sv. Urban, specimen P 01824.

Fig. 2: Large erect colony showing irregular pattern of autozoecial growth and large frontal pores. Section Židlochovice, specimen P 01825. Scale bar 1 mm.

Fig. 3: Detail showing position of avicularia with pivotal bars. Section Kralice nad Oslavou, specimen P 01826.

Fig. 4: Detail of autozoecium showing the deep, wide sinus and the large drop-like avicularium with its pivotal bar. Section sv. Urban, specimen P 01827.

Fig. 5: Interior view of the autozoecia showing the porous frontal wall, the small sinus in the primary orifice and the position of the avicularian chamber. Section Rousínov pumpa, specimen P 01828.

Scale bars 100 µm unless indicated otherwise.

PLATE 107

Schizobrachiella? granosoporosa (REUSS, 1874)

Fig. 1: Part of a colony showing cleithridiate apertures with large oblique condyles. Borehole Vranovice VK-1, specimen P 01822.

Fig. 2: Detail of a few autozoecia showing large frontal pores and characteristic cleithridiate apertures. Borehole Vranovice VK-1, specimen P 01823.

All scale bars 100 µm.

PLATE 108

Ferganula rousinovenssis sp. n.

Fig. 1-3: Holotype from section Rousínov pumpa, specimen P 01591.

Fig. 1: General view showing growth pattern of autozoecia. Scale bar 1 mm.

Fig. 2: Detail of ovicell showing the perforation of the ectoecium and the deep sinus of autozoecial apertures.

Fig. 3: Detail of part of a colony showing a kenozoecium (lowermost edge). Scale bar 1 mm.

Fig. 4: Fragment of a colony showing the deep sinus and the enlarged lateral walls. Section Podbřežice, specimen P 01592.

Fig. 5: Part of a colony showing ovicell and perforation of its frontal walls. Section Rousínov pumpa, specimen P 01593.

Fig. 6: Detail of autozoecia showing sinus with clearly visible condyles. Section Hluchov, specimen P 01594.

Scale bars 100 µm unless indicated otherwise.

PLATE 109

Ferganula sp. 1

Fig. 1: Small fragment of a colony showing small avicularia situated in the middle of the frontal wall. Borehole Přemyslovice Py1, specimen P 01595.

***Ferganula* sp. 2**

Part of the colony from the section Židlochovice, specimen P 01596.

Fig. 2: General view showing budding pattern of autozooe-
cia. Scale bar 1 mm.

Fig. 3: Detail showing position and shape of avicularia.

Fig. 4: Detail showing the shape of the apertures with clear-
ly visible condyles.

Scale bars 100 µm unless indicated otherwise.

PLATE 110

***Margaretta cereoides* (ELLIS et SOLANDER, 1786)**

Fig. 1: Part of an erect colony showing the alternating
growth pattern of autozoecia. Section Židlochovice,
specimen P 01663.

Fig. 2: Part of a colony showing the convex, porous frontal
walls and the short peristomes. Section Mikulov,
specimen P 01664.

Fig. 3: Detail of the autozoecium showing ascopore and
shallow grooves separating the autozoecia. Section
Mikulov, specimen P 01665.

Fig. 4: Detail showing the circular ascopore and the auto-
zoecial peristomes. Section Hlohovec, specimen
P 01666.

All scale bars 100 µm.

PLATE 111

***Myriapora truncata* (PALLAS, 1766)**

Fig. 1-2: Well-preserved colony from section Podbřežice,
specimen P 01705. Fig. 1: General view. Scale bar 1
mm.

Fig. 2: Detail showing ovicelled autozoecia. Note the very
slight enlargement of the space distally from the
maternal autozoecium.

Fig. 3: Large colony from section Mohyla míru, specimen
P 01706 showing cleithridiate apertures. Scale bar
1 mm.

Fig. 4: Detail of cleithridiate apertures, specimen from sec-
tion Kroužek, specimen P 01707.

Scale bars 100 µm unless indicated otherwise.

PLATE 112

***Escharina otophora* (REUSS, 1847)**

Fig. 1: Detail of a colony showing ovicelled autozoecia
with clearly visible small suboral avicularia and oral
spines. Section Podbřežice, specimen P 01566.

Fig. 2: Encrusting colony from the section Drnovice, speci-
men P 01565 showing marginal areolar pores and
the small short sinus.

***Herentia hyndmanni* (JOHNSTON, 1847)**

Fig. 3: Small colony from section Podbřežice, showing the
position of the avicularium on the autozoecia and
the shallow sinus on the apertures. Specimen P
01612.

Fig. 4: Well-preserved colony showing the characteristic
arrangement of avicularia and the distribution of
marginal areolar pores. Section Židlochovice, speci-
men P 01611.

All scale bars 100 µm.

PLATE 113

***Emballotheca seriata* (REUSS, 1874)**

Fig. 1-2: Colony from borehole Přemyslovce Py-4, speci-
men P 01552. Fig. 1: General view showing regular
growth pattern of autozoecia. Scale bar 1 mm.

Fig. 2: Detail of a few autozoecia showing the characteris-
tic shape of the aperture with large condyles and
spatulate frontal avicularium.

Fig. 3-4: Colony from borehole Přemyslovce Py-4, speci-
men P 01553. Fig. 3: Part of the colony showing
longitudinal rows of autozoecia.

Fig. 4: Detail showing the remains of the only one preserv-
ed ovicell.

Fig. 5: Colony from section Židlochovice, specimen P 01554
showing porous frontal walls and the spatulate avic-
ularium.

Scale bars 100 µm unless indicated otherwise.

PLATE 114

***Phoceana tubulifera* (REUSS, 1847)**

Fig. 1: Well preserved colony showing rows of autozoecia
with the characteristic ridge inside the peristome.
Section Holubice, specimen P 01716.

Fig. 2 and 6: Colony from borehole Přemyslovce Py4, speci-
men P 01717. Fig. 2: General view showing long-
itudinal rows of autozoecia. Scale bar 1 mm.

Fig. 6: Lateral view showing thickness of the frontal walls
and the median lamella.

Fig. 3: Part of a colony with clearly visible median ridge
inside the peristomes. Section Kralice nad Oslavou,
specimen P 01718. Scale bar 1 mm.

Fig. 4: Detail of a peristome with prominent median ridge.
Section Podbřežice specimen P 01719.

Fig. 5: Another colony with longitudinal rows of autozooe-
cia and visible median ridge inside the peristomes.
Section Kralice nad Oslavou, specimen P 01720.

Scale bars 100 µm unless indicated otherwise.

PLATE 115

***Microporella crenilabris* (REUSS, 1847)**

Fig. 1-3: Colony from section Podbřežice, specimen P 01698.

Fig. 1: Details showing ovicelled autozoecia with
porous frontal wall and avicularia with prominent
pivotal bar.

Fig. 2: General view showing chaotic growth of autozoecia.

Fig. 3: Detail of an autozoecium with clearly visible avic-
ularium and oral spines.

Fig. 4: Part of a colony with prominent avicularia. Section
Podbřežice, specimen P 01699.

Fig. 5: Another colony from section Kralice nad Oslavou,
specimen P 01700.

All scale bars 100 µm.

PLATE 116

***Microporella berningi* sp. n.**

Fig. 1-2: Holotype from section Holubice, specimen P 01695.

Fig. 1: Details showing small ovicells and a pair of
suboral avicularia.

Fig. 2: General view of the colony showing growth pattern
and oral spines of autozoecia.

Fig. 3-4: Paratype from section Židlochovice, specimen P 01696. Fig. 3: General view of the colony showing growth pattern and variable shape of autozoocia.

Fig. 4: Detail of an autozoocium with prominent small ovicell, avicularia and semilunar ascopore.

Fig. 5: Another colony with ovicelled autozoocium from section Podbřežice, specimen P 01697.

All scale bars 100 µm.

PLATE 117

Calloporina decorata (REUSS, 1847)

Fig. 1: Colony showing regular longitudinal rows of autozoocia in two directions. Section Židlochovice, specimen P 01470. Scale bar 1 mm.

Fig. 2-3: Colony from section Sedlec pole, specimen P 01471.

Fig. 2: General view showing radial growth of the autozoocia from the ancestrula, the ancestrula itself is not preserved. Scale bar 1 mm.

Fig. 3: Detail showing autozoocia with ovicells and long avicularia. Scale bar 100 µm.

PLATE 118

Fenestrulina sp.

Specimen P 01590 from section Kralice nad Oslavou

Fig. 1: General view showing chaotic growth of the colony.

Fig. 2: General view under a different angle showing the oval shape of the autozoocia and the short peristomes.

Fig. 3: Detail of an autozoocium showing the semicircular aperture with its straight proximal margin and small, poorly preserved ascopore.

All scale bars 100 µm.

PLATE 119

Crepidacantha odontostoma (REUSS, 1874)

from section Kralice nad Oslavou, specimen P 01503.

Fig. 1: General view of a colony showing growth pattern of the autozoocia. Scale bar 1 mm.

Fig. 2: Detail of autozoocia showing position of avicularia and the shape of the aperture.

Fig. 3: Detail of ovicelled autozoocia showing the endoeial frontal window with visible porous endoeium.

Scale bars 100 µm unless indicated otherwise.

PLATE 120

Cribellopora latigastra (DAVID, 1949)

Fig. 1, 5 and 7: Part of a colony with one ovicelled autozoocium. Borehole Přemyslovice Py-1, specimen P 01508. Fig. 1: General view. Scale bar 1 mm.

Fig. 5: Detail of ovicelled autozoocium showing characteristic frontal pores. Fig. 7: Detail of aperture with sinus showing regeneration of an autozoocium.

Fig. 2 and 6: The largest colony showing regular growth pattern of autozoocia. Section Rebešovice, specimen P 01509. Fig. 2: General view. Scale bar 1 mm.

Fig. 6: Details showing hexagonal shape of autozoocia.

Fig. 3-4: Colony showing irregular growth pattern, from section Židlochovice, specimen P 01510. Fig. 3:

Detail of clearly visible ovicell. Fig. 4: General view. Scale bar 1 mm.

Scale bars 100 µm unless indicated otherwise.

PLATE 121

Cribellopora hluchovensis sp. n.

Fig. 1-3: Holotype from section Hluchov, specimen P 01504.

Fig. 1: Detail of oval to hexagonal autozoocia showing their shape and a poorly preserved ovicell.

Fig. 2: General view of the colony showing regular budding pattern. Scale bar 1 mm.

Fig. 3: Detail of hexagonal autozoocia with clearly visible aperture sinus.

Fig. 4: Paratype (specimen P 01506) showing regular hexagonal shape of the autozoocia and the recumbent, partly immersed ovicell. Section Hluchov. Scale bar 1 mm.

PLATE 122

Cribellopora trasoni sp. n.

Fig. 1-2: Holotype from the section Kralice nad Oslavou, specimen P 01505.

Fig. 1: General view showing autozoocia with their narrow sinus. Scale bar 1 mm.

Fig. 2: Detail of one autozoocium showing narrow sinus and scattered cribellate frontal pores.

Fig. 3: Paratype showing oval autozoocia with an ovicell. Section Kralice nad Oslavou, specimen P 01924.

Cribellopora sp.

Fig. 4: Specimen P 01511 from section Sedlec, showing the broad sinus and single row of pores on the ovicell. Scale bar 1 mm.

Scale bars 100 µm unless indicated otherwise.

PLATE 123

Kionidella moravicensis PROCHÁZKA, 1894

Fig. 1 and 3: Neotype from section Kralice nad Oslavou, specimen P 01391. Fig. 1: General view. Scale bar 1 mm.

Fig. 3: Details showing ovicelled autozoocia with one avicularium.

Fig. 2: Another colony from section Kralice nad Oslavou showing ovicelled autozoocia and the position of the avicularia. Specimen P 01396.

Fig. 4 and 5: Small fragment of a colony from section Kralice nad Oslavou, specimen P 01395. Fig. 4: Detail of one autozoocium showing a pair of avicularia and the deeply immersed ovicell. Fig. 5: General view of a fragment showing the arrangement of autozoocia.

Scale bars 100 µm unless indicated otherwise.

PLATE 124

Buffonellaria kuklinskii sp. n.

Fig. 1: Holotype (P 01460) from the section Podbřežice showing immersed ovicells and general characteristics of the colony.

Fig. 2: Detail of an autozoocium with secondary hypercalcification changing the shape of the aperture. Section Podbřežice, specimen P 01465.

Fig. 3: Detail of non-ovicelled autozoocia with low calcification showing the deep sinus and two types of avicularia. Section Podbřežice, specimen P 01461.

Fig. 4: Part of a colony showing ovicells with ribs and two types of avicularia. Section Kralice nad Oslavou, specimen P 01464.

Fig. 5: Part of a colony showing a regular growth pattern. Section Kralice nad Oslavou, specimen P 01463.

Fig. 6: Encrusting base of a colony showing paired oral avicularia. Section Podbřežice, specimen P 01462.

All scale bars 100 μ m.

PLATE 125

Buffonellaria holubicensis sp. n.

Fig. 1-2: Encrusting colony from section Podbřežice, specimen P 01466. Fig. 1: General view showing chaotic growth pattern of autozooezia. Scale bar 1 mm. Fig. 2: Details of autozooezia with deeply immersed ovicell and circular secondary apertures.

Fig. 3: Erect colony showing less calcified autozooezia with clearly visible narrow sinus. Section Holubice, specimen P 01467. Scale bar 1 mm.

Fig. 4: Detail of a colony showing large adventitious avicularia. Section Holubice, specimen P 01468.

Fig. 5-6: Holotype P 01469 from section Holubice. Fig. 5: Detail of colony surface showing circular secondary apertures and large adventitious avicularia. Fig. 6: Detail of colony showing deeply immersed ovicell with a few endoecial ribs.

Scale bars 100 μ m unless indicated otherwise.

PLATE 126

Turbicellepora coronopus (WOOD, 1844)

Fig. 1: Columnar colony showing "V"-shaped sinus, small suboral avicularia and ligula on the pivotal bar of the vicarious avicularia (on the right margin in the middle of the colony). Section Podbřežice, specimen P 01920. Scale bar 1 mm.

Fig. 2: Detail of another colony showing an ovicell with scattered perforations. Section Podbřežice, specimen P 01919.

Fig. 3: Detail of autozooezia showing the shape of the sinus and position of the suboral avicularia. Section Židlochovice, specimen P 01921.

Fig. 4-5: Columnar colony from section Židlochovice, specimen P 01428. Fig. 4: General view showing chaotic growth of autozooezia and the position of a vicarious avicularium. Scale bar 1 mm. Fig. 5: Detail of the avicularium with clearly visible ligula on the pivotal bar.

Scale bars 100 μ m unless indicated otherwise.

PLATE 127

Hippoporella bicornis CANU et LECOINTRE, 1928

Fig. 1: Columnar colony from section Hlohovec, specimen P 01631. Scale bar 1 mm.

Fig. 2: Fragment of a colony showing a small, median avicularium with the characteristic lip around the aperture with a pair of small avicularia. Section Mikulov, specimen P 01632.

Fig. 3: Encrusting colony showing regular growth pattern of autozooezia. Section Drnovice, specimen P 01633. Scale bar 1 mm.

Fig. 4-5: Colony from section Mikulov, specimen P 01634.

Fig. 4: General view showing regular growth pattern. Scale bar 1 mm. Fig. 5: Detail of an ovicelled autozooezium showing the characteristic lip around the aperture with a pair of small avicularia and the slightly perforated endoecium of the immersed ovicell.

Scale bars 100 μ m unless indicated otherwise.

PLATE 128

Hagiosynodos campanulata (CIPOLLA, 1921)

Fig. 1: Part of an encrusting colony from section Podbřežice, specimen P 01607.

Fig. 2-4: The largest colony from section Židlochovice, specimen P 01608. Fig. 1: General view showing the growth pattern of autozooezia. Scale bar 1 mm. Fig. 3: Detail of an ovicelled autozooezium showing the granular frontal wall of the ovicell. Fig. 4: Detail of a non-ovicelled autozooezium showing a pair of small avicularia situated laterally from the aperture.

Hagiosynodos latus (BUSK, 1856)

Fig. 5: Part of the colony from section Oslavany, specimen P 01933. with well visible enlarged lateral corners of aperture with developed tubercles.

Fig. 6: Another fragment of colony, showing the characteristic shape of the aperture with a pair of oral avicularia. Section Podbřežice, specimen P 01610.

Scale bars 100 μ m unless indicated otherwise.

PLATE 129

Saevitella inermis BOBIES, 1956

Fig. 1: Encrusting colony showing deeply immersed ovicells and the characteristic perforation of the frontal wall. Section Mohyla míru, specimen P 01609.

Fig. 2: Small fragment of the colony from Korytnica (specimen P 01934), showing characteristic dimorphic apertures (note slightly visible condyles on lower right autozooezium aperture) and deeply immersed ovicells.

All scale bars 1 mm.

PLATE 130

Reteporella cf. *beaniana* (KING, 1846)

Fig. 1: Frontal view of a fragment showing deeply immersed ovicells with their wide frontal fissure. Section Podbřežice, specimen P 01770.

Fig. 2: Part of a branch showing small, oval, suboral avicularia with pivotal bars. Section Podbřežice, specimen P 01771.

Fig. 3-4: Frontal view of a well-preserved specimen showing large areolar pores, small suboral avicularia and slightly larger frontal avicularia. Section Podbřežice, specimen P 01772. Fig. 4: Detail of aperture showing suboral avicularium and the absence of any traces of oral spines.

Fig. 5: Ovicelled colony showing the wide fissure on the frontal walls. Section Podbřežice, specimen P 01773.

Fig. 6: Dorsal side of a branch showing small oval avicularia and larger avicularia on the margin of a branching

area (two of them visible on the upper part of the colony). Section Podbřežice, specimen P 01774.

All scale bars 100 µm.

PLATE 131

Reteporella hluchovensis sp. n.

Fig. 1-2: Holotype P 01775. Fig. 1: General view showing the robust, reticulate colony with its wide branches and short fenestrulae. Fig. 2: Detail of the frontal side of the colony showing small areolar pores, no avicularia and deeply immersed ovicells with their wide frontal fissure. Scale bar 100 µm.

Fig. 3: Paratype P 01776 showing very narrow fenestrulae, longitudinal rows of autozoocidia and deeply immersed ovicells with their wide frontal fissures.

Fig. 4: Dorsal side of the colony showing the absence of any avicularia. Paratype P 01777.

All specimens from section Hluchov. Scale bars 1 mm unless indicated otherwise.

PLATE 132

Reteporella kralicensis ZÁGORŠEK, HOLCOVÁ et TRÁSOŇ, 2008

Fig. 1: Frontal view of a colony showing small areolar pores, two oral spines, pseudospiramen, immersed frontal avicularia and deeply immersed ovicells with their wide frontal fissures. Section Kralice nad Oslavou, specimen P 01309.

Fig. 2: Detail of an ovicelled autozoocidium showing the immersed ovicell with its wide frontal fissure and a large avicularium as a separate polymorph. Section Drnovice, specimen P 01778.

Fig. 3: Frontal side of a colony showing the position of large avicularia developing as separate polymorphs. Section Podbřežice, specimen P 01779.

Fig. 4: Detail of frontal side of a colony showing the pseudospiramen, areolar pores and large avicularia. Section Podbřežice, specimen P 01780.

Fig. 5: Holotype (number P 01306) from section Kralice nad Oslavou.

Fig. 6: Dorsal side of the colony showing the position of large avicularia in a branching area. Section Kralice nad Oslavou, specimen P 01781.

All scale bars 100 µm.

PLATE 133

Reteporella vladkae sp. n.

Specimens from section Kralice nad Oslavou.

Fig. 1-2: Holotype, number P 01782. Fig. 1: General view showing the delicate colony with its large fenestrulae. Scale bar 1 mm. Fig. 2: Details of the frontal side of the branch showing large areolar pores, frontal avicularia and deeply immersed ovicells with their rather narrow frontal fissures.

Fig. 3: Part of a branch showing large areolar pores and small suboral avicularia. Specimen P 01783.

Fig. 4: Detail of the autozoocidial aperture showing small suboral avicularia. Specimen P 01784.

Fig. 5: Part of a branch showing large areolar pores and deeply immersed suboral avicularia. Specimen P 01785.

Fig. 6: Dorsal side of the colony showing the absence of any avicularia on the dorsal side and the presence of

large narrow avicularia in the area of bifurcation. Specimen P 01786.

Scale bars 100 µm unless indicated otherwise.

PLATE 134

Reteporella ruzenkae sp. n.

Specimens from section Holubice.

Fig. 1: Branch of a colony showing large circular apertures arranged in six longitudinal rows. Specimen P 01787. Scale bar 1 mm.

Fig. 2-3: Holotype, number P 01788. Fig. 2: General view showing large, scattered areolar pores and small frontal avicularia without any pivotal bar. Fig. 3: Detail showing autozoocidia separated by very thin furrows, small frontal avicularia and large apertures with small condyles.

Scale bars 100 µm unless indicated otherwise.

PLATE 135

Reteporella sp.

Fig. 1: General view of a colony showing wide branches and narrow fenestrulae. Borehole Přemyslovice, specimen P 01789. Scale bar 1 mm.

Fig. 2-3: Massive colony from borehole Přemyslovice, specimen P 01790. Fig. 2: Scale bar 1 mm. Fig. 3: Details showing pseudo-sinus and scattered large areolar pores.

Fig. 4: Part of a colony showing small frontal avicularia. Section Hlohovec, specimen P 01791.

Fig. 5: Part of a colony with frontal avicularia and pseudospiramen. Section Podbřežice, specimen P 01792. Scale bar 1 mm.

Fig. 6: Dorsal view of a colony showing small avicularia around the margin of the fenestrulae. Borehole Přemyslovice, specimen P 01793.

Scale bars 100 µm unless indicated otherwise.

PLATE 136

Iodictyum rubeschii (REUSS, 1847)

Fig. 1, 4-5: Colony from section Sv. Urban, specimen P 01658.

Fig. 1: Frontal view of a branch showing arrangement of autozoocidial rows. Fig. 4: Detail of an ovicelled autozoocidium also showing frontal avicularia. Fig. 5: Detail of an autozoocidium with a secondary sinus on its aperture, a short peristome and small frontal avicularia without any pivotal bar.

Fig. 2: Part of a branch showing elongated oval autozoocidia with large apertures and sinus. Section Vranová Lhota, specimen P 01659.

Fig. 3: Bifurcating branch showing oval, irregularly elongated autozoocidia separated by thin grooves, and perforation of the smooth, flat frontal wall. Section Podbřežice, specimen P 01660

All scale bars 100 µm.

PLATE 137

Stephanolona pauper (REUSS, 1874)

Fig. 1 and 4: Specimen number P 01869 from section Mikulov. Fig. 1: General view showing arrangement of autozoocidia. Scale bar 1 mm. Fig. 4: Details of autozoocidia with large, spatulate, adventitious avicularia and globular ovicell with frontal fissure.

Fig. 2: Part of a colony showing regularly budding hexagonal autozoocia with small suboral avicularia and oral spines. Section Kralice nad Oslavou, specimen P 01870. Scale bar 1 mm.

Fig. 3: Detail of lateral view of autozoocia showing small suboral avicularia and large spatulate avicularia. Section Mikulov, specimen P 01871.

Fig. 5: Detail showing oral spines and slightly cleithridiate apertures. Section Mikulov, specimen P 01872.

Fig. 6: Detail showing prominent marginal pores, both types of avicularia and oral spines around cleithridiate apertures. Section Kralice nad Oslavou, specimen P 01873. Scale bars 100 µm unless indicated otherwise.

PLATE 138

Schizotheca cf. fissa (BUSK, 1856)

Fig. 1 and 3: Colony from section Podbřežice, specimen P 01850. Fig. 1: Part of the colony showing growth pattern of autozoocia. Fig. 3: Details showing small adventitious avicularia, oral spines and globular ovicell with wide triangular frontal fissure.

Fig. 2: Detail showing hexagonal autozoocia with small sinus and small areolar pores. Section Podbřežice, specimen P 01851.

Fig. 4: Part of a colony showing regular shape of autozoocia and small adventitious avicularia. Section Podbřežice, specimen P 01852.

Fig. 5: Detail of a colony showing two large, immersed, vicarious avicularia and narrow sinus of autozoocia. Section Podbřežice, specimen P 01853.

Fig. 6: Detail of deeply immersed vicarious avicularium and apertures with six oral spines. Section Podbřežice, specimen P 01854.

All scale bars 100 µm.

PLATE 139

Schedocleidochasma incisa (REUSS, 1874)

Fig. 1-2: Large colony from section Podbřežice, specimen P 01817. Fig. 1: General view showing growth pattern of autozoocia. Scale bar 1 mm. Fig. 2: Details showing ovicelled autozoocia and small adventitious avicularia.

Fig. 3, 4, 6: Colony from section Podbřežice, specimen P 01818, Fig. 3: Details of ovicelled autozoocium showing indistinct marginal pores and large, cleithridiate aperture. Fig. 4: Details showing adventitious avicularia. Fig. 6: General view showing regular growth of autozoocia.

Fig. 5: Colony with clearly visible adventitious avicularia and cleithridiate autozoocial aperture. Section Podbřežice, specimen P 01819.

Fig. 7: Detail of cleithridiate autozoocial aperture. Section Židlochovice, specimen P 01820.

Fig. 8: Colony with clearly visible ovicells showing two short lateral fissures and small avicularia with pivotal bars. Section Židlochovice, specimen P 01821.

Scale bars 100 µm unless indicated otherwise.

PLATE 140

Rhynchozoon monoceros (REUSS, 1847)

Fig. 1: Colony showing small globular ovicells and the asymmetrical position of avicularia. Section Sedlec, specimen P 01803.

Fig. 2-3: Specimen P 01804 from section Mikulov. Fig. 2: Oblique view of the aperture showing pair of oral spines. Fig. 3: Oblique view showing a pair of oral spines and marginal areolar pores.

Fig. 4-5: Specimen P 01805 from section Mikulov. Fig. 4: Oblique view showing asymmetrical position of avicularia. Fig. 5: Frontal view showing semicircular apertures and asymmetrical position of avicularia.

Fig. 6: Colony showing budding pattern of autozoocia and marginal areolar pores. Section Sedlec, specimen P 01806. All scale bars 100 µm.

PLATE 141

Rhynchozoon oslavanensis sp. n.

Fig. 1: Holotype P 01807, from section Oslavany, showing large avicularian chamber and prominent marginal areolar pores.

Fig. 2: Paratype P 01808, from section Podbřežice, showing incomplete ovicell and oral spines.

Rhynchozoon krouzkovensis sp. n.

Fig. 3: Paratype showing growth pattern and large marginal areolar pores. Section Kroužek, specimen P 01809.

Fig. 4: Holotype showing shape of the autozoocia, the asymmetrical pseudospiramen and a small umbo near the pseudospiramen. Section Kroužek, specimen P 01810.

All scale bars 100 µm.

PLATE 142

Rhynchozoon sp.

Fig. 1, 4 and 5: Colony from Rebešovice, specimen P 01801.

Fig. 1: General view showing budding pattern of autozoocia. Scale bar 1 mm. Fig. 4: Detail of apertures showing dentition on the distal margin and prominent condyles. Fig. 5: Detail of avicularia with pivotal bars.

Fig. 2, 3 and 6: Colony from section Podbřežice, specimen P 01802. Fig. 2: General view of the colony. Fig. 3: Detail of apertures showing dentition on distal and also proximal margin. Fig. 6: Detail showing avicularia chambers.

Scale bars 100 µm unless indicated otherwise.

PLATE 143

Hippomenella mucronelliformis (WATERS, 1899)

Fig. 1: Detail of specimen P 01619, showing the broad sinus of the aperture and two rows of marginal pores.

Fig. 2: Part of a colony showing chaotic growth pattern of autozoocia with two rows of marginal pores. Specimen P 01617. Scale bar 1 mm.

Fig. 3: General view of the largest colony found (specimen P 01618), showing regular growth pattern of autozoocia. Scale bar 1 mm.

Fig. 4: Detail of the specimen P 01618 showing a small umbo on the frontal wall, two rows of marginal pores and a prominent globular ovicell.

All samples from section Kralice nad Oslavou. Scale bars 100 µm unless indicated otherwise.

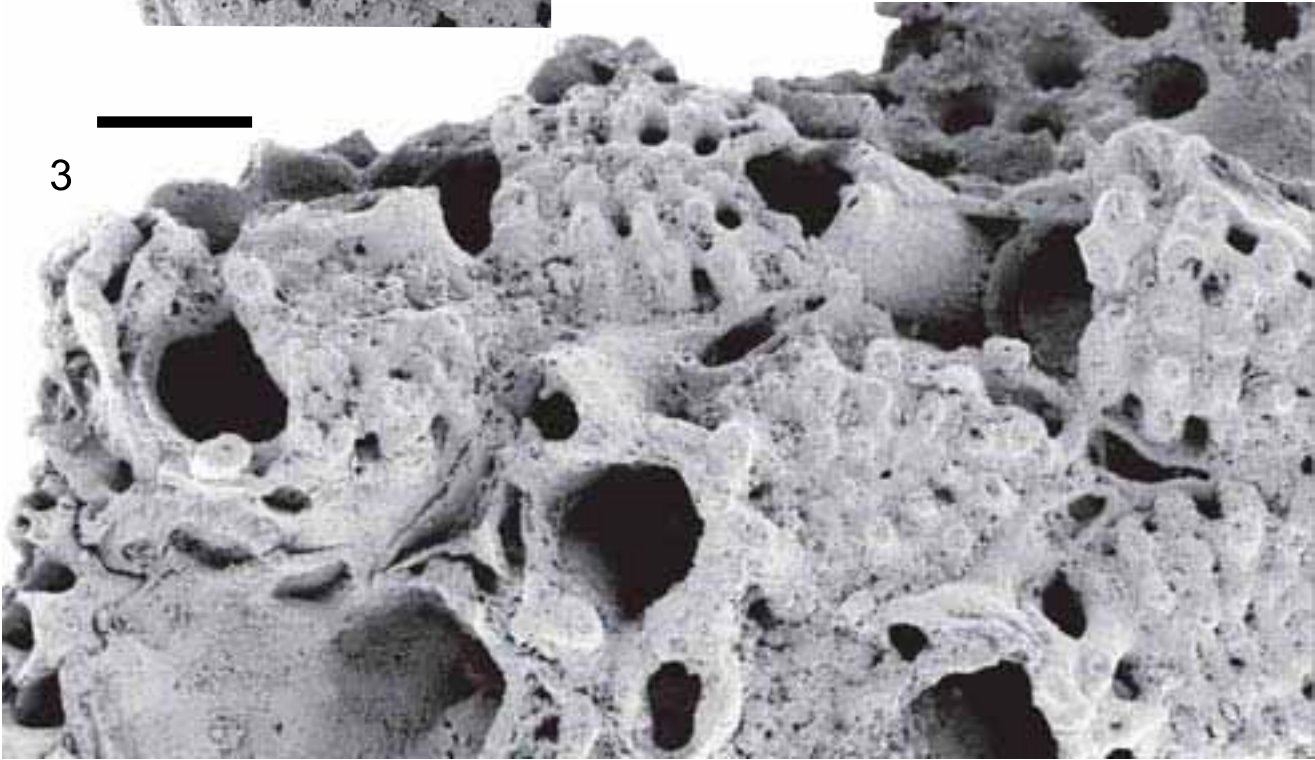
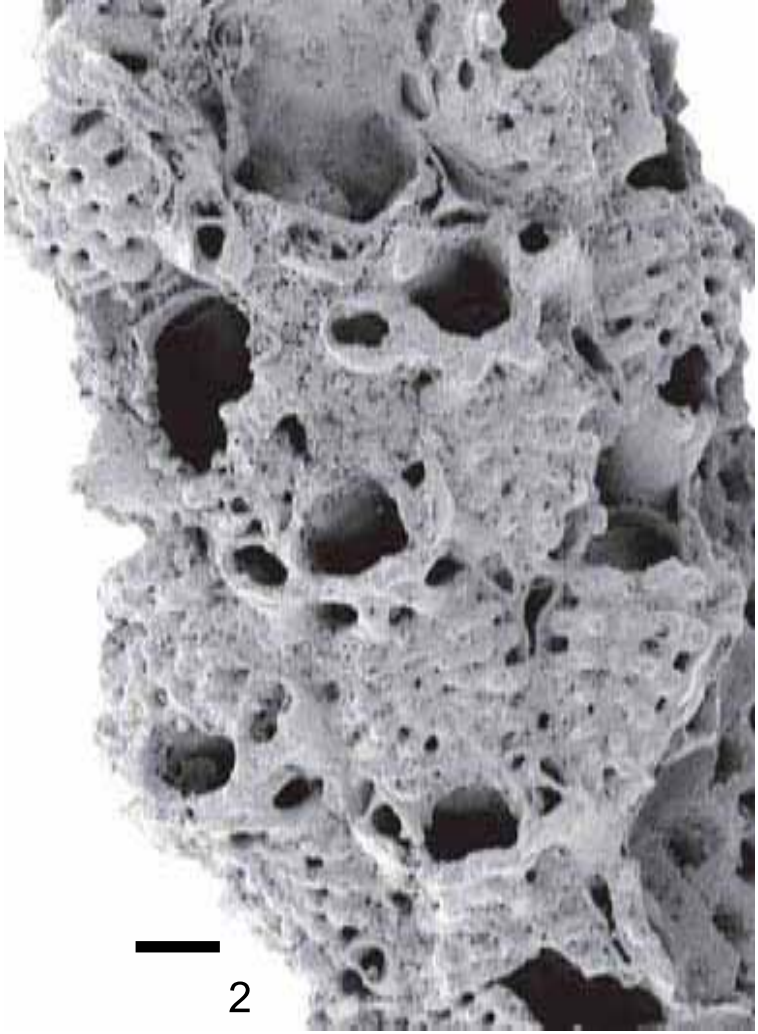
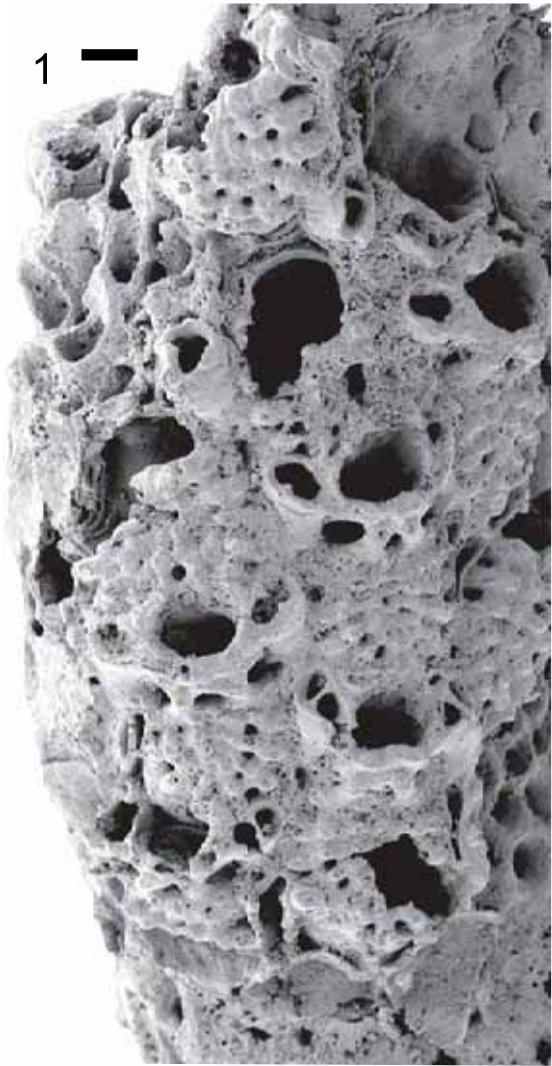
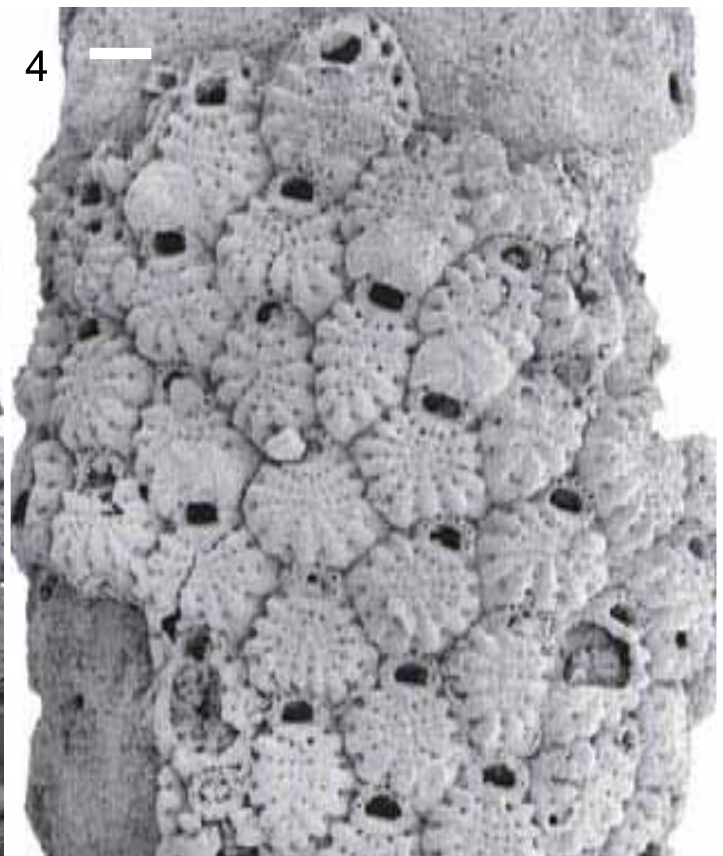
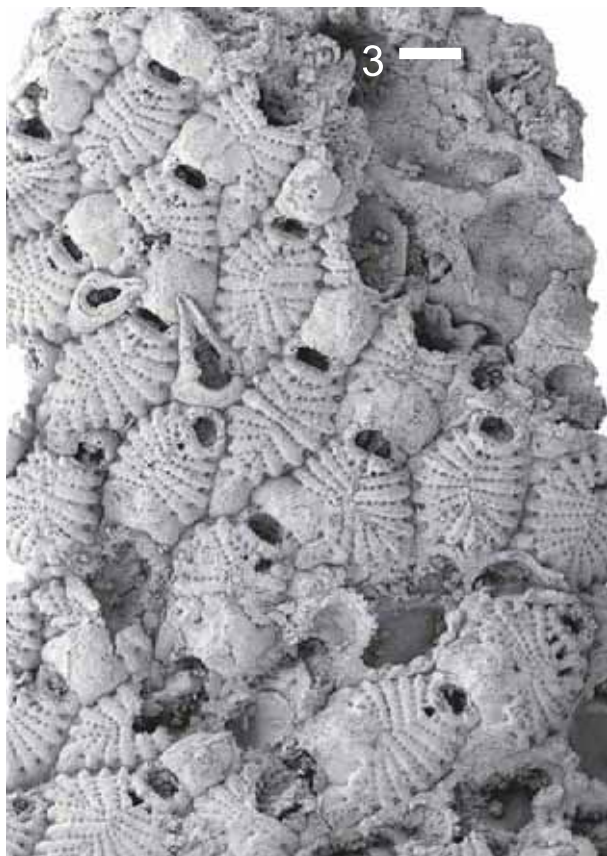
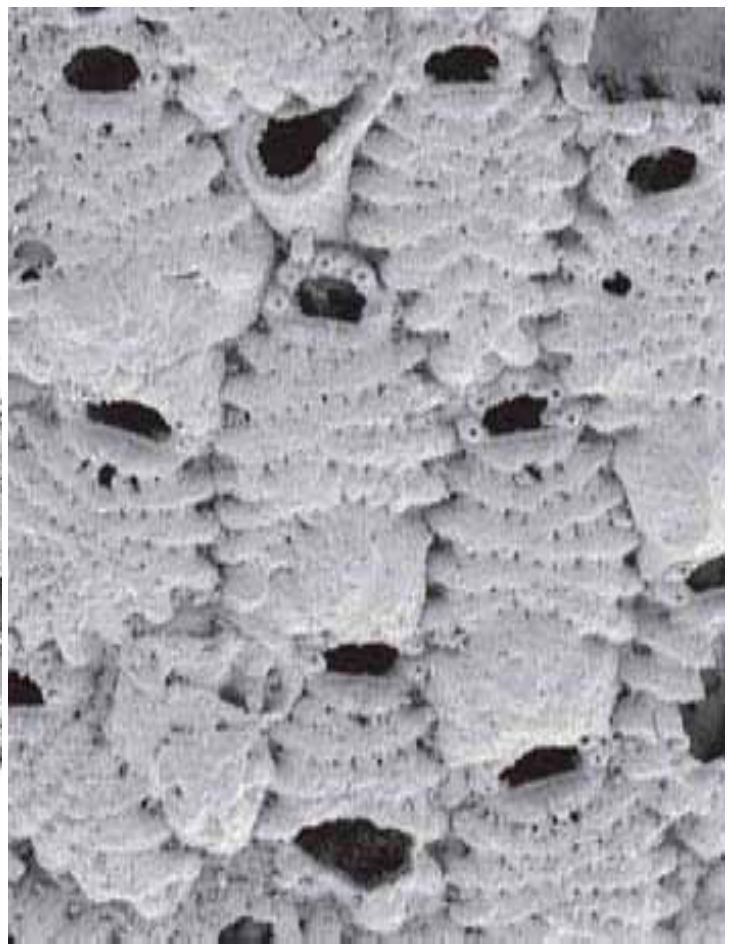


PLATE 72



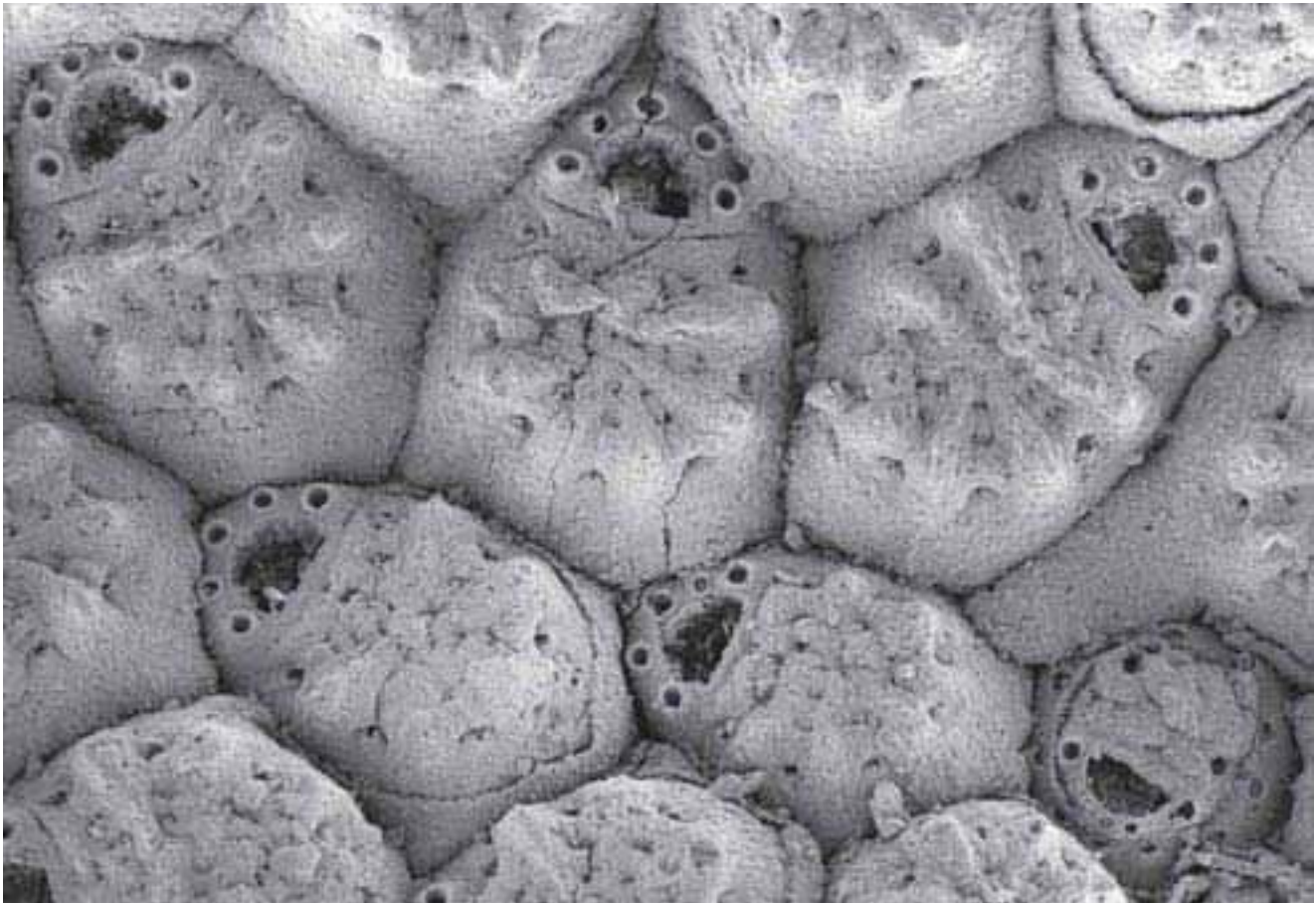
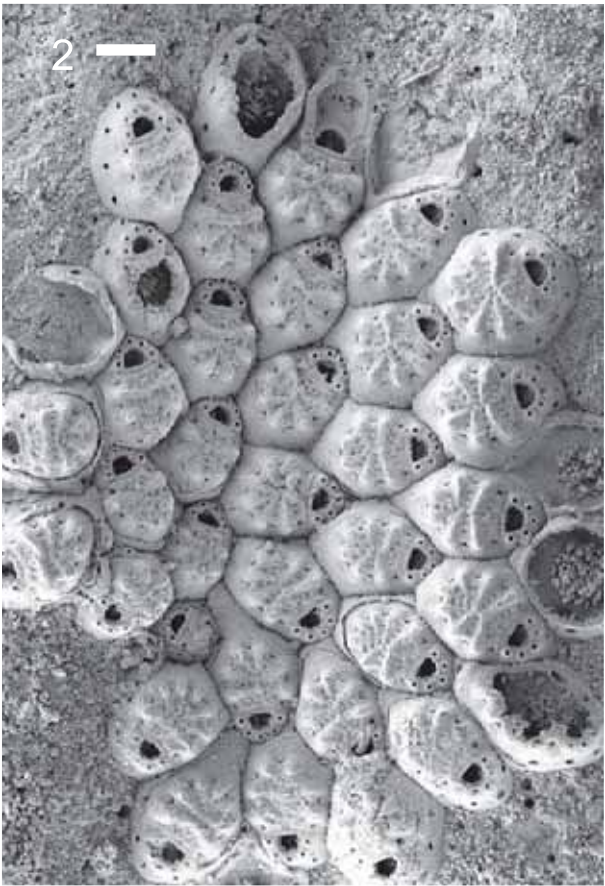
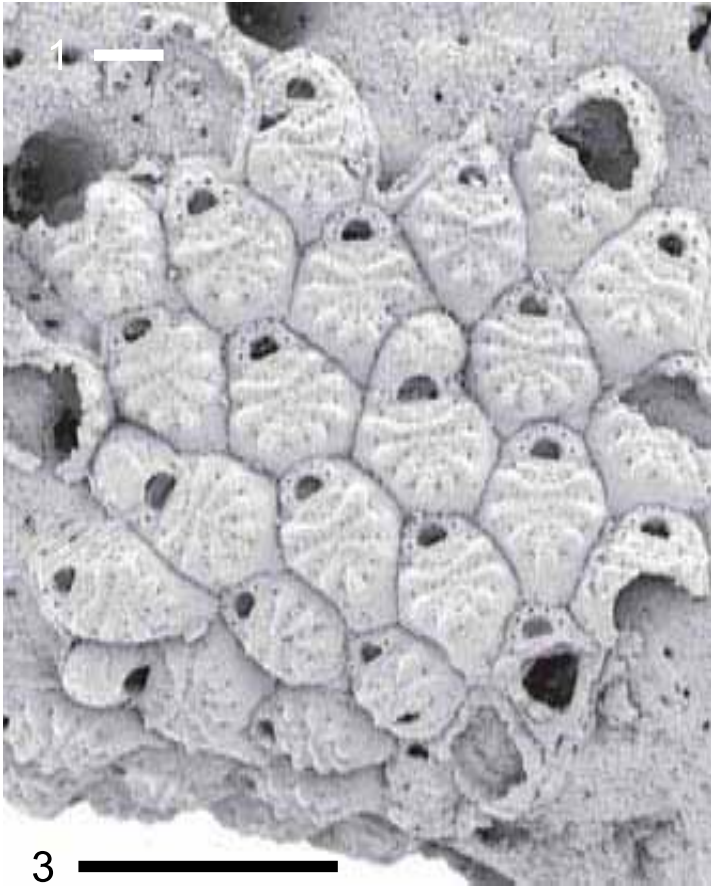
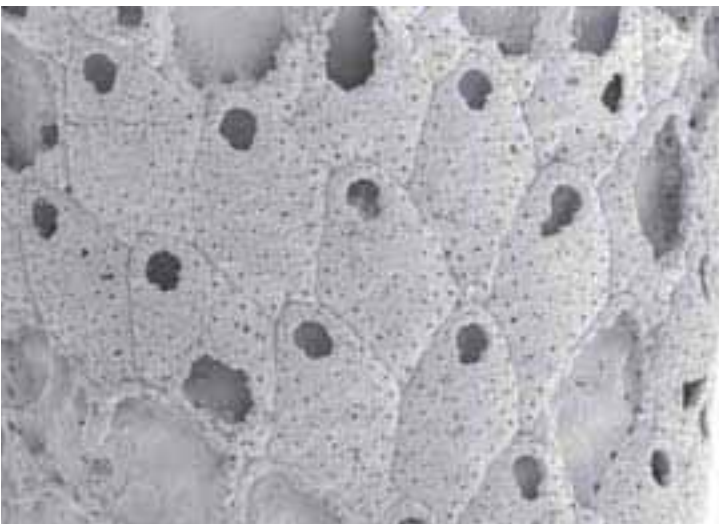
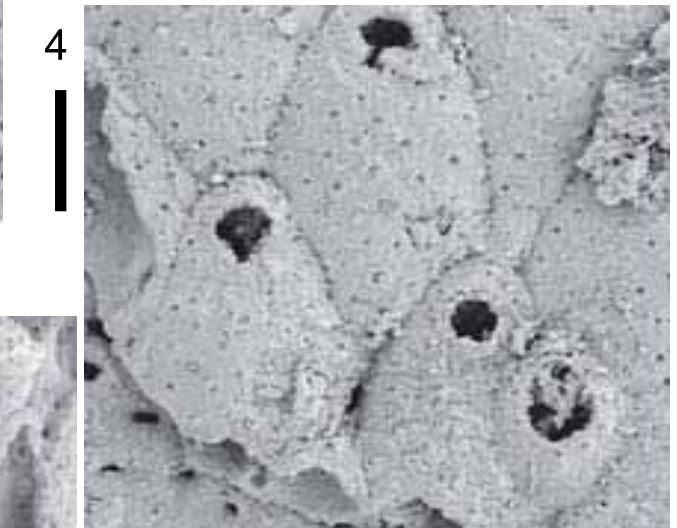
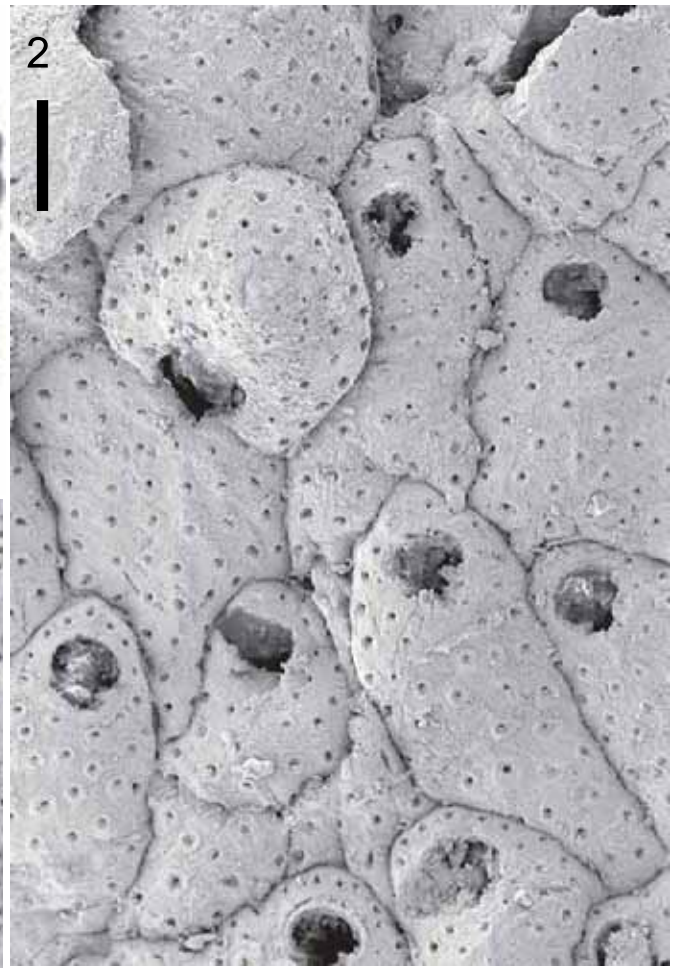
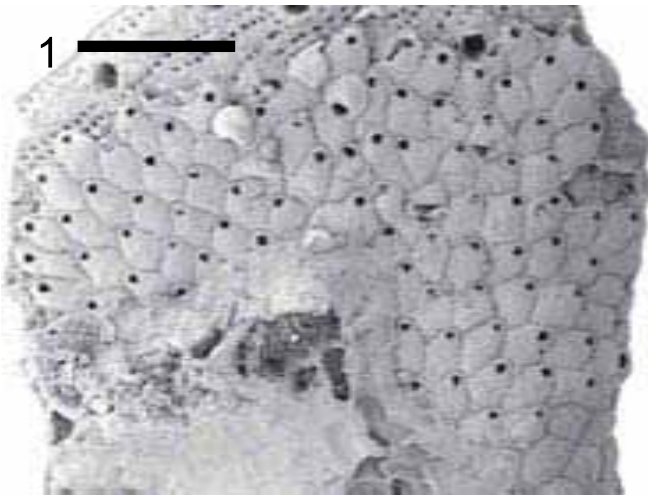
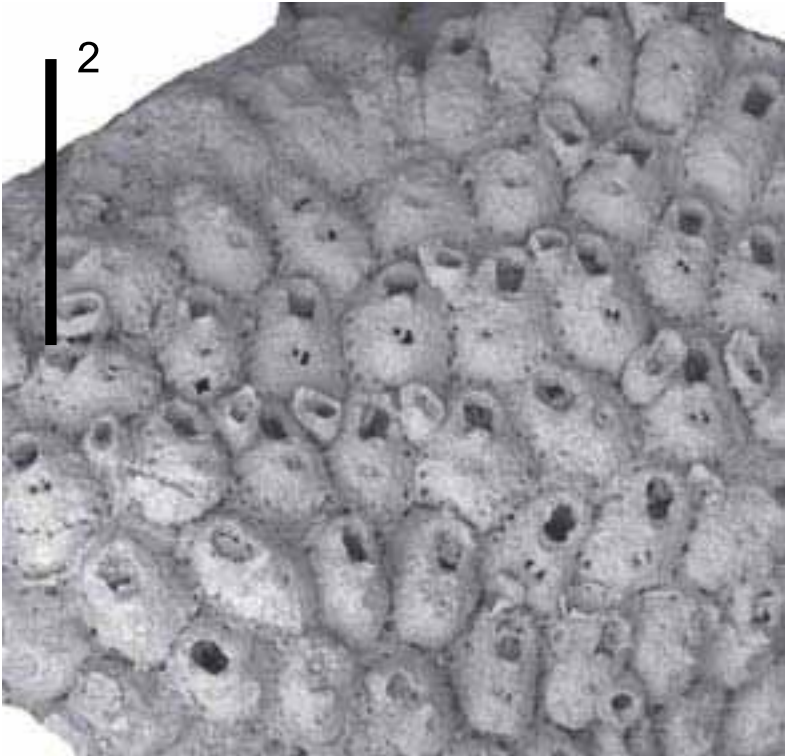
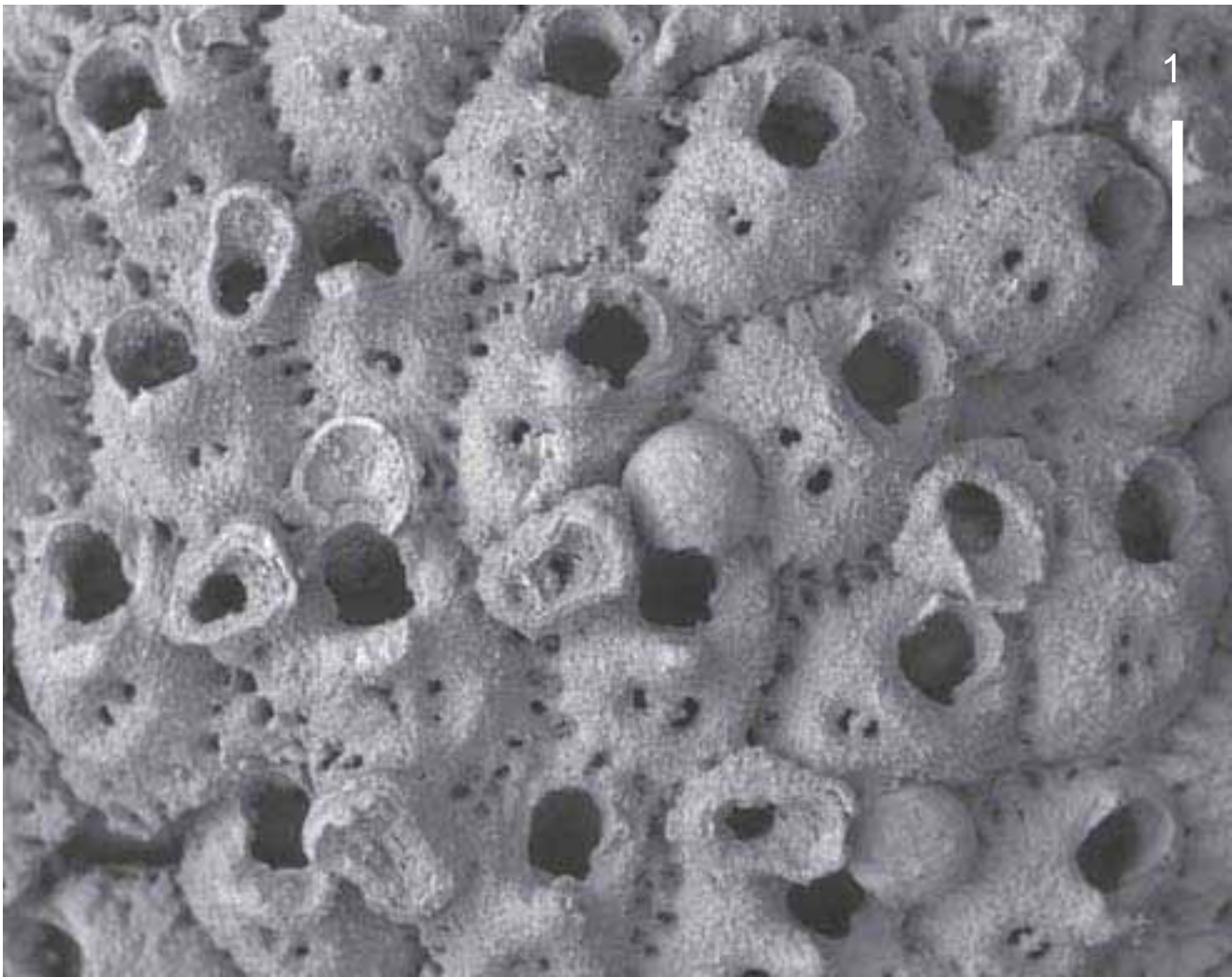
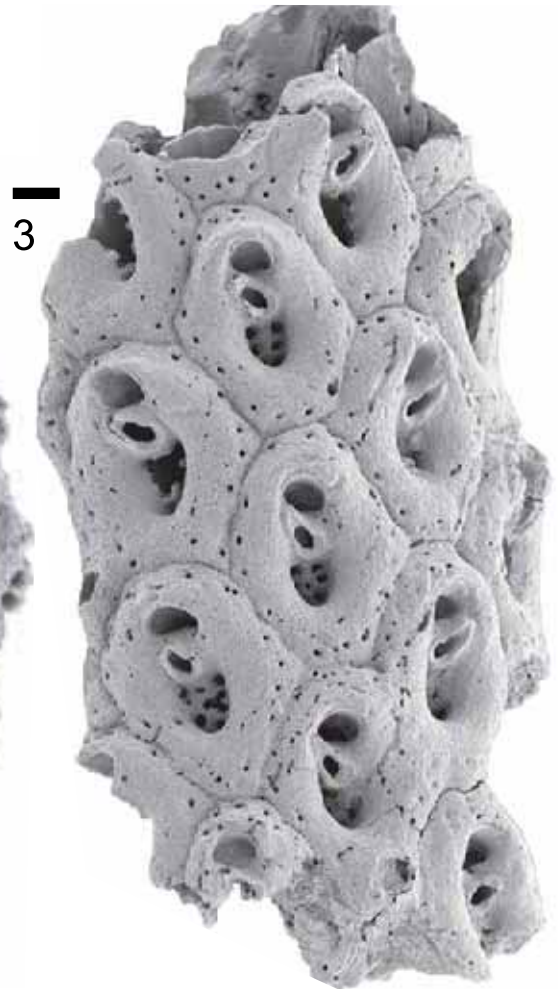
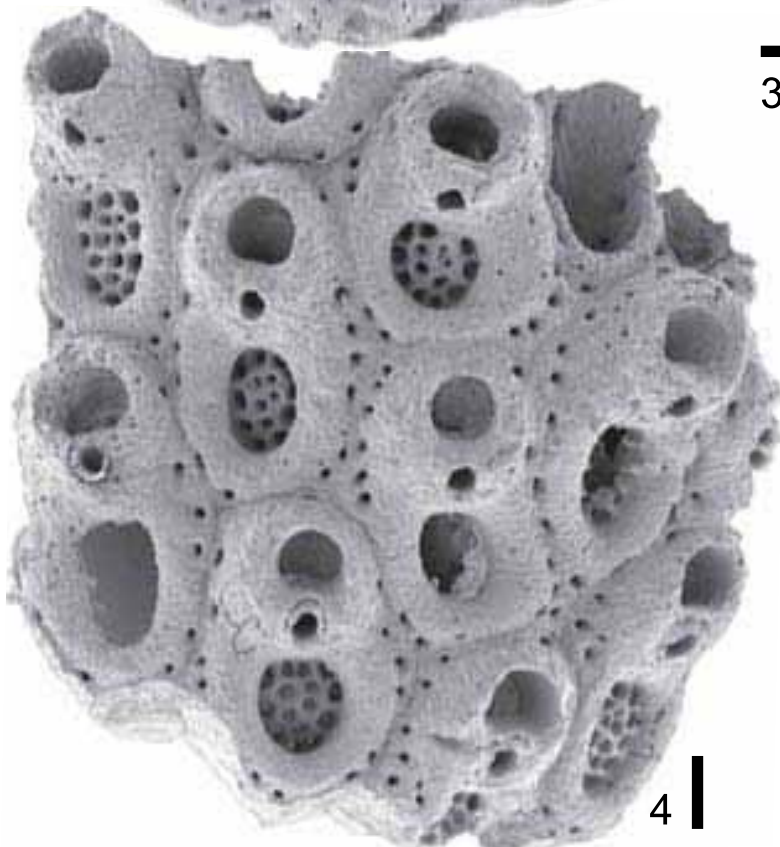
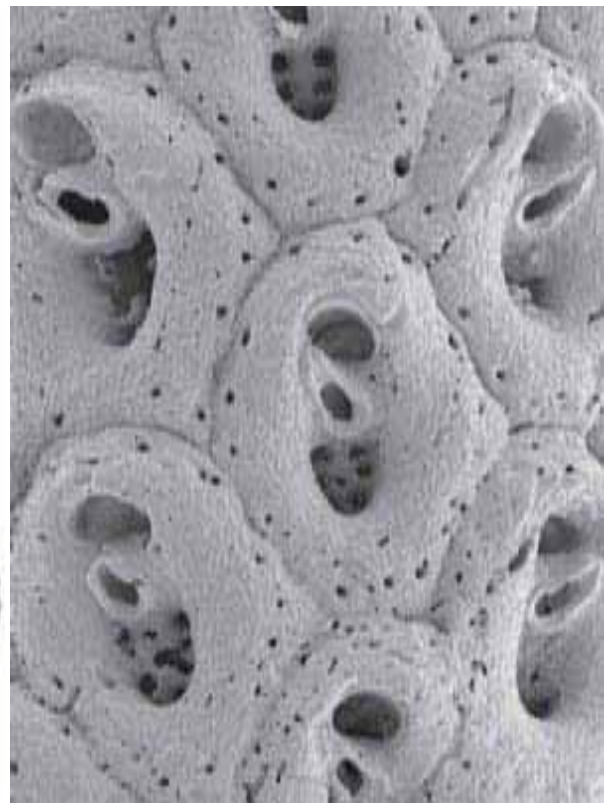
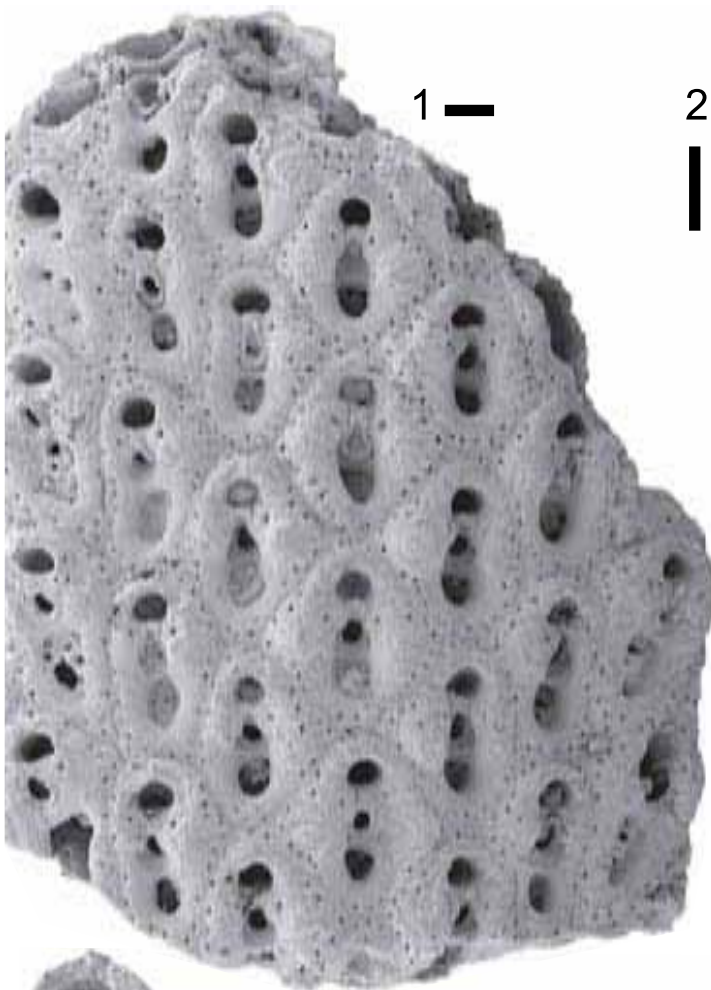


PLATE 74







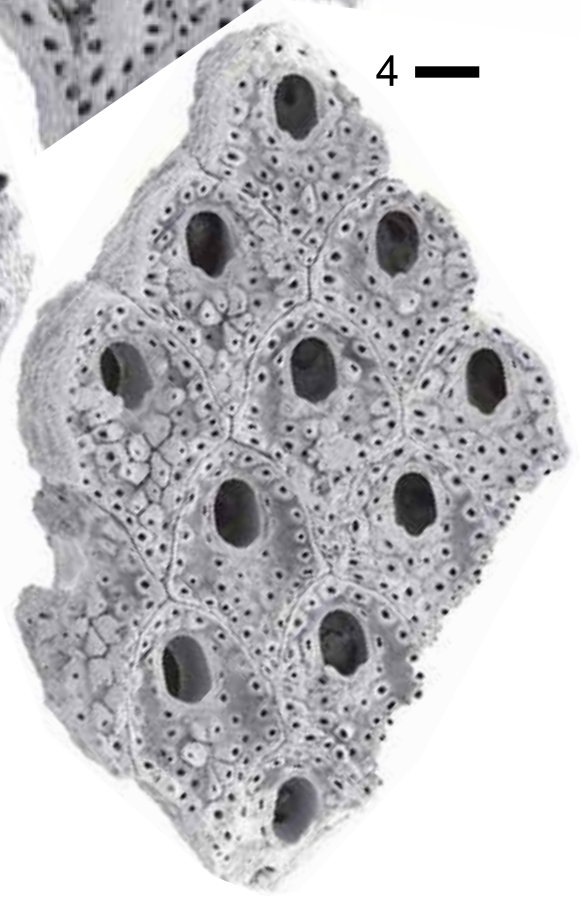
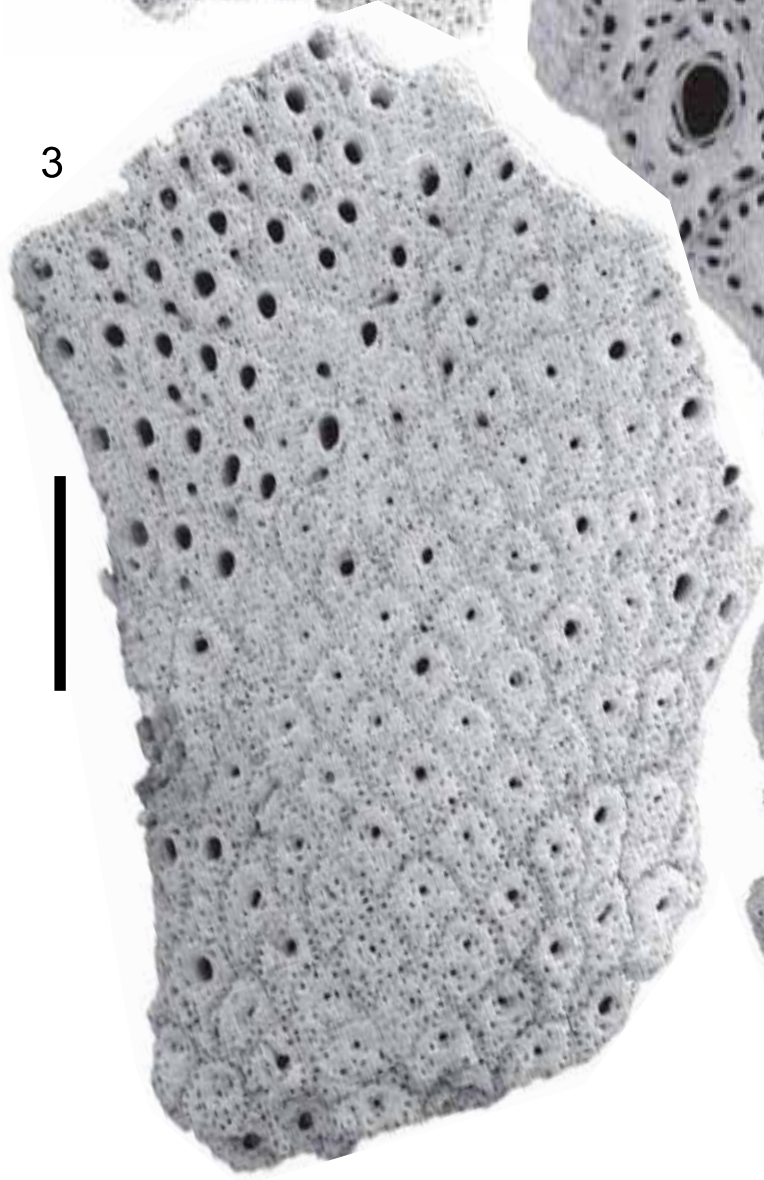
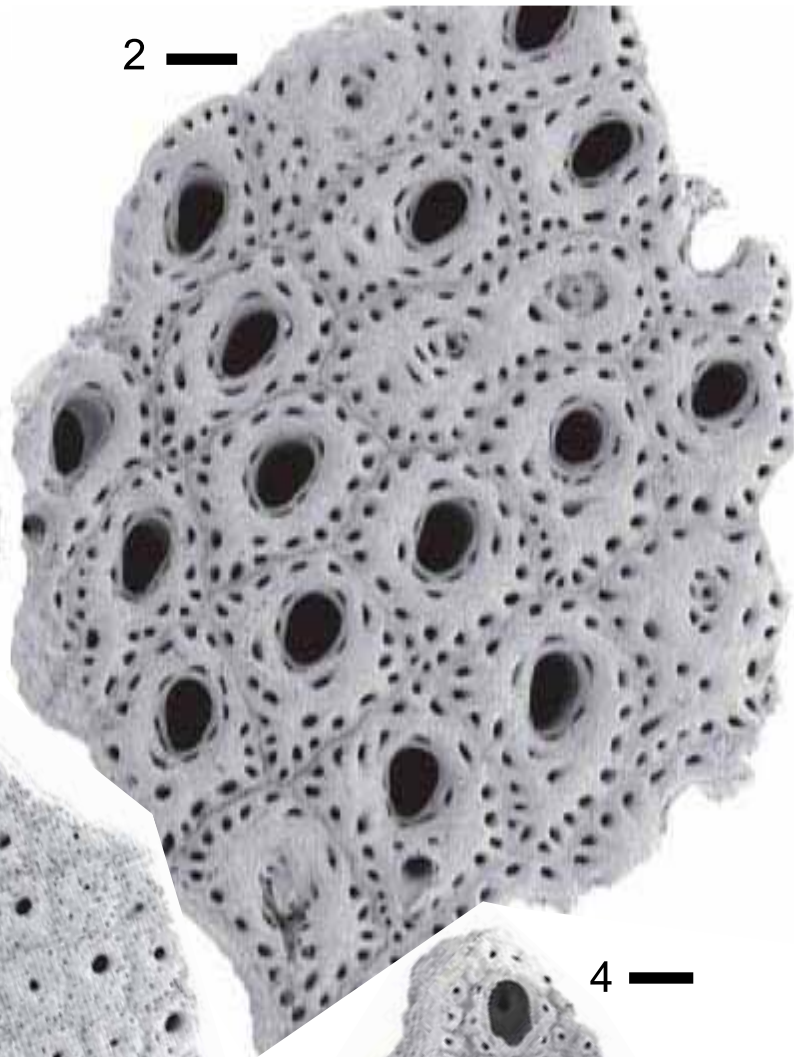
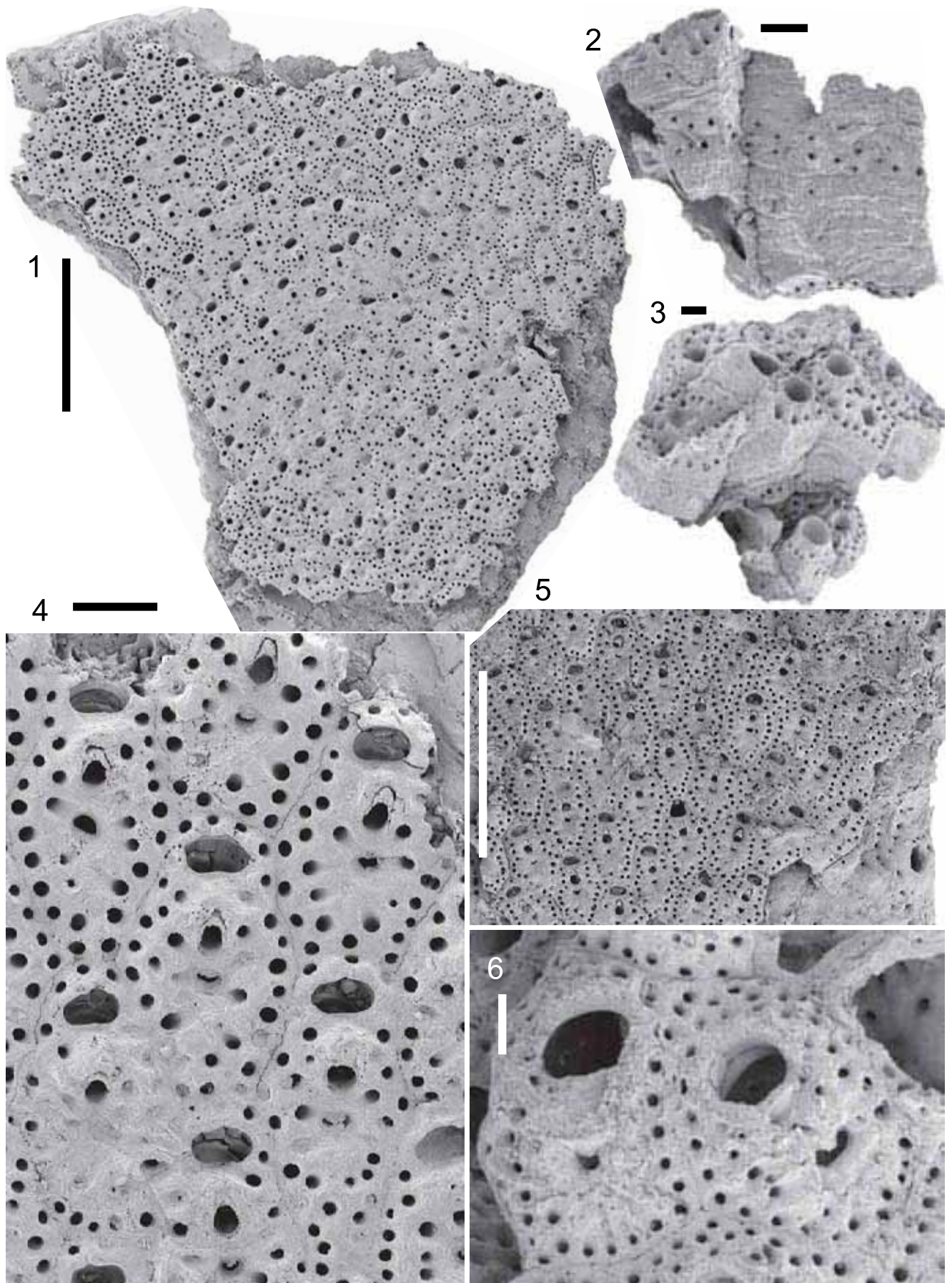


PLATE 78



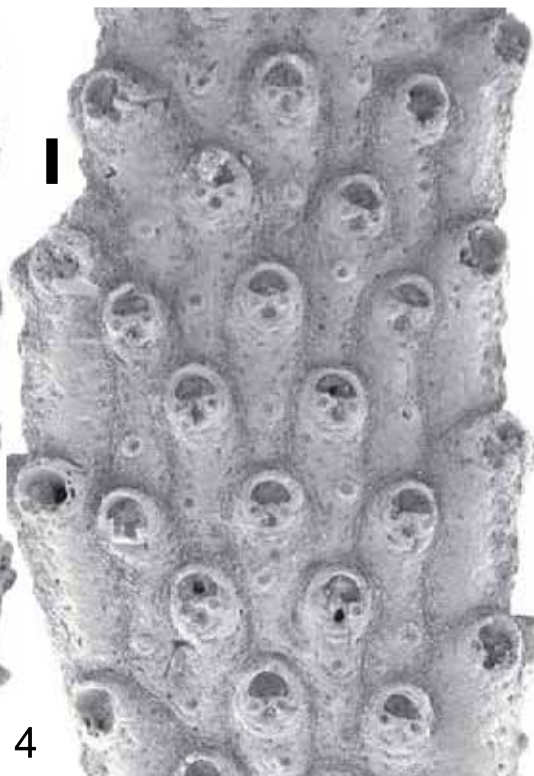
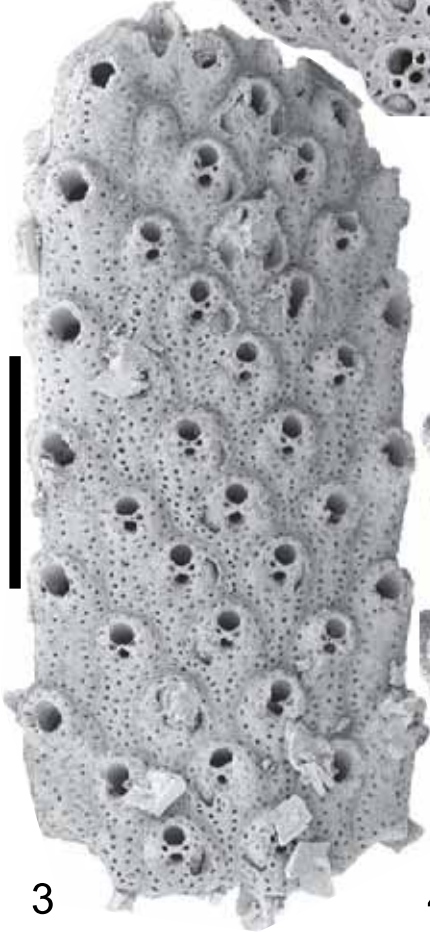
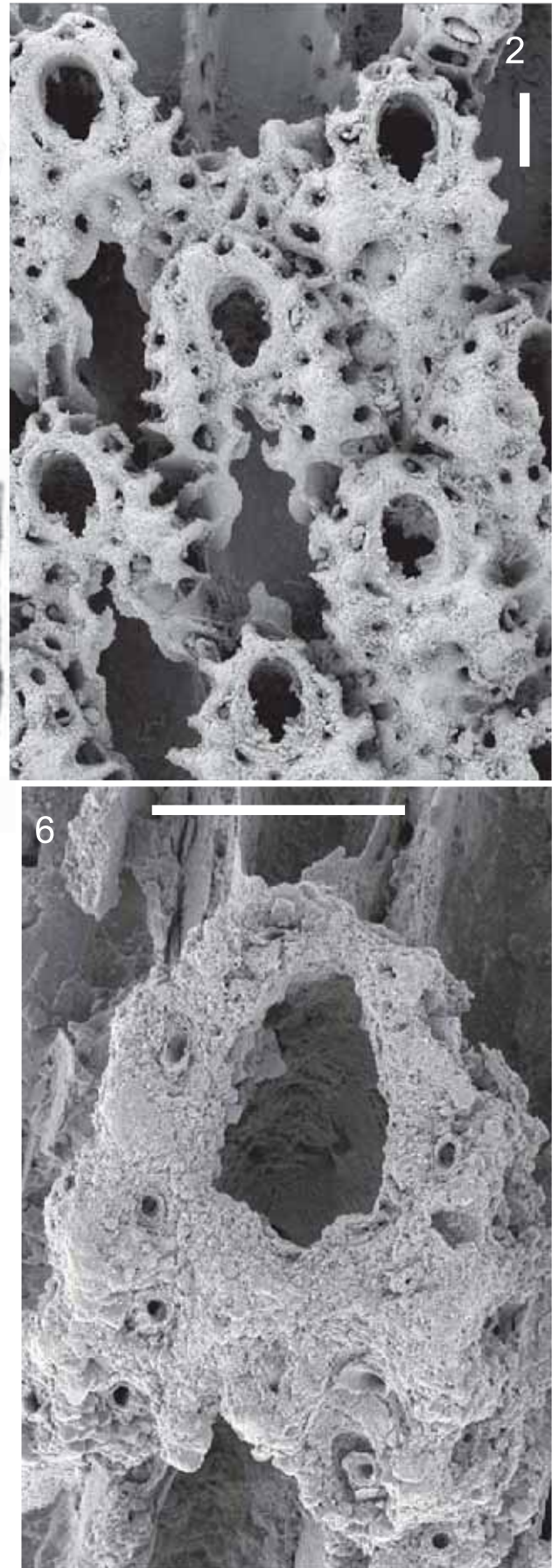
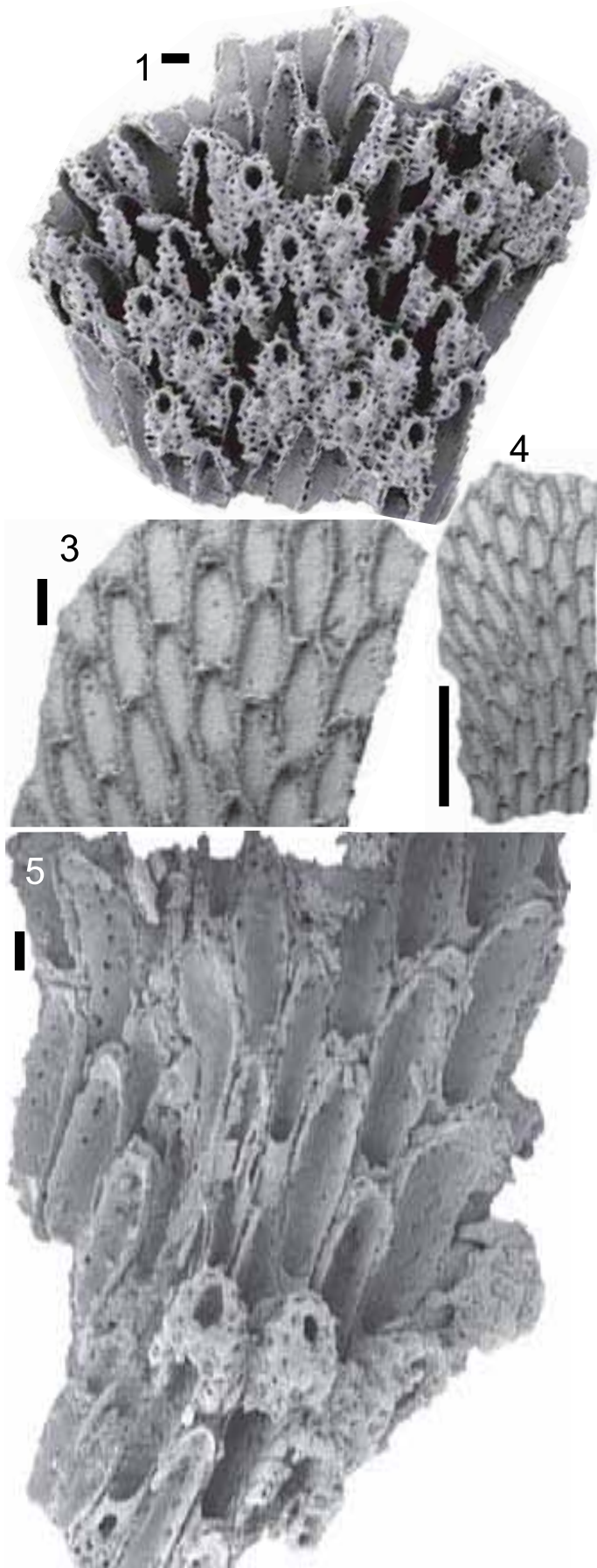
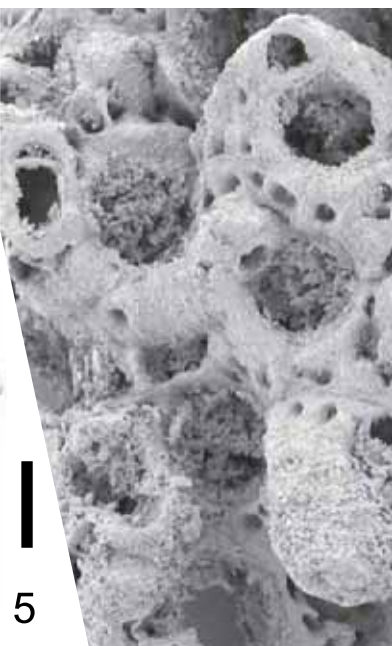
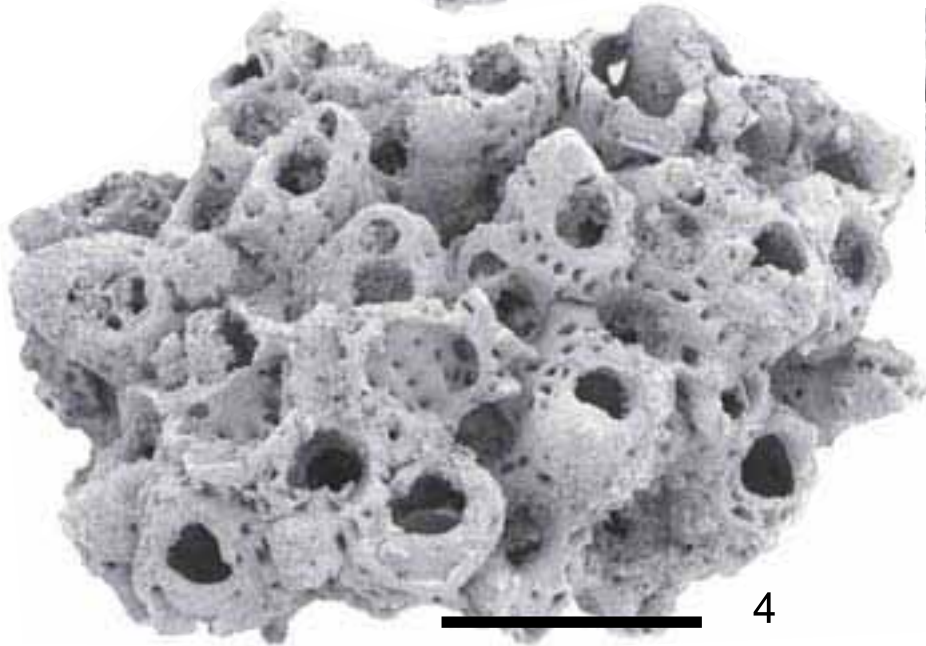
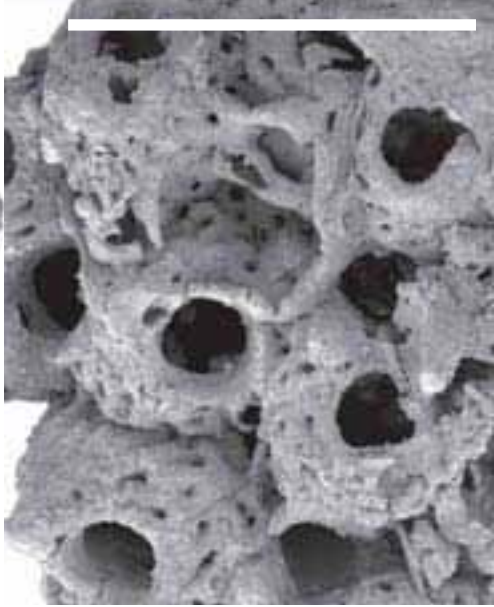
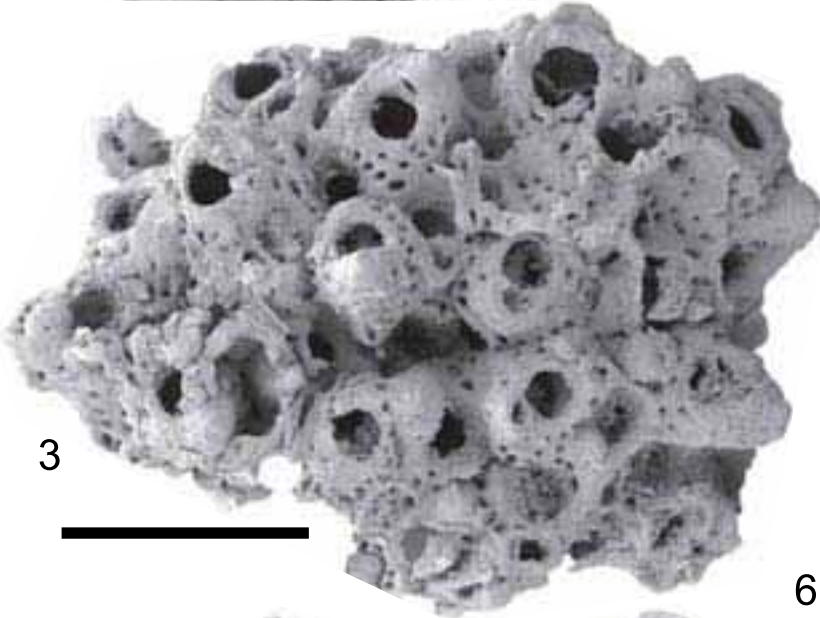
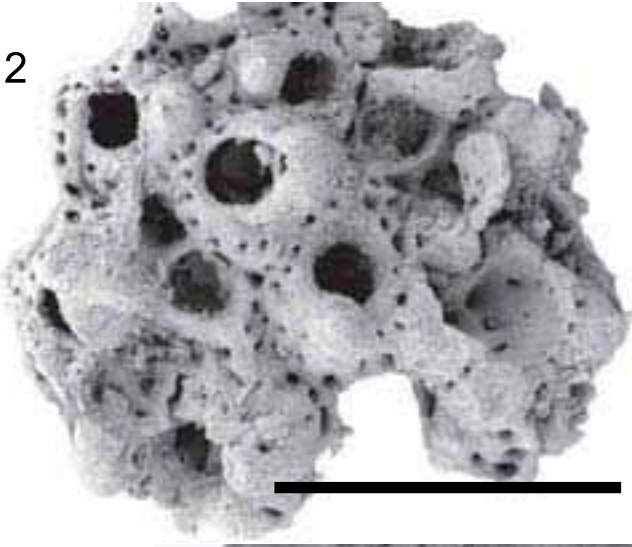
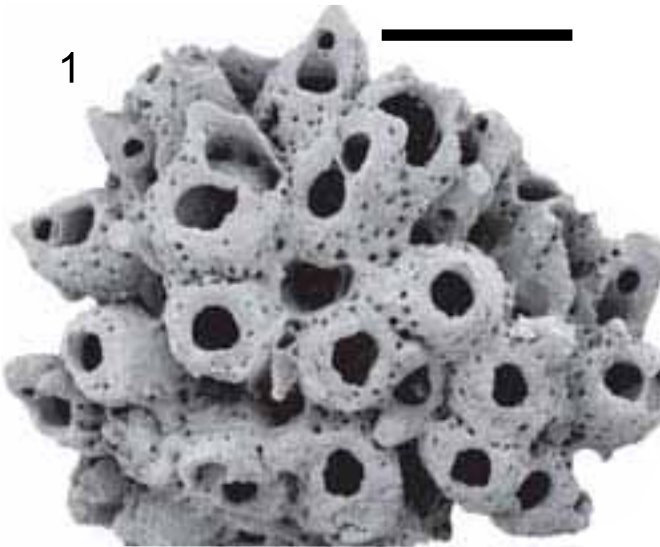
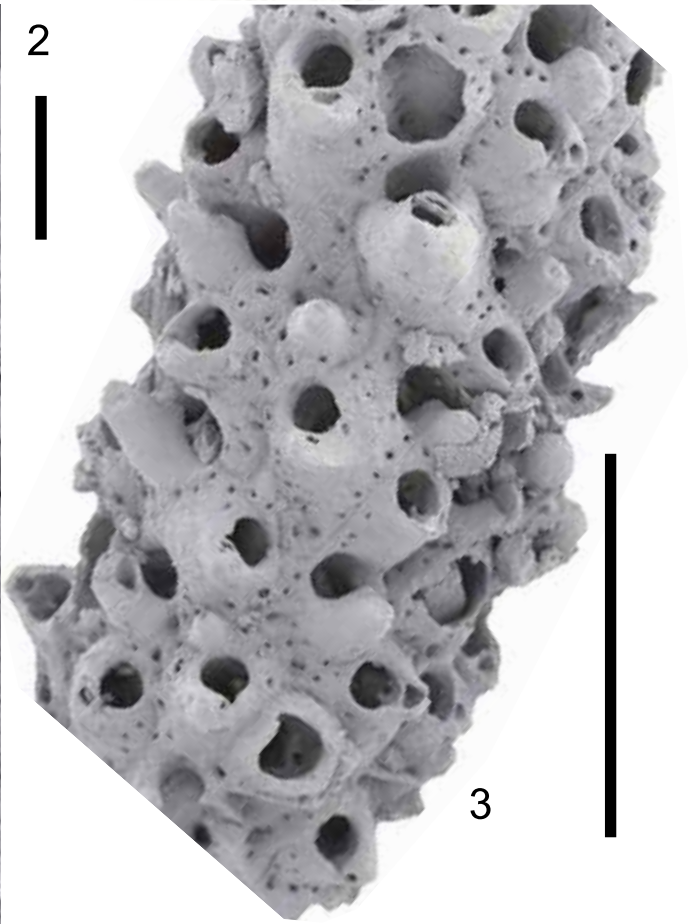
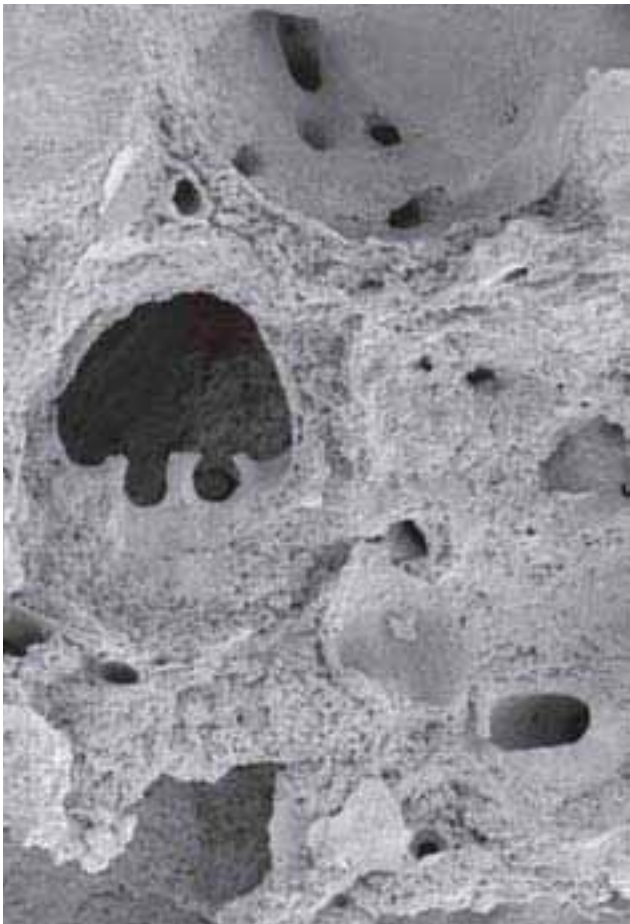
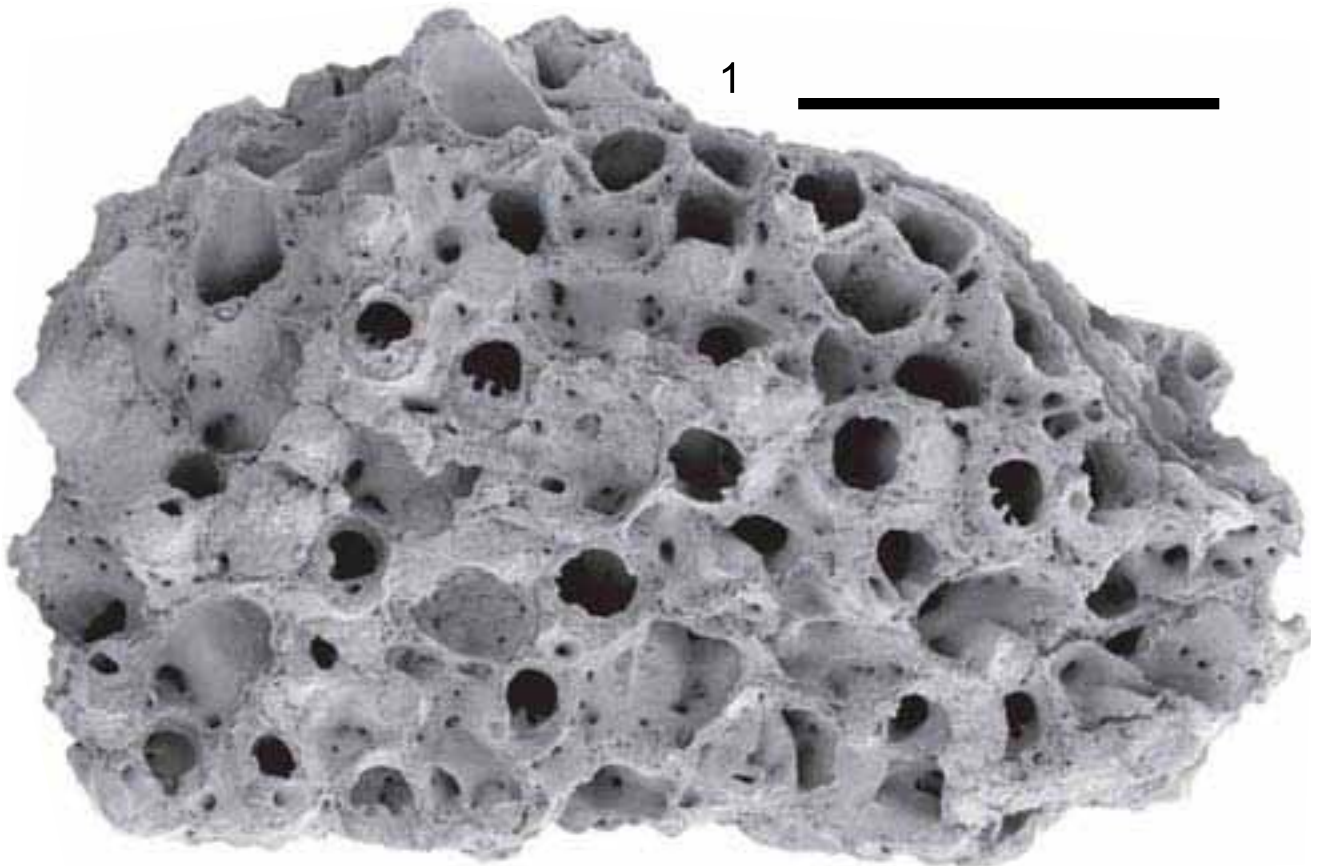


PLATE 80







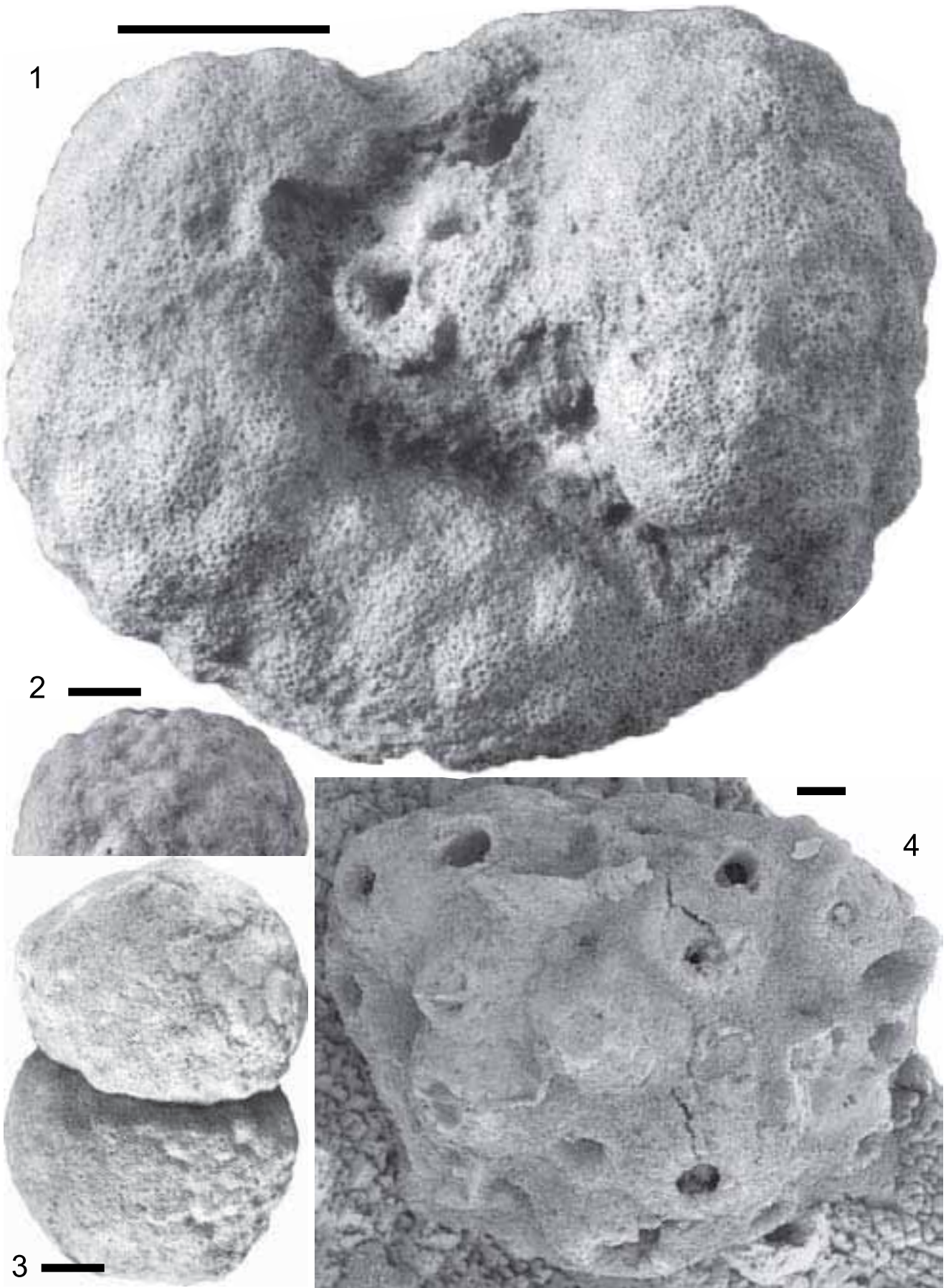
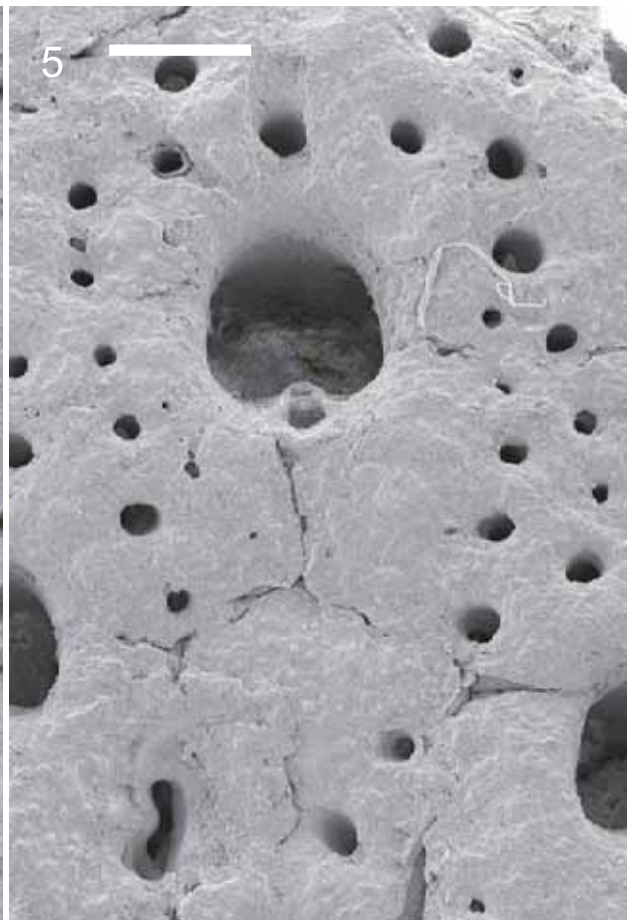
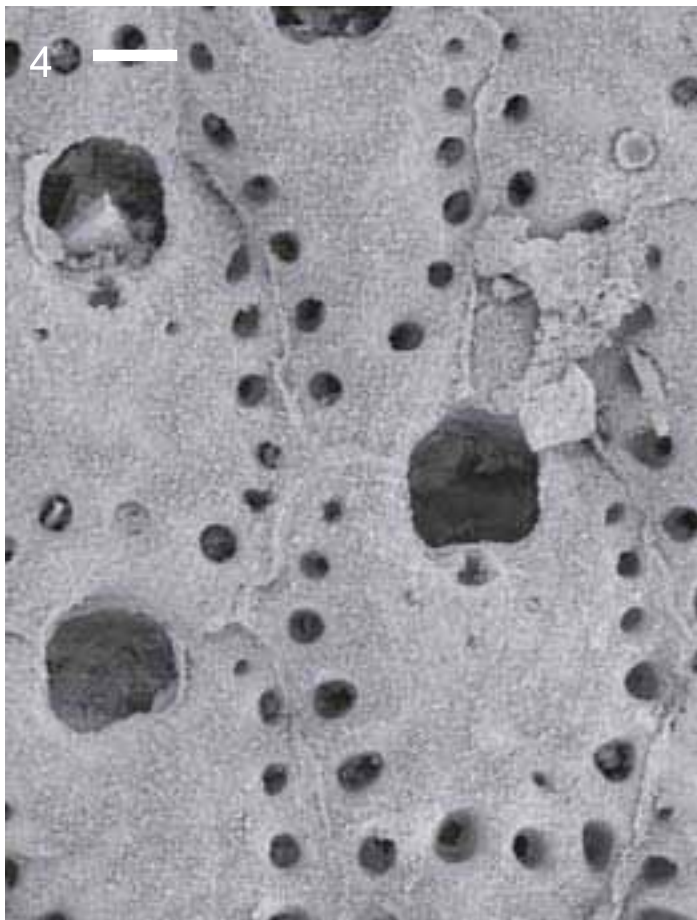
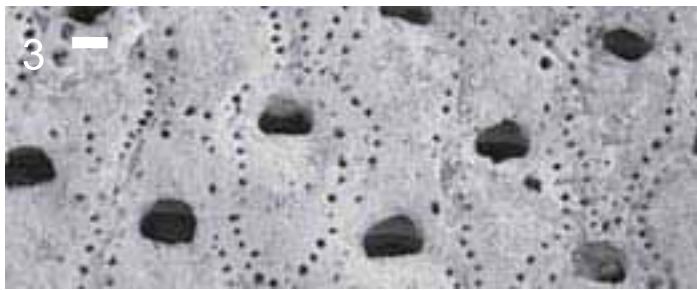
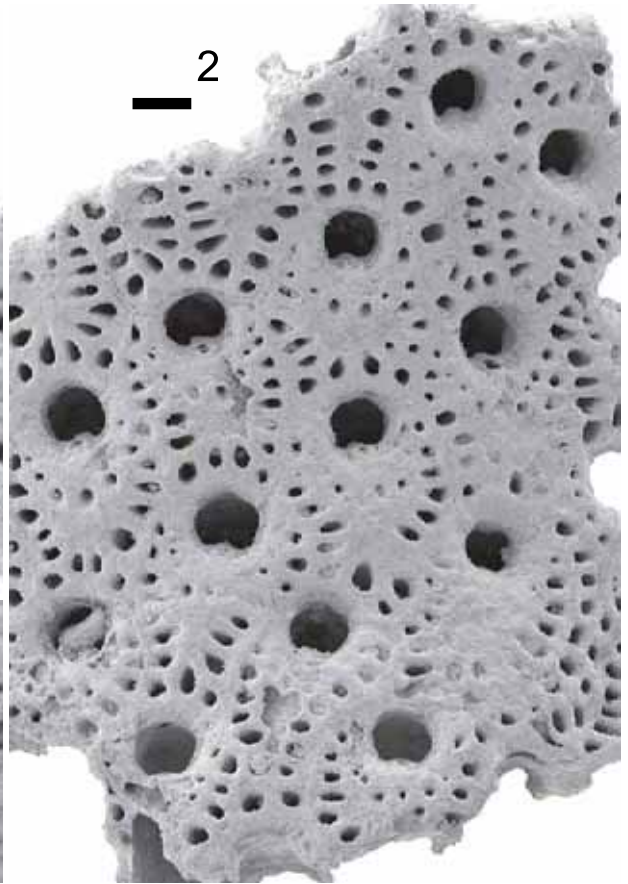
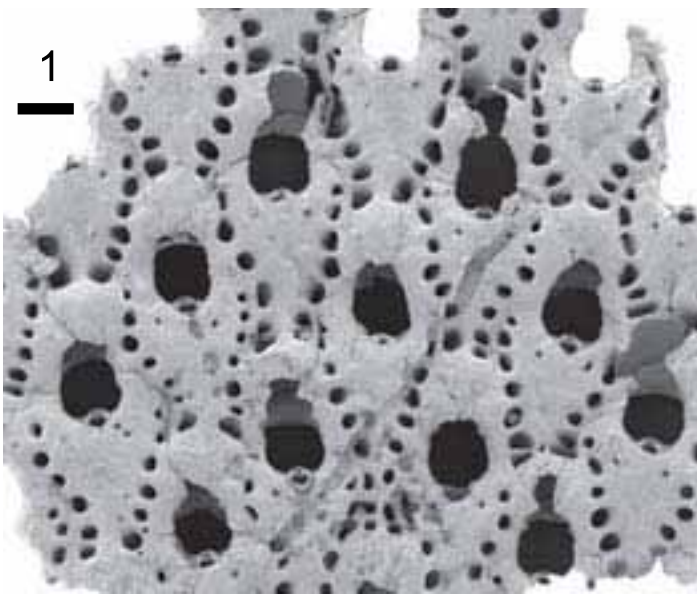


PLATE 84



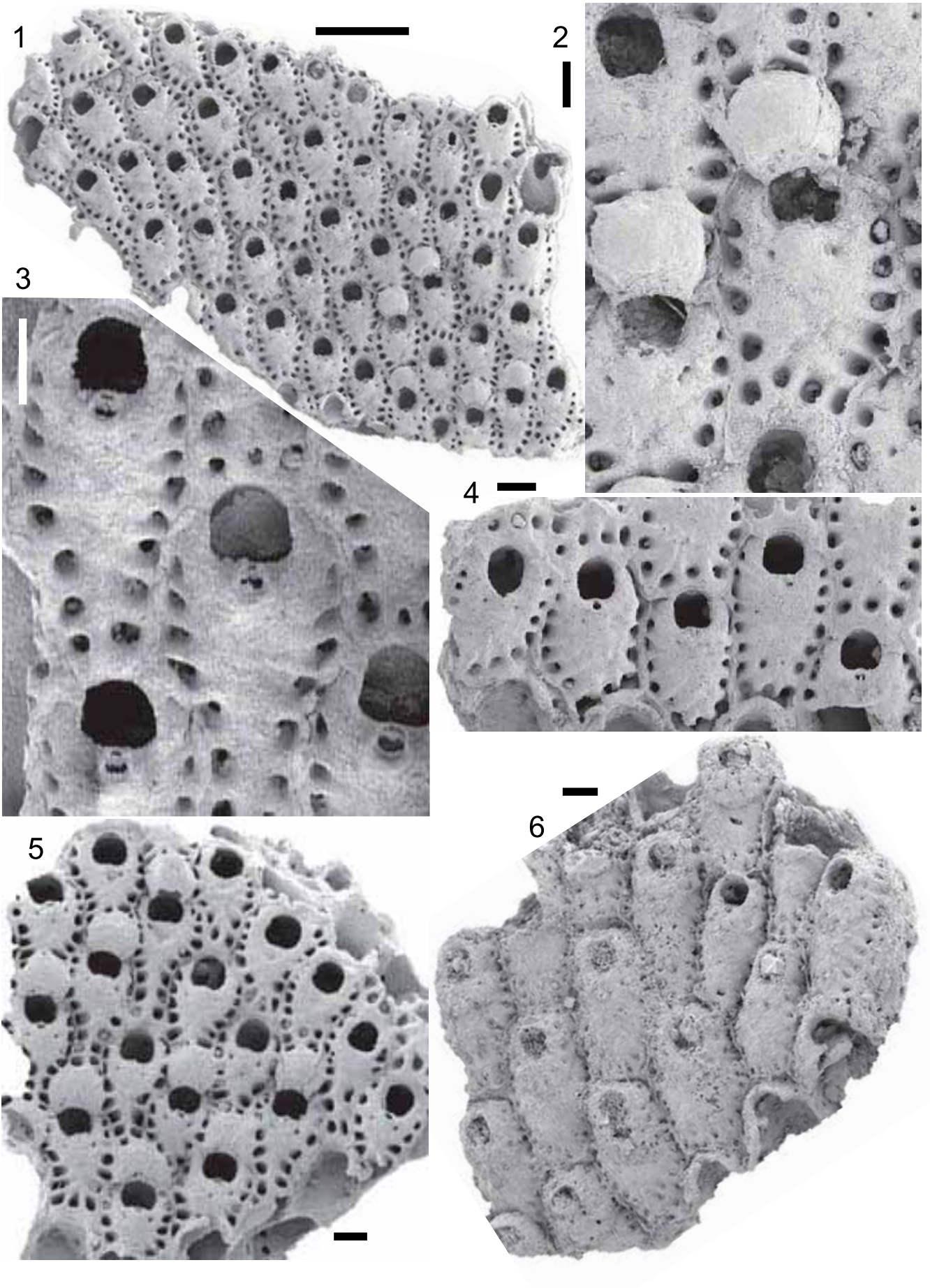
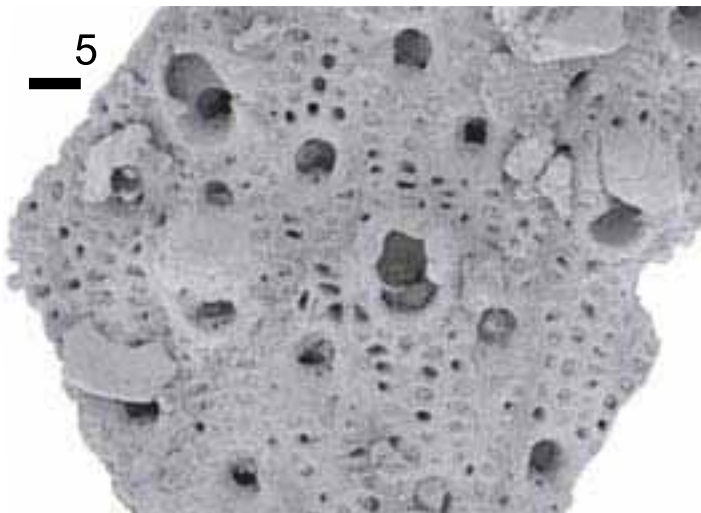
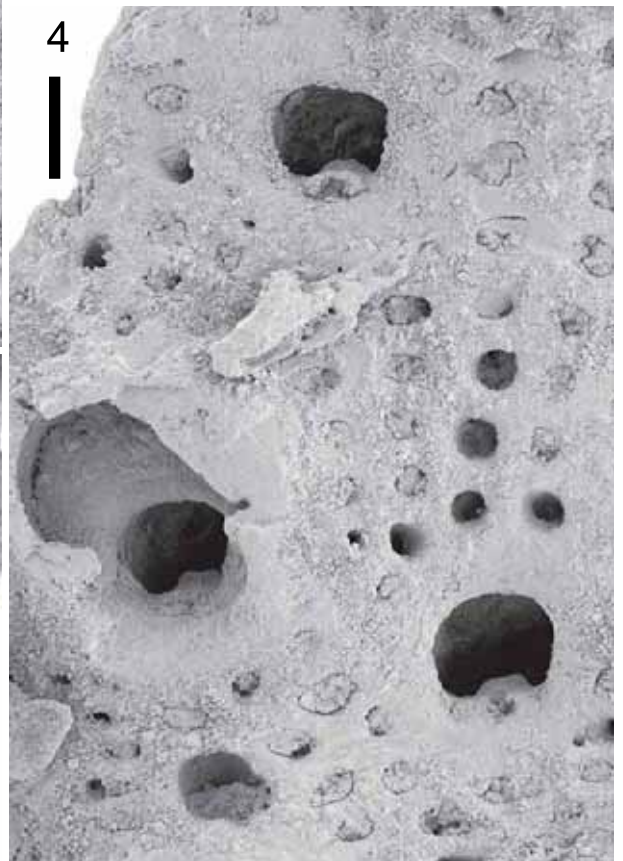
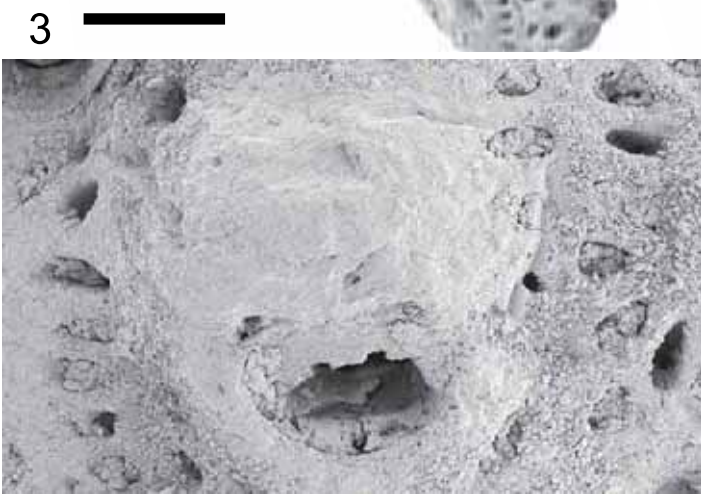
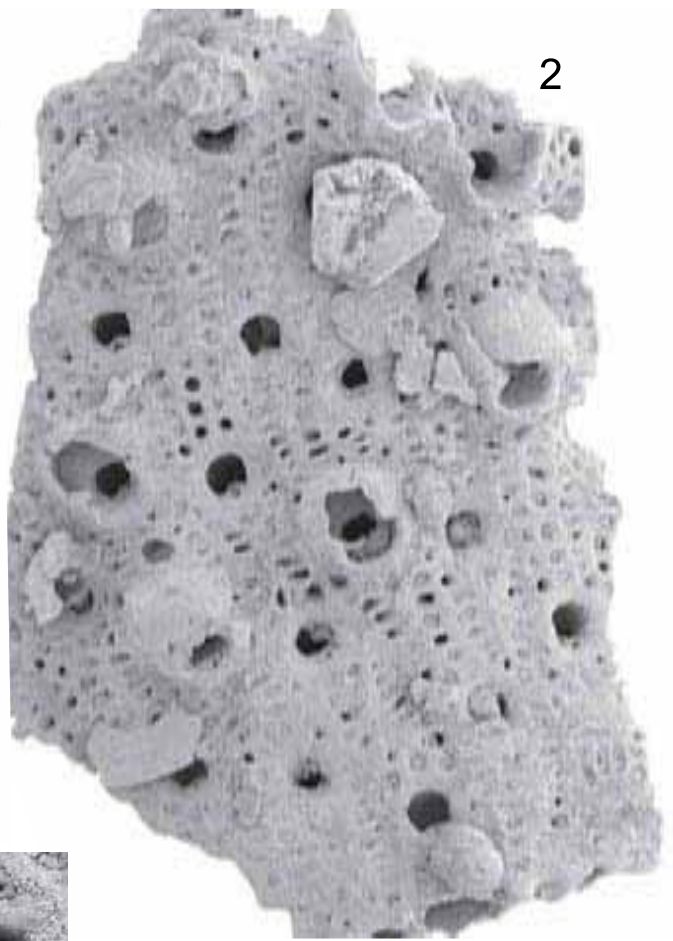
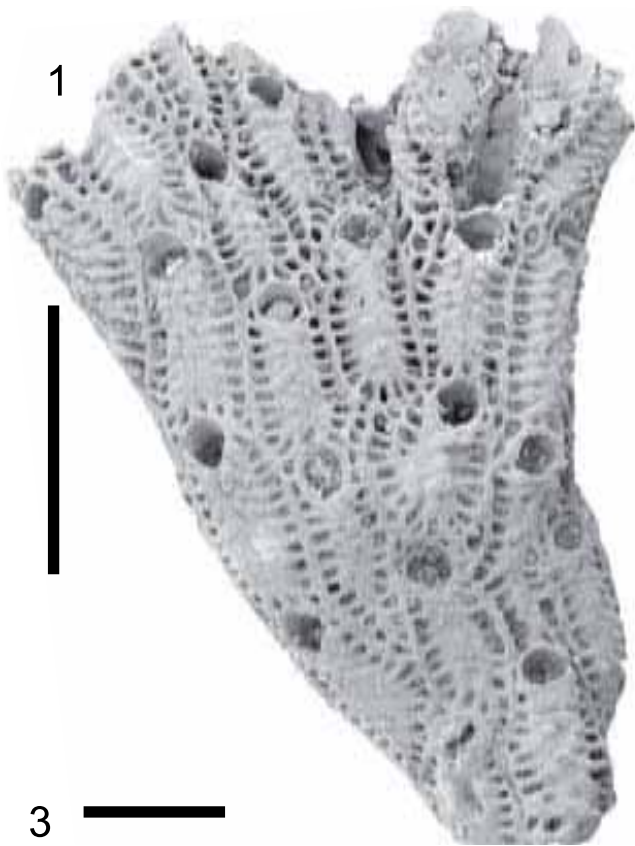


PLATE 86



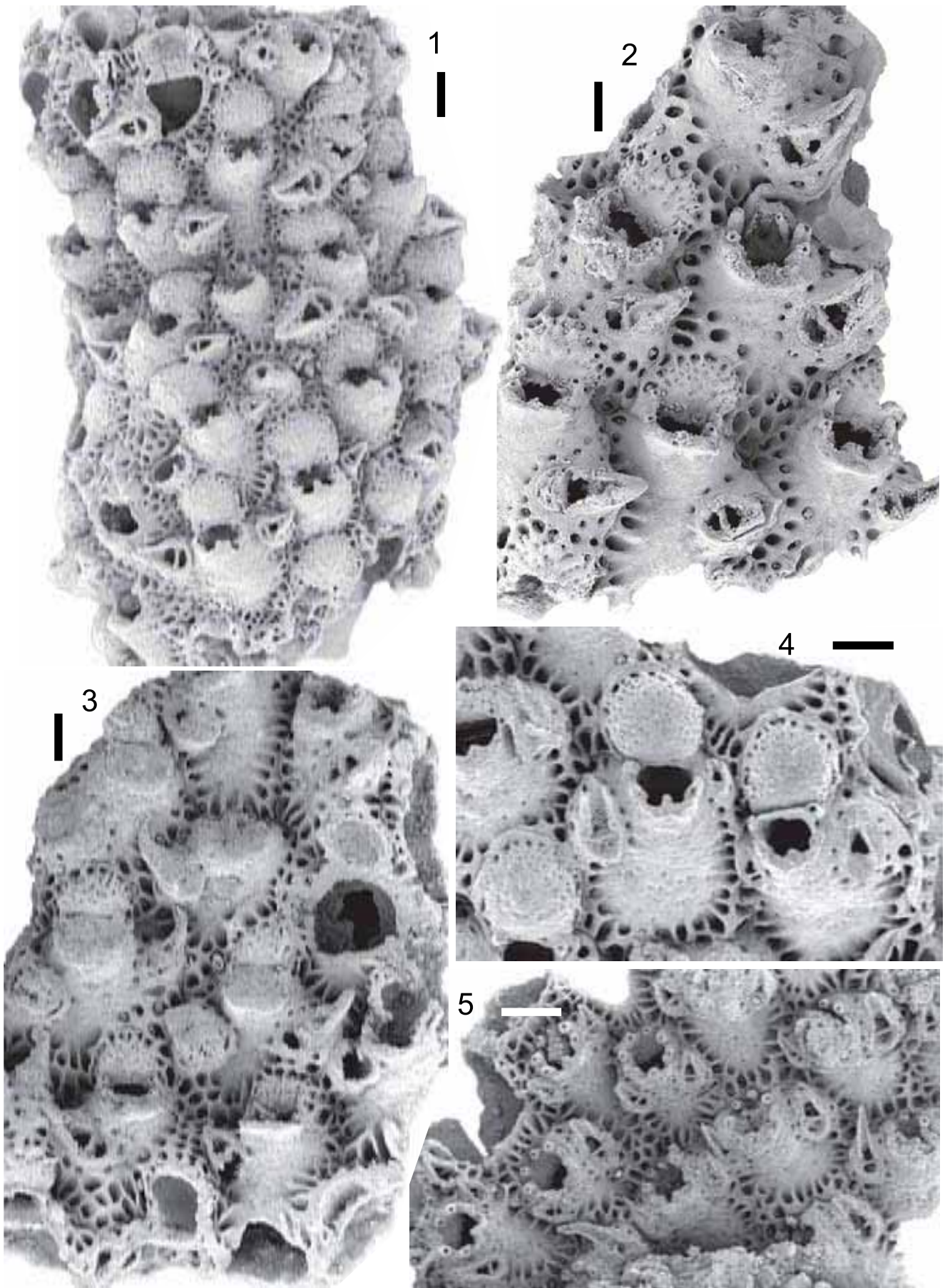
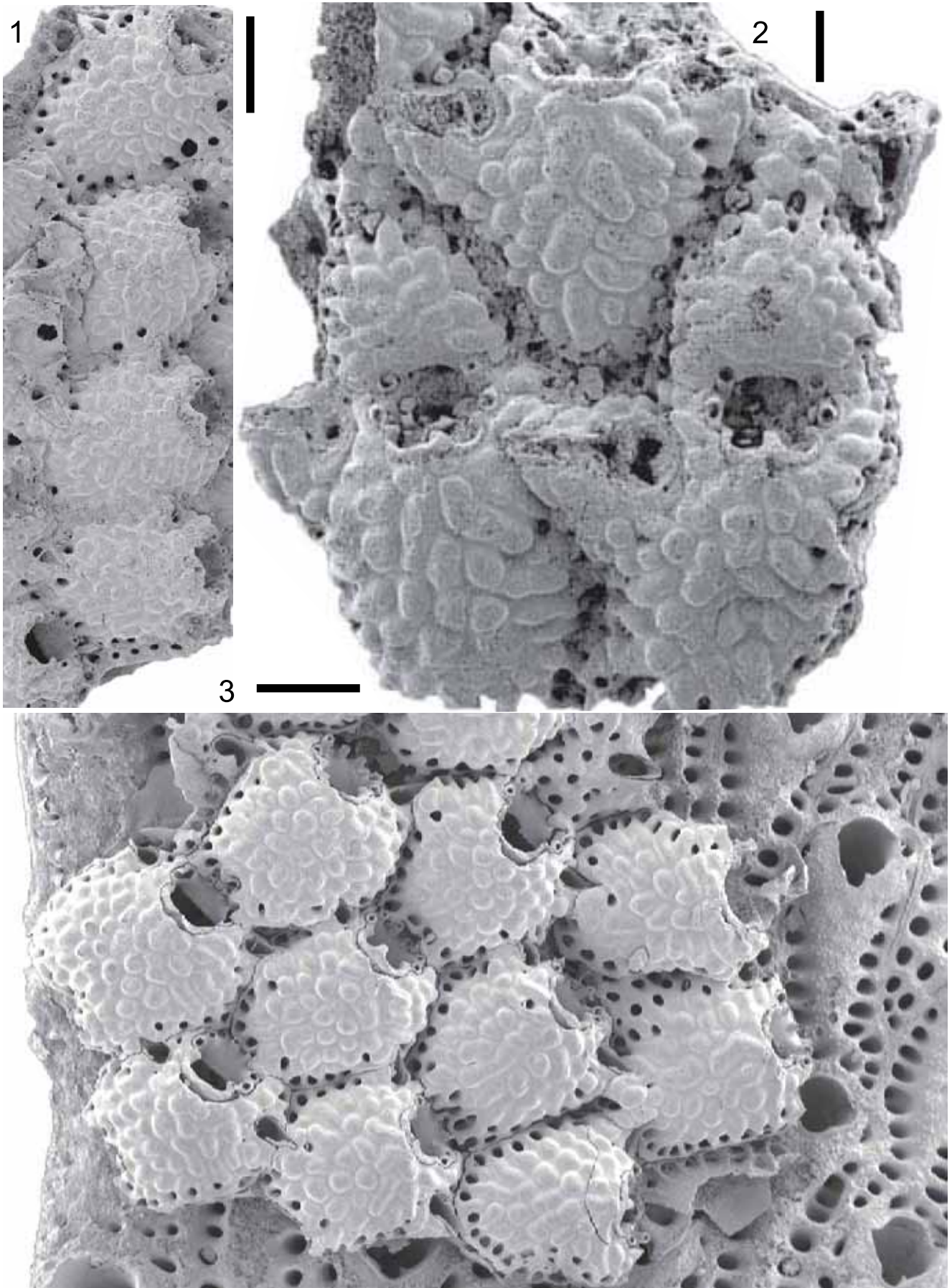


PLATE 88



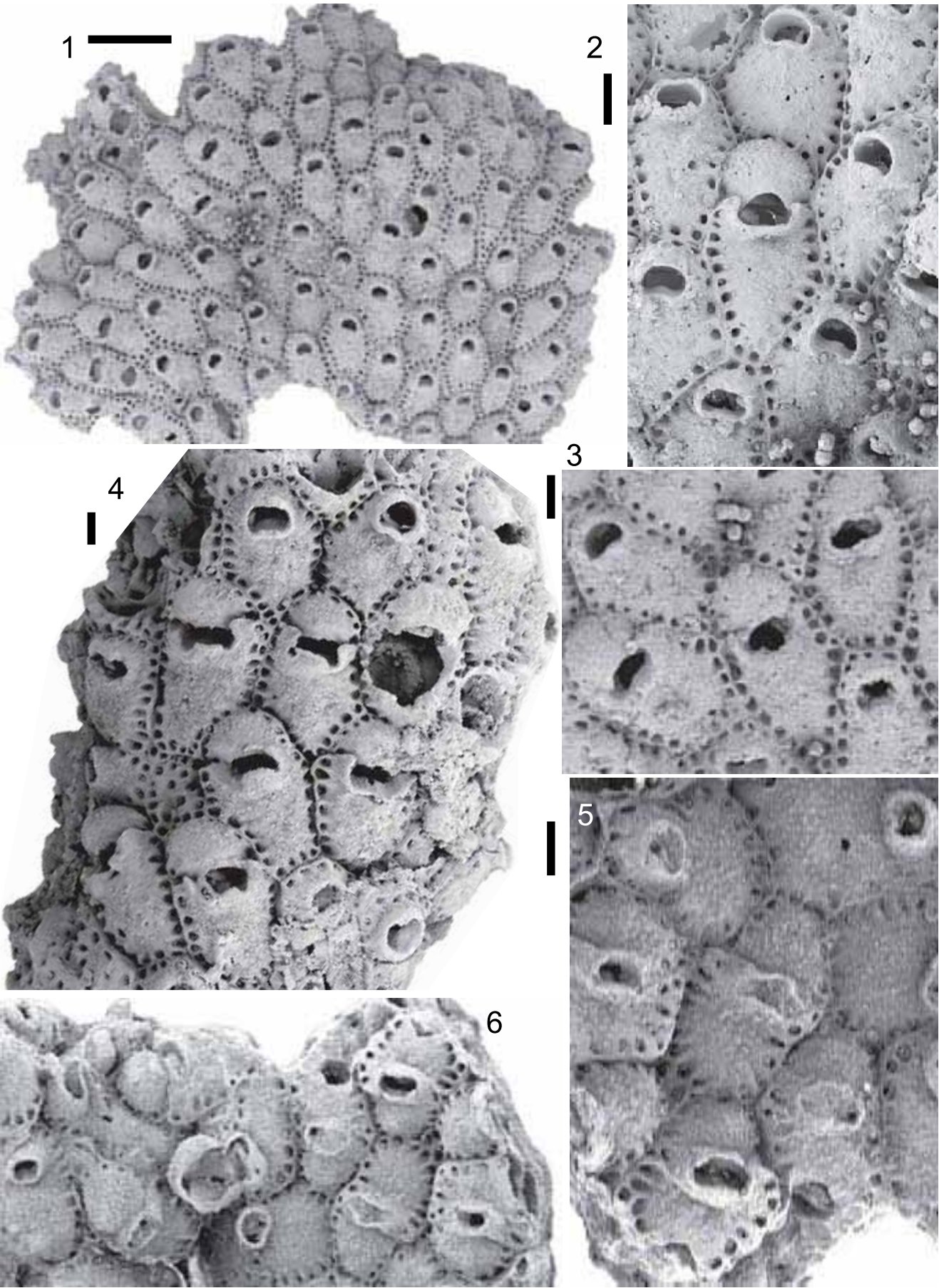
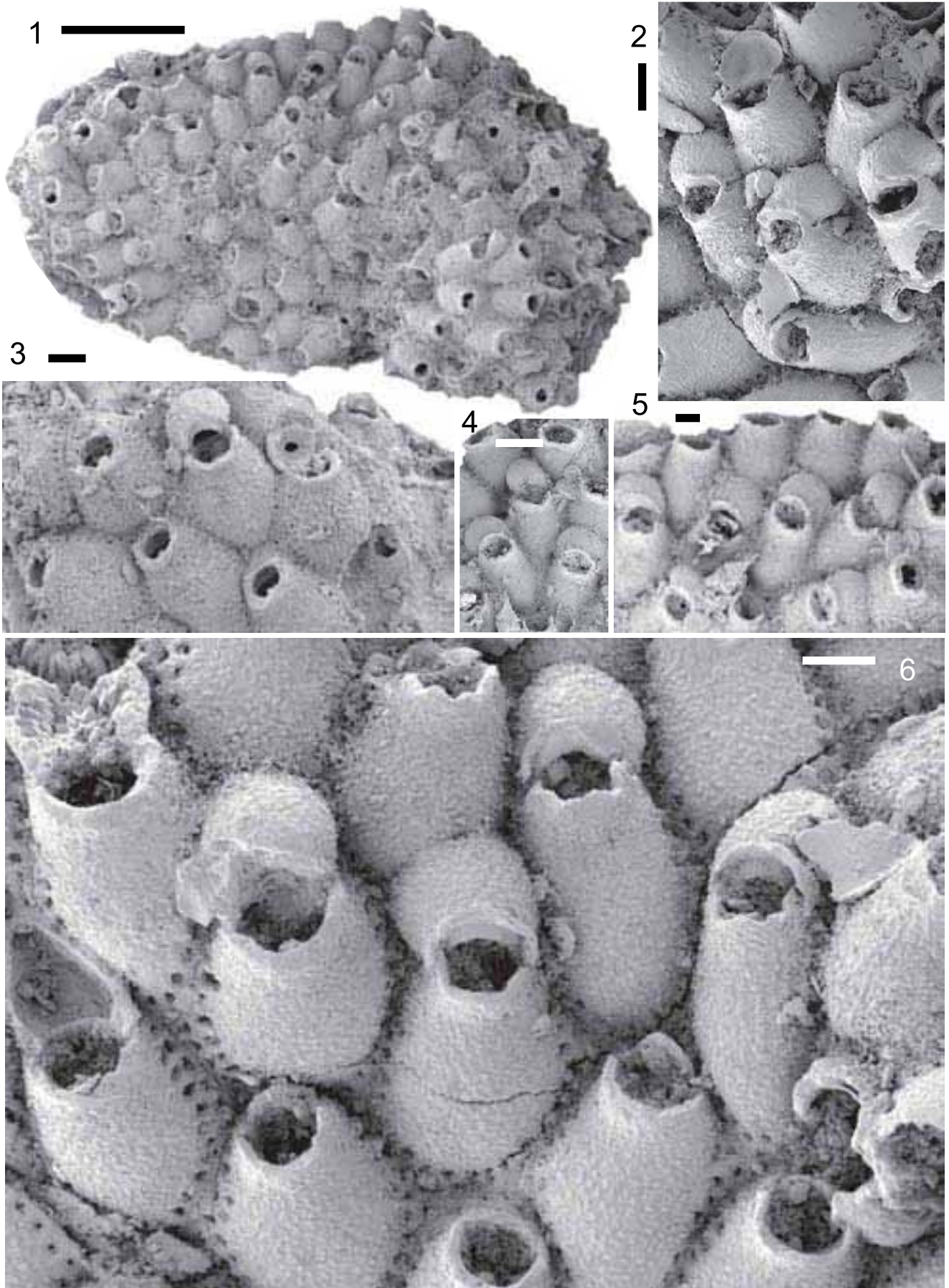


PLATE 90



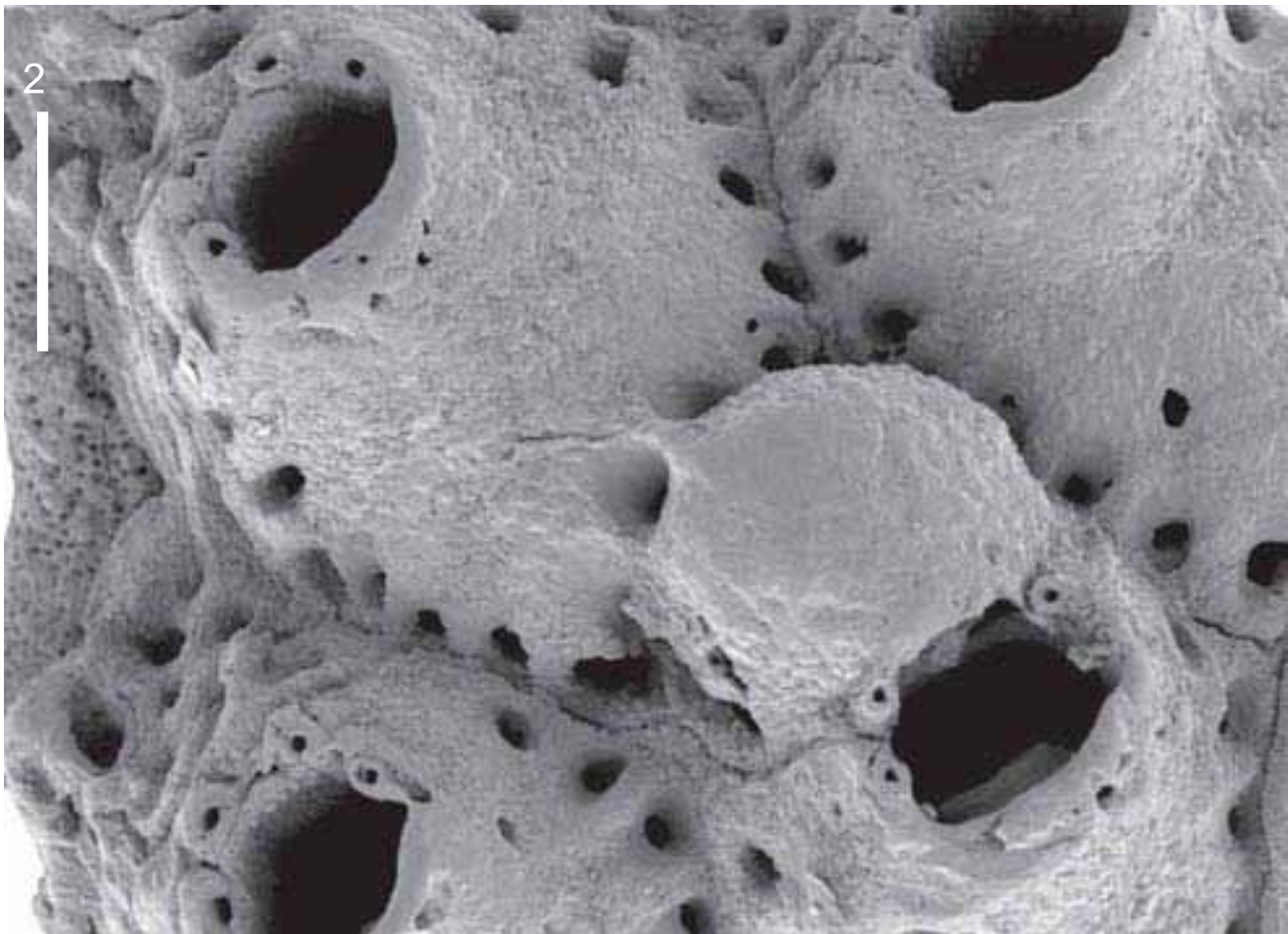
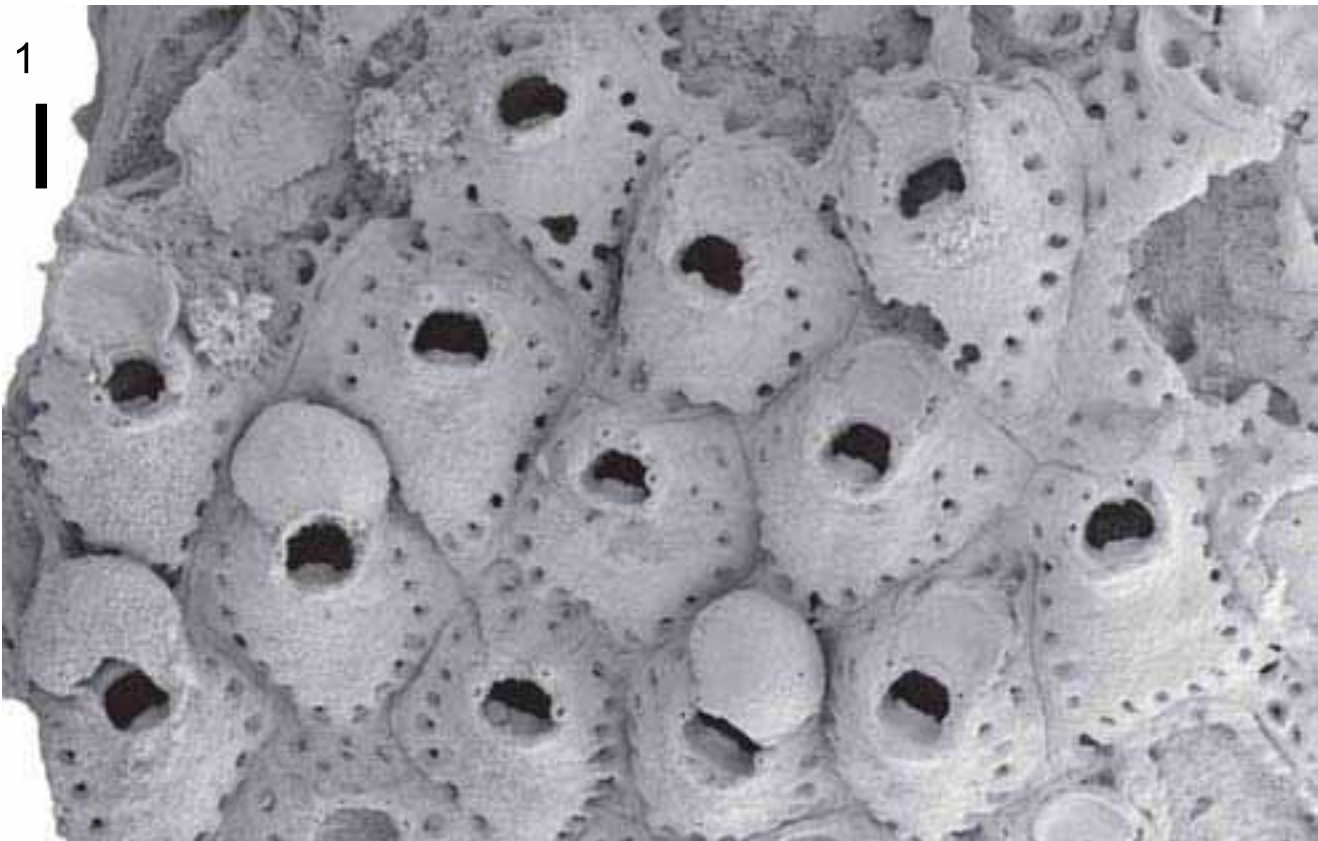
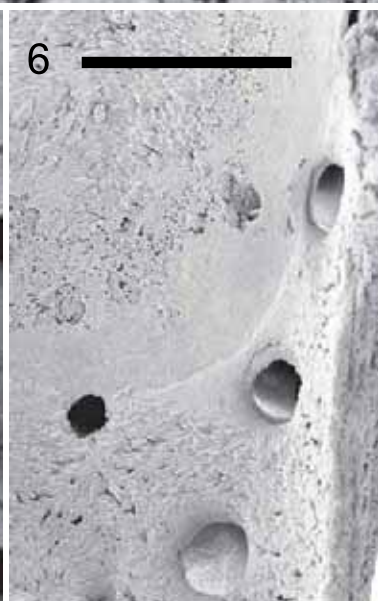
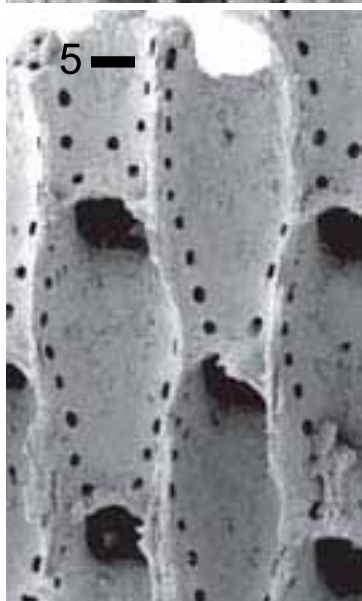
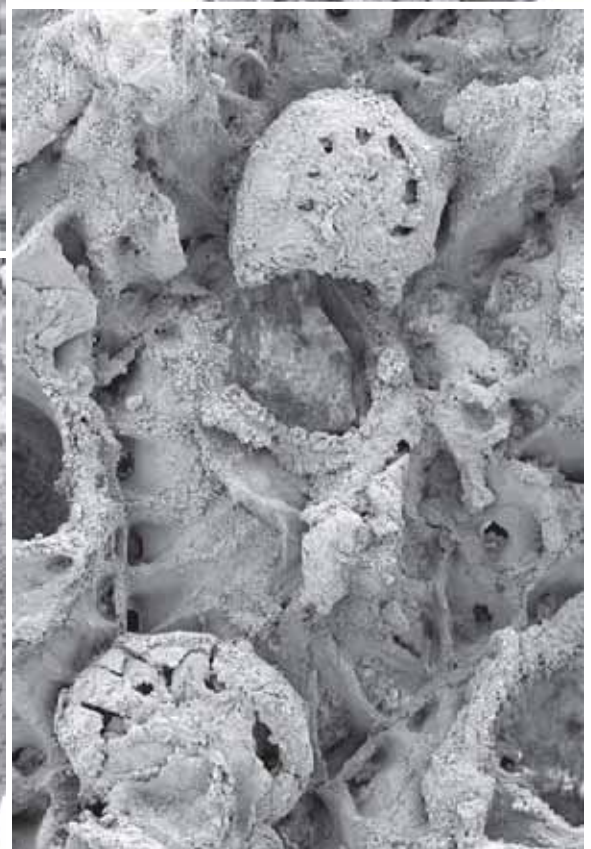
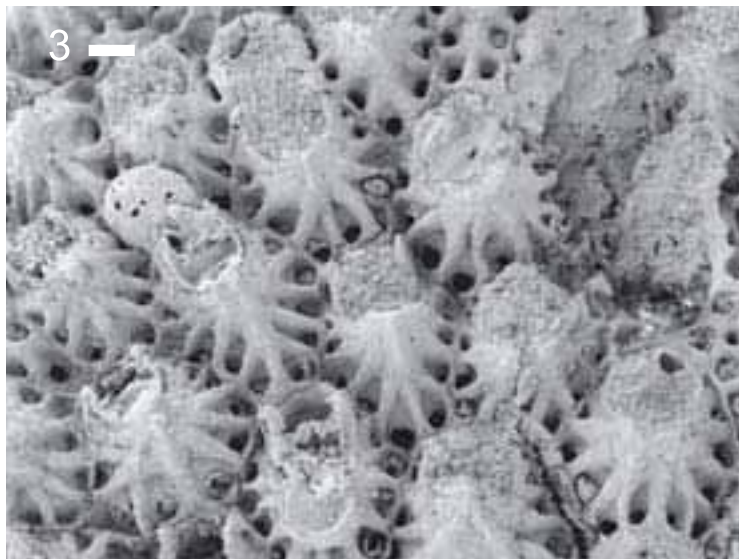
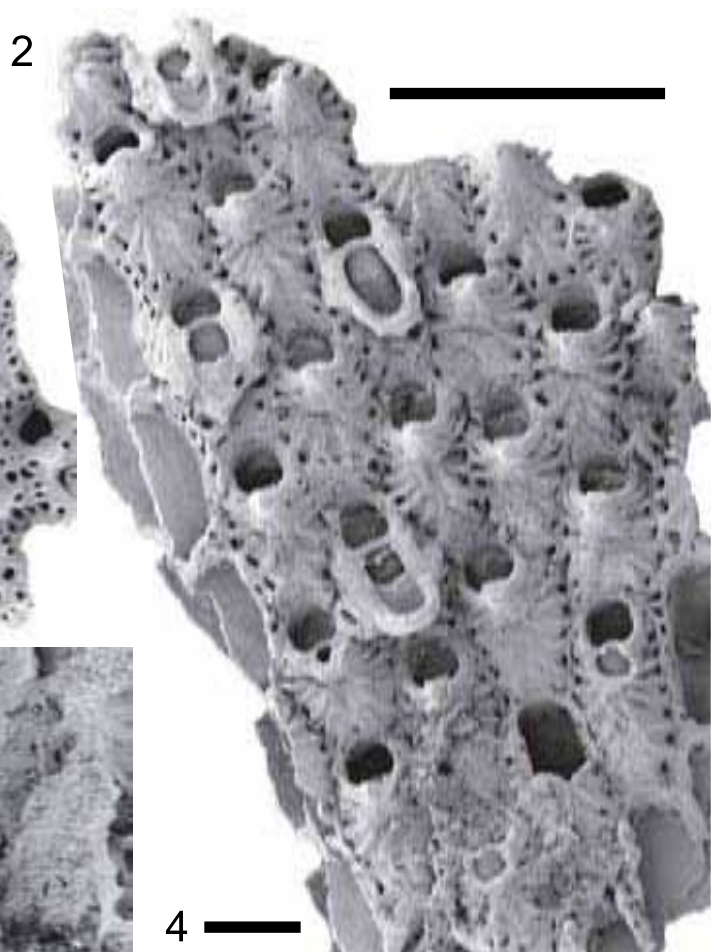
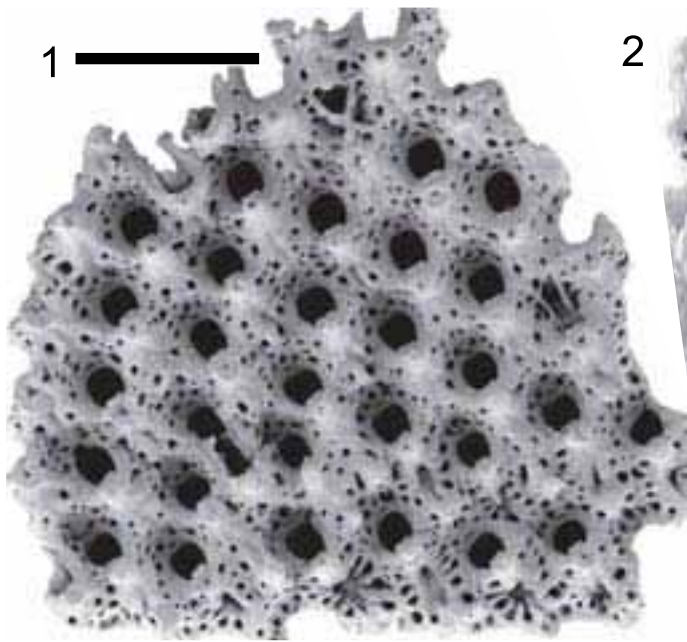


PLATE 92



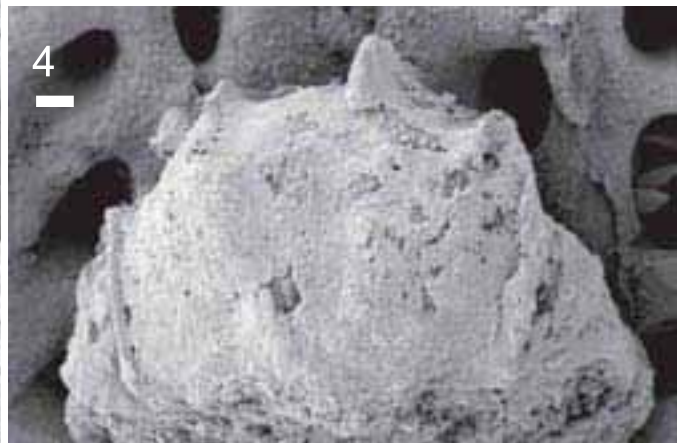
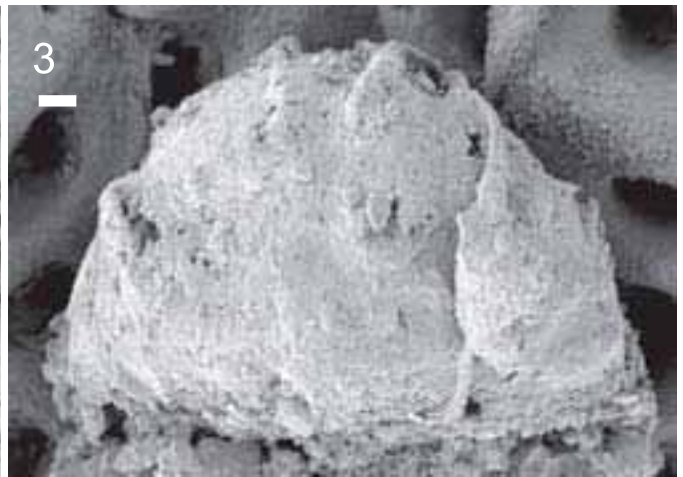
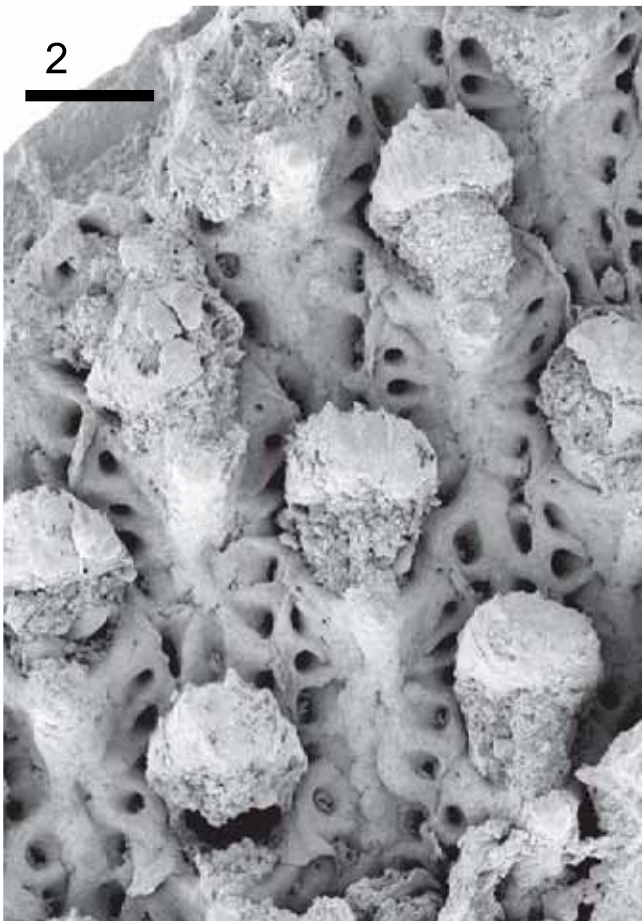
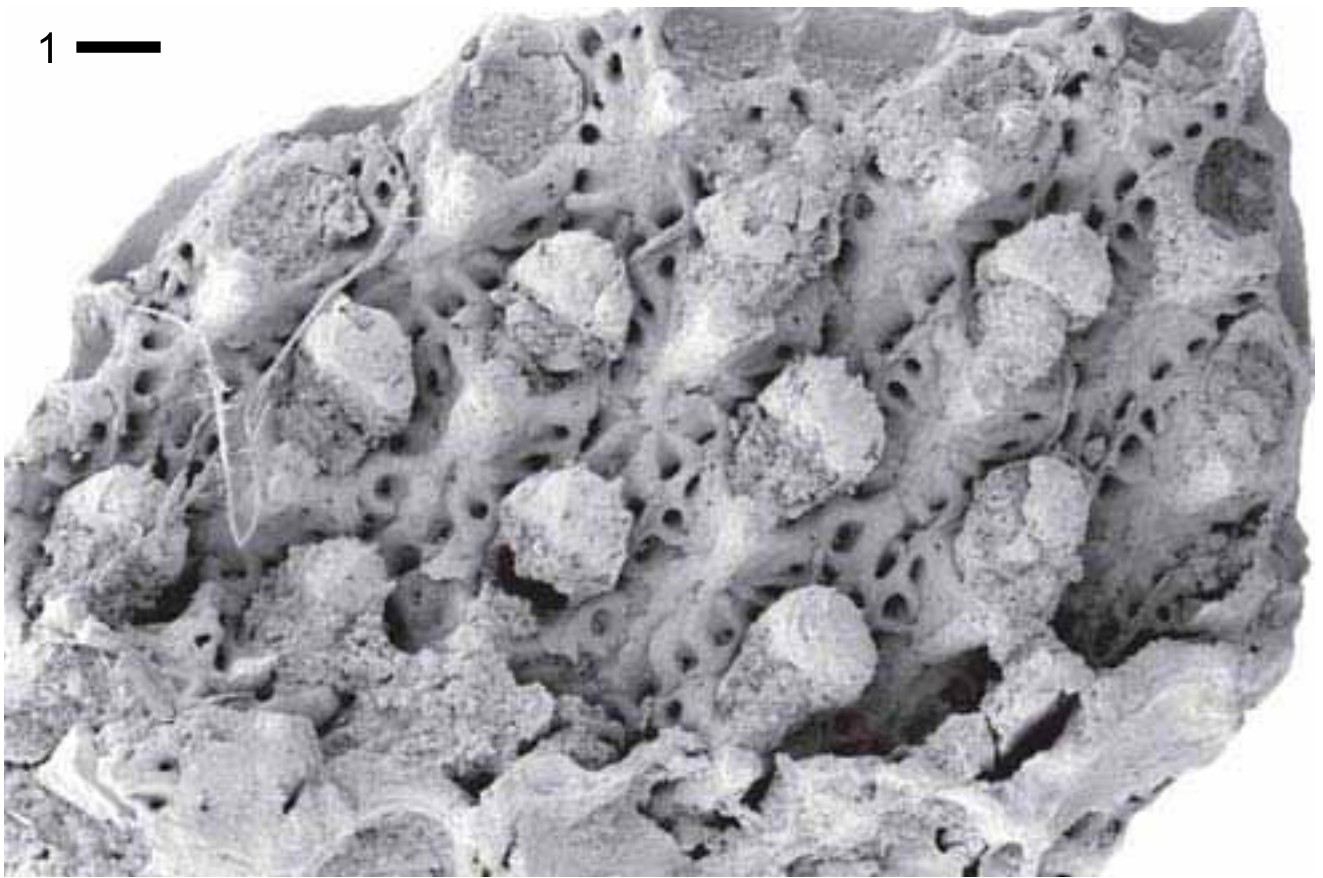
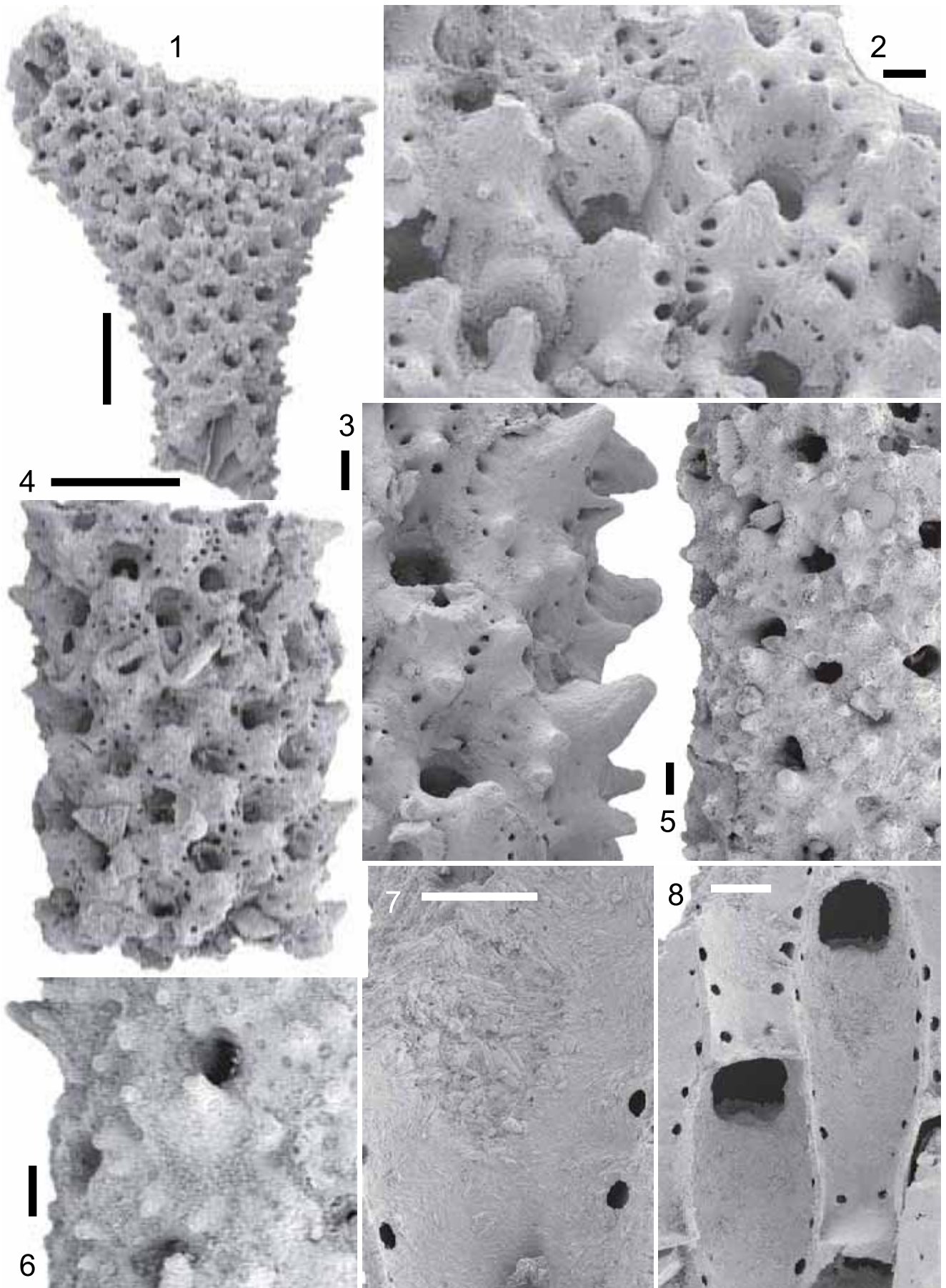
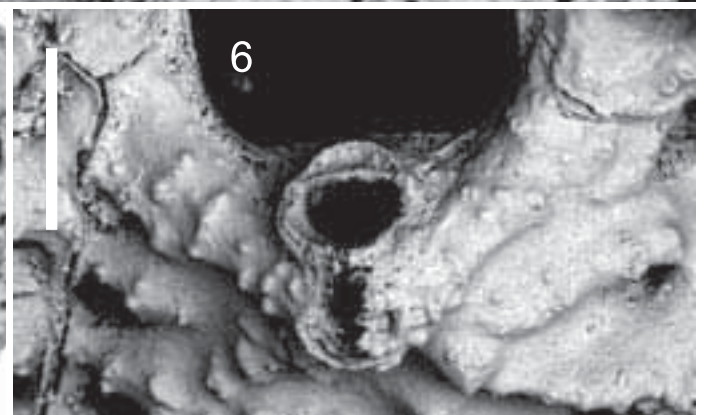
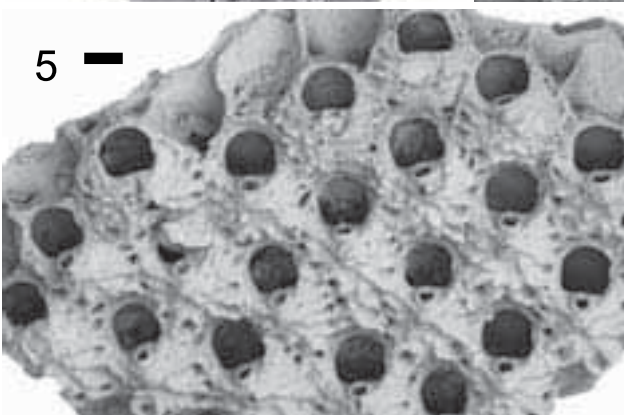
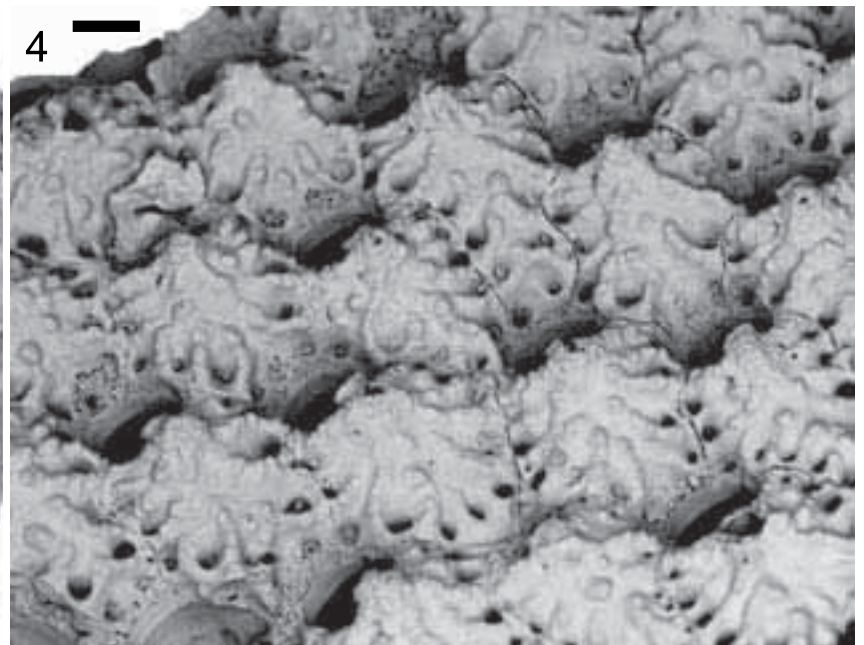
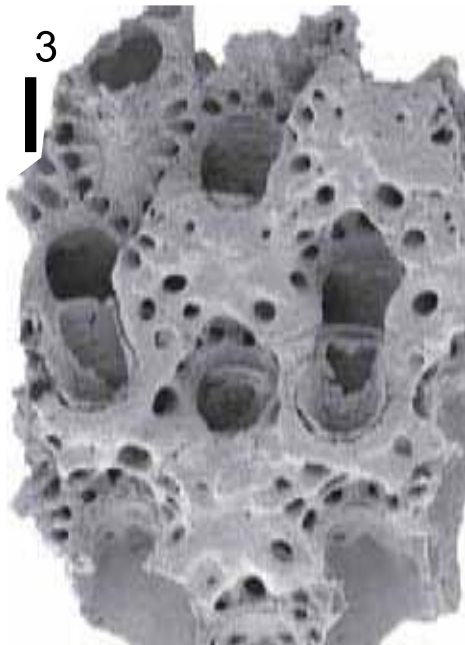
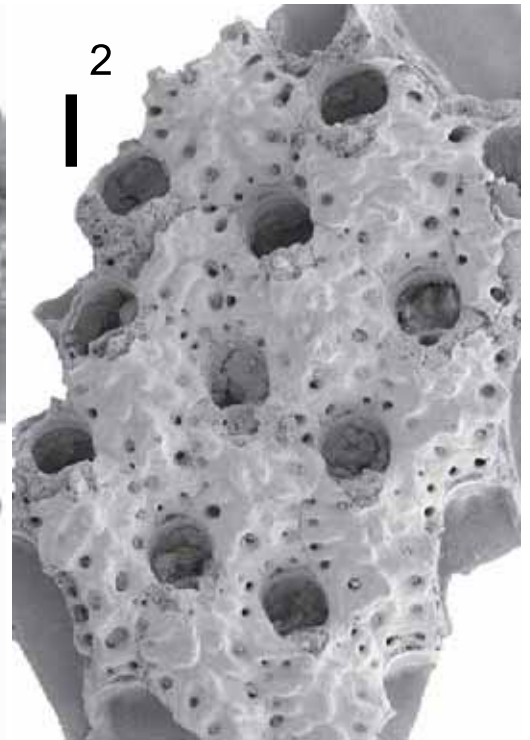
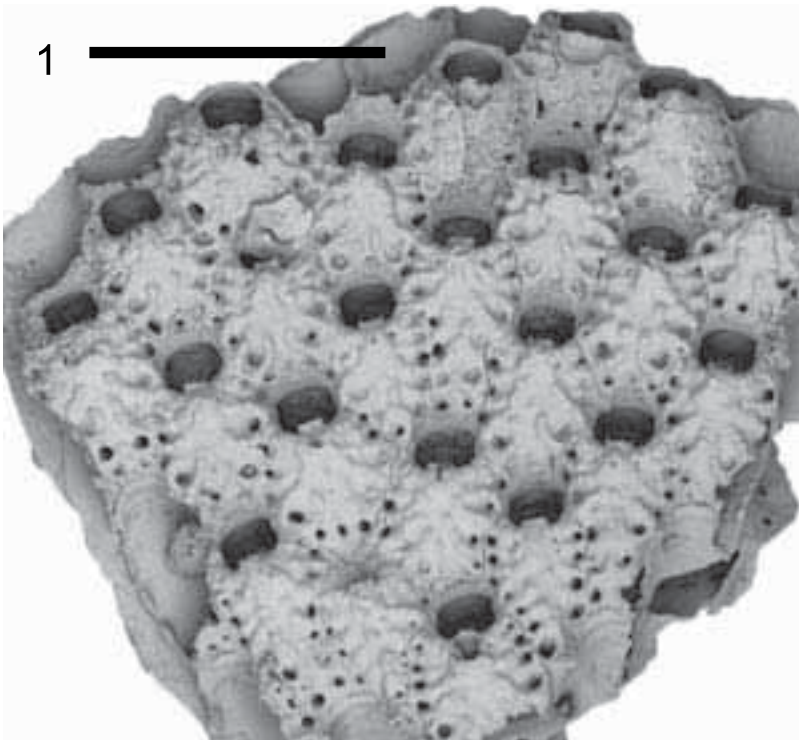
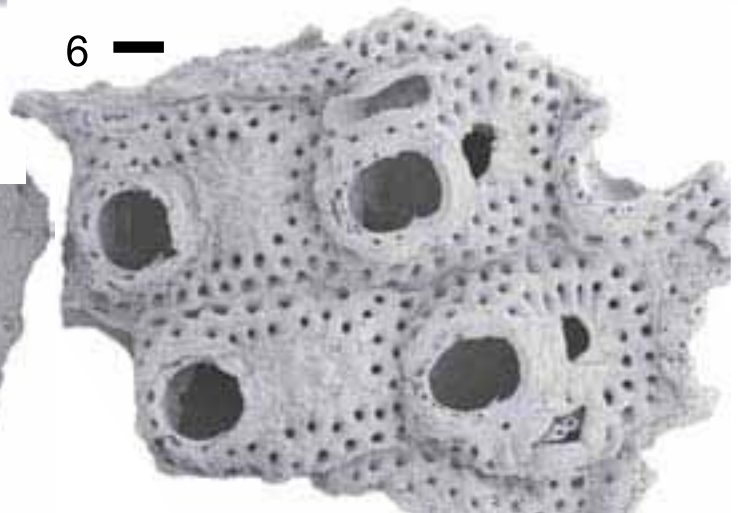
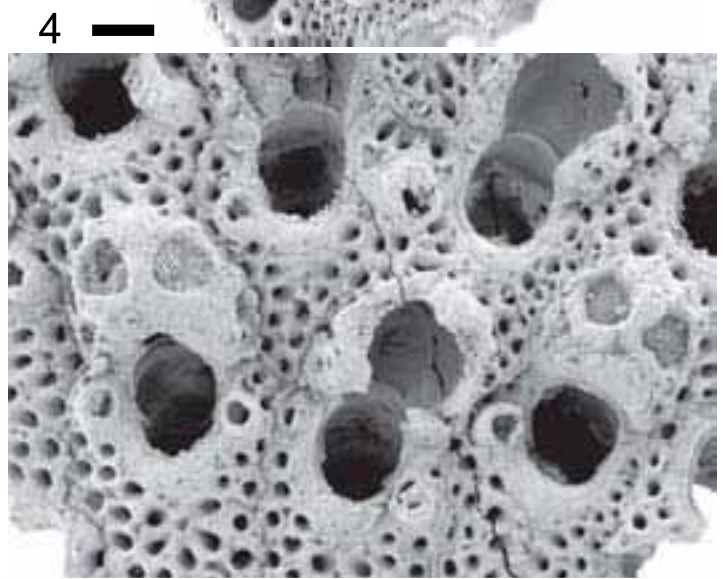
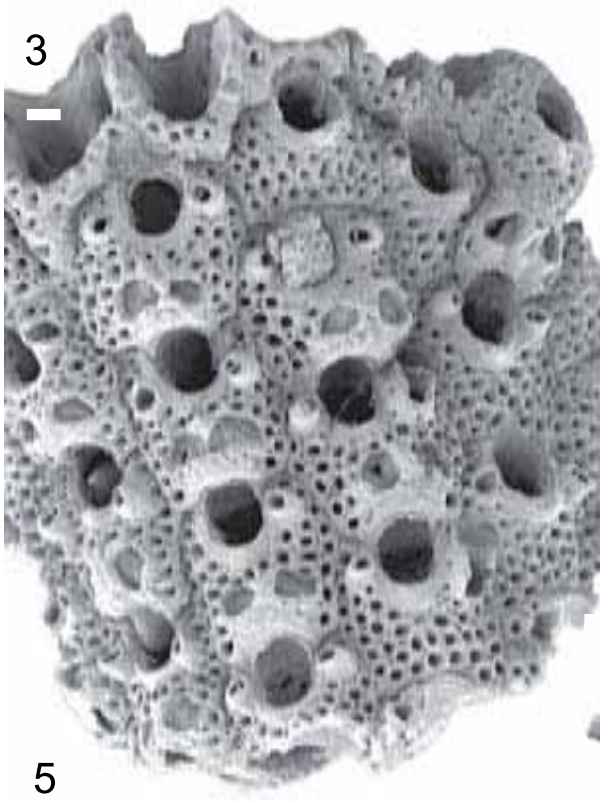
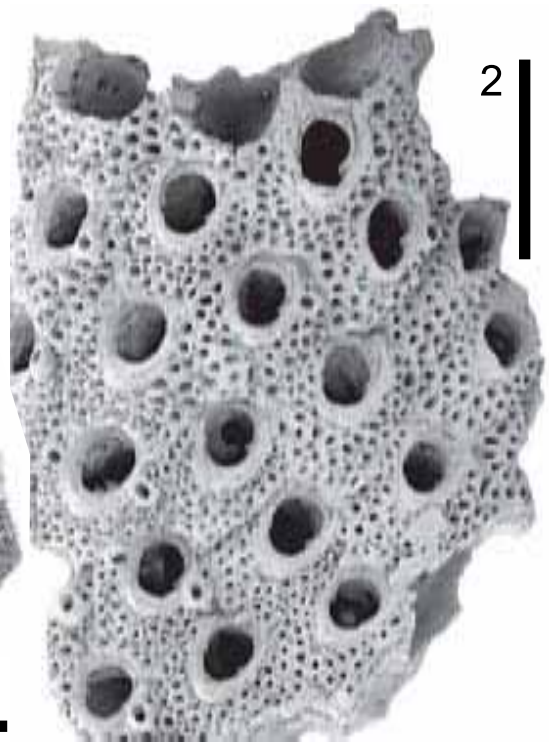
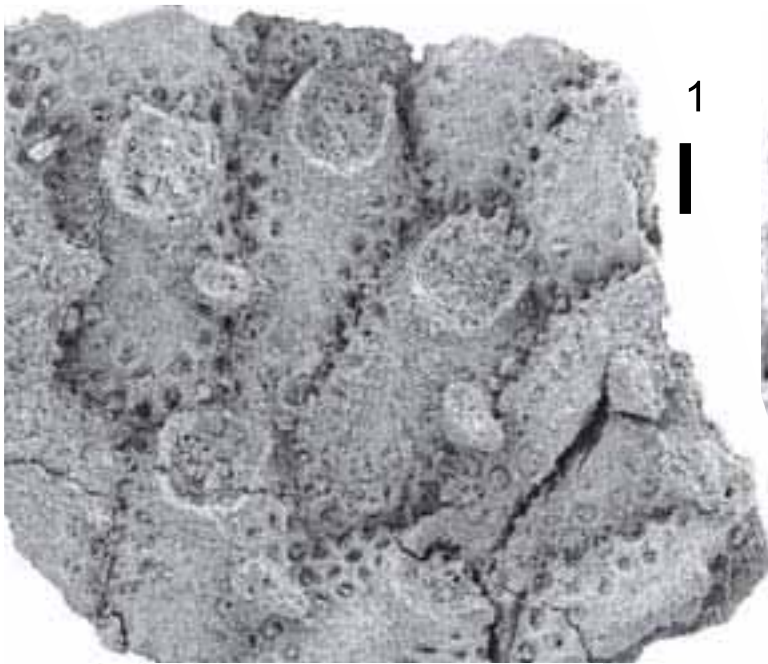


PLATE 94







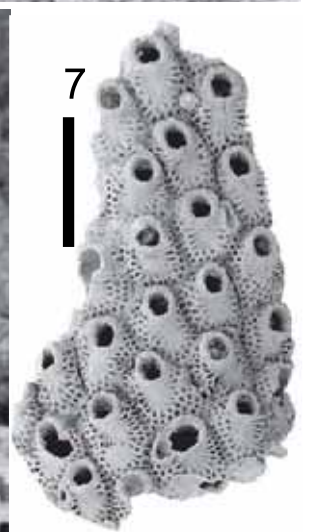
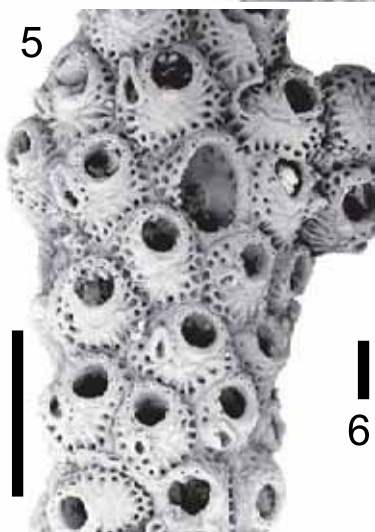
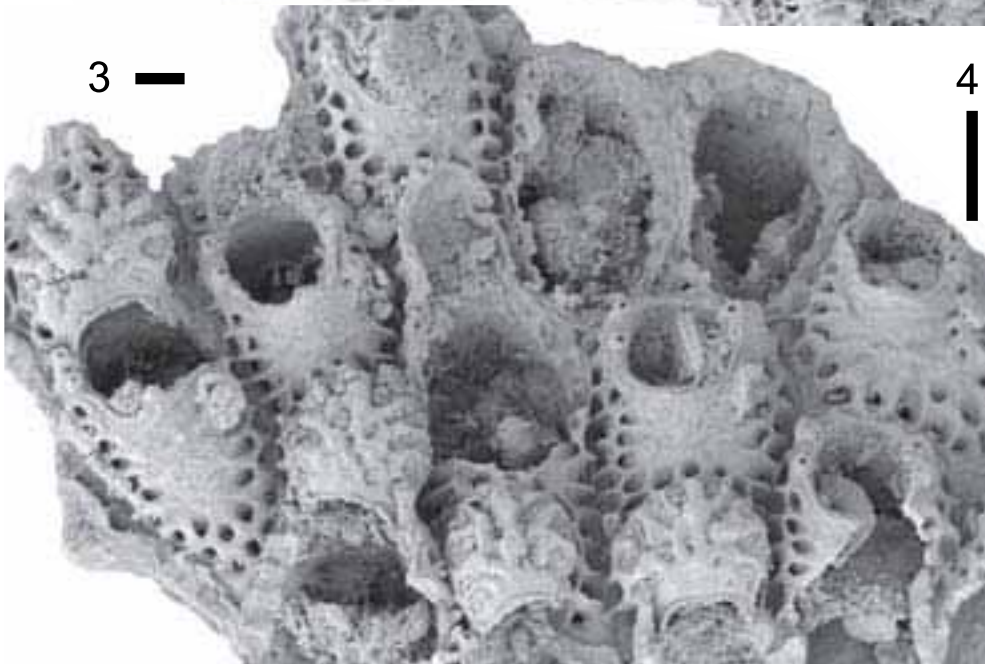
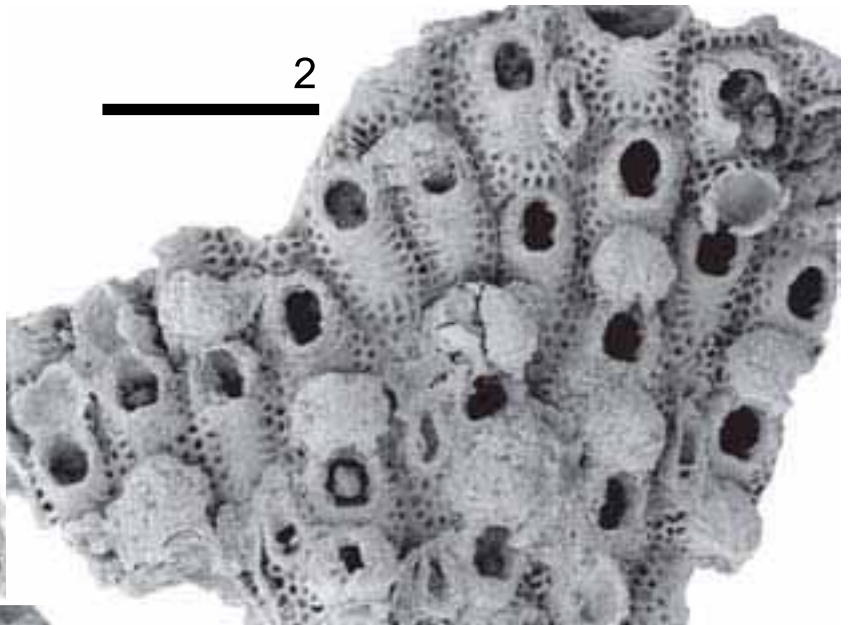
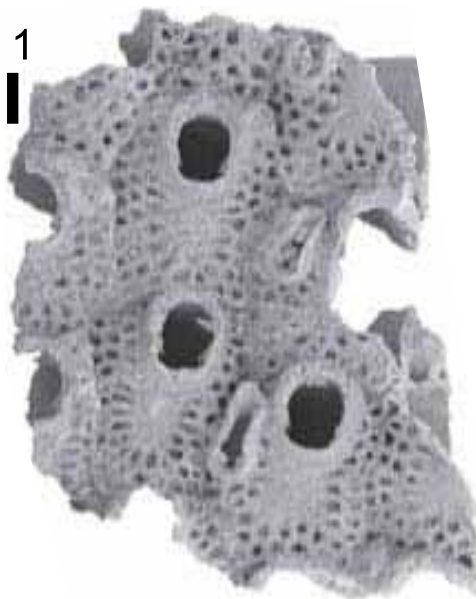
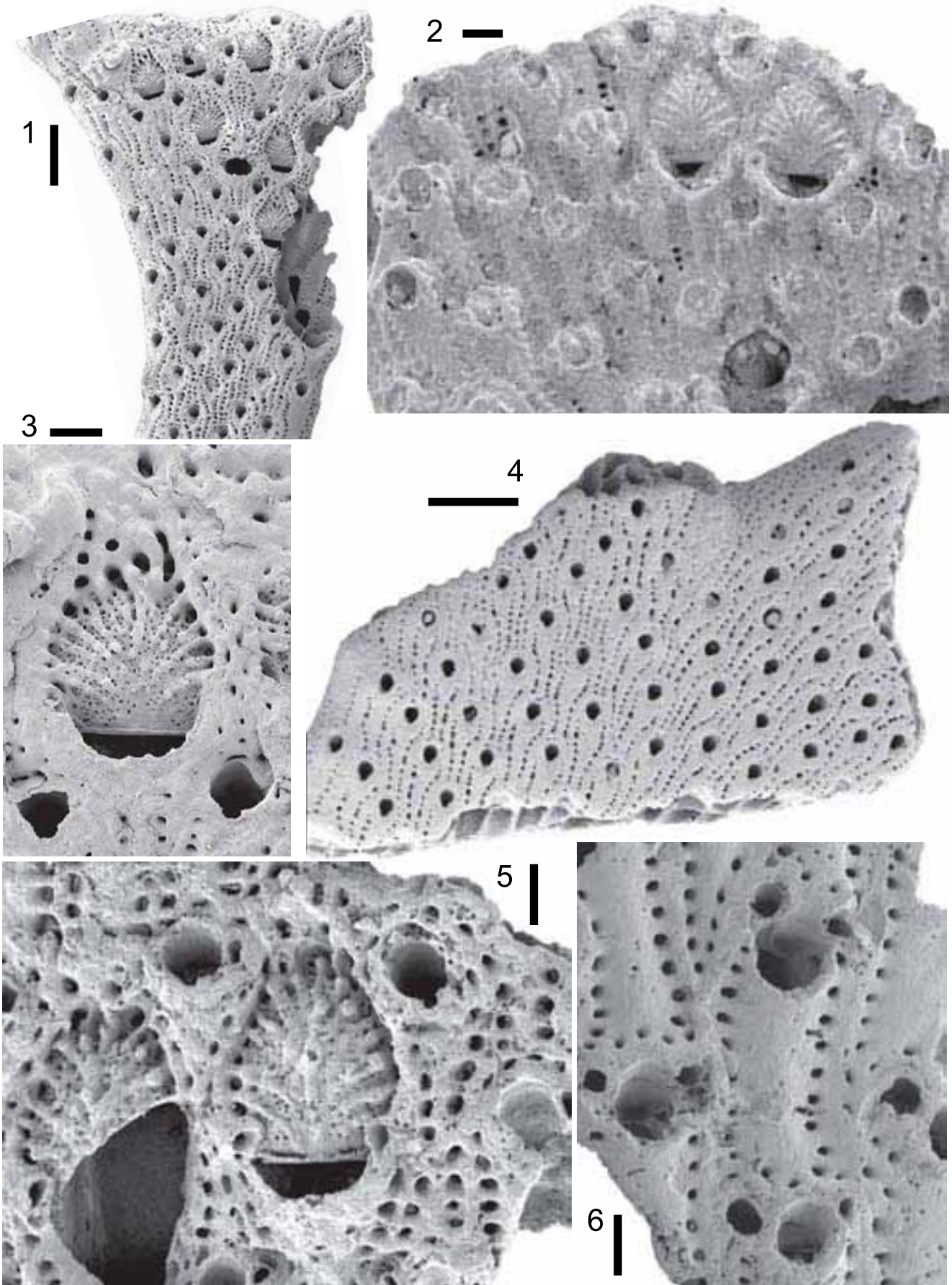


PLATE 98



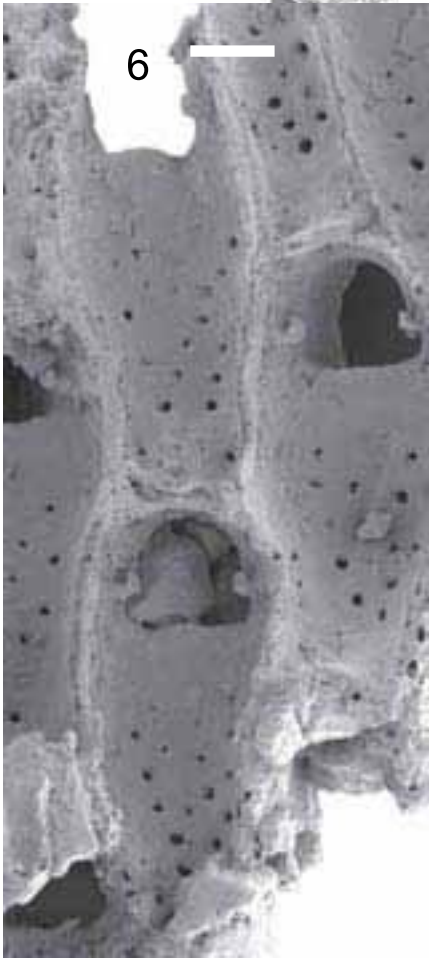
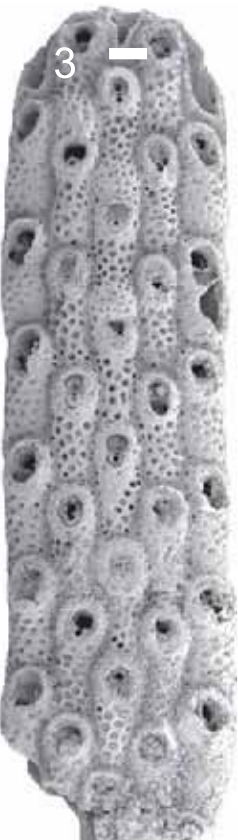
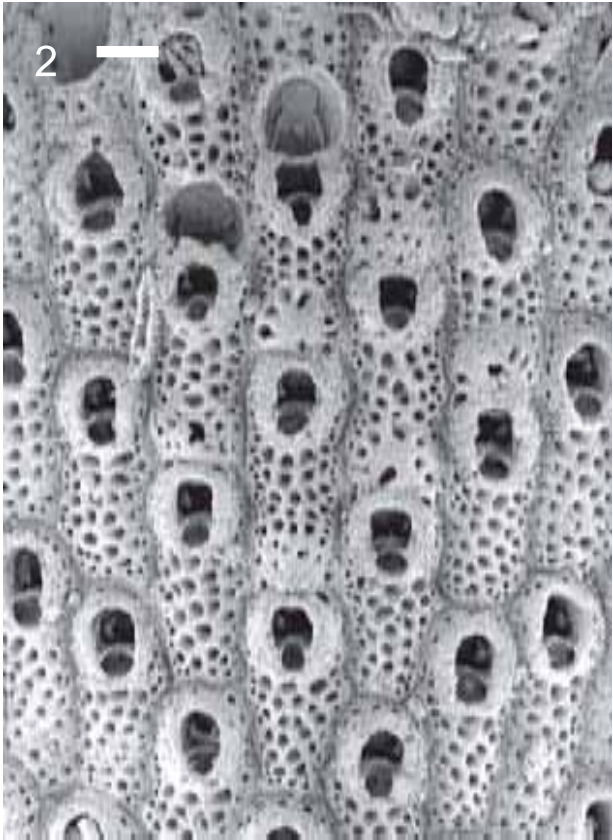
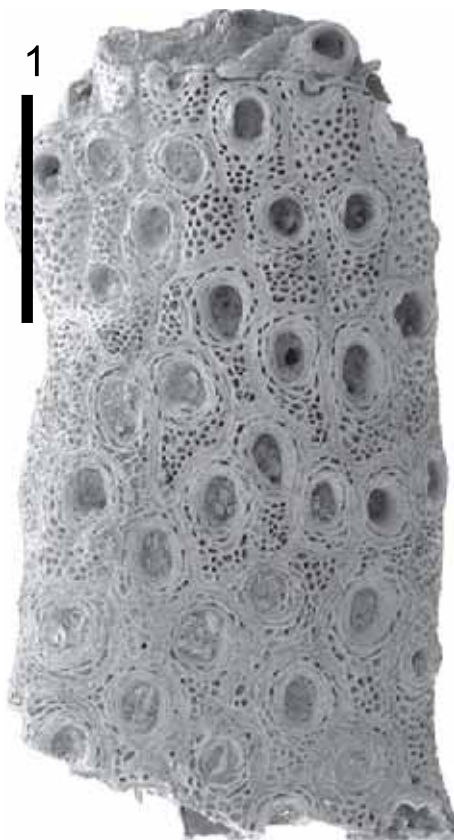
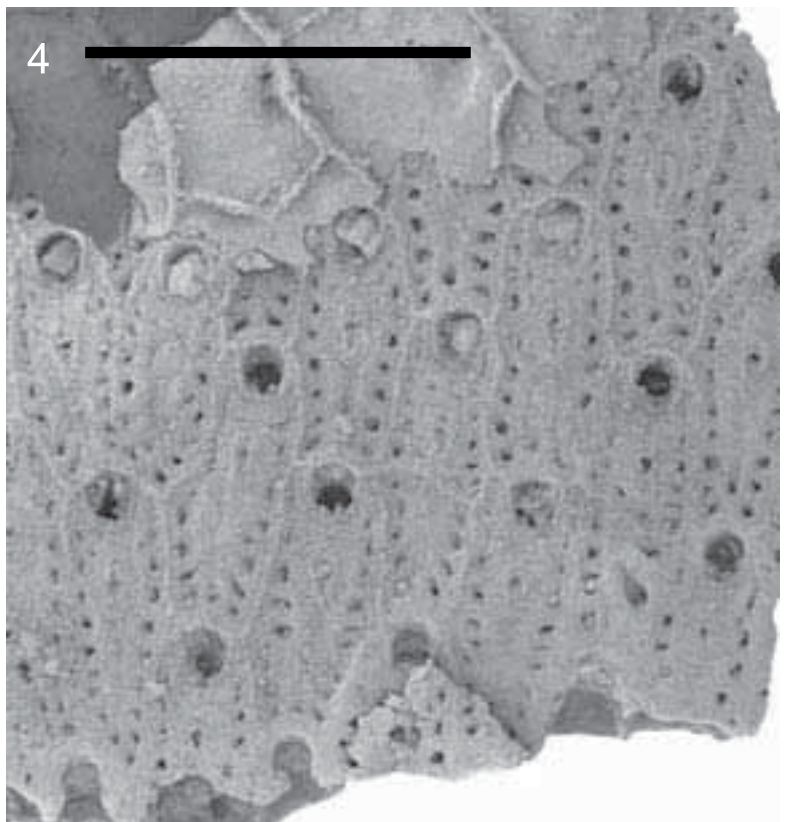
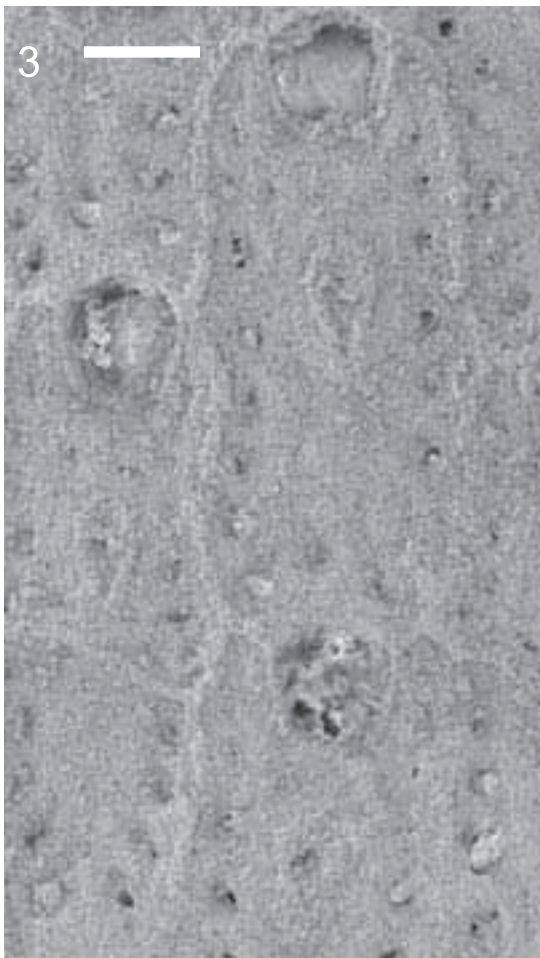
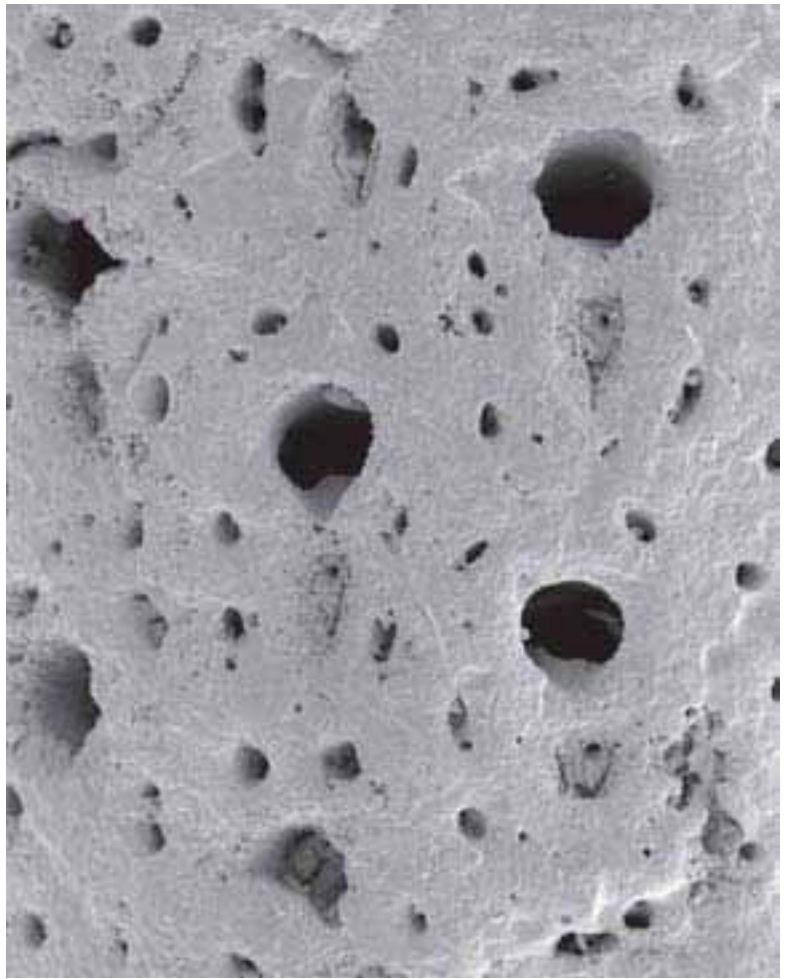
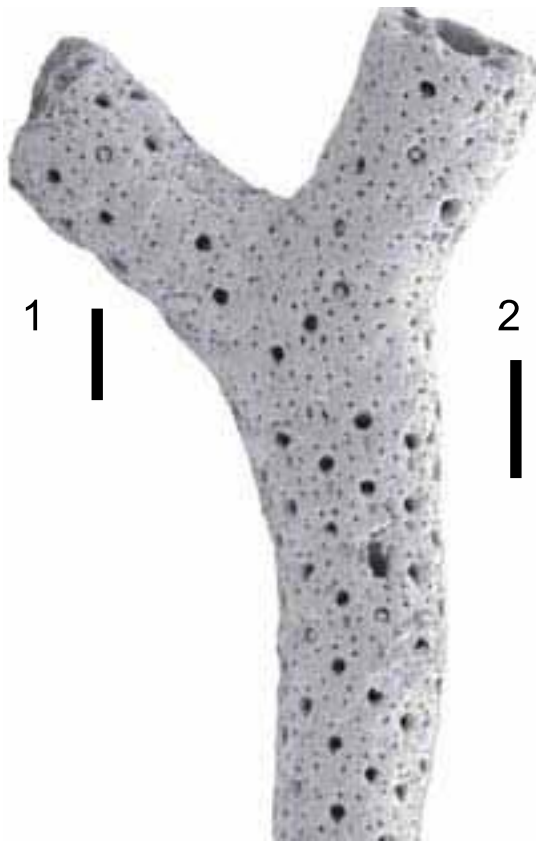


PLATE 100



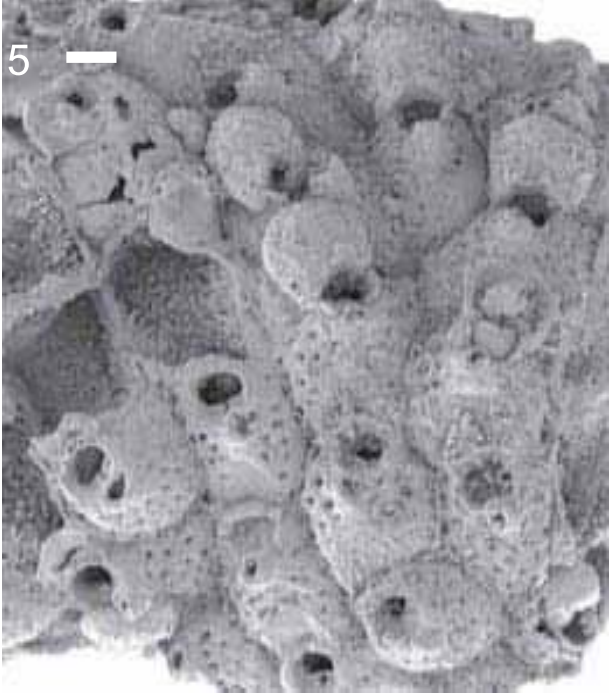
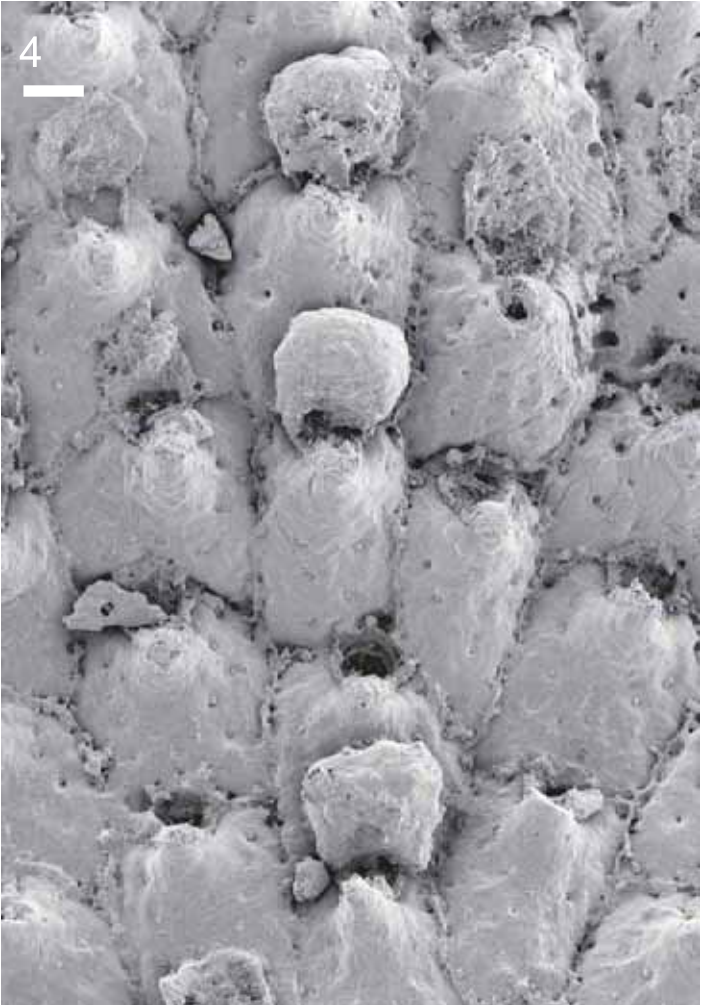
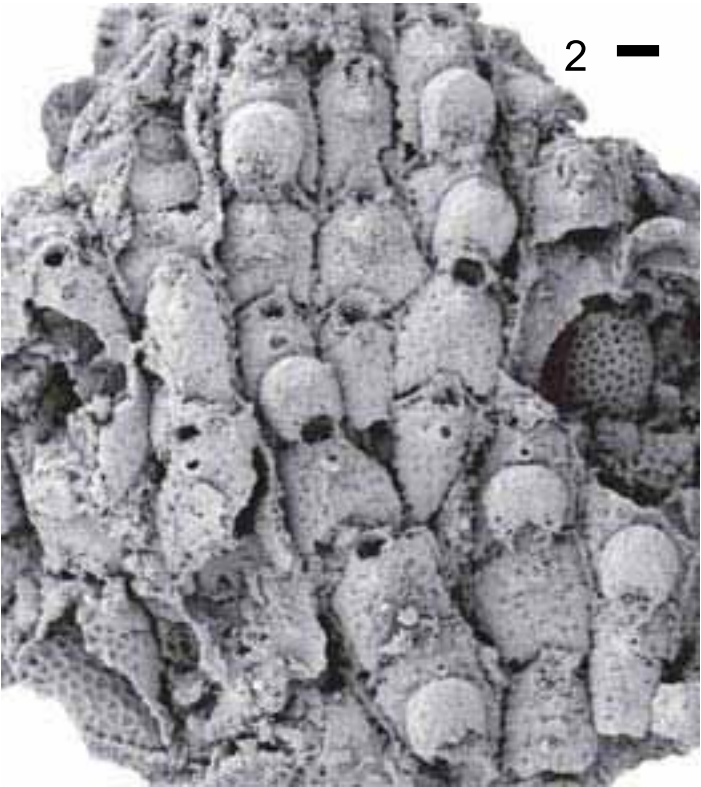
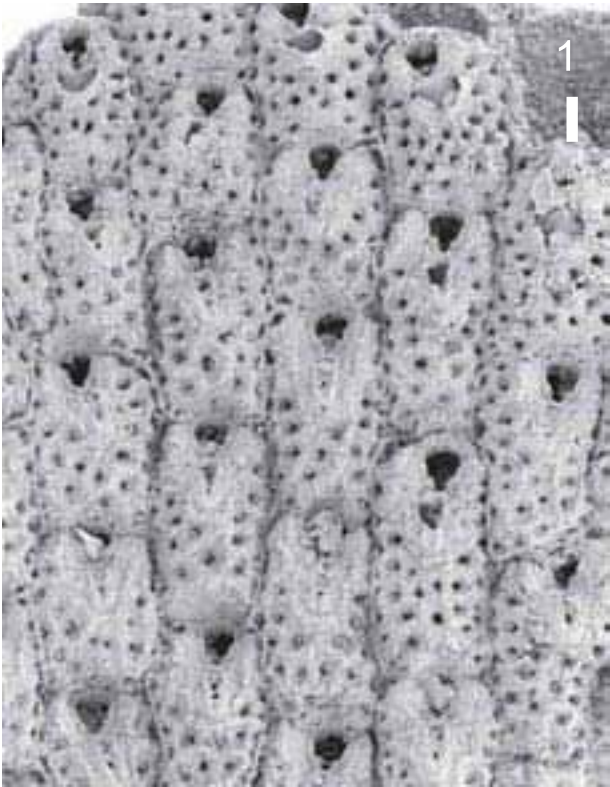
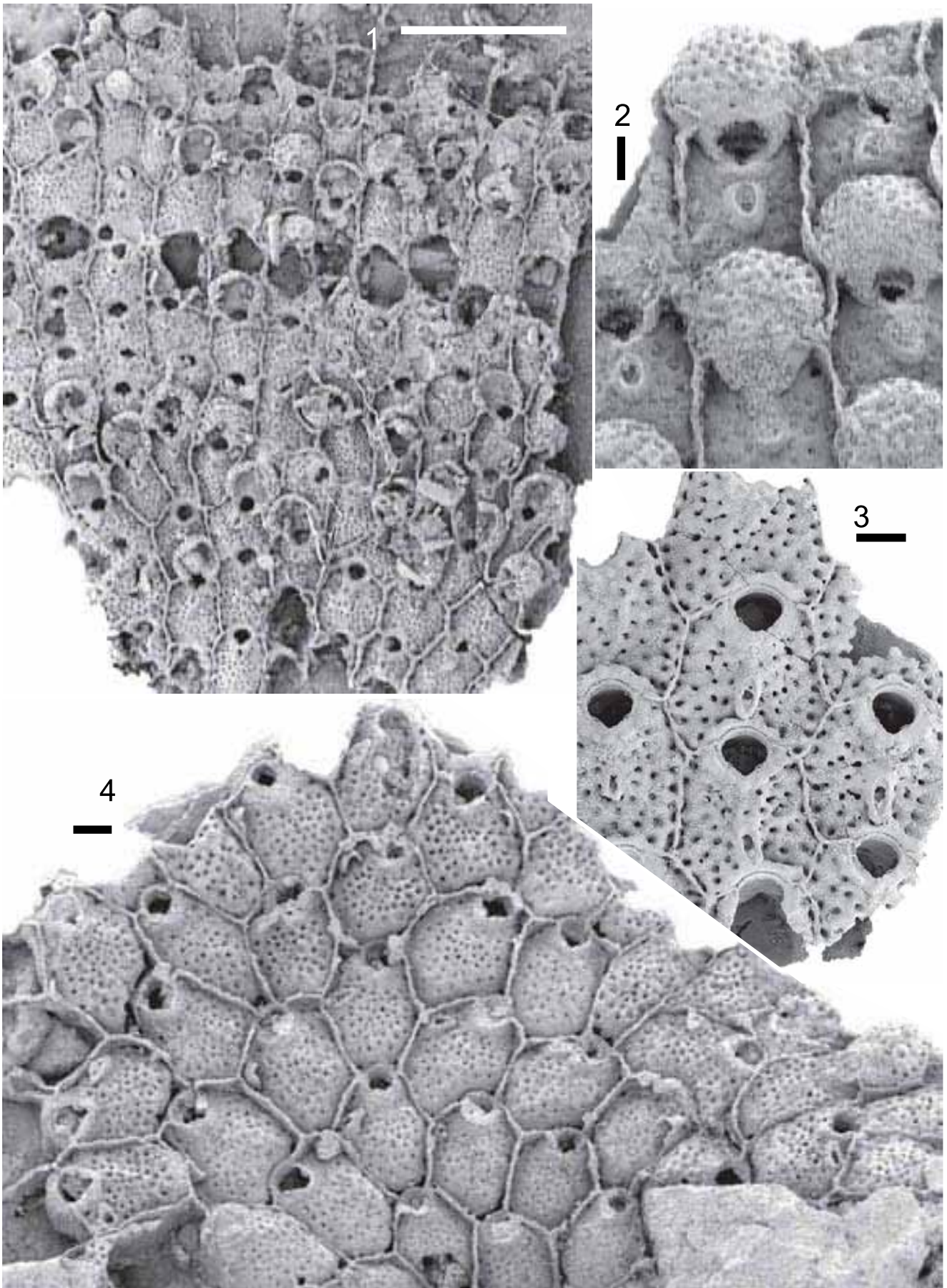


PLATE 102



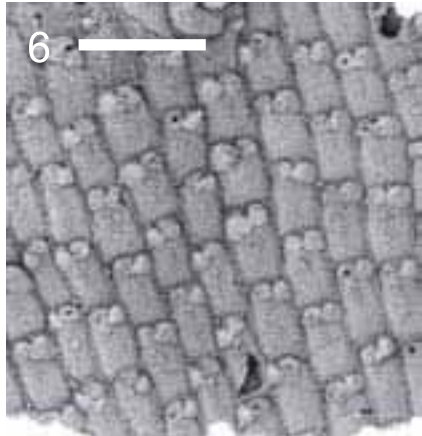
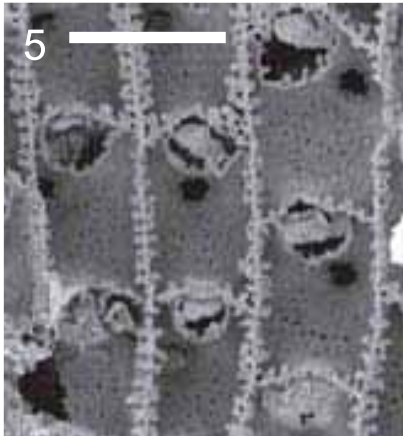
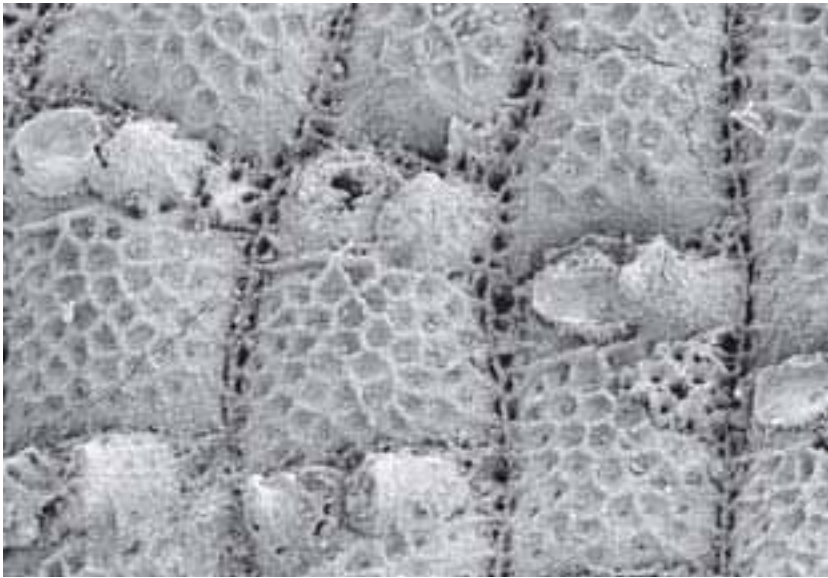
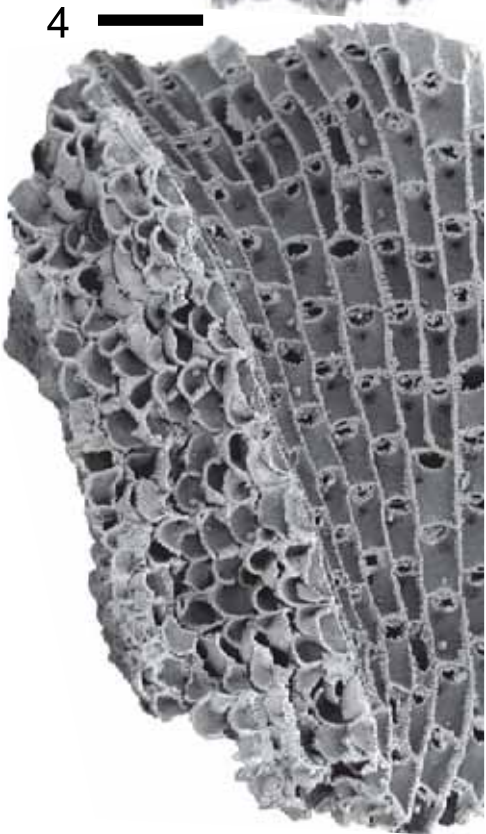
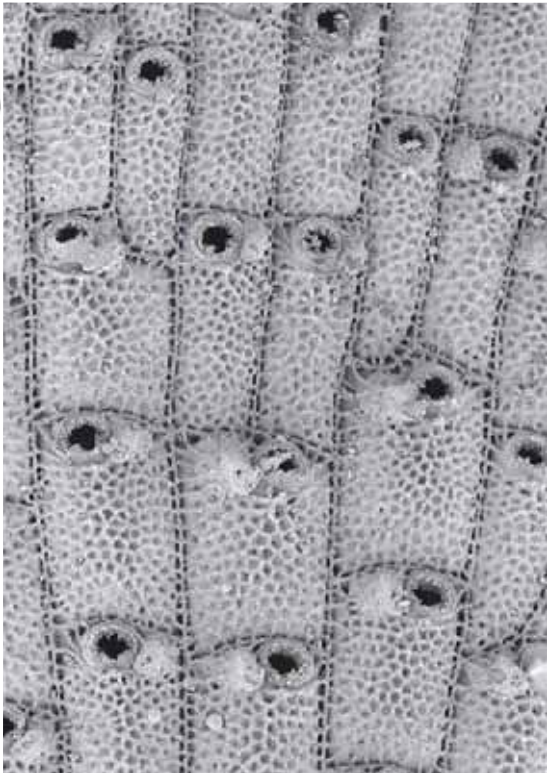
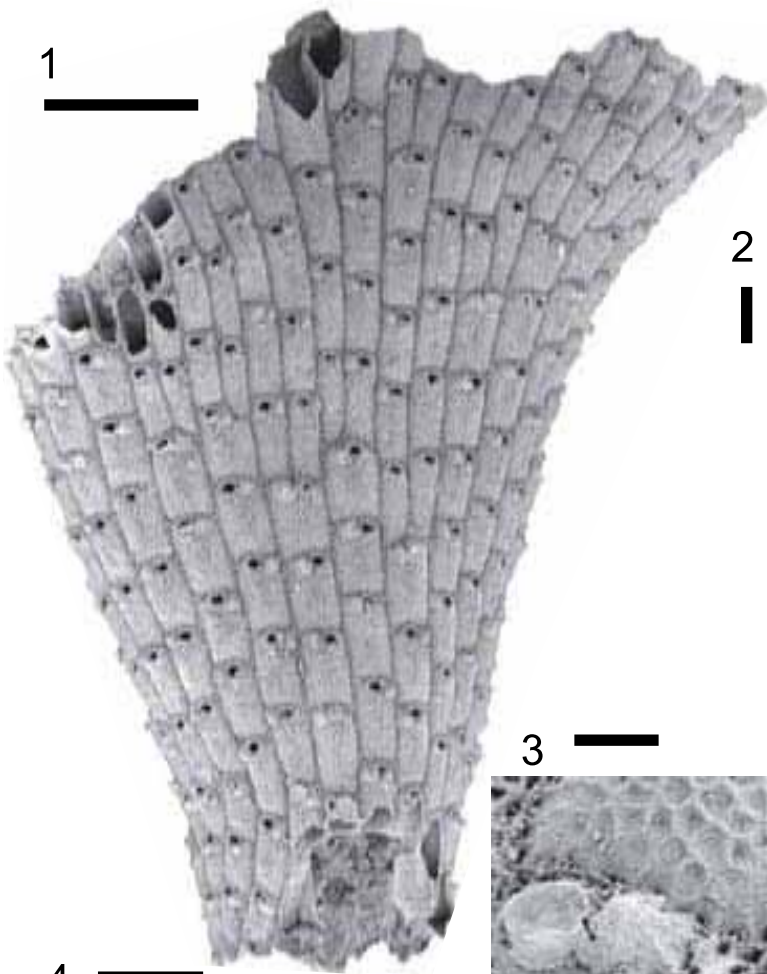
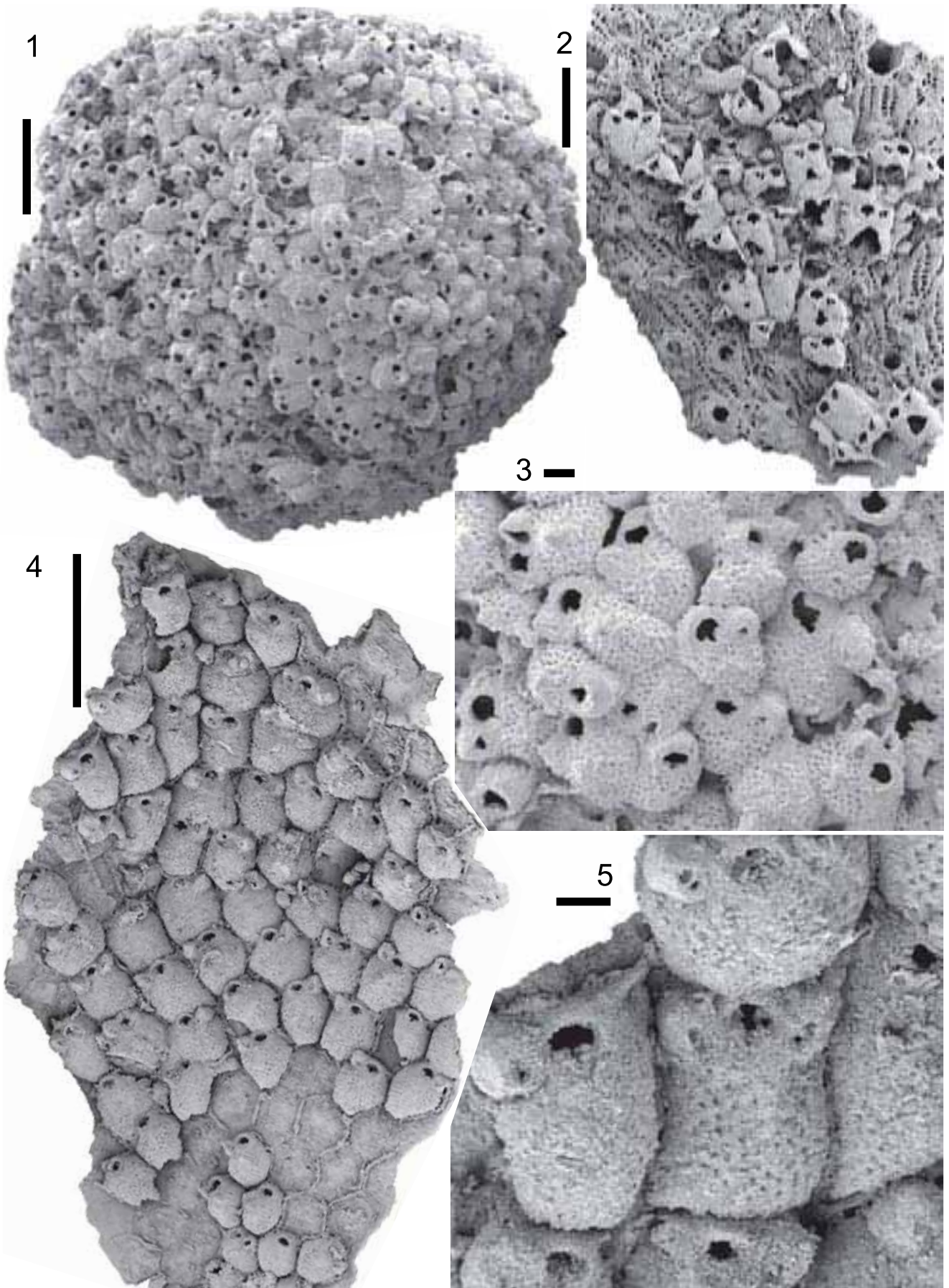
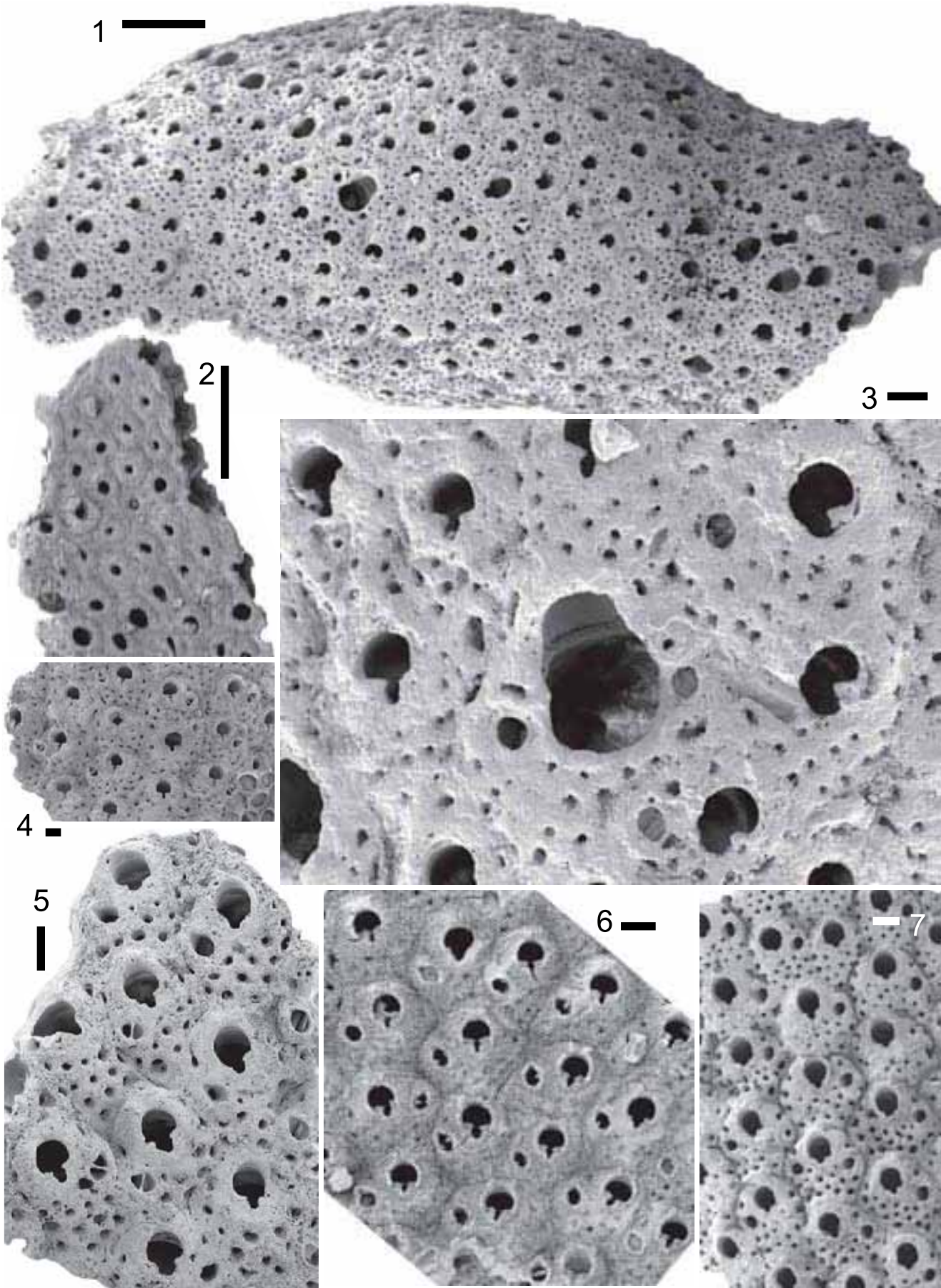
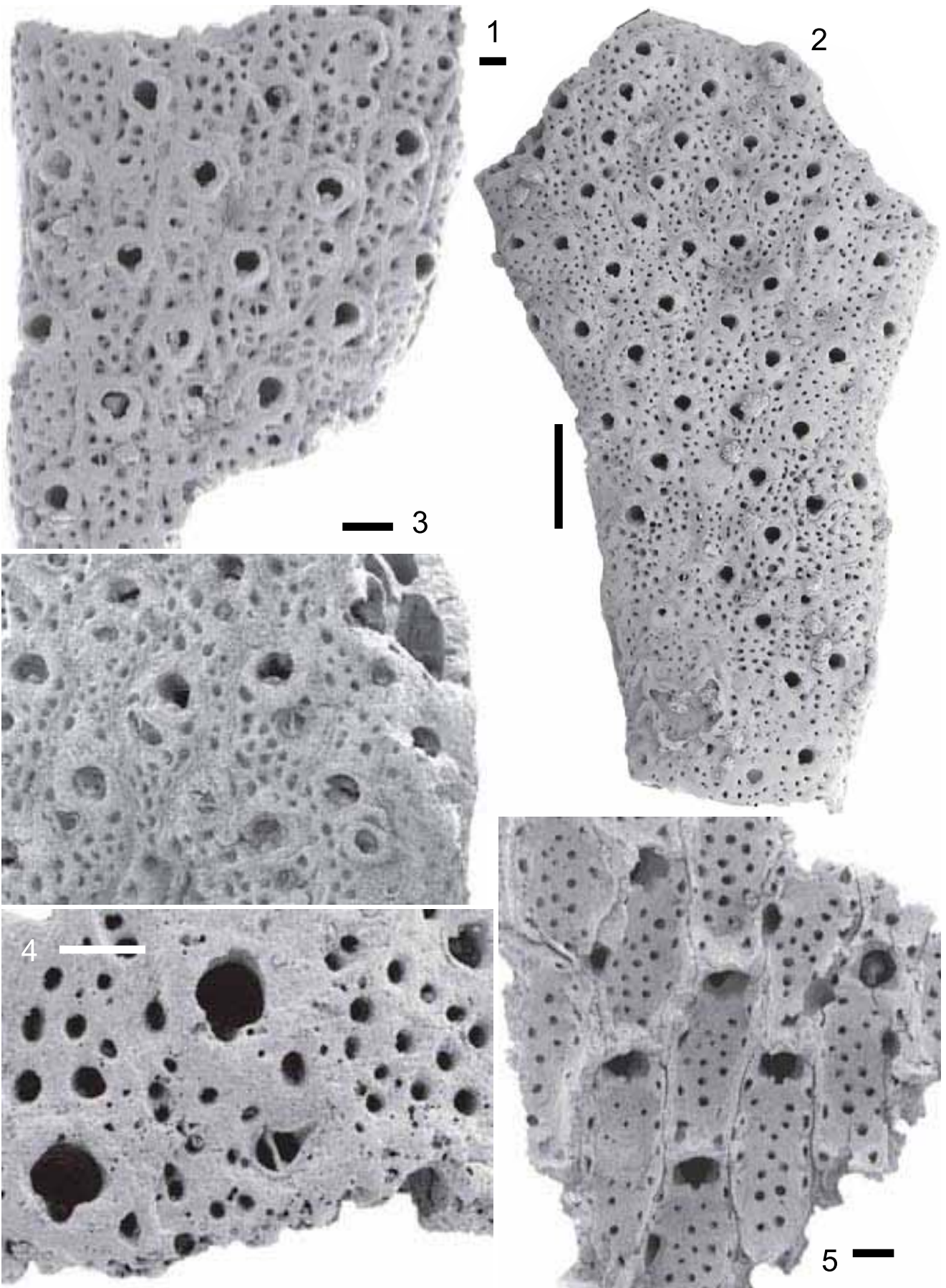


PLATE 104







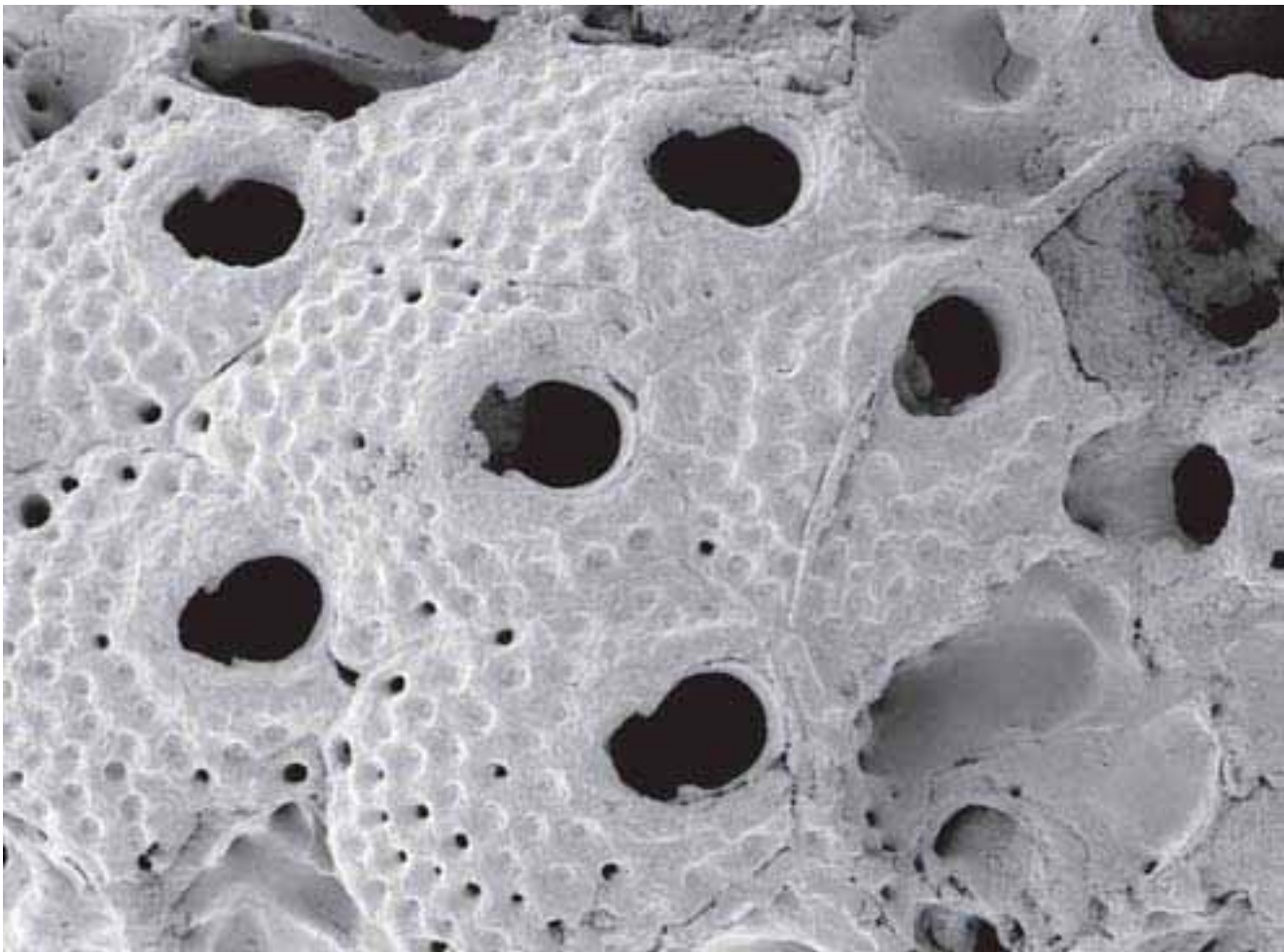
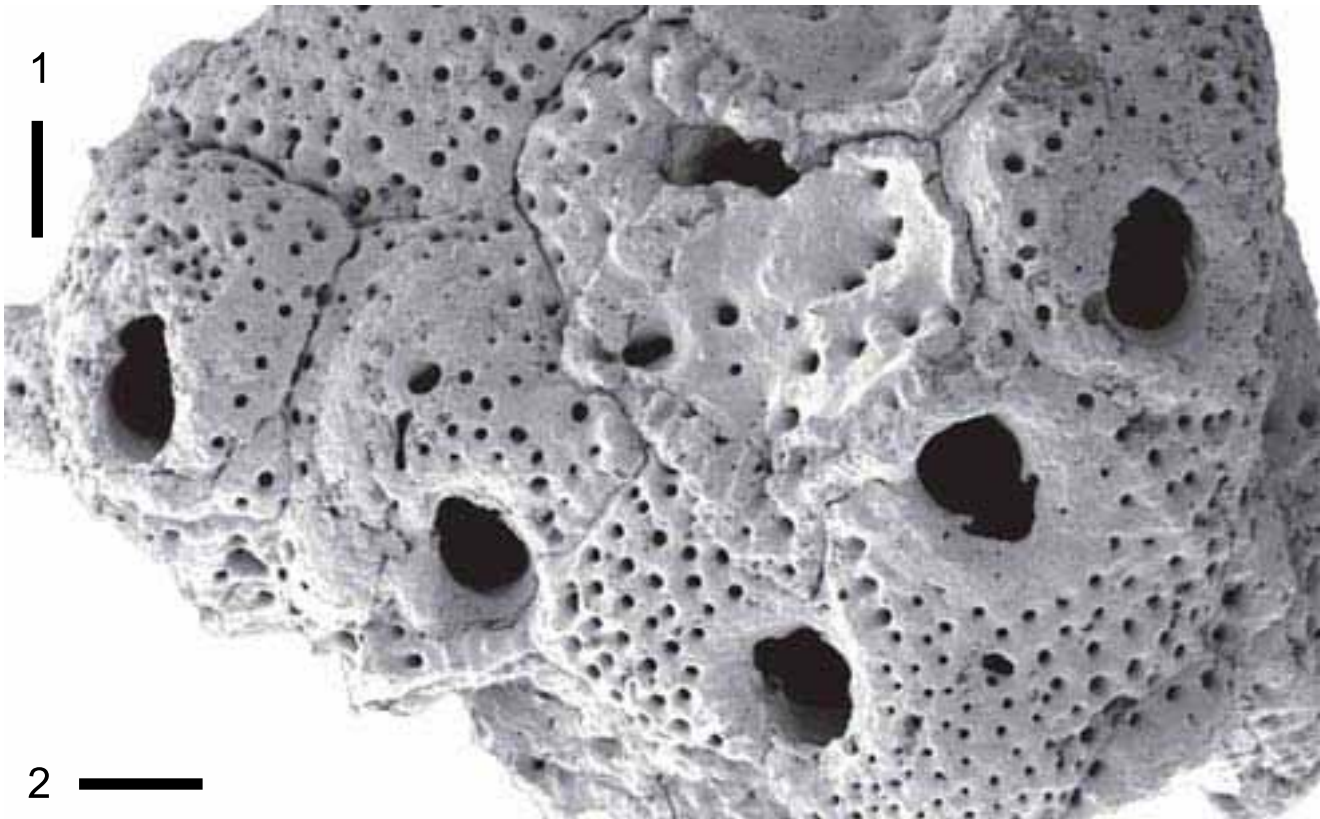
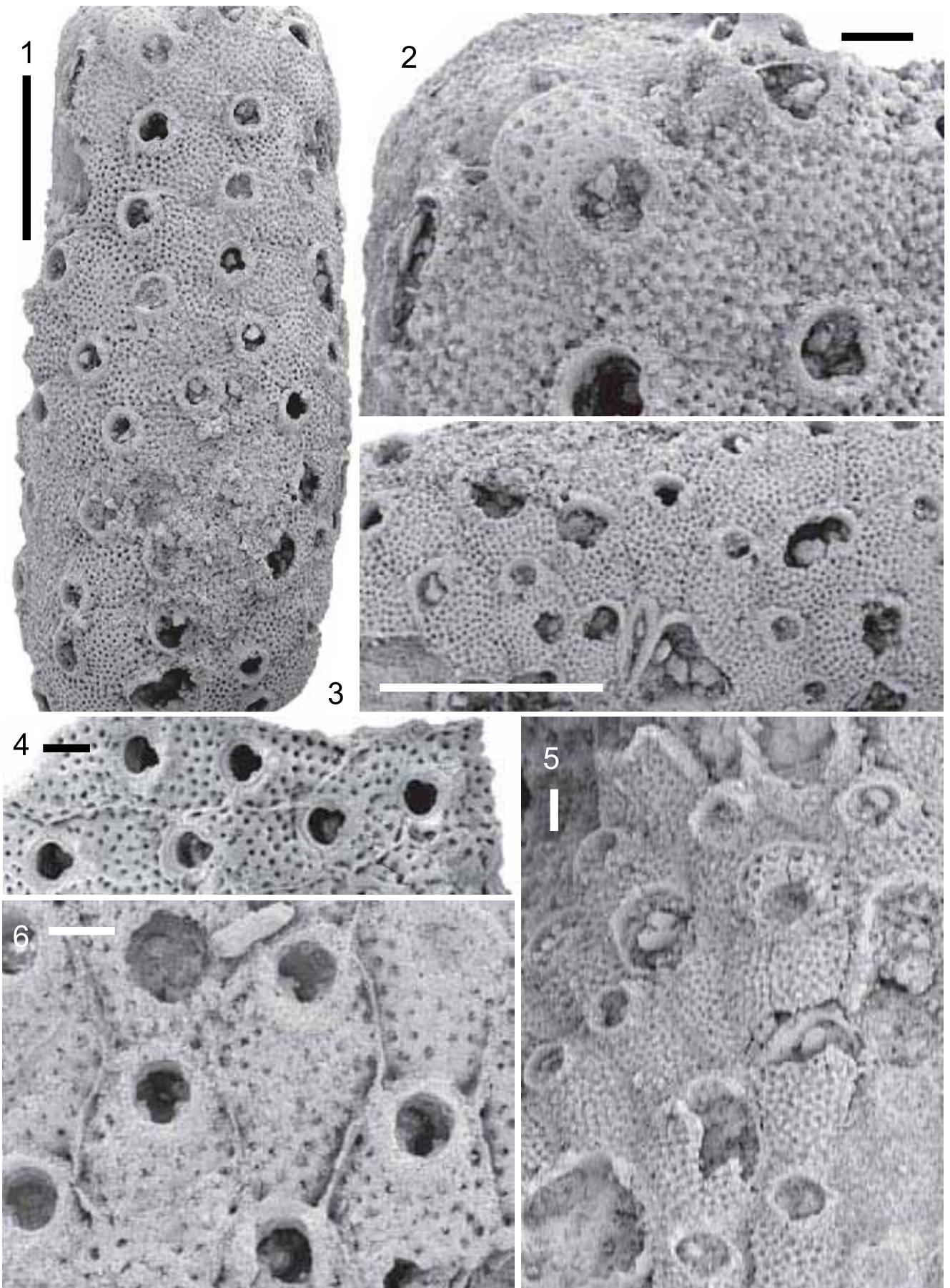


PLATE 108



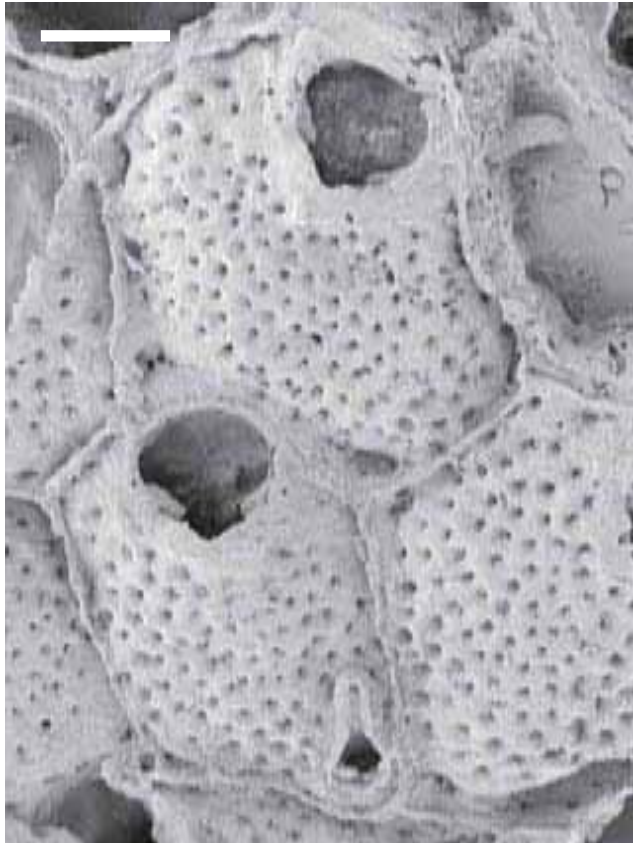
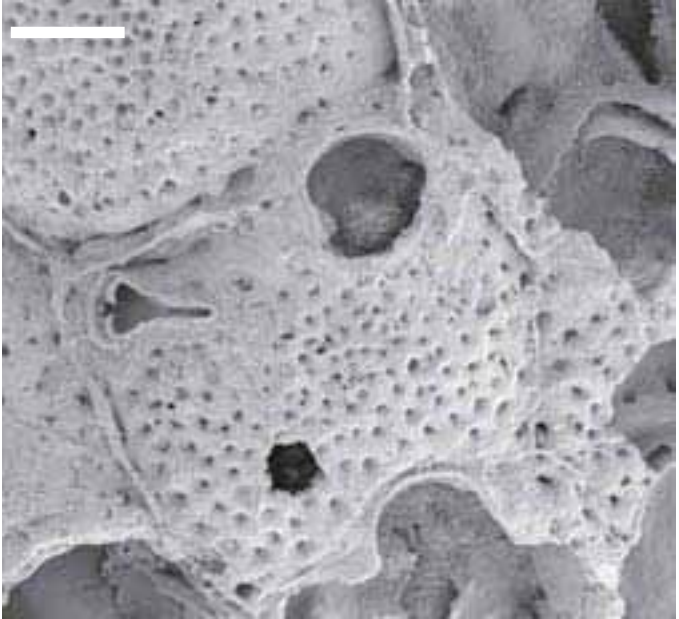
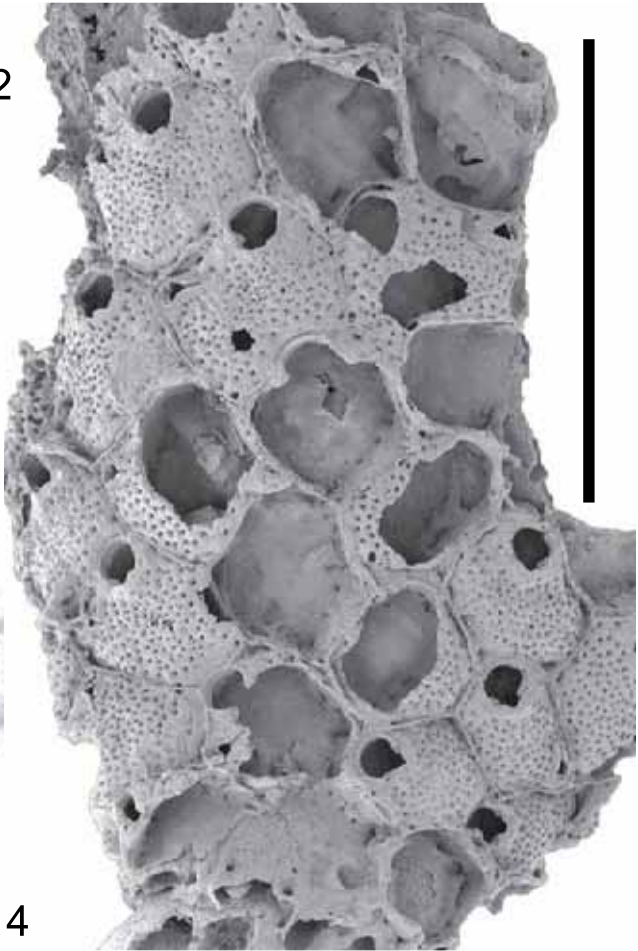
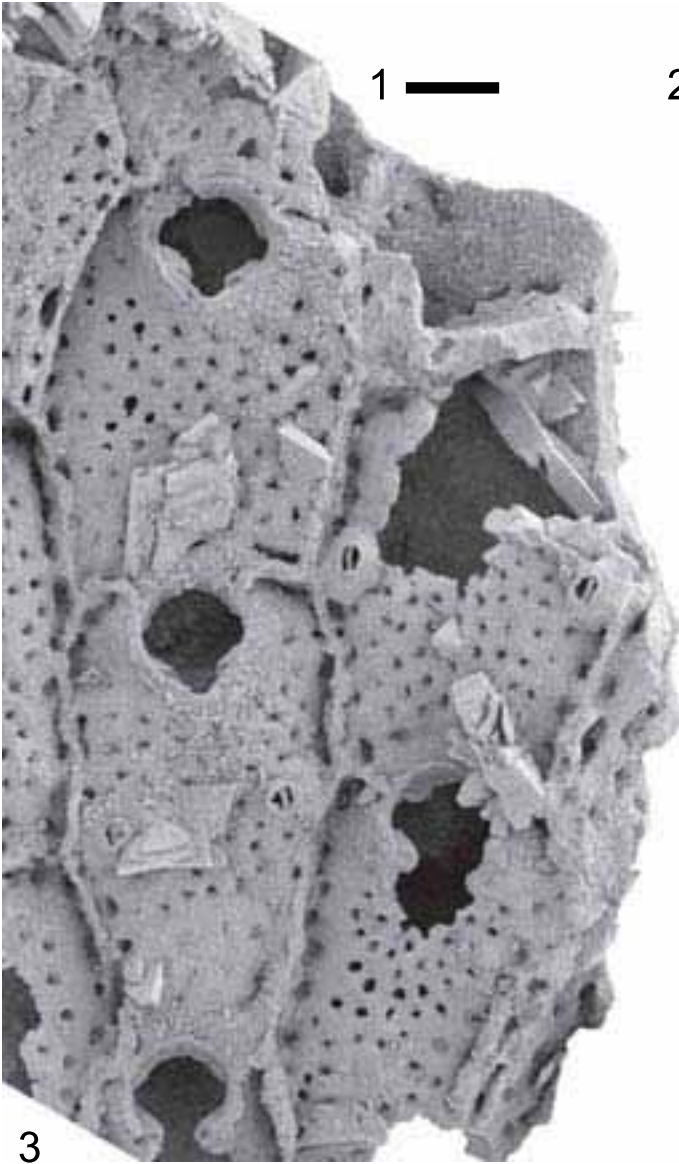
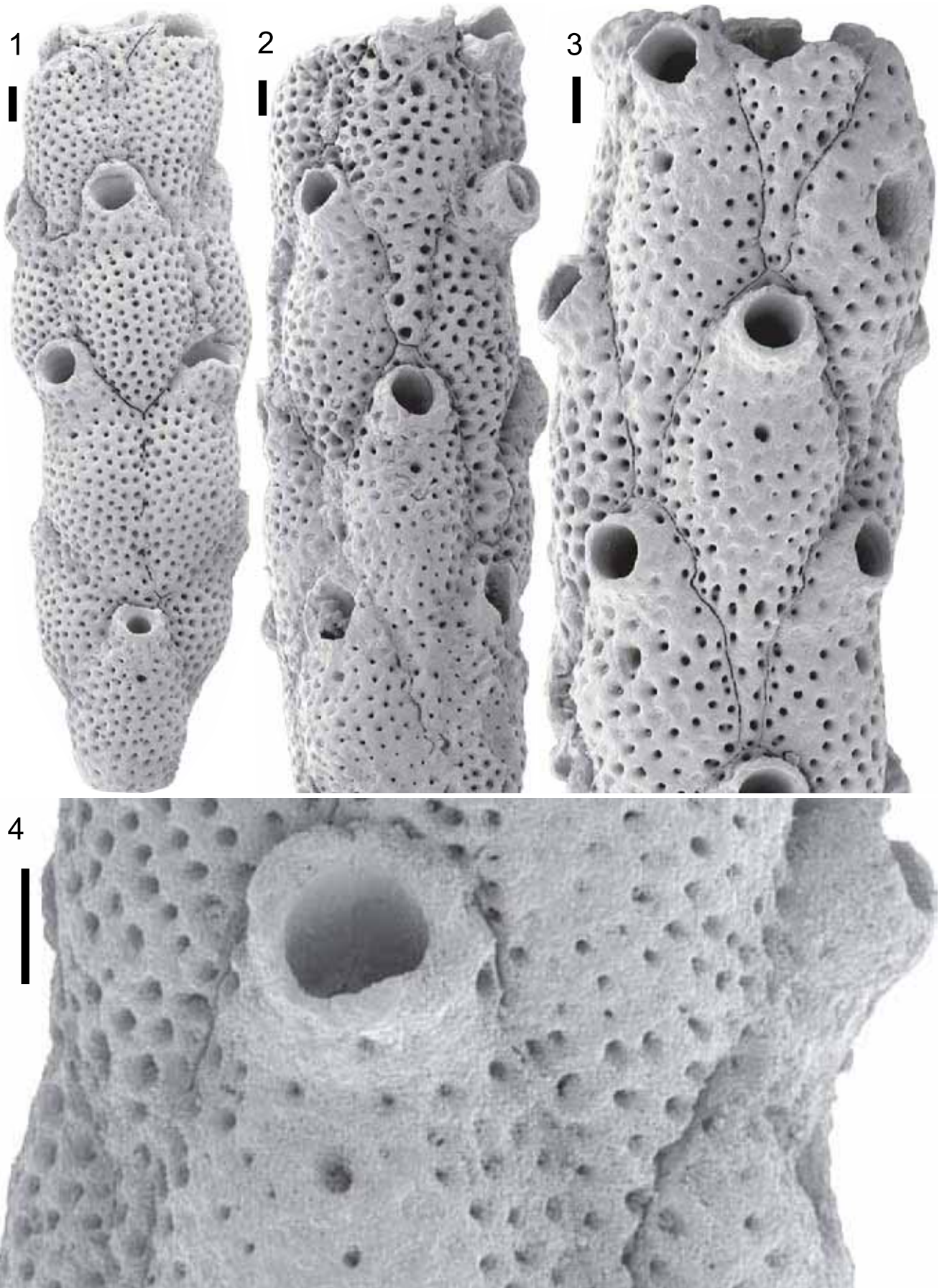


PLATE 110



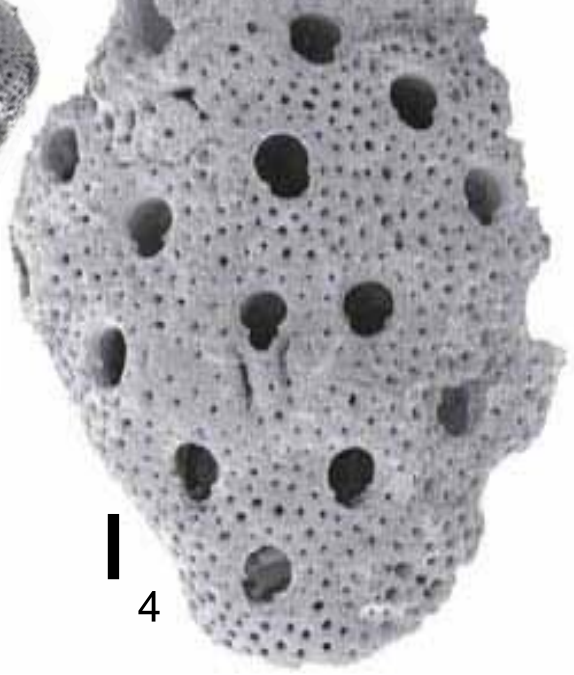
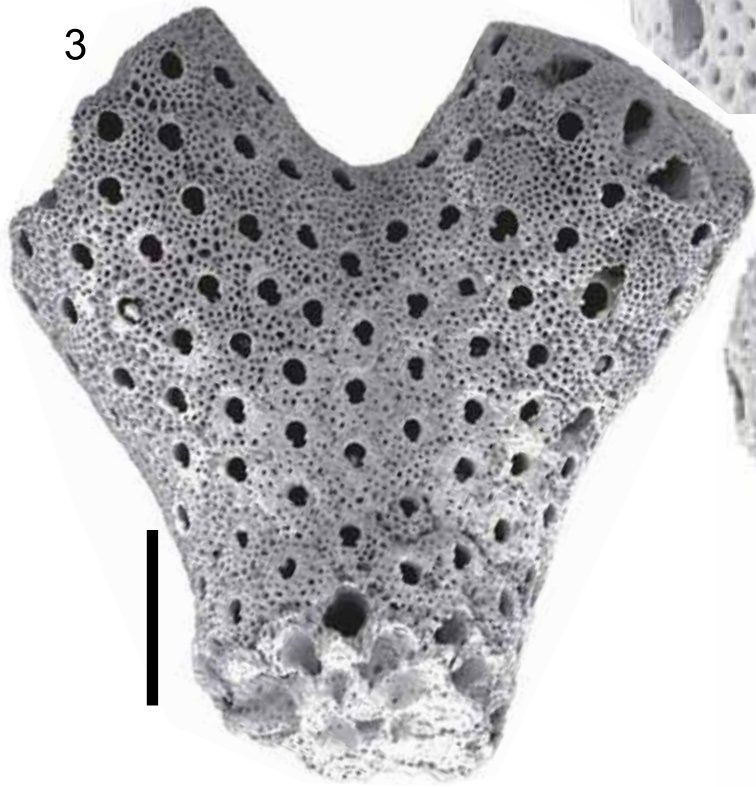
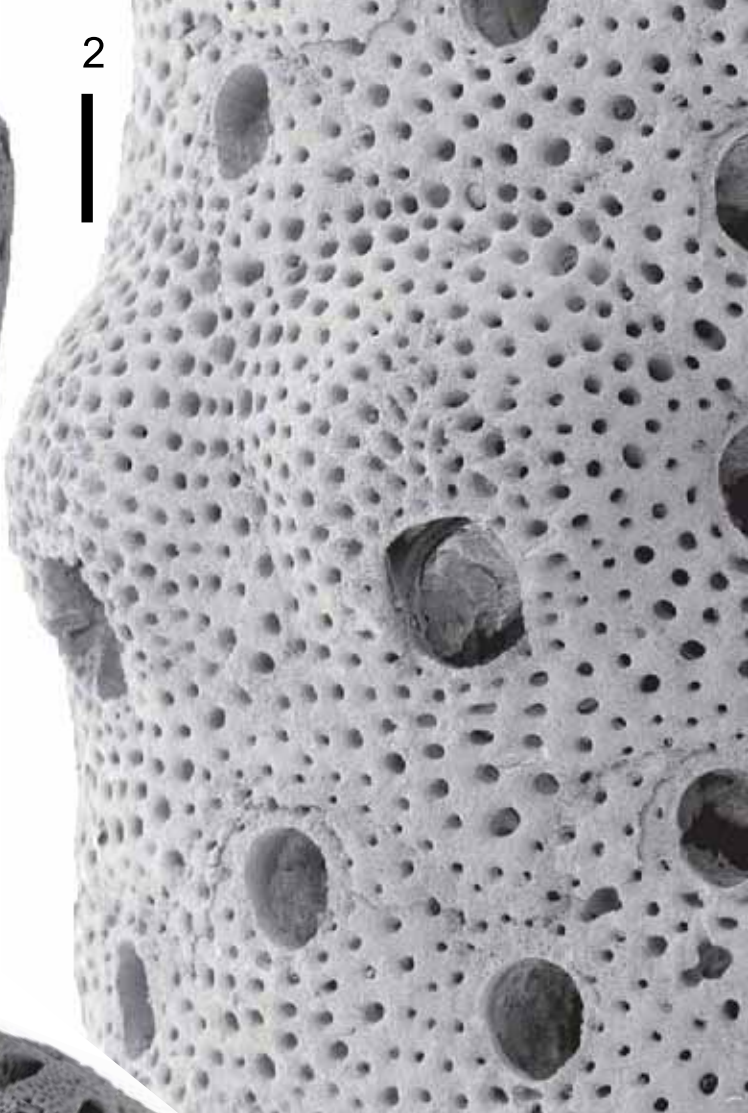
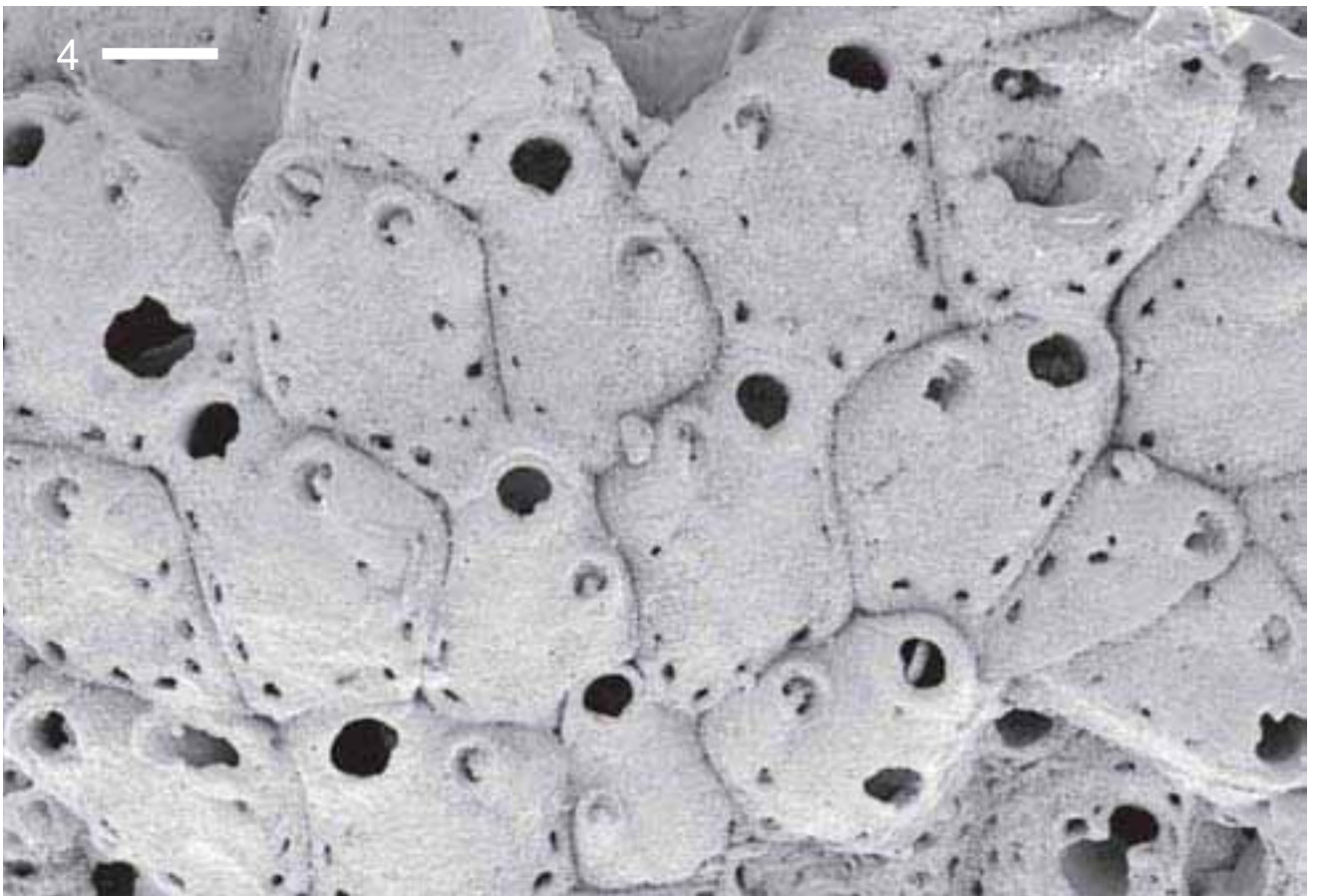
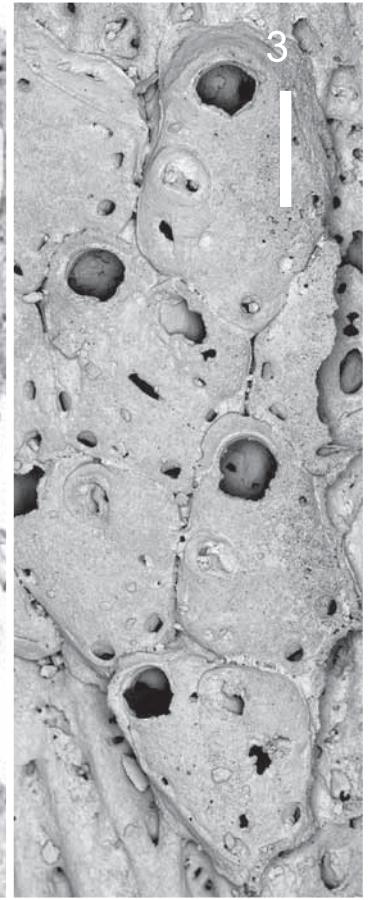
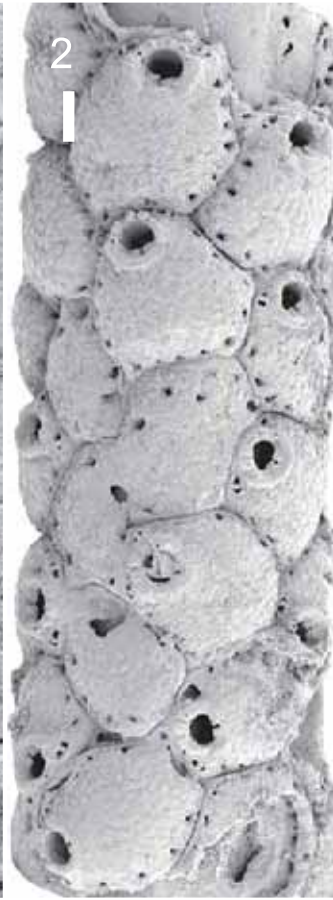
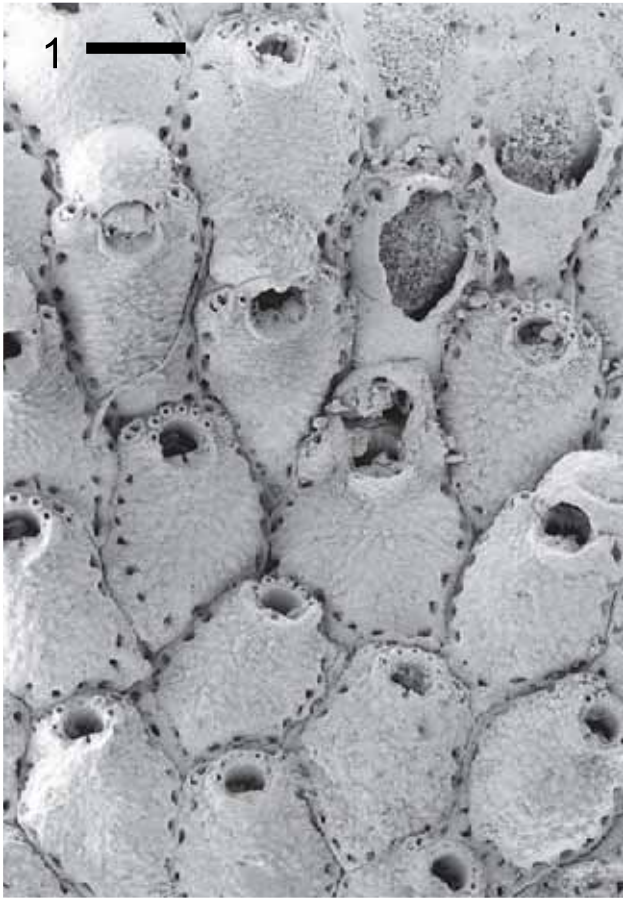


PLATE 112



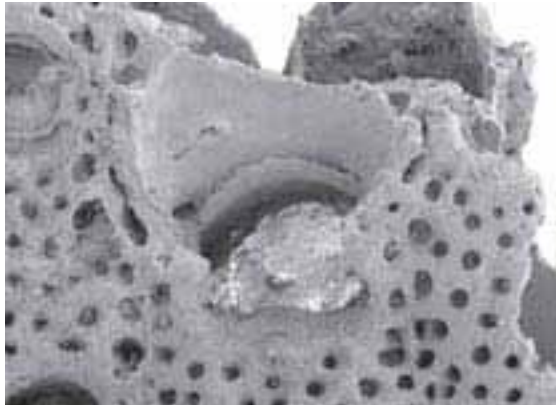
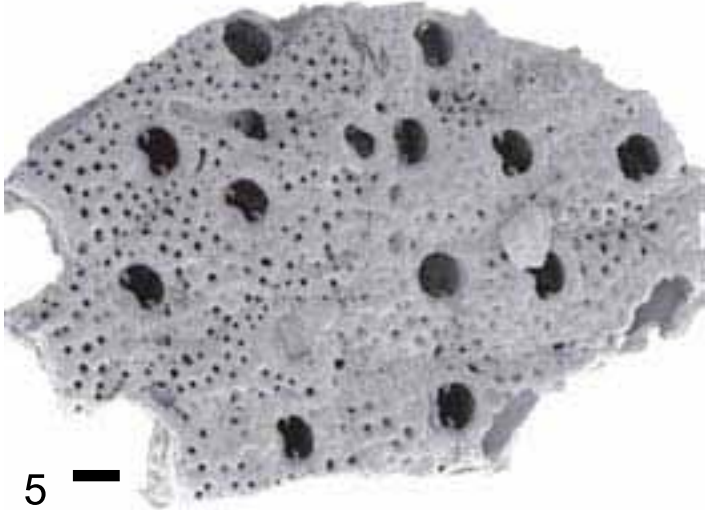
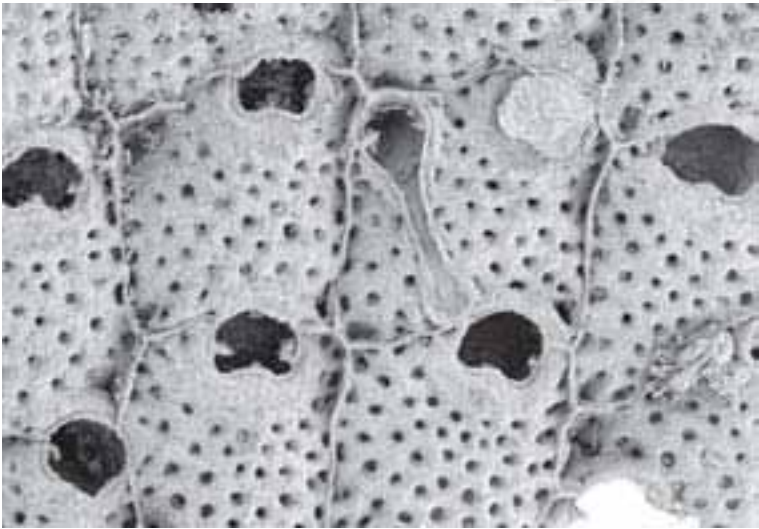
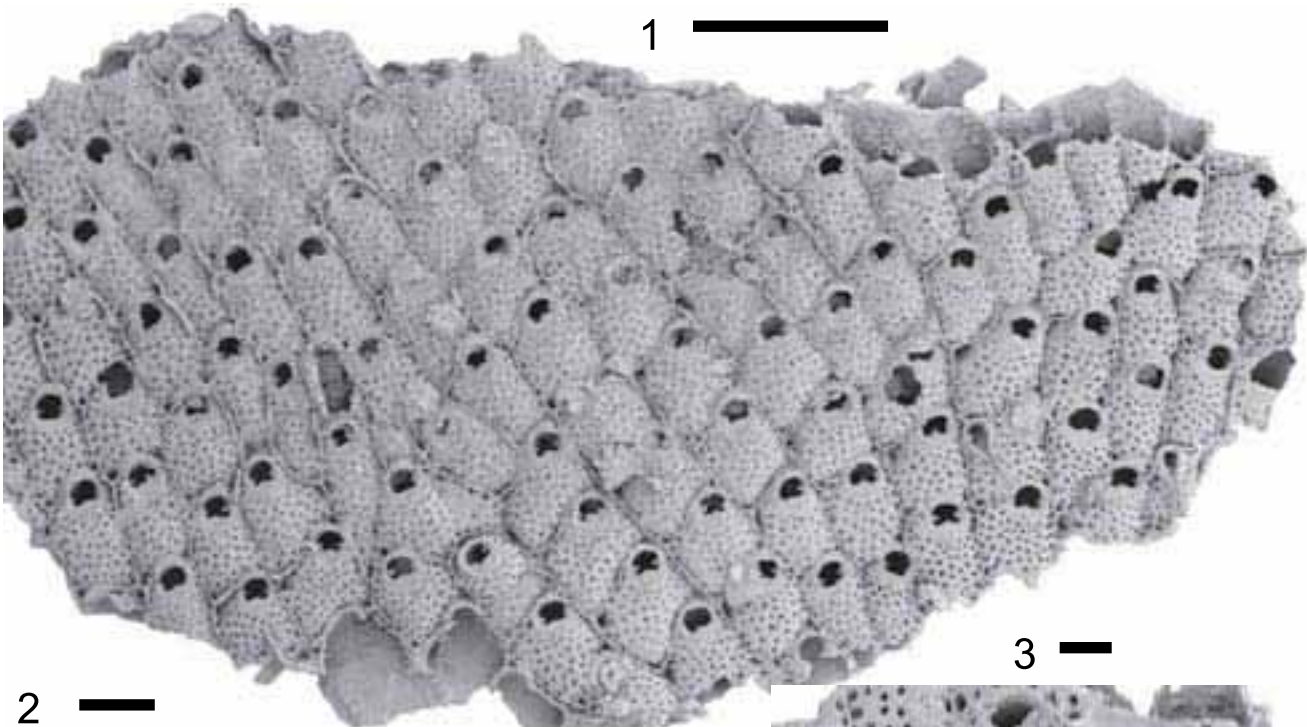
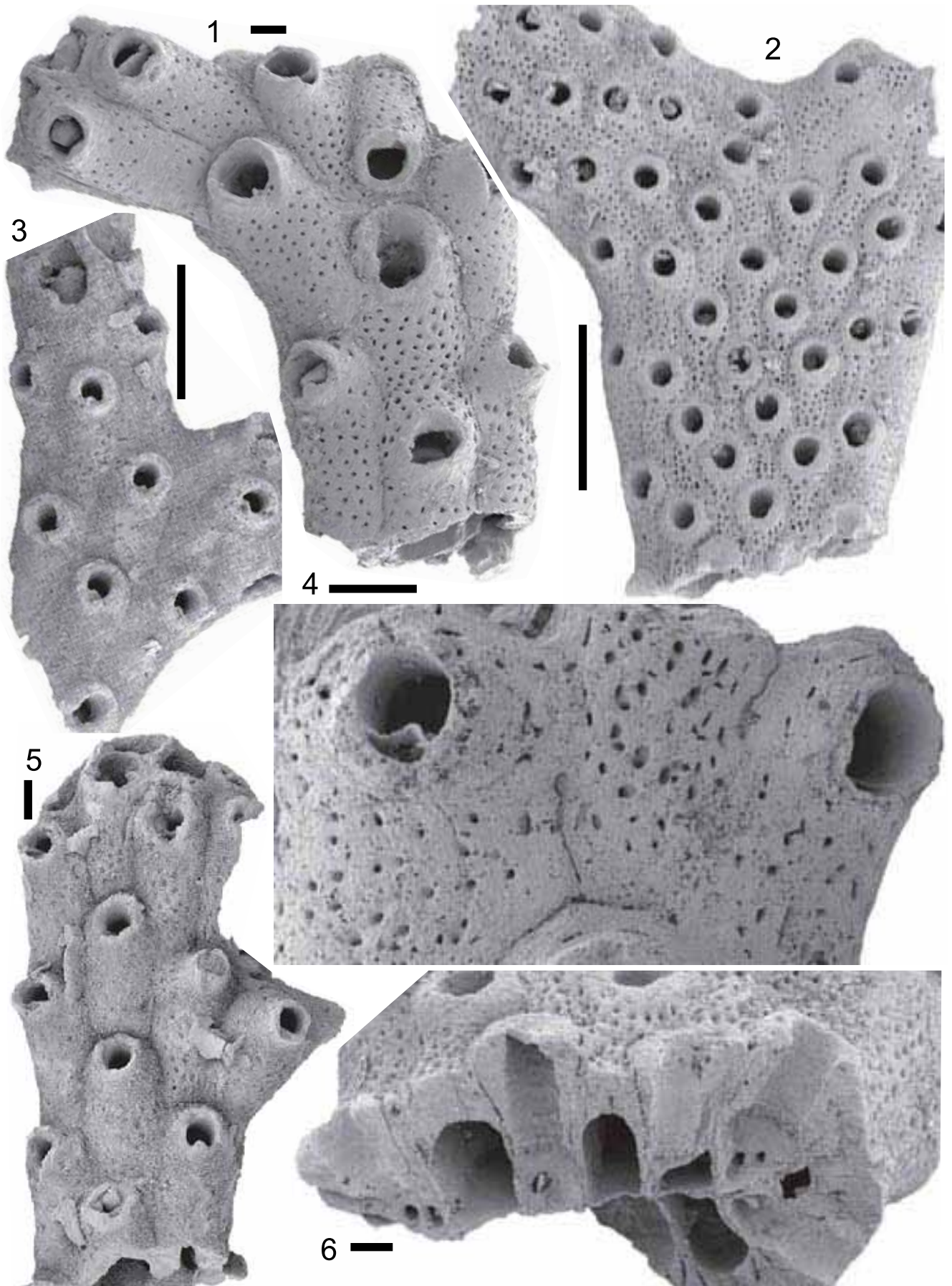


PLATE 114



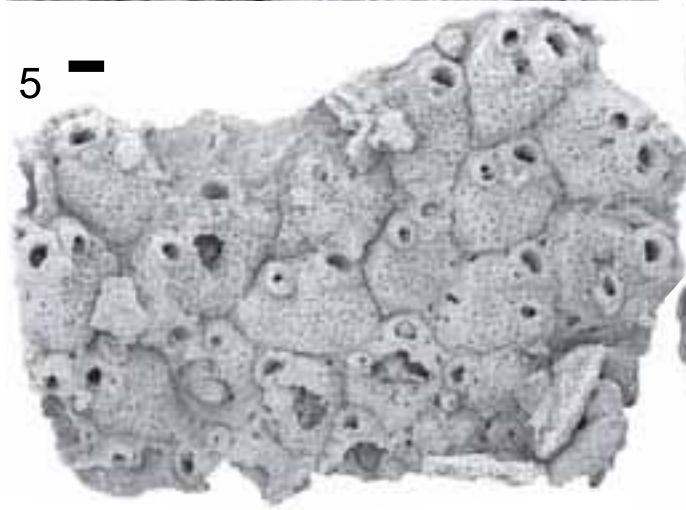
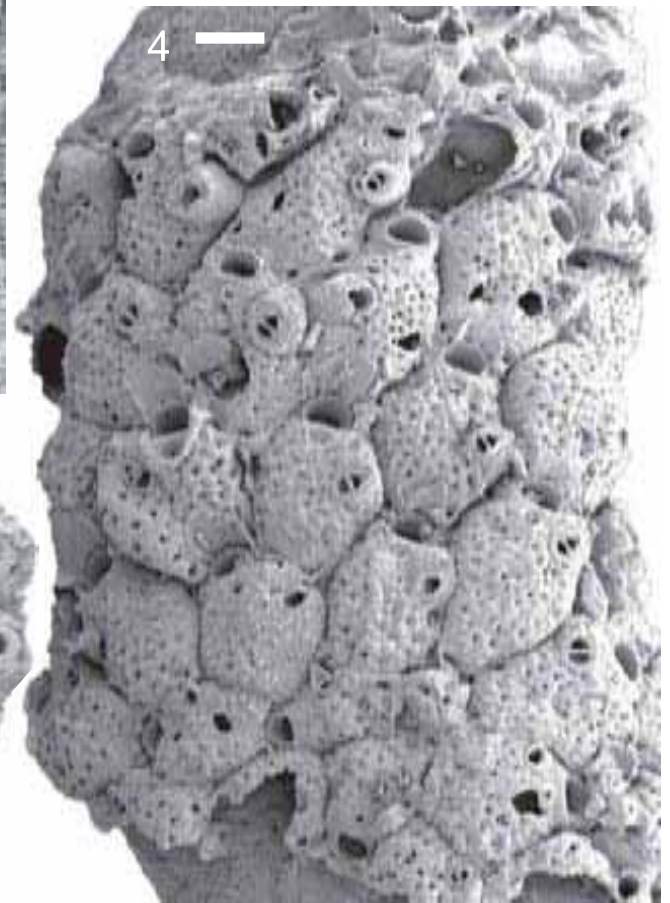
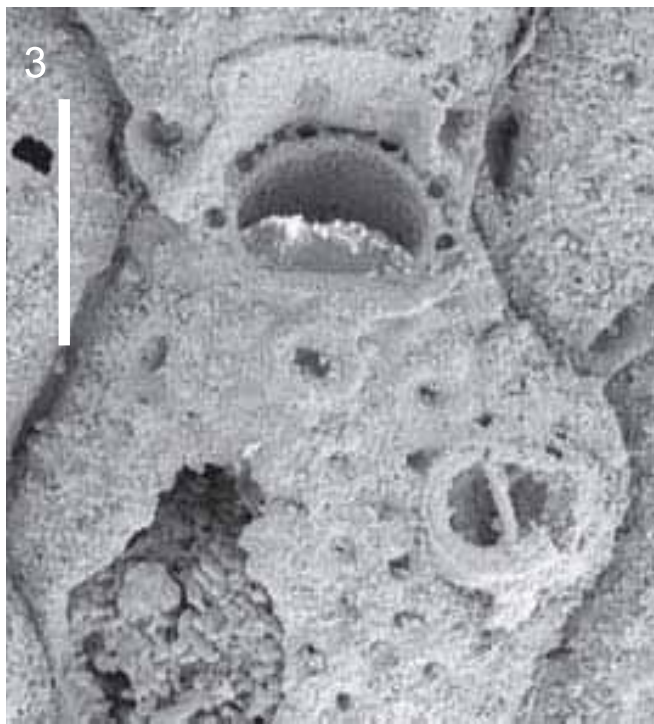
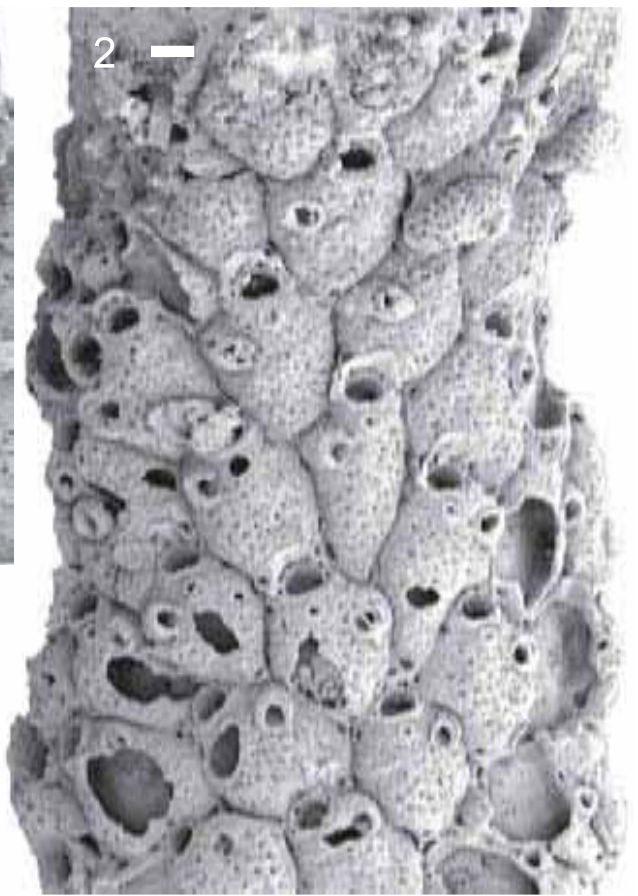
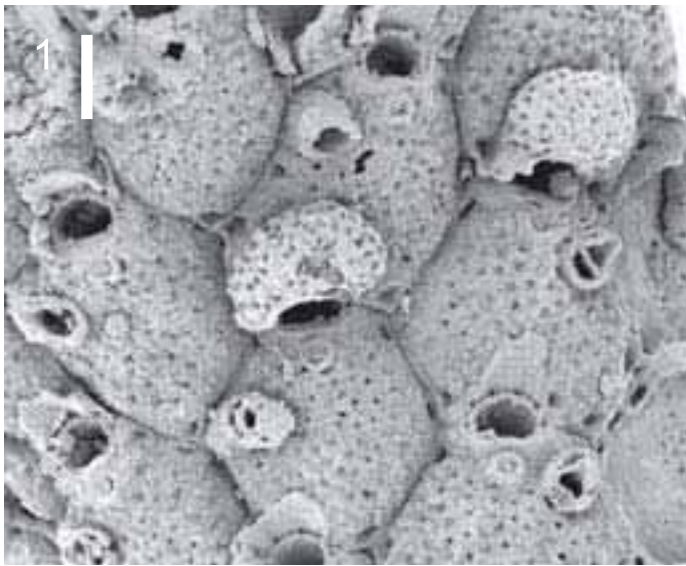
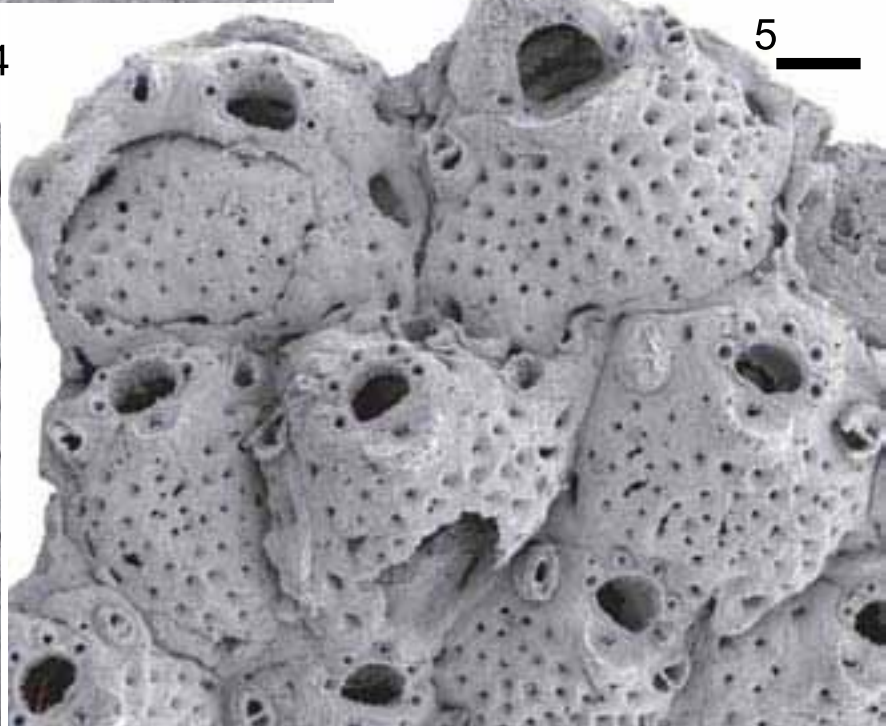
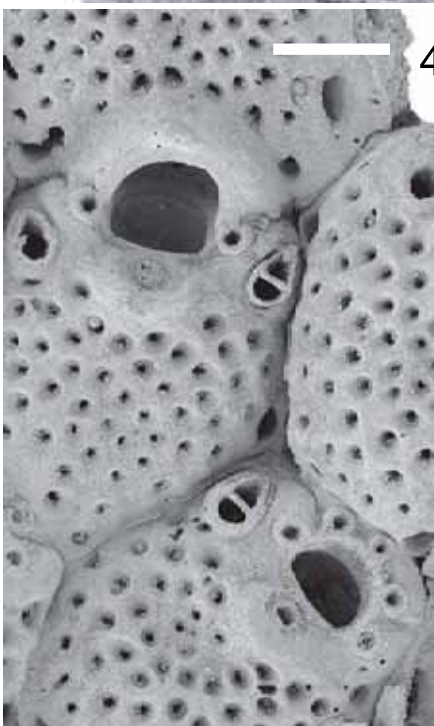
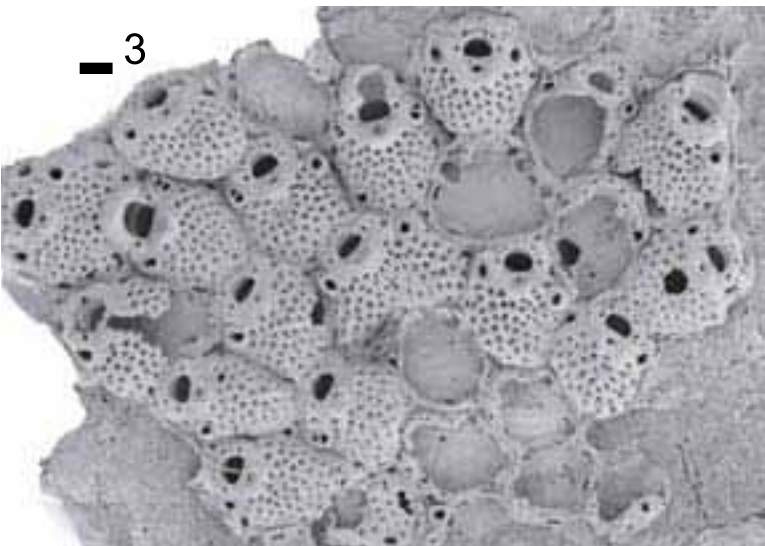
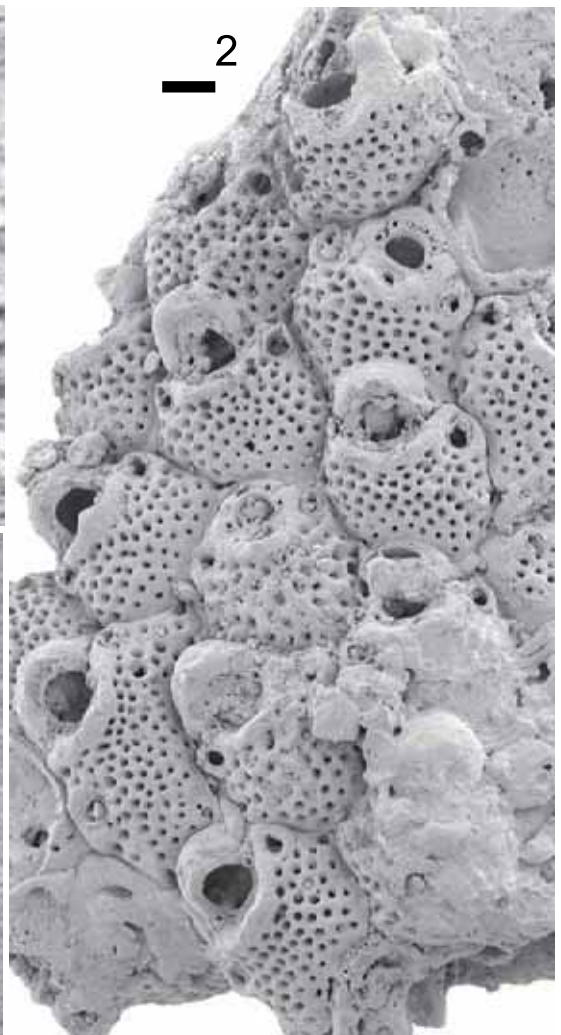
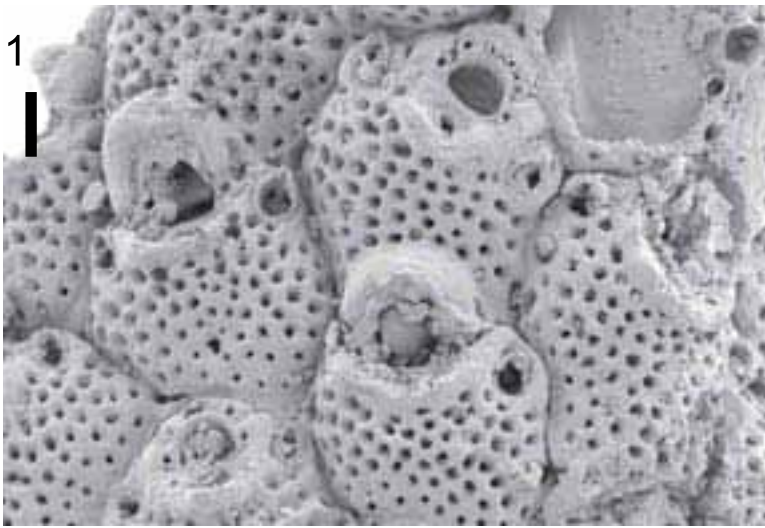


PLATE 116



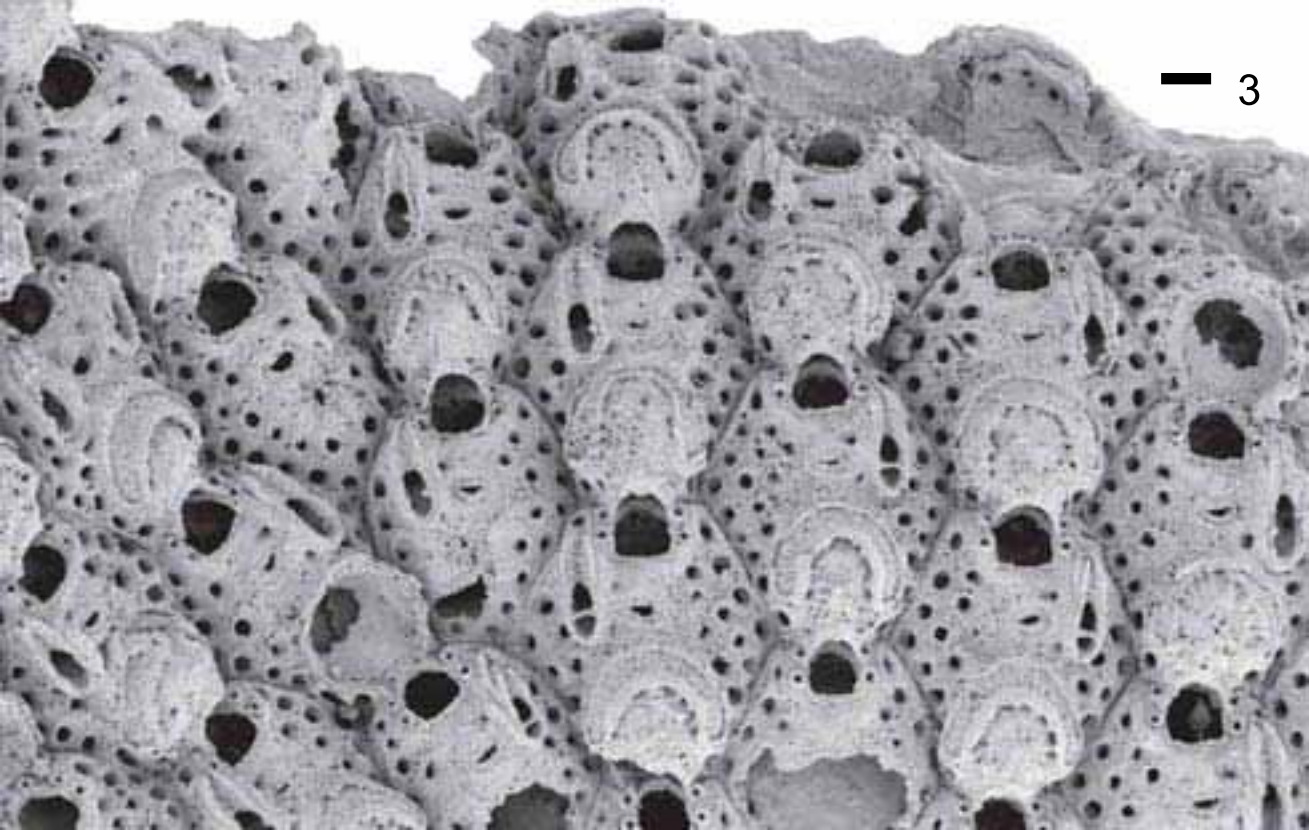
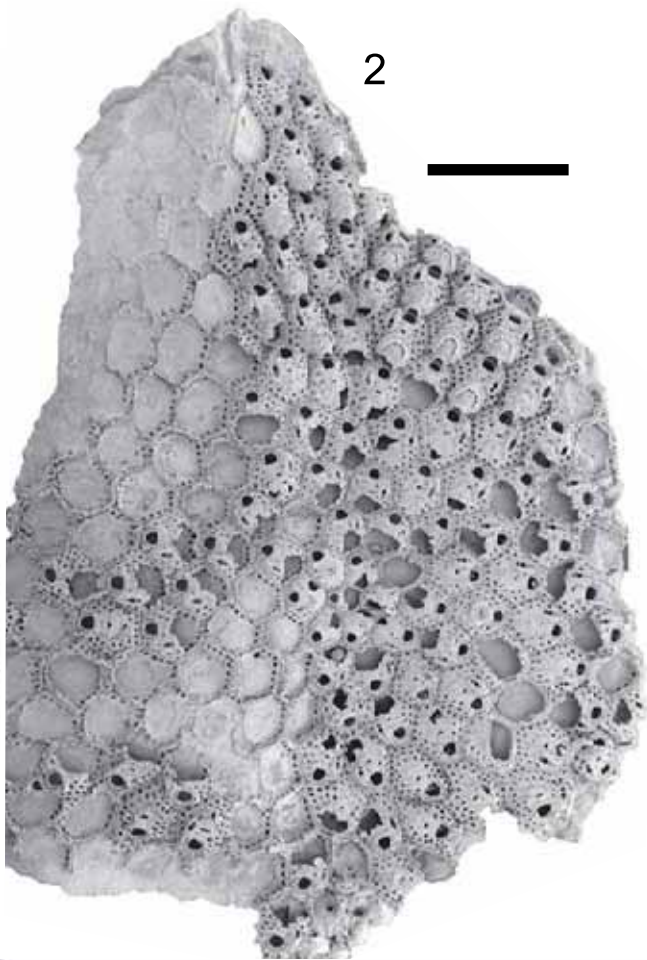
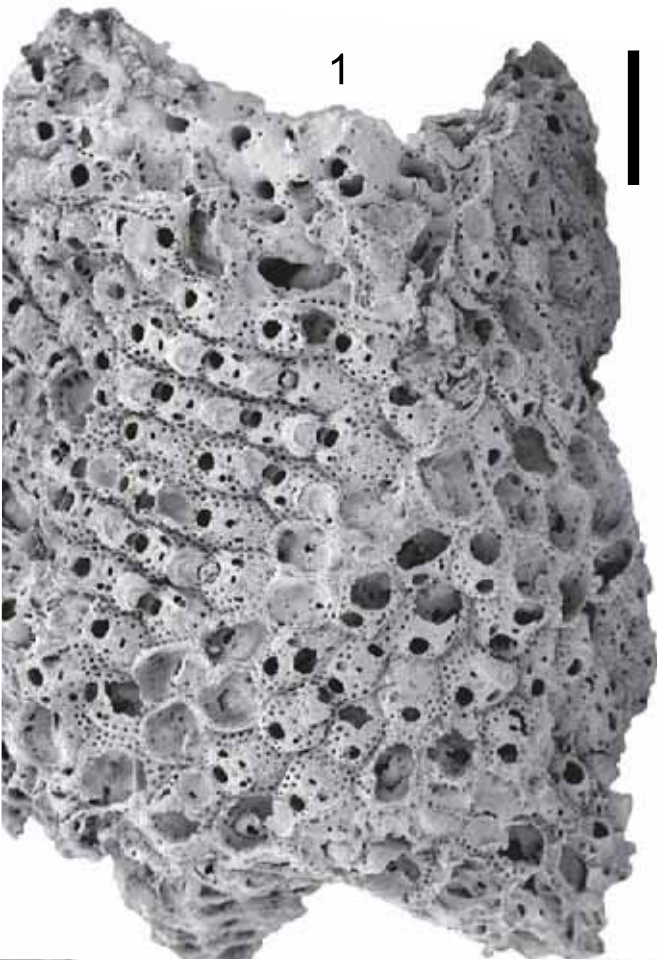
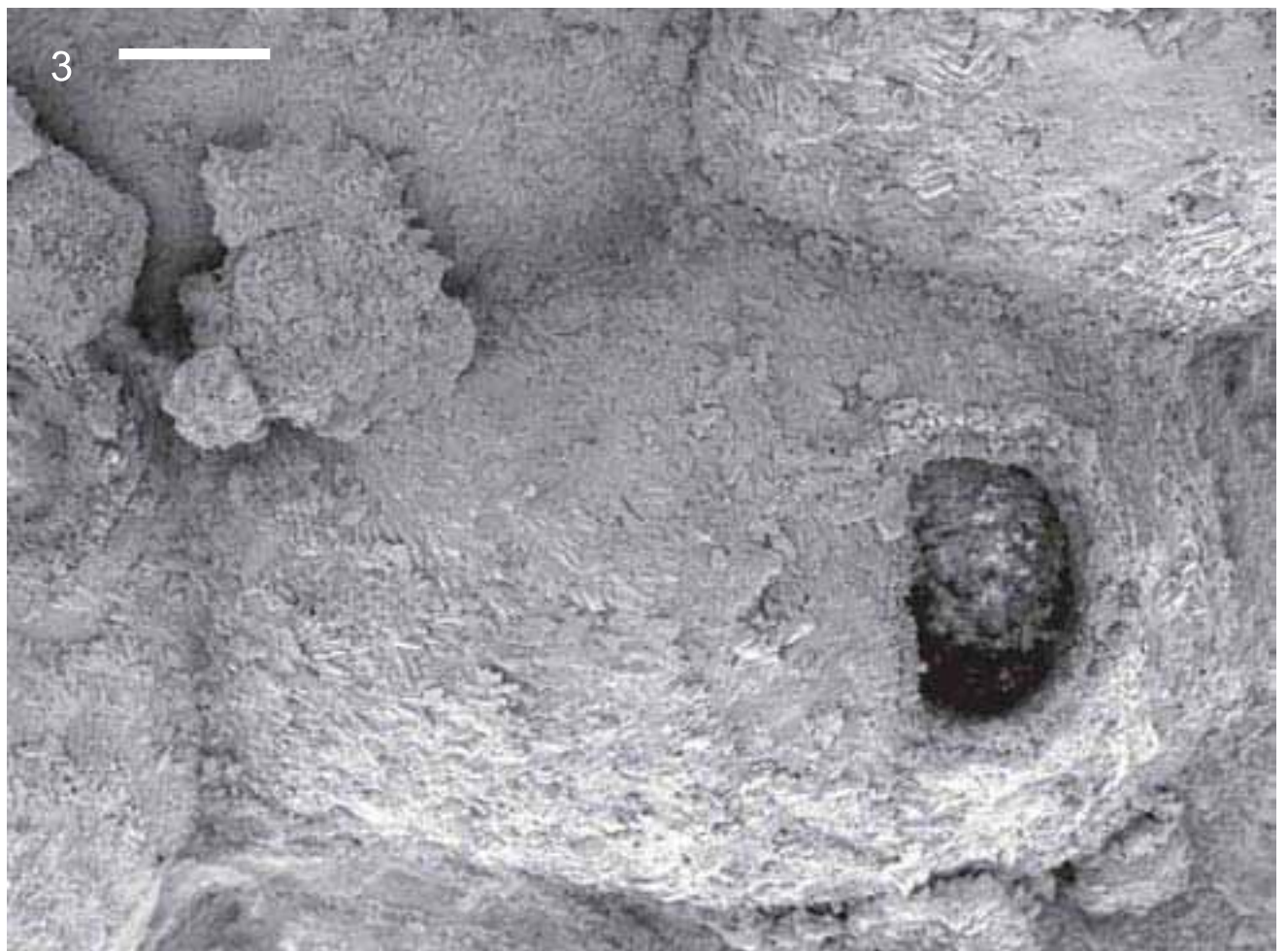
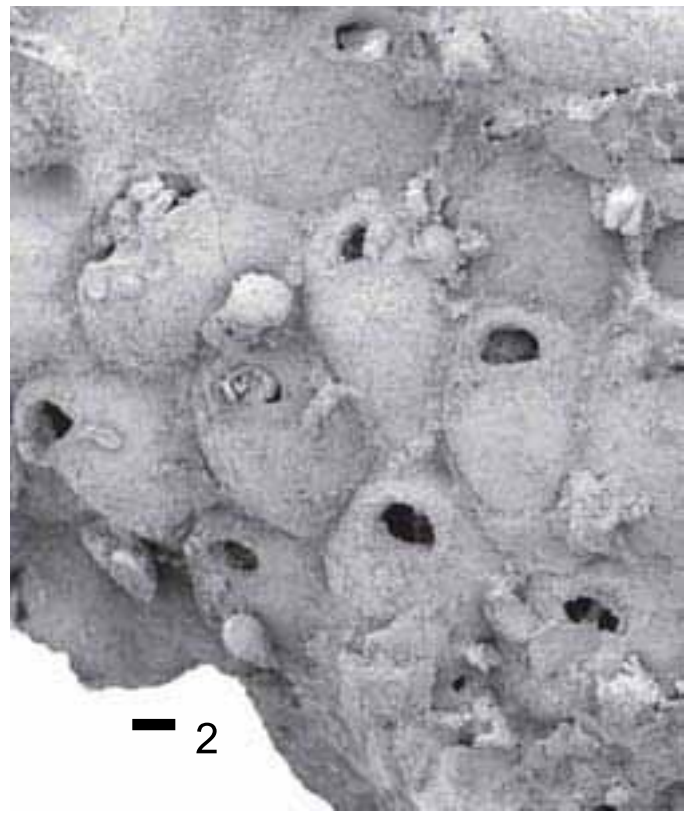
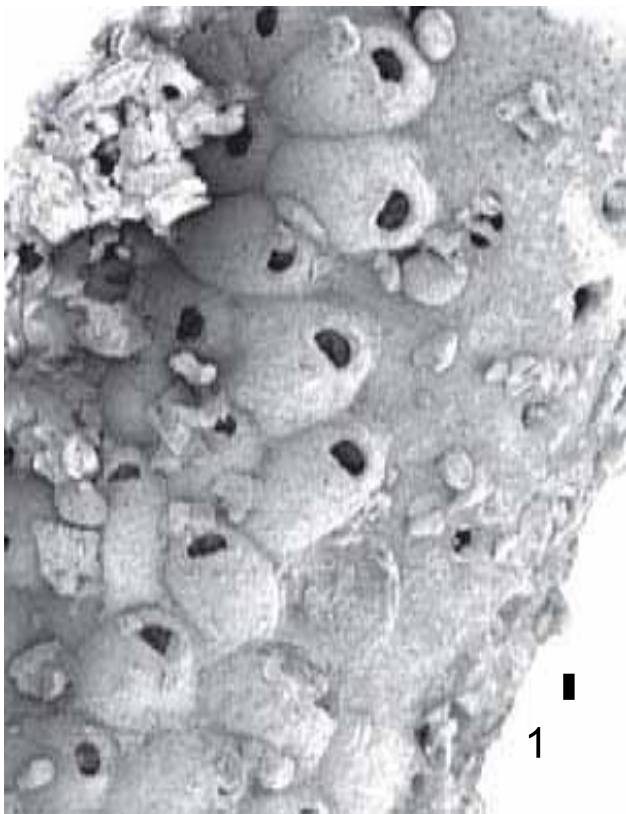


PLATE 118



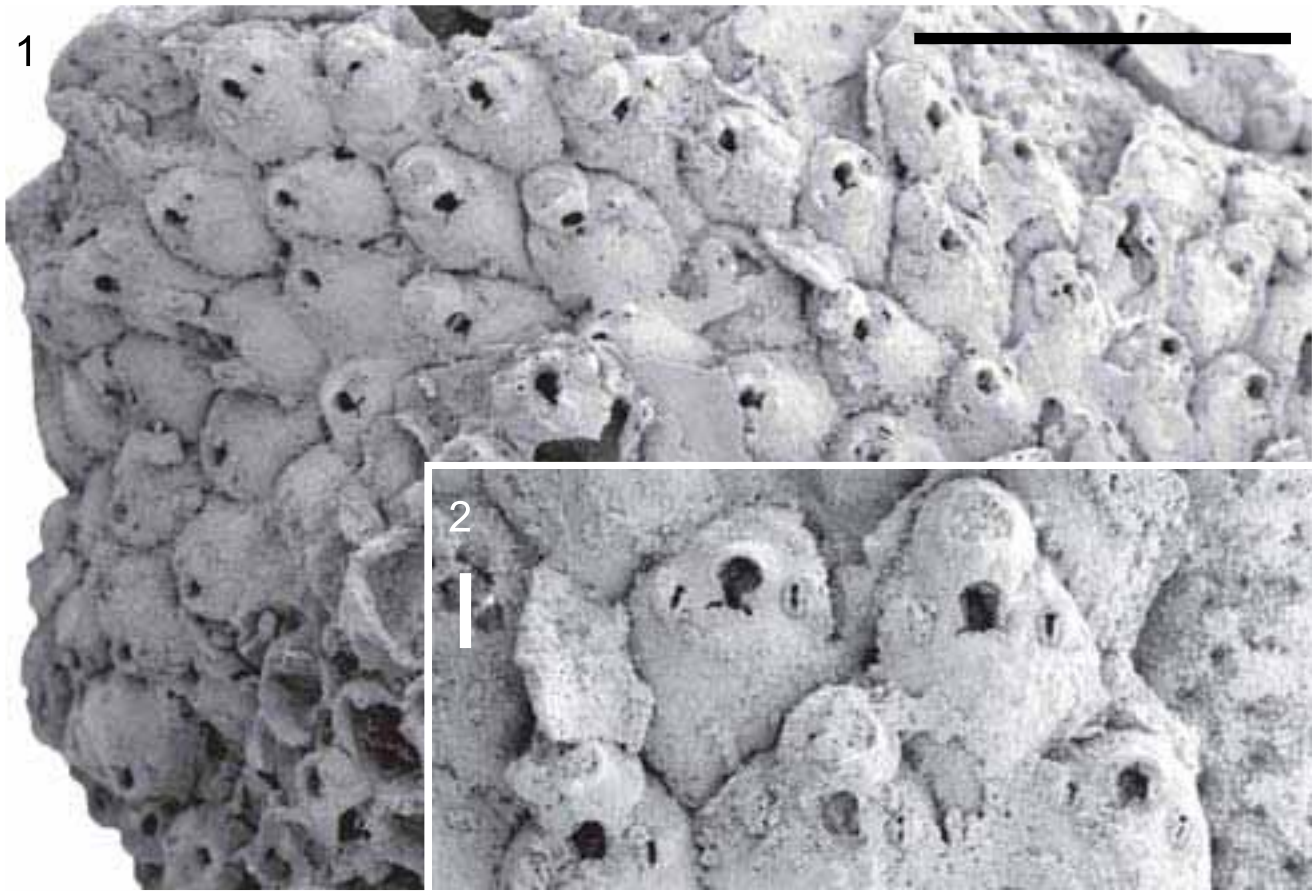
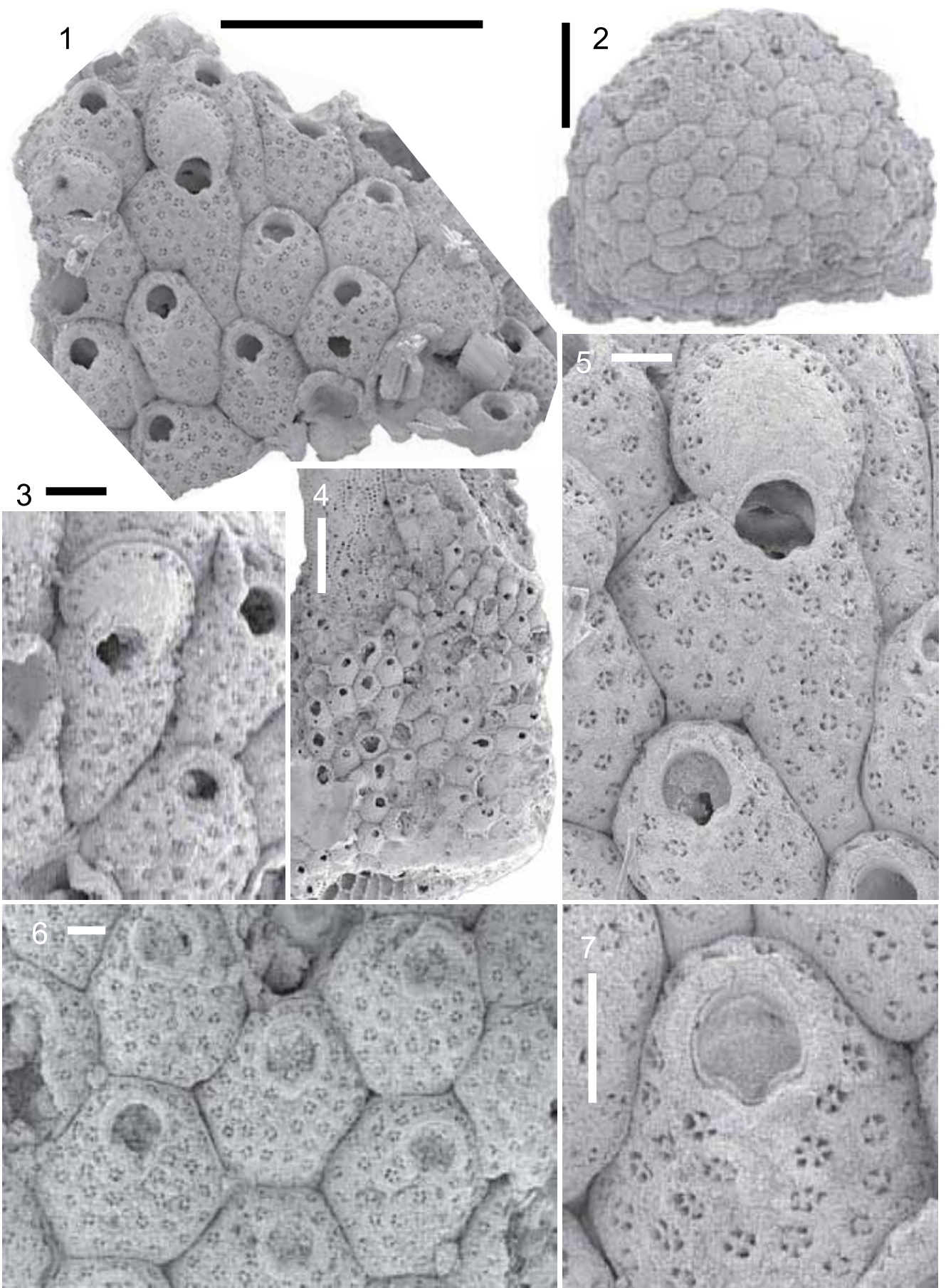


PLATE 120



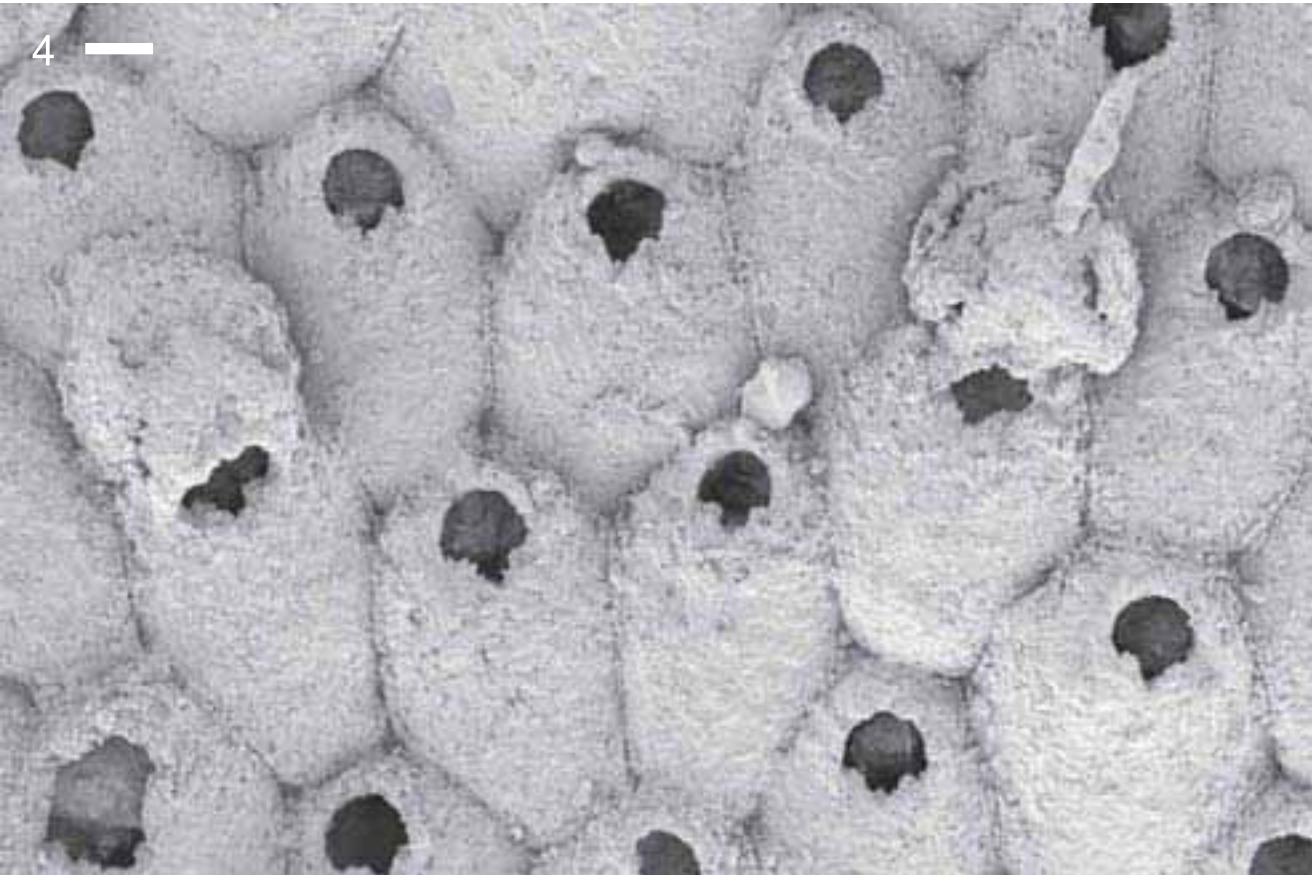
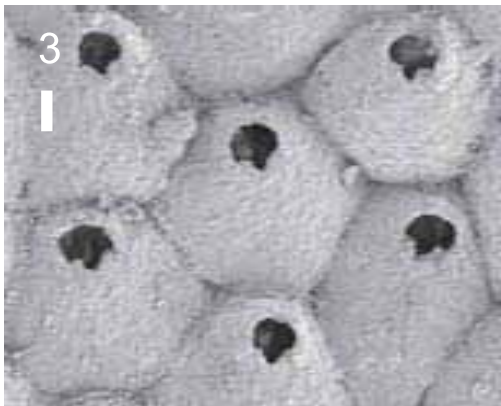
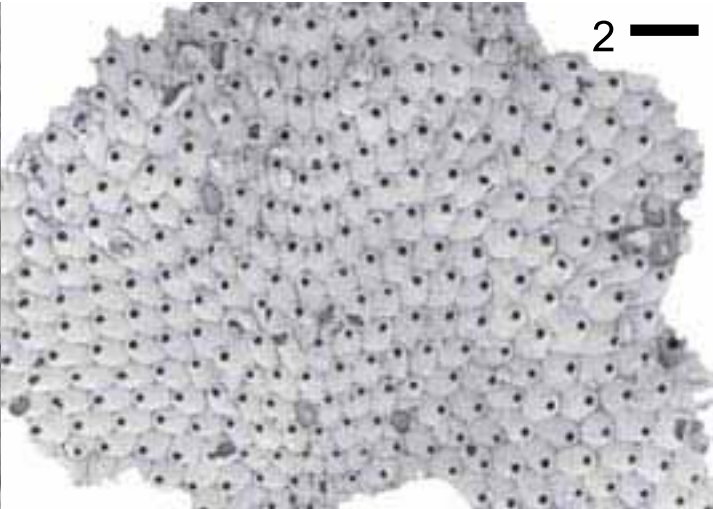
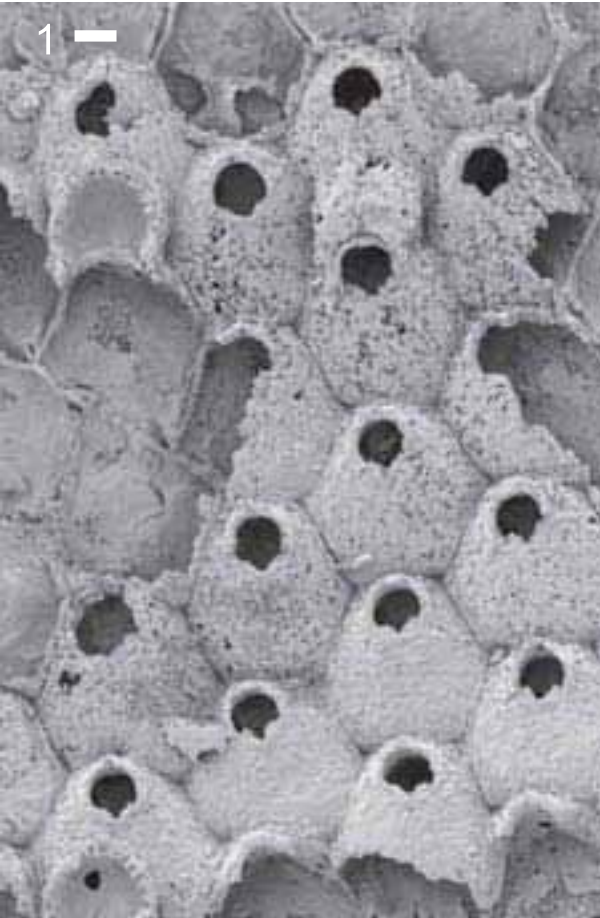
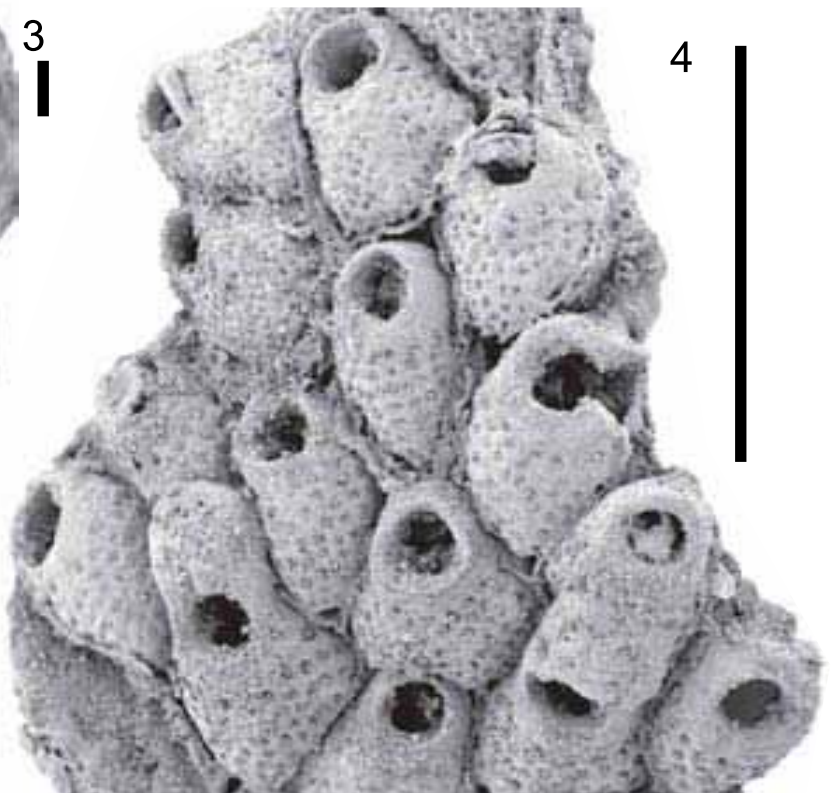
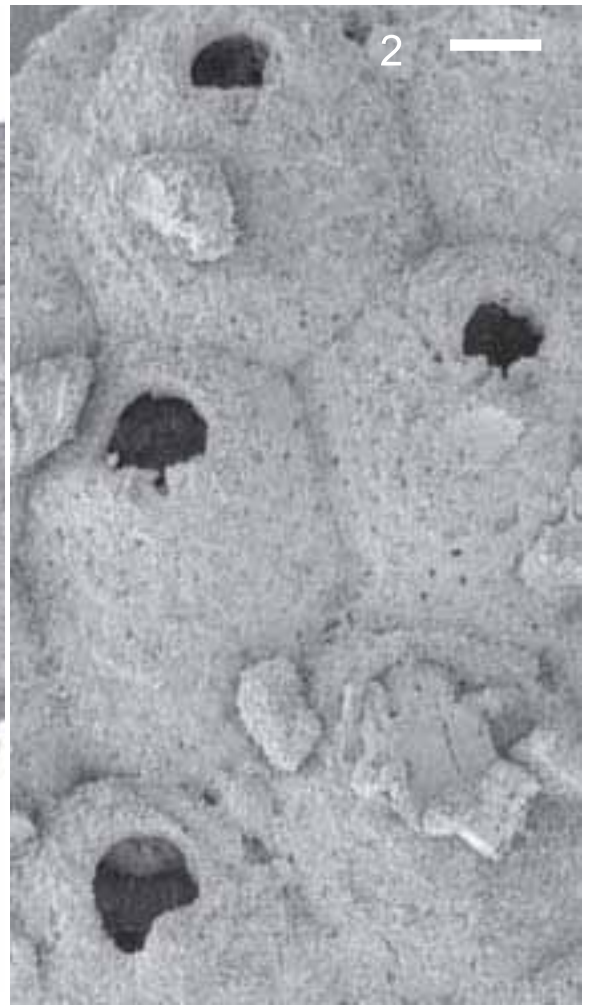
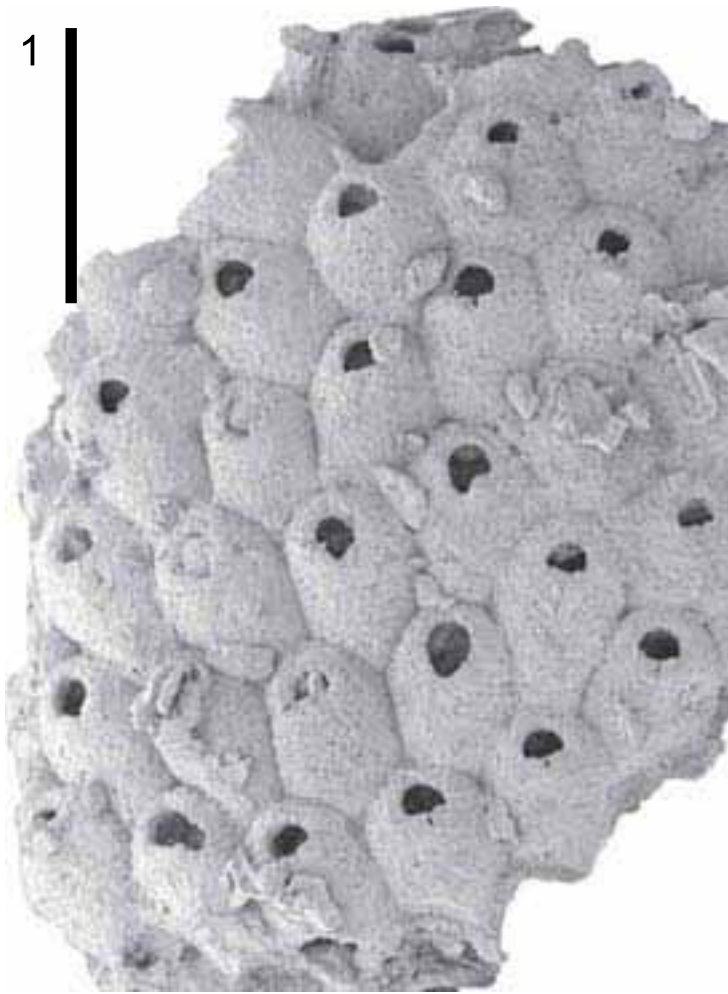


PLATE 122



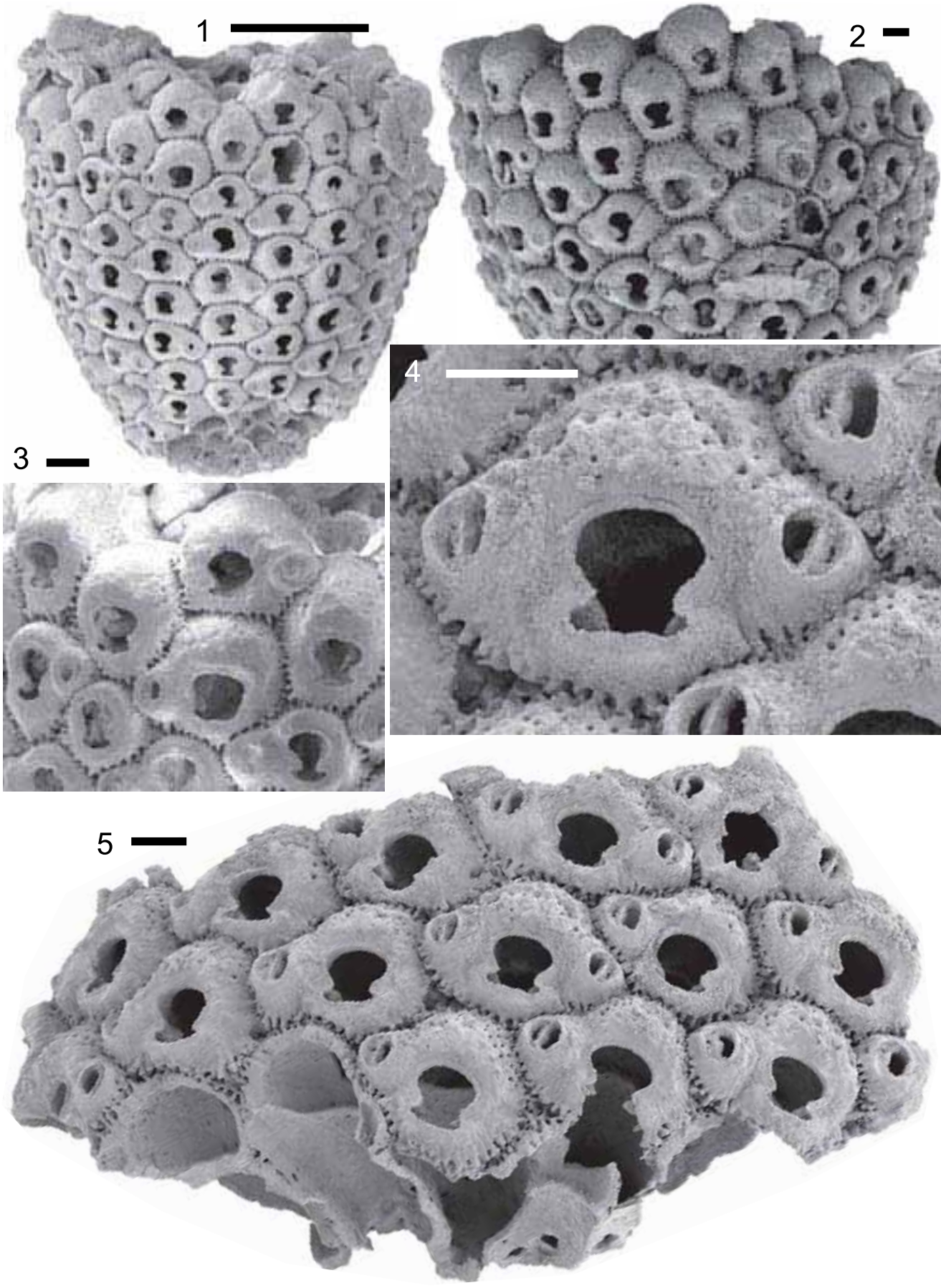
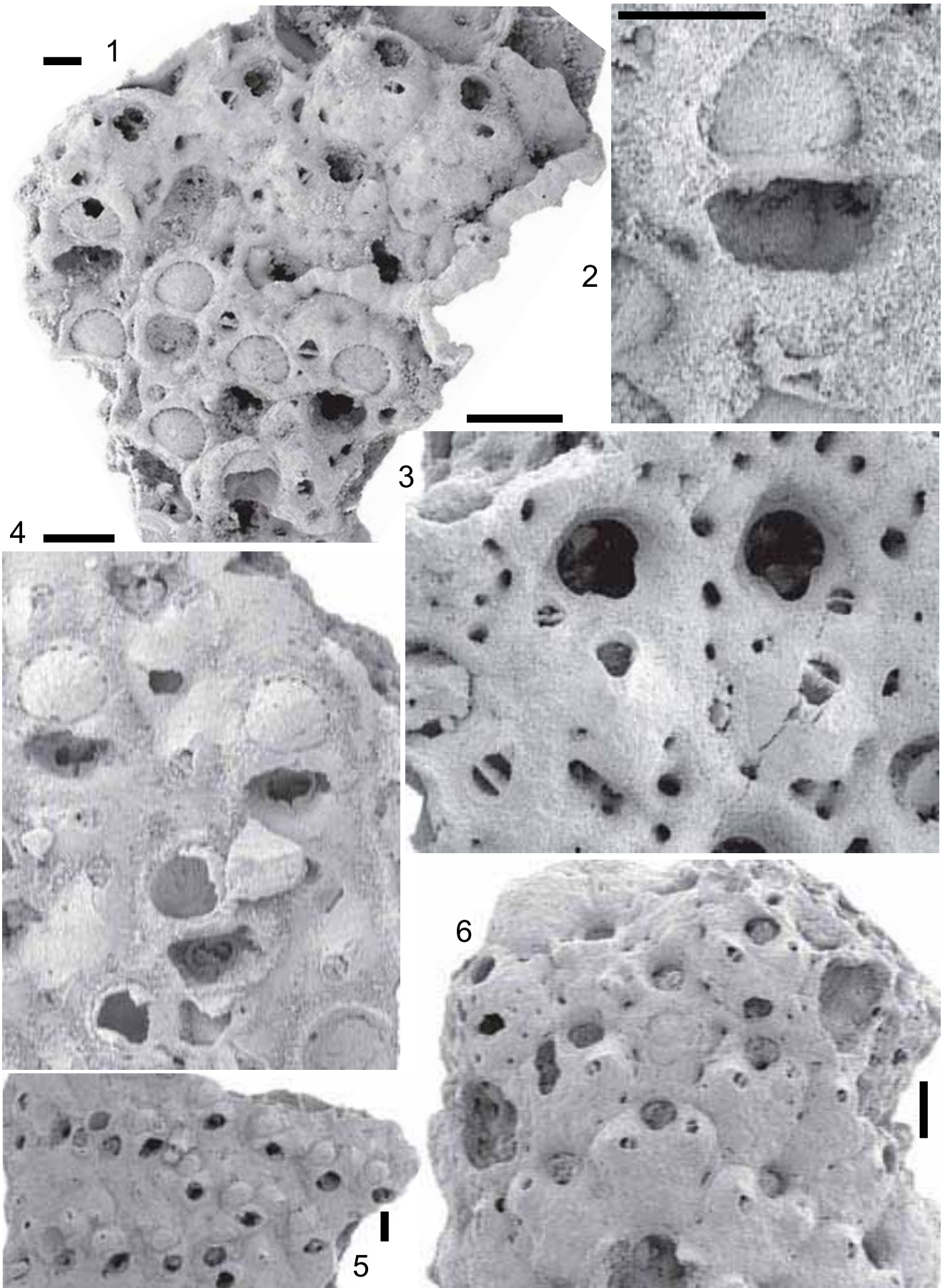


PLATE 124



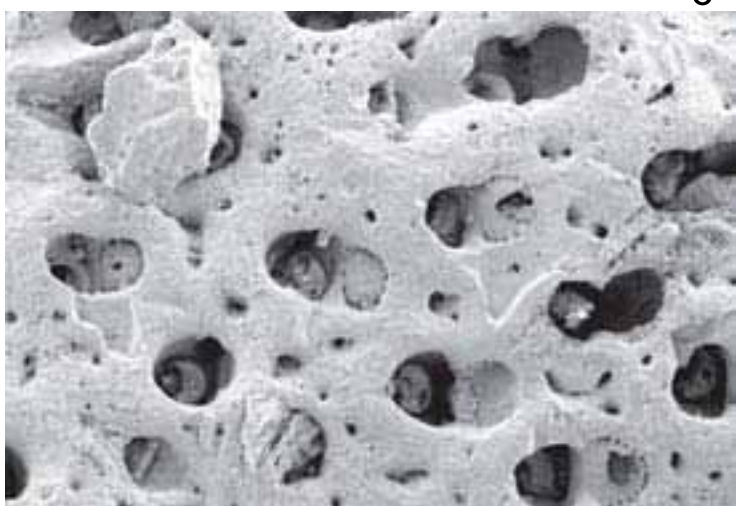
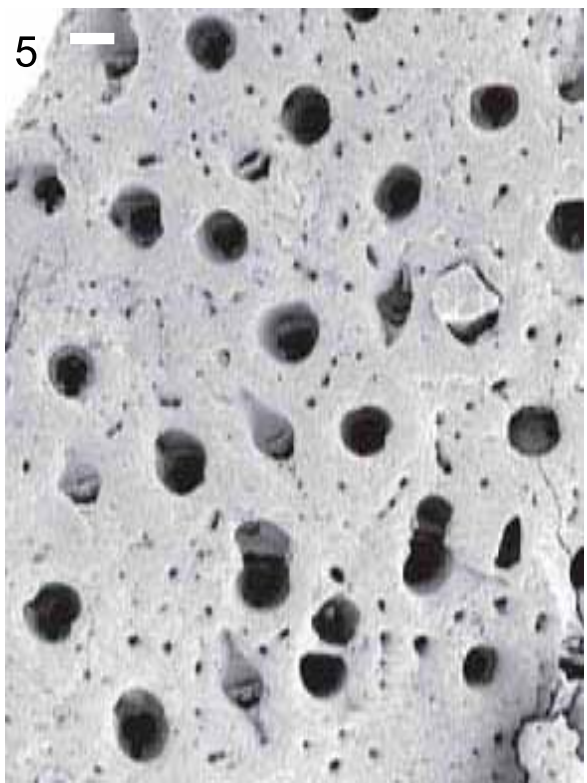
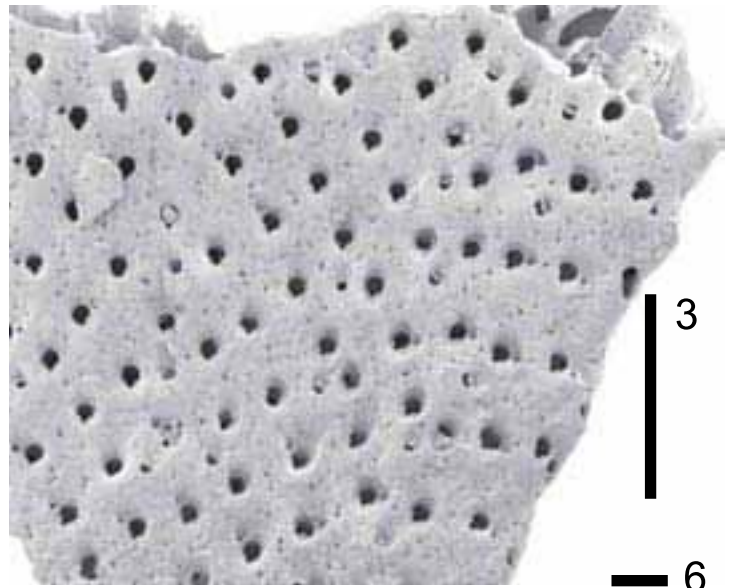
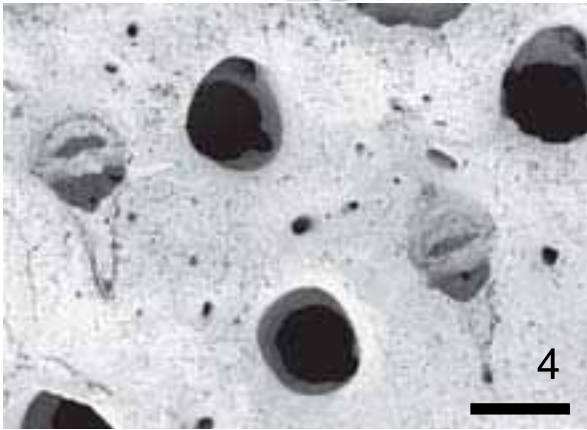
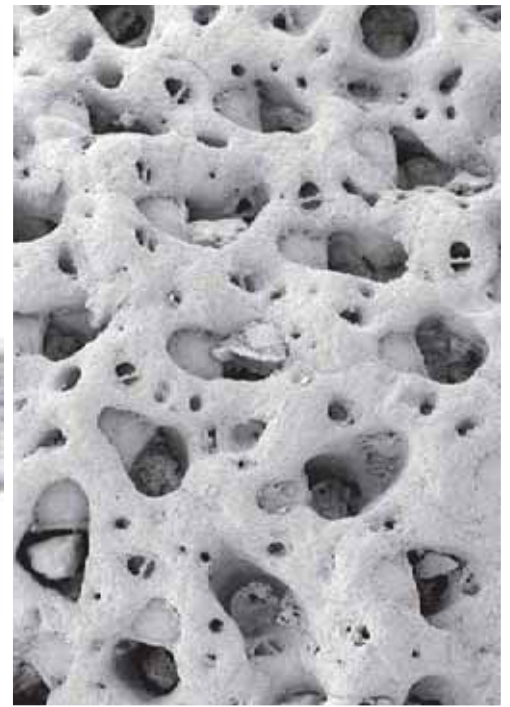
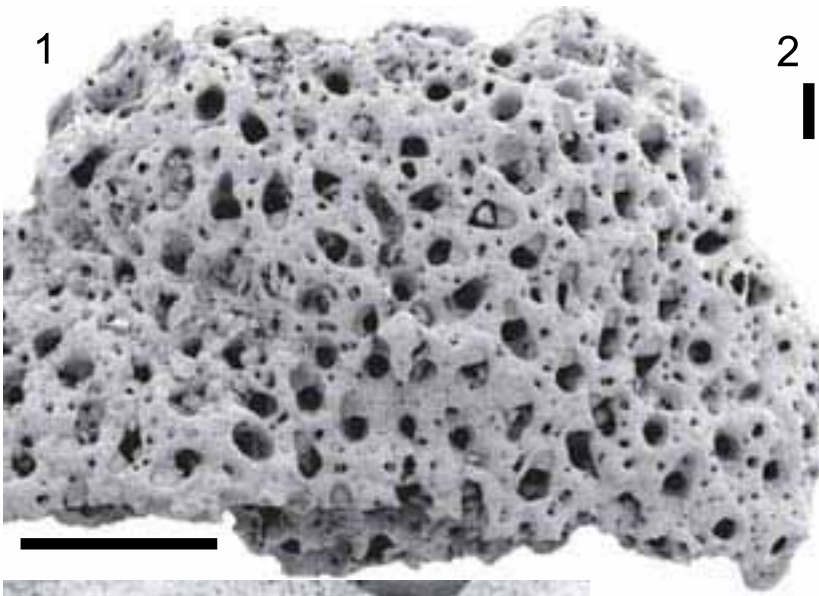
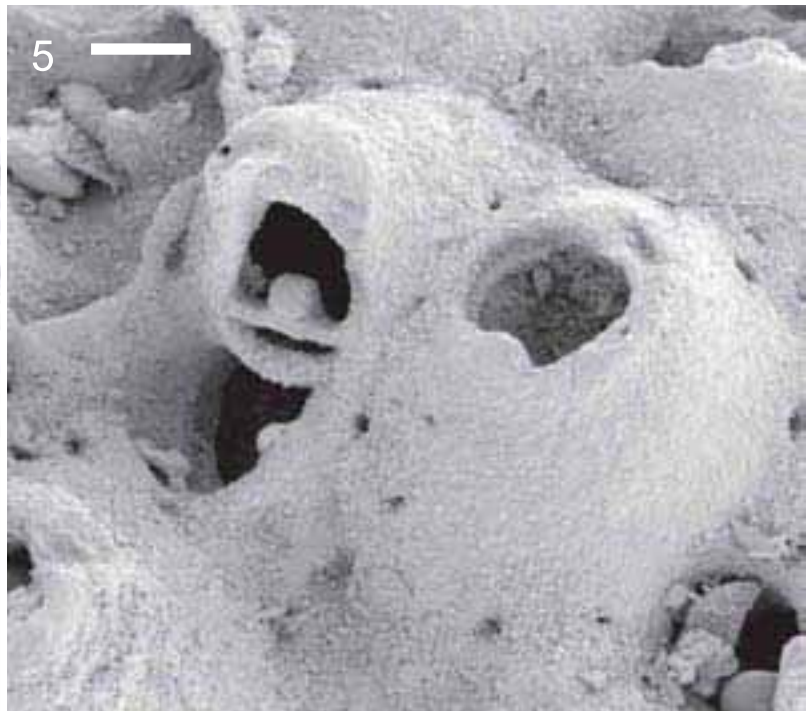
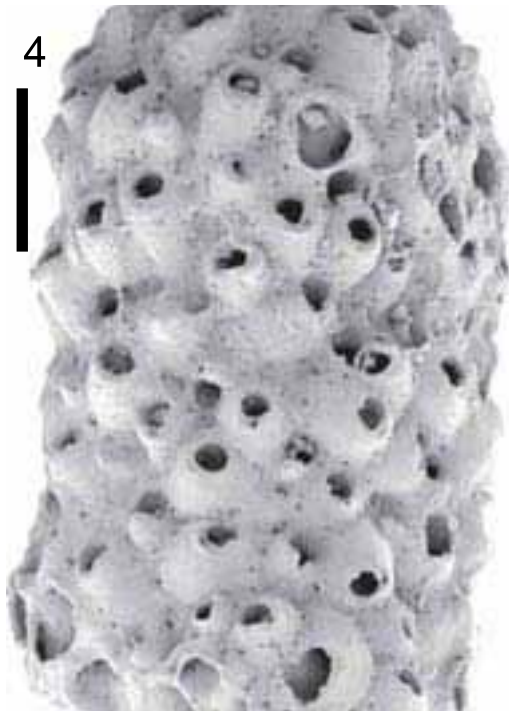
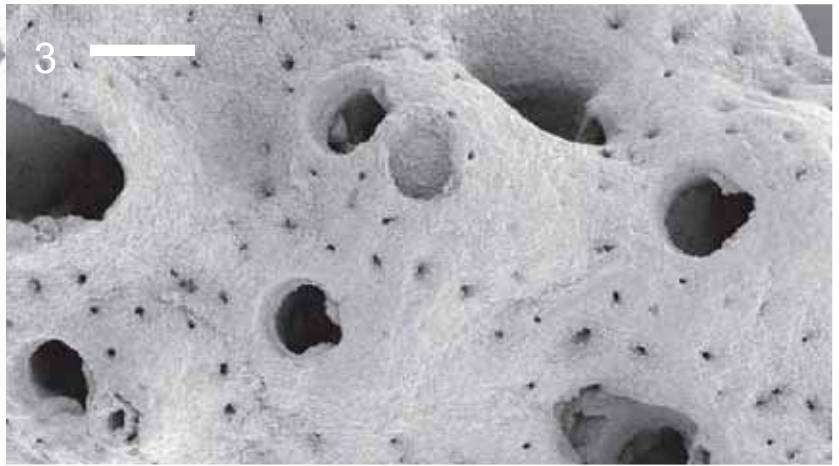
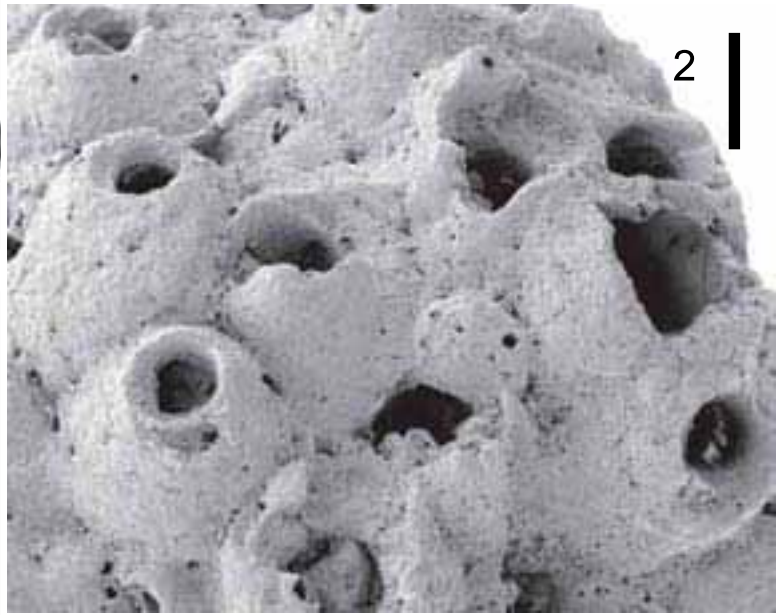
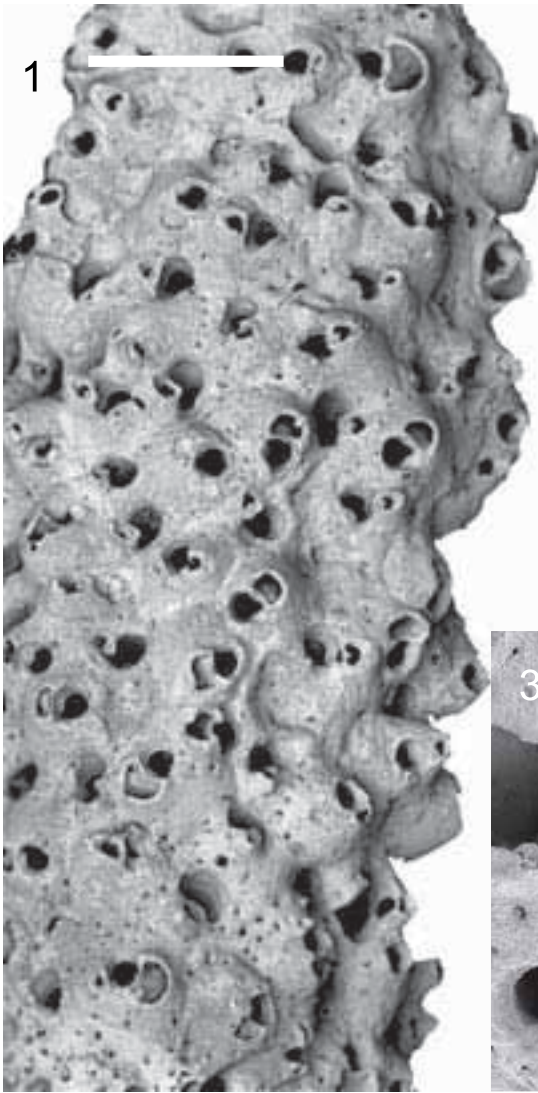


PLATE 126



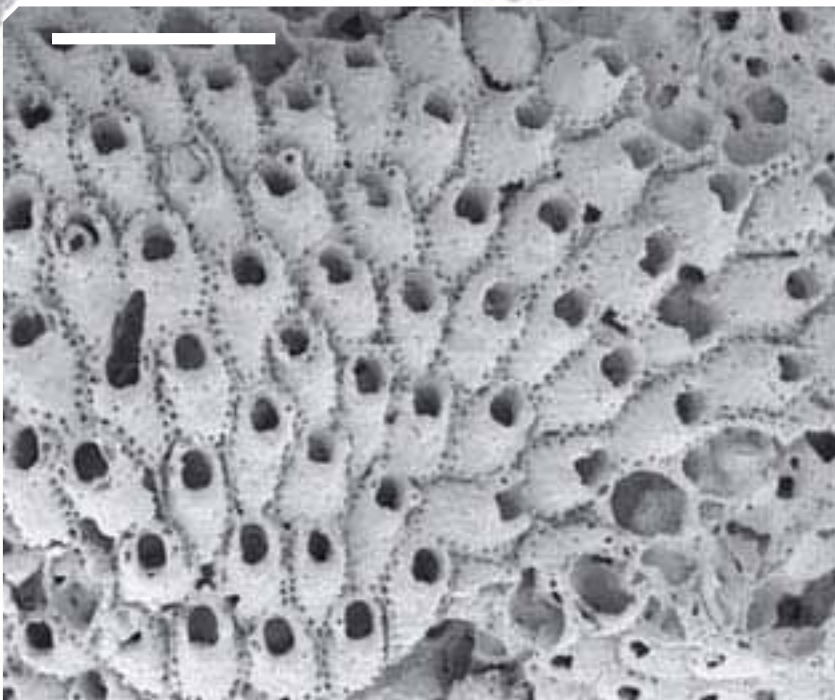
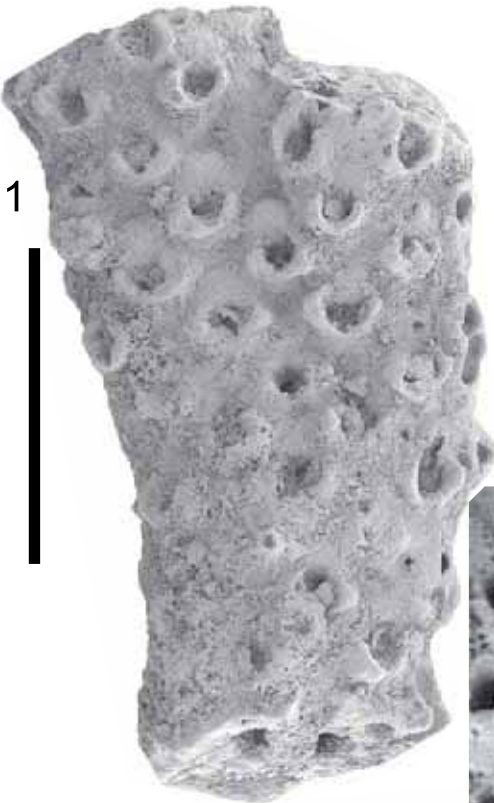
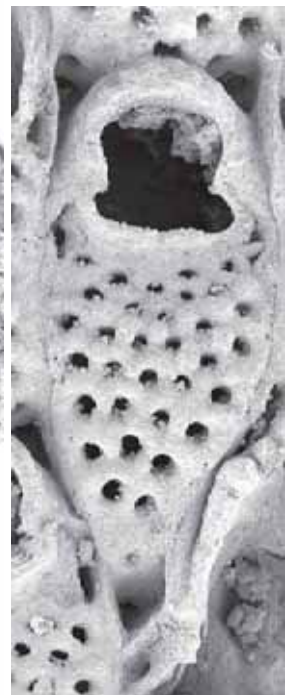
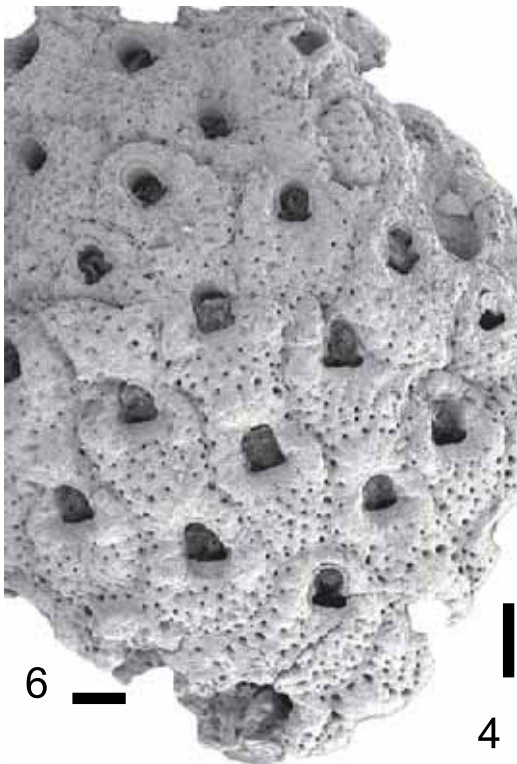
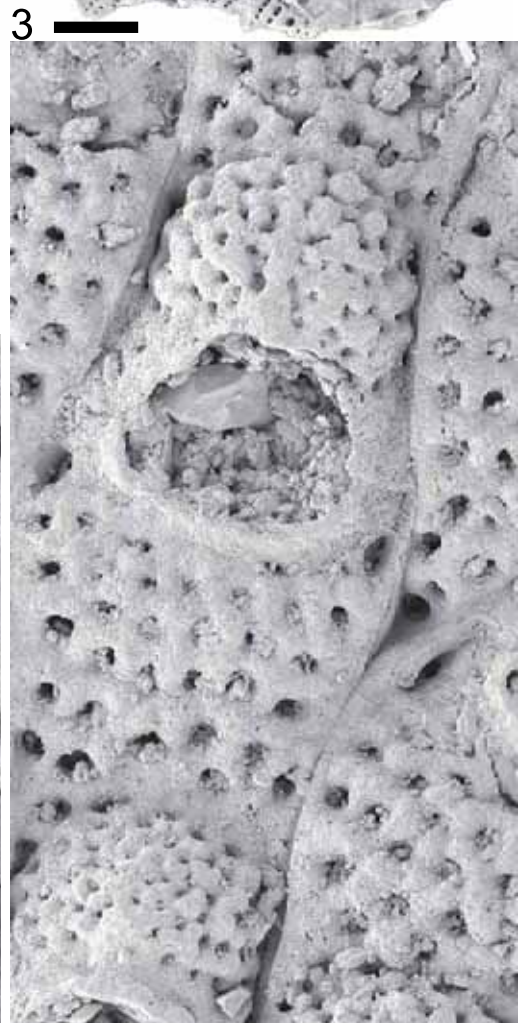
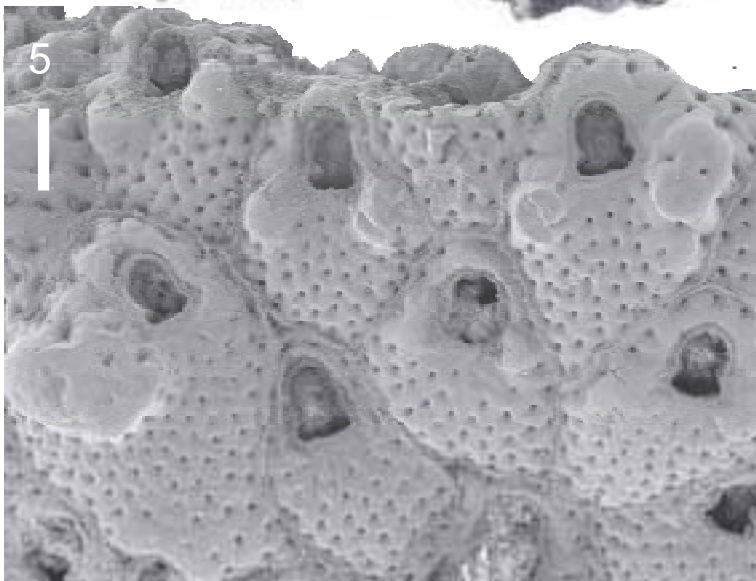
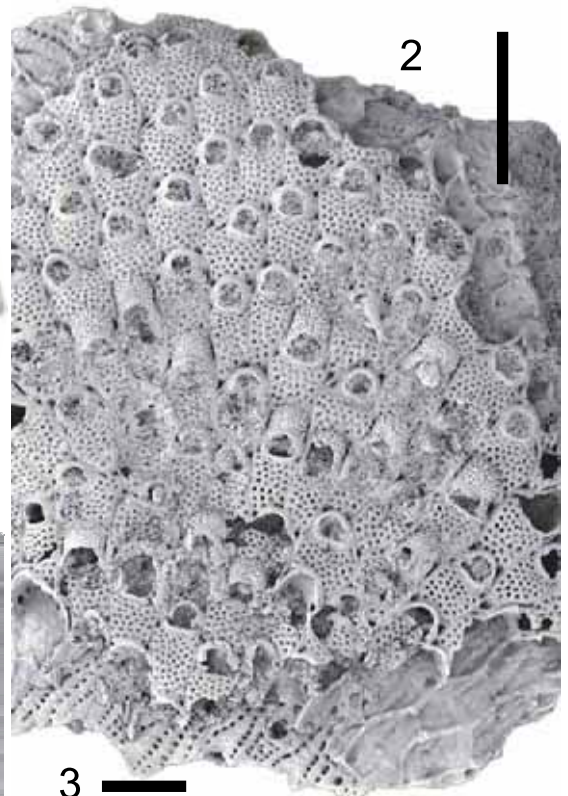
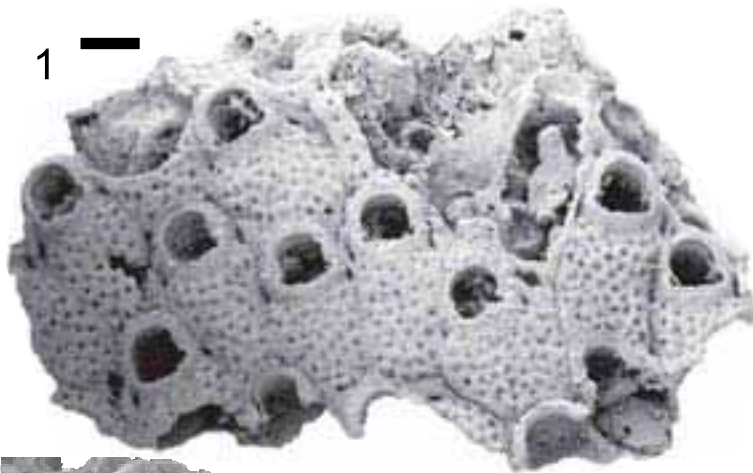


PLATE 128



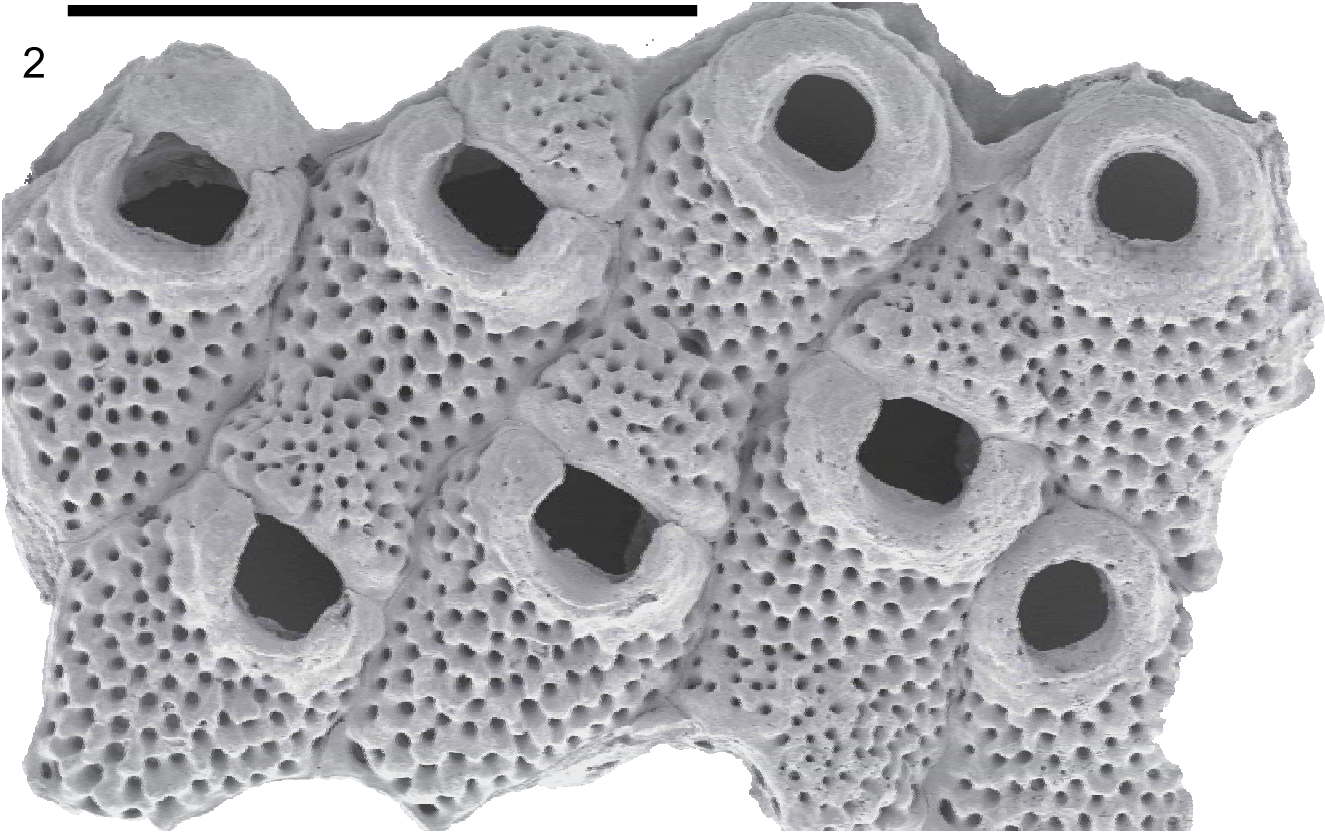
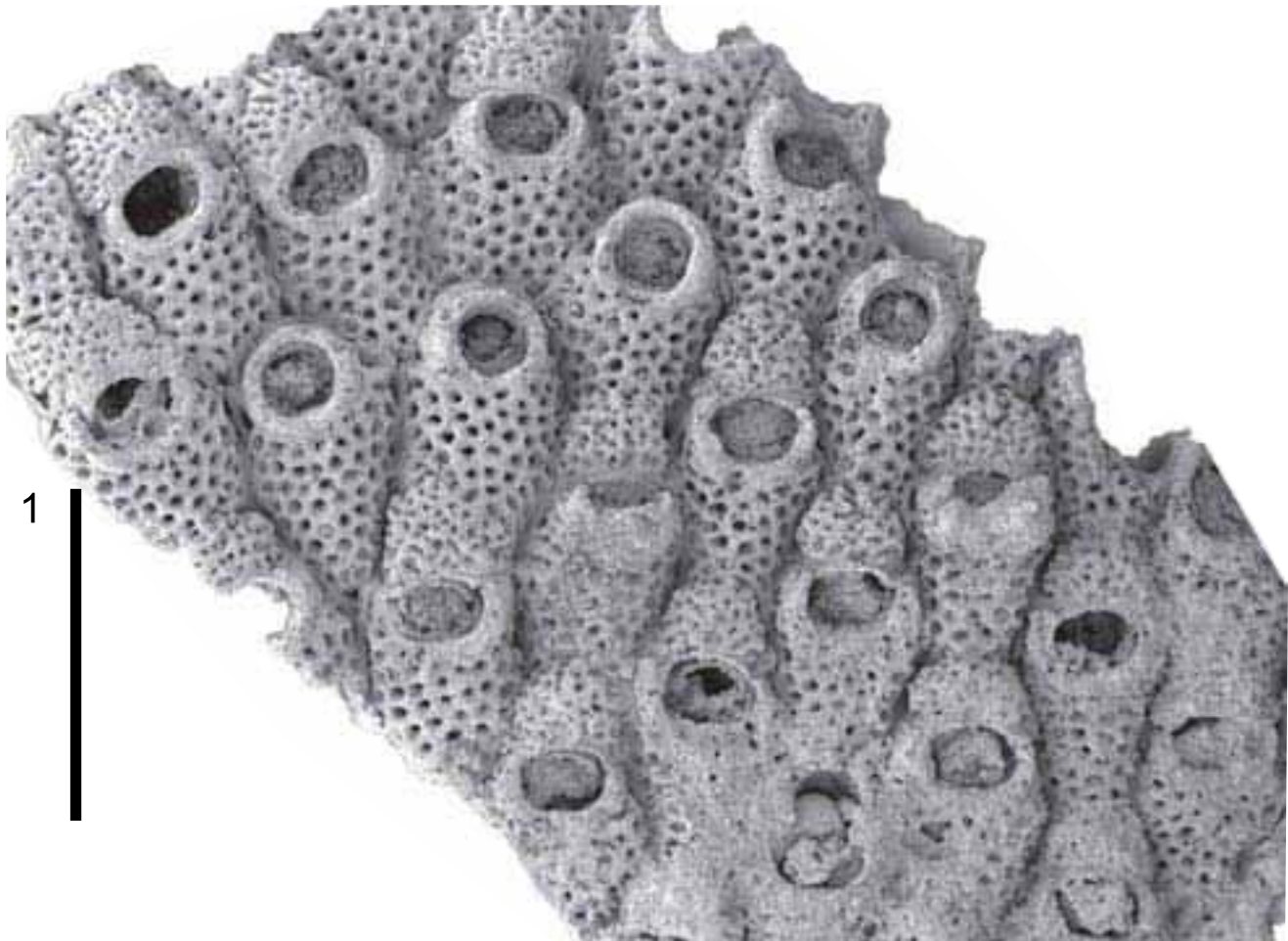
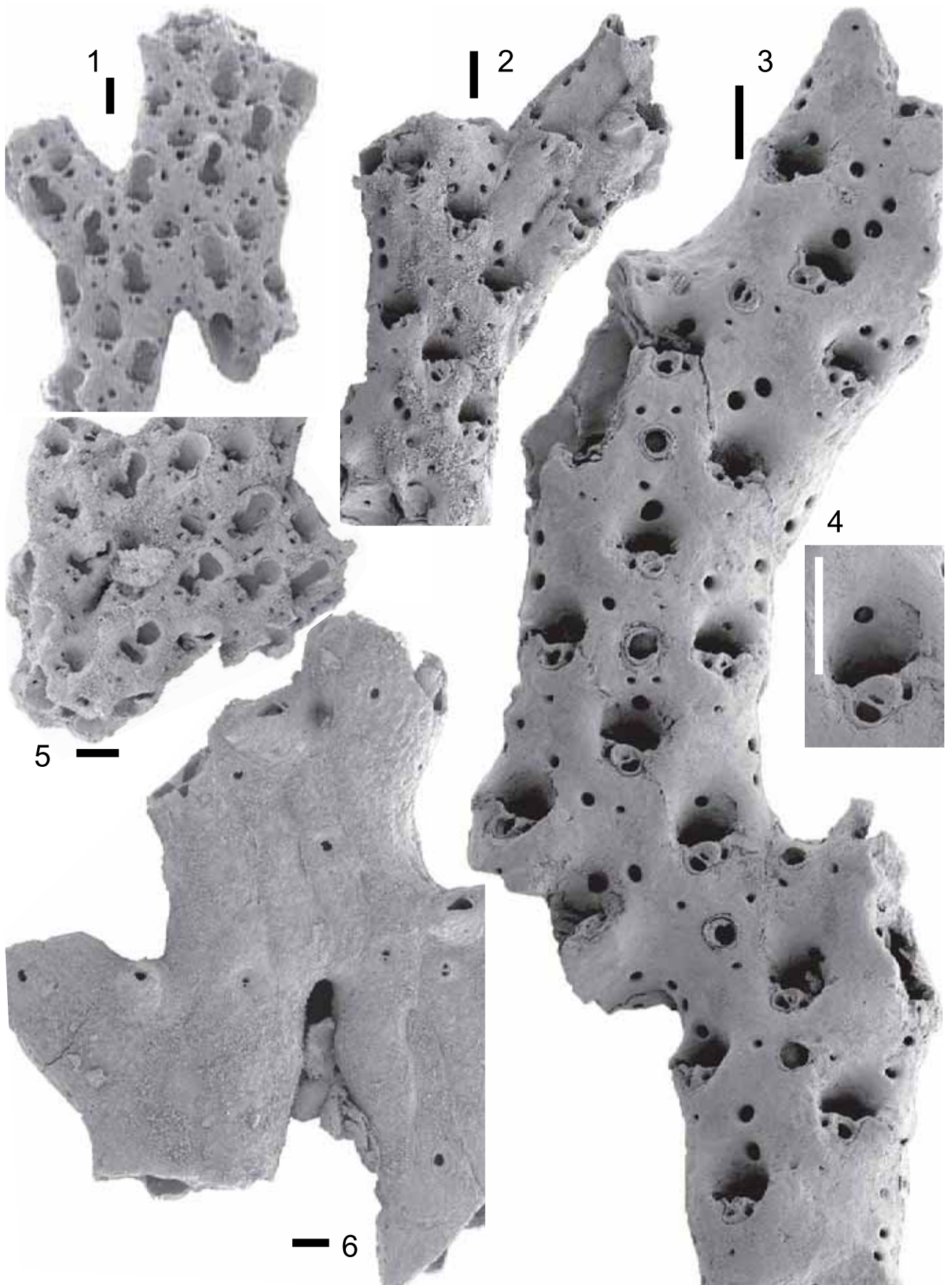


PLATE 130



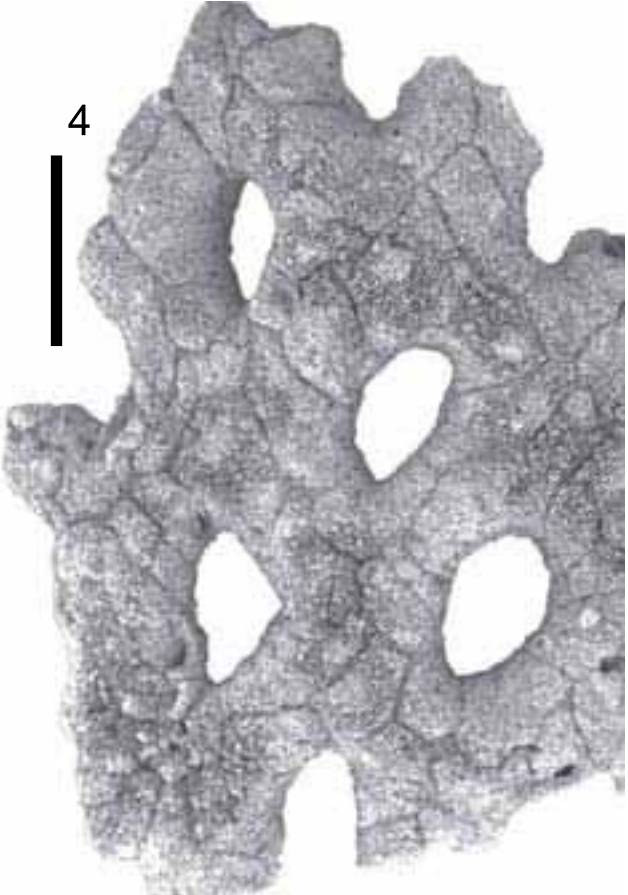
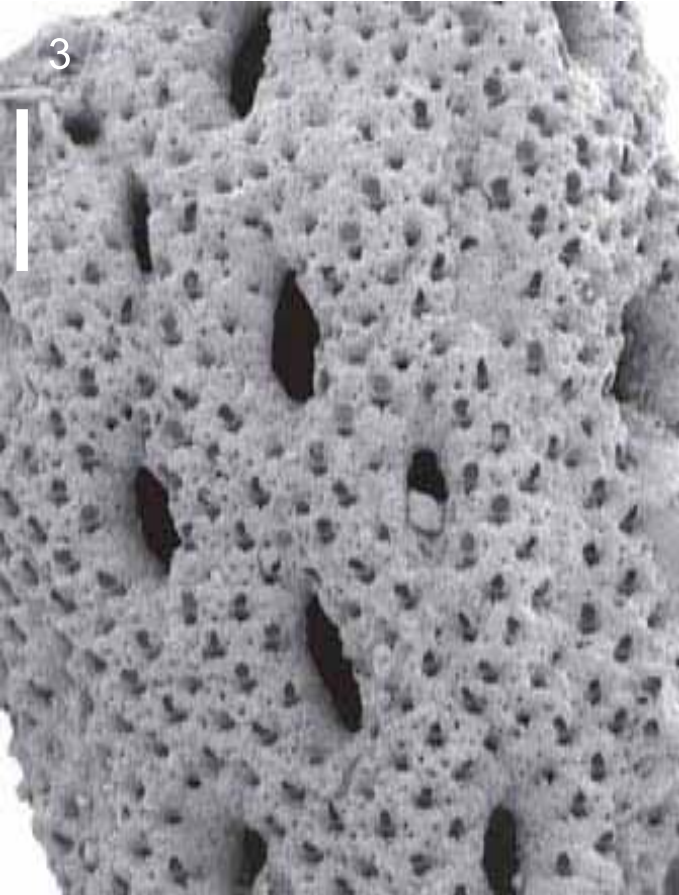
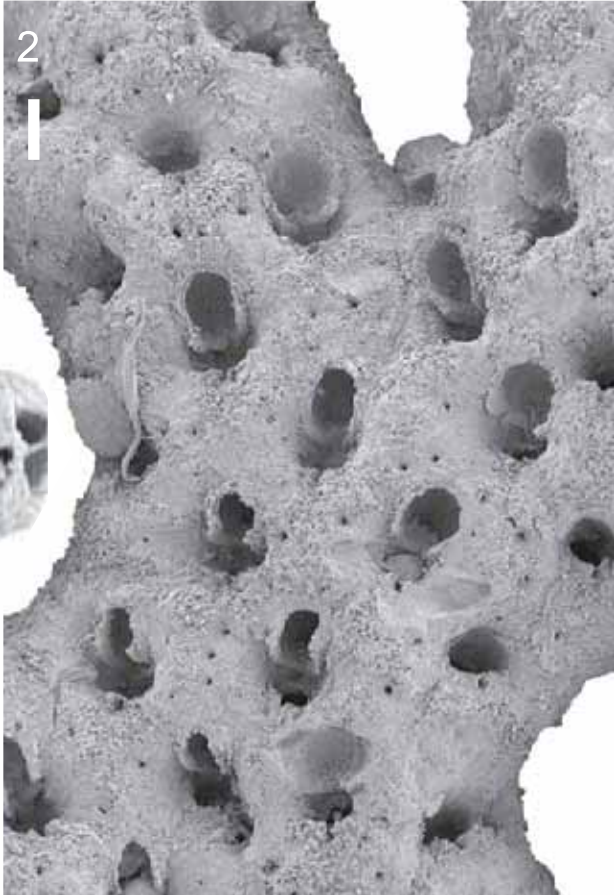
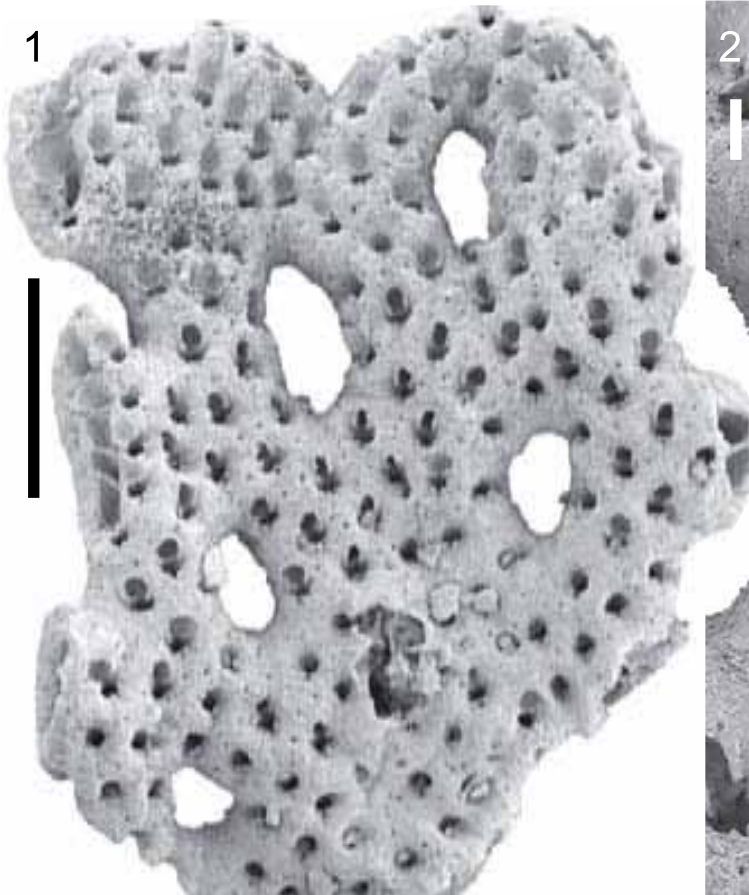
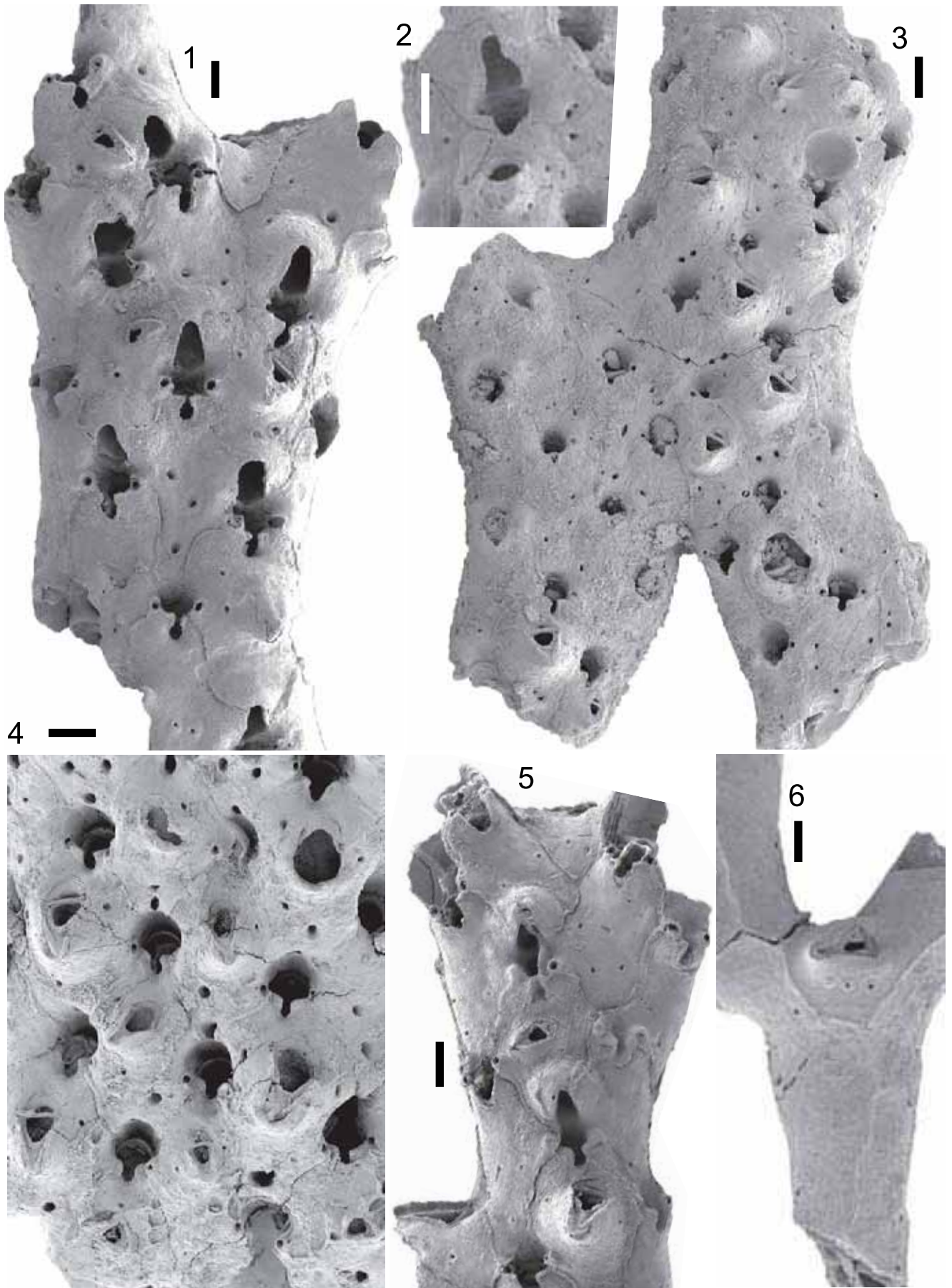
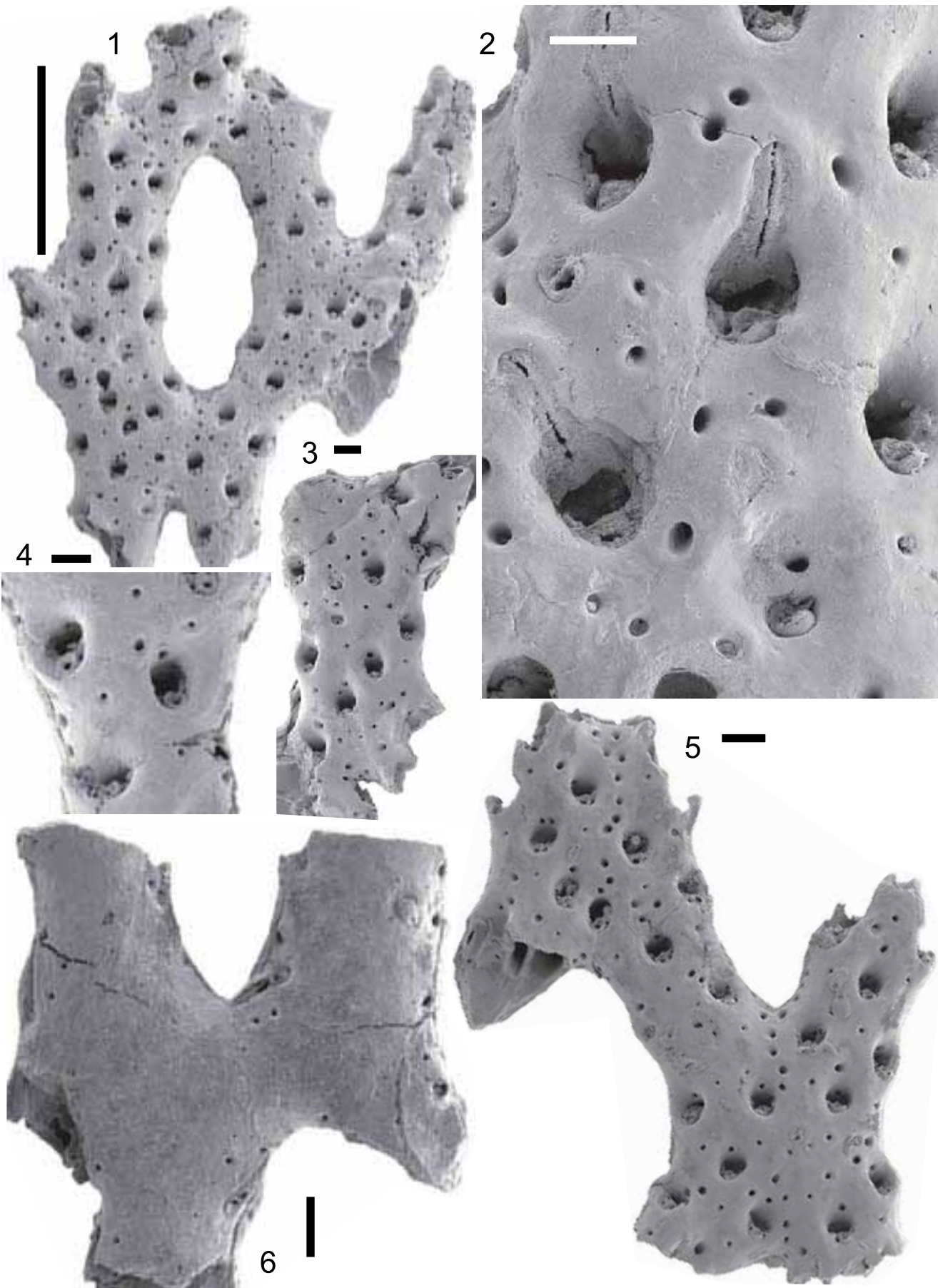
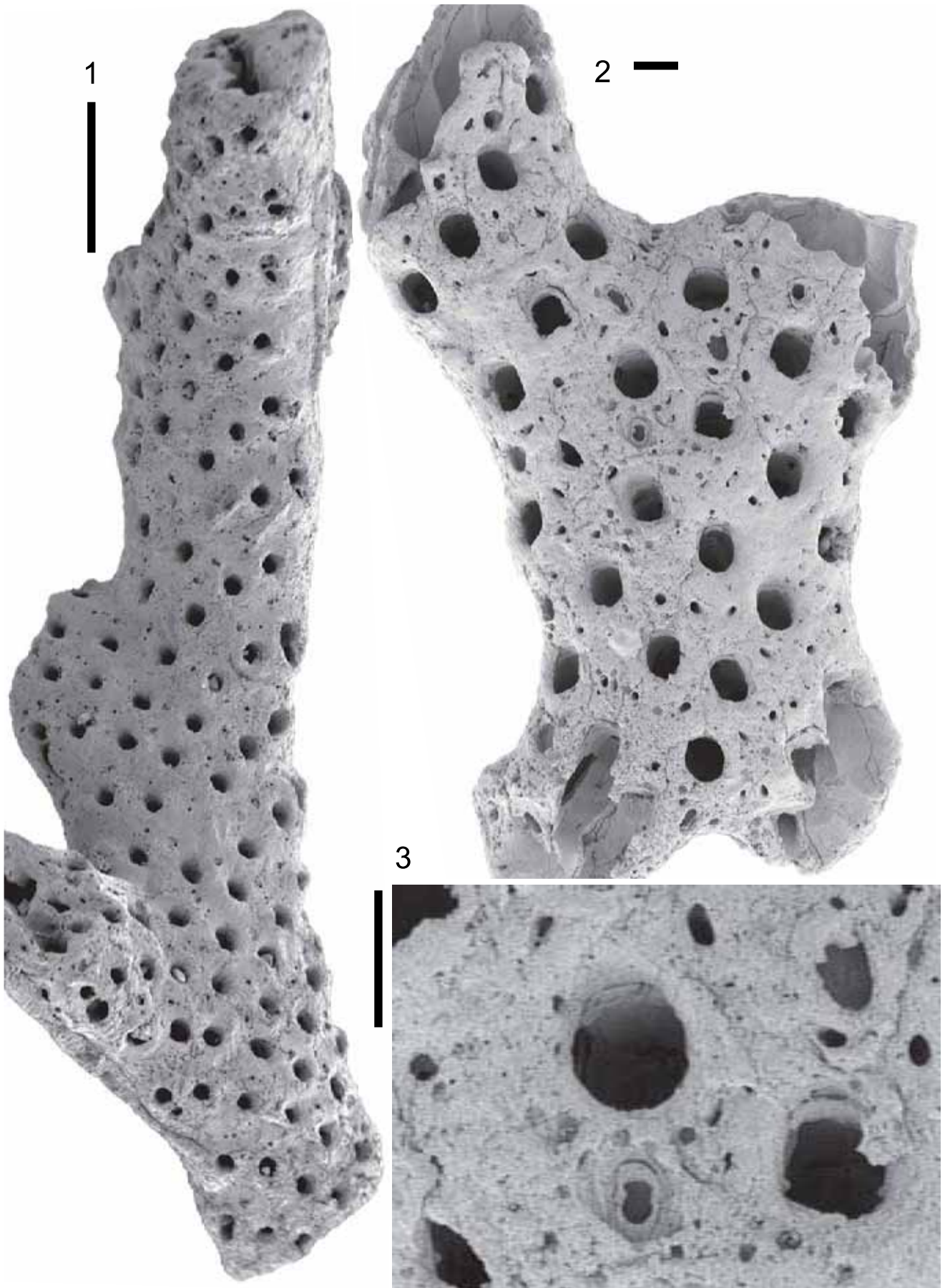


PLATE 132







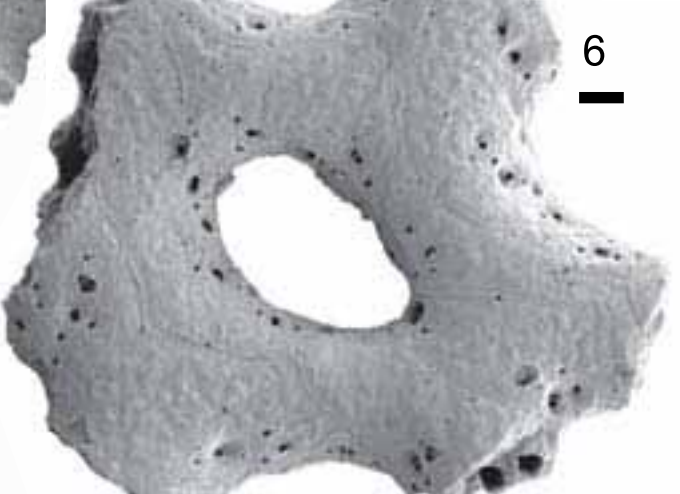
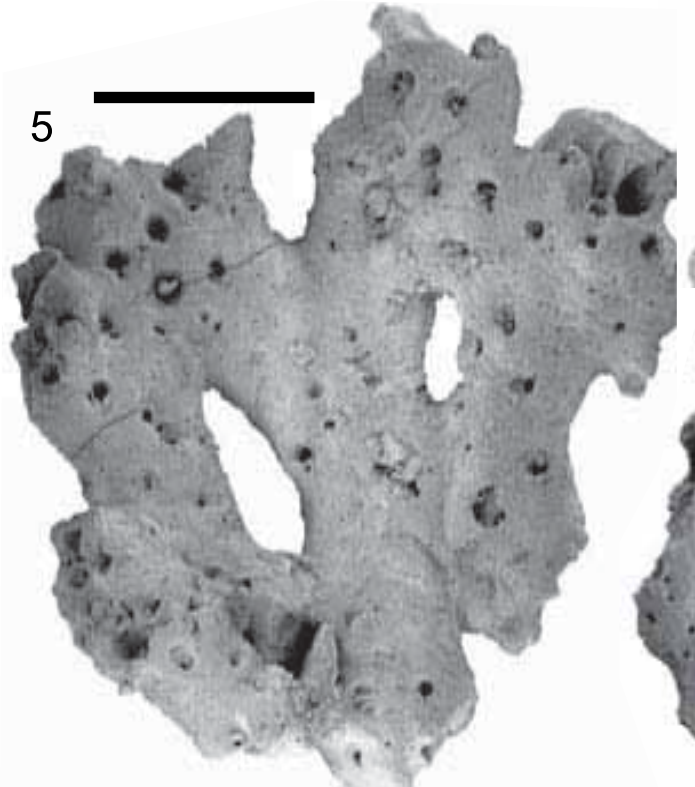
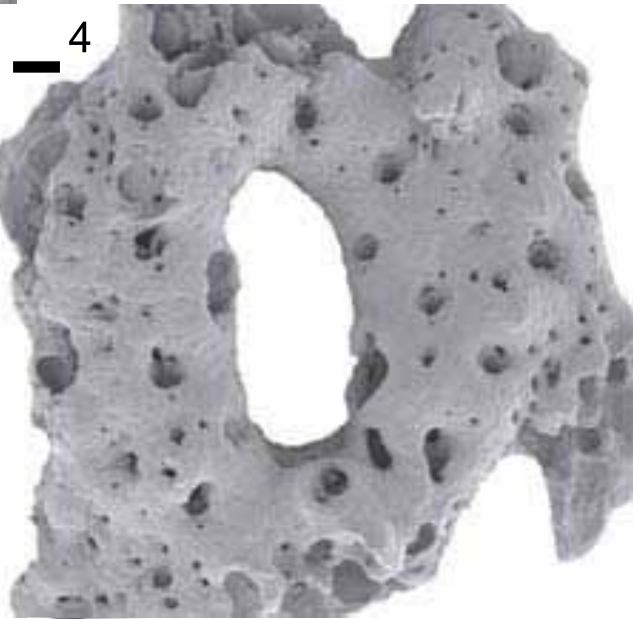
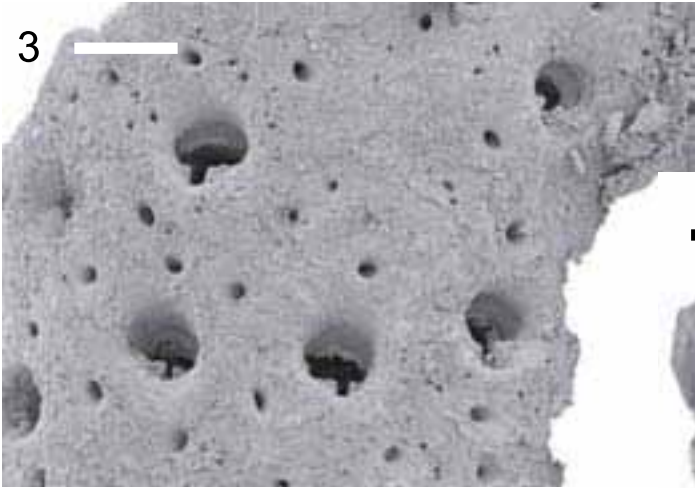
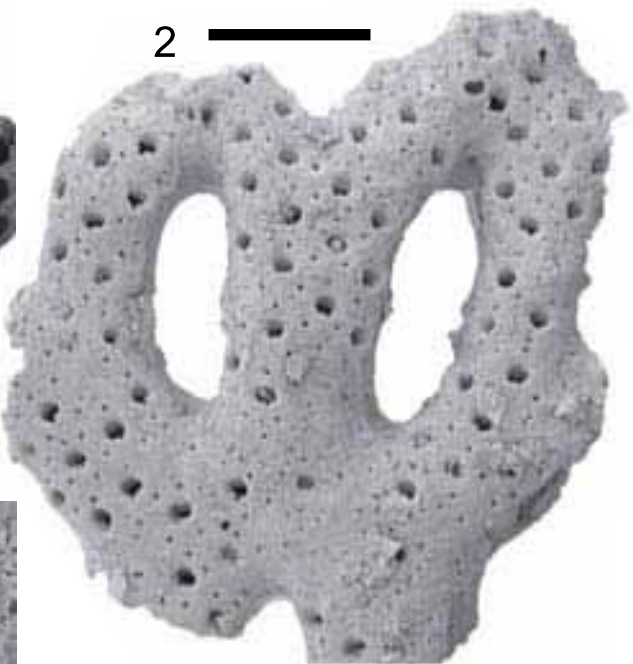
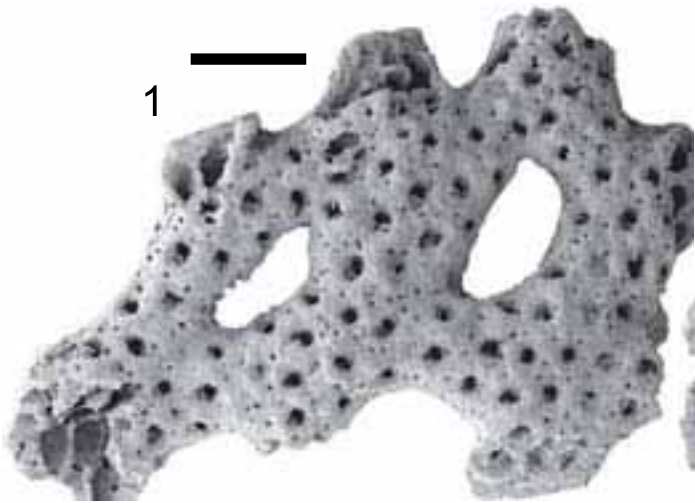
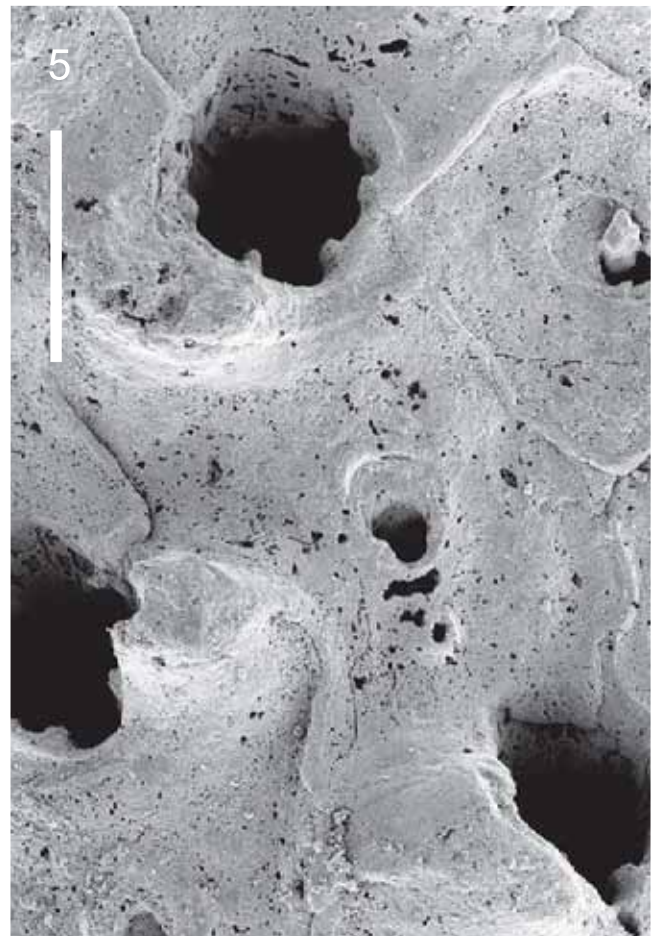
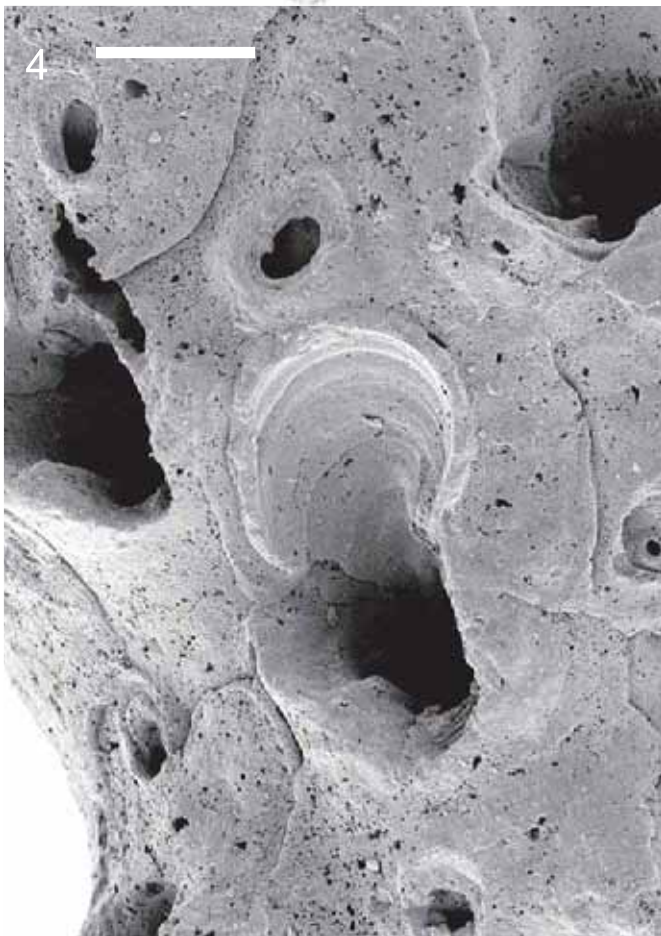
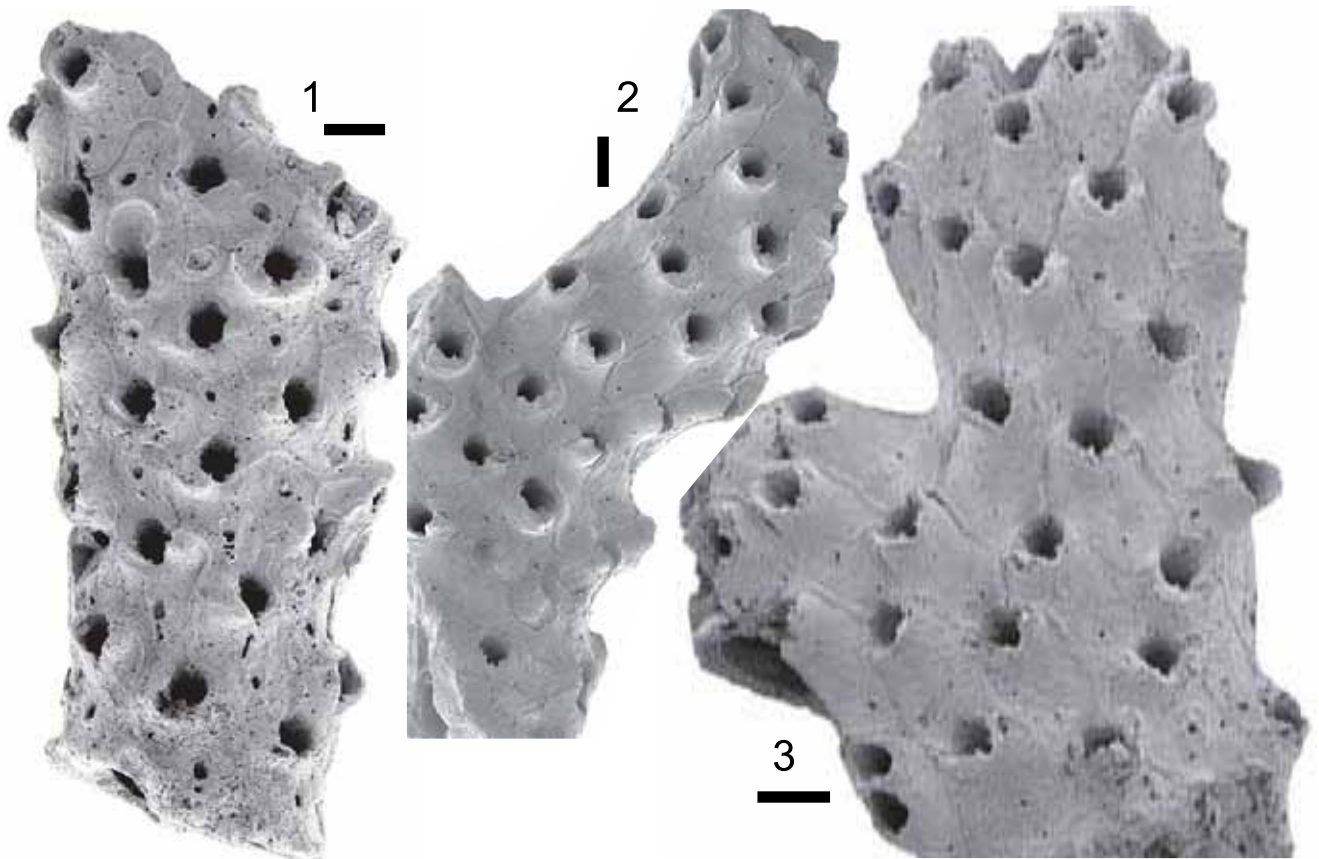


PLATE 136



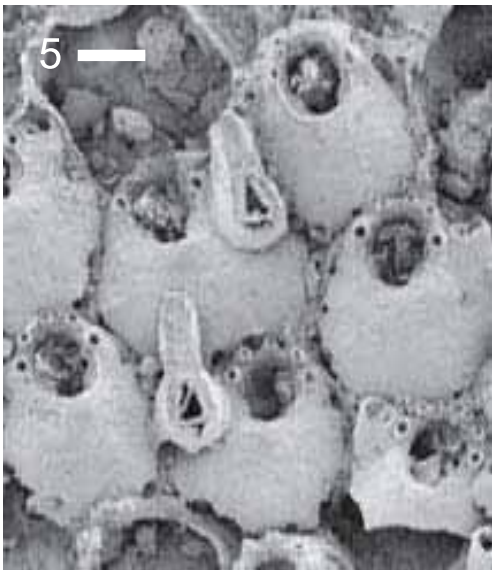
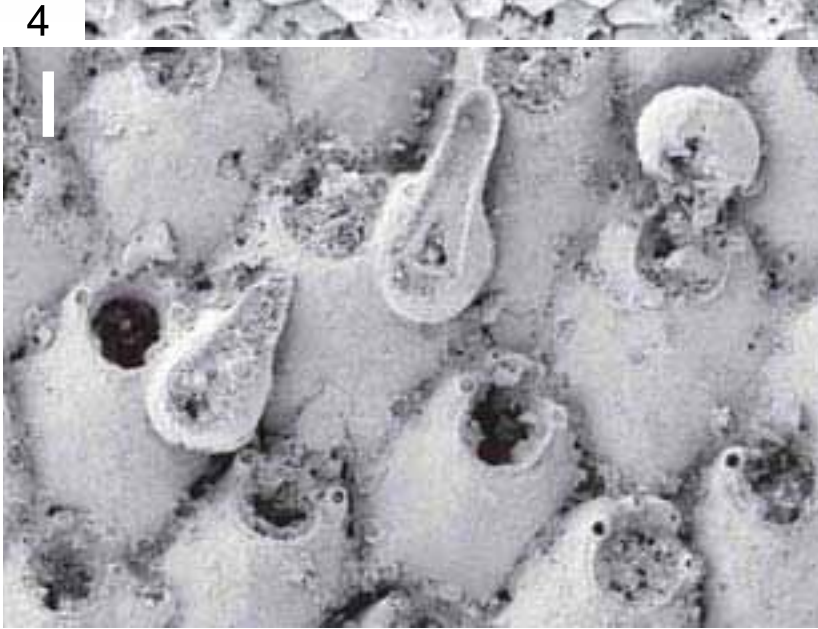
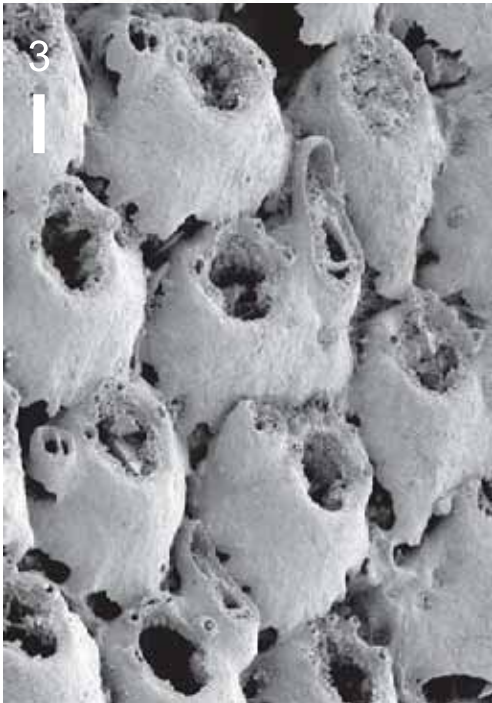
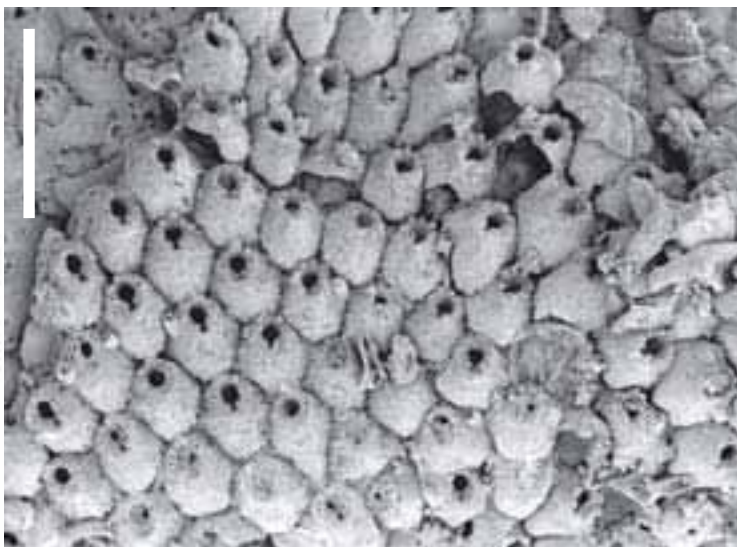
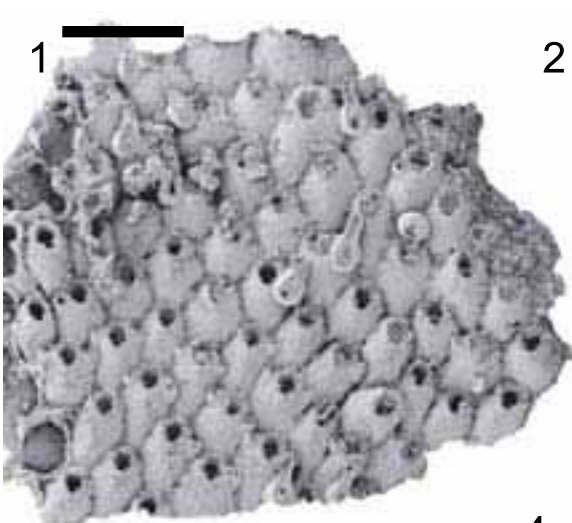
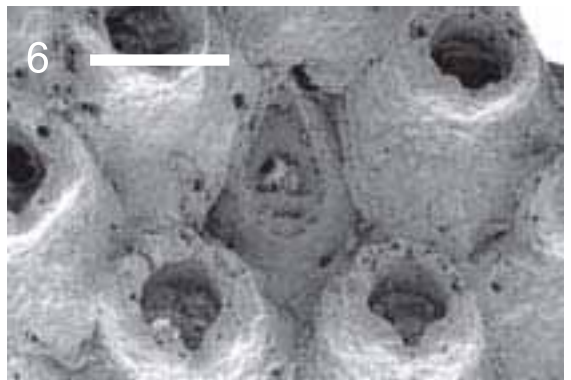
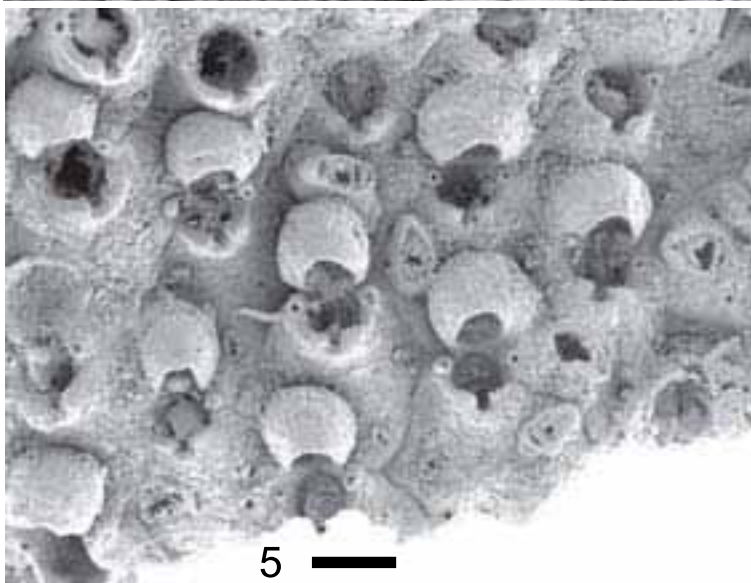
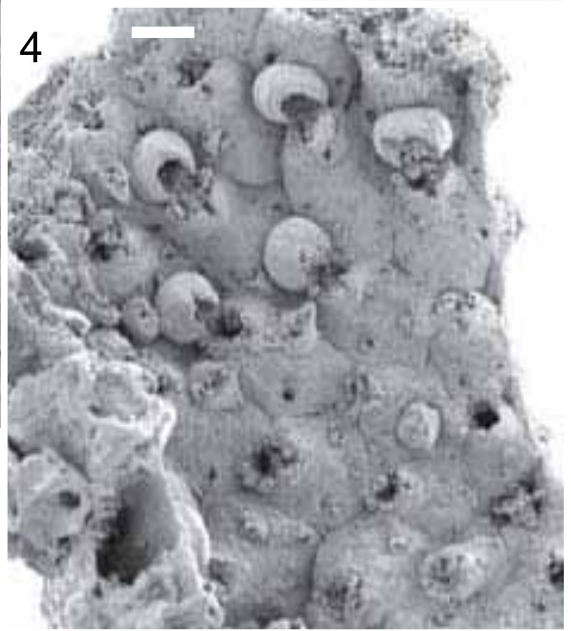
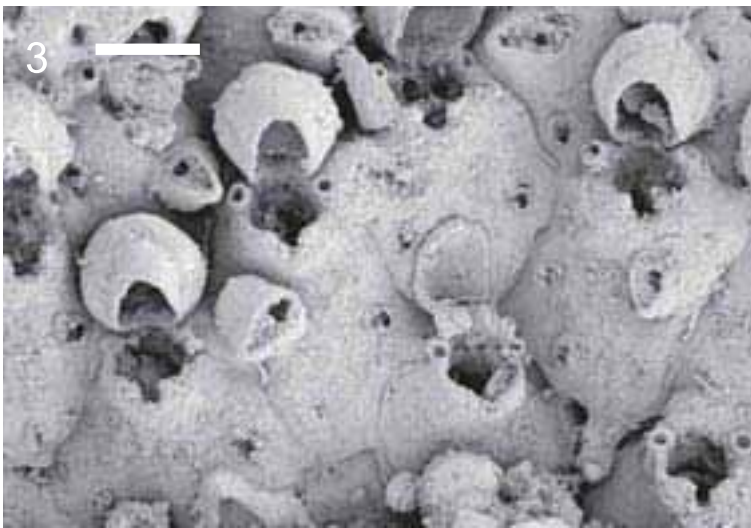
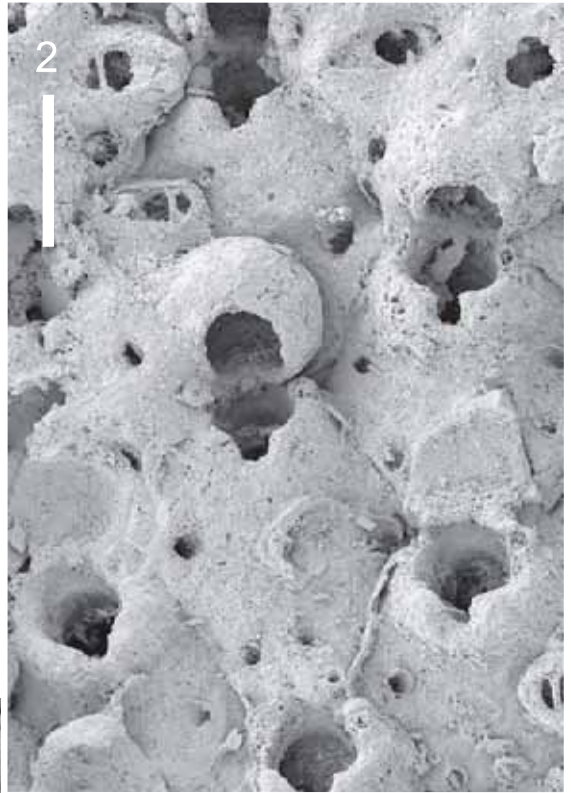
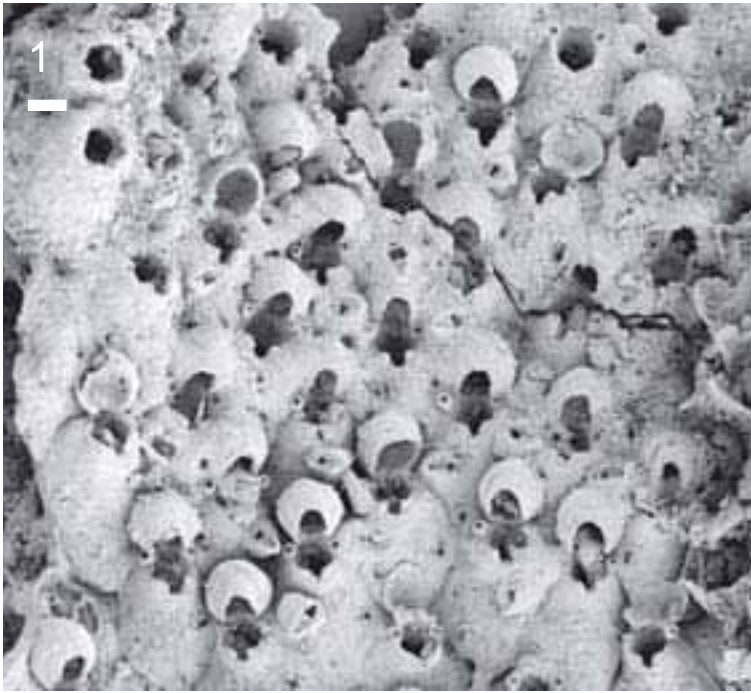


PLATE 138



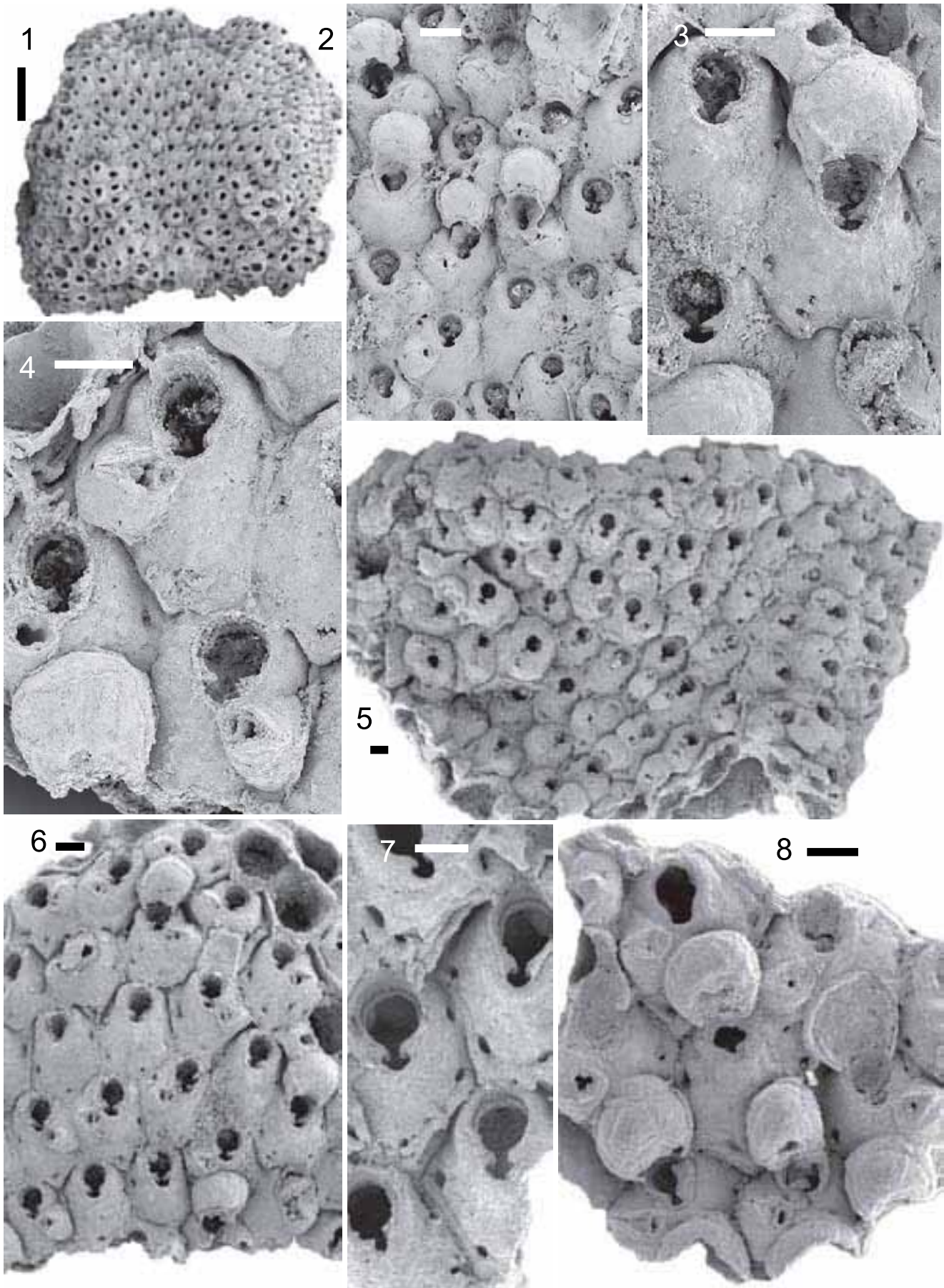
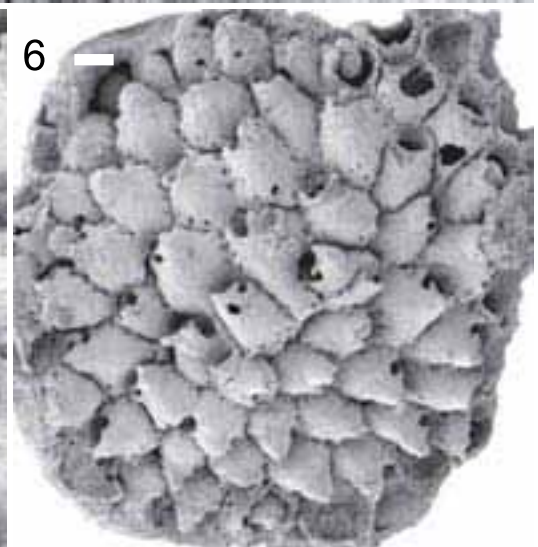
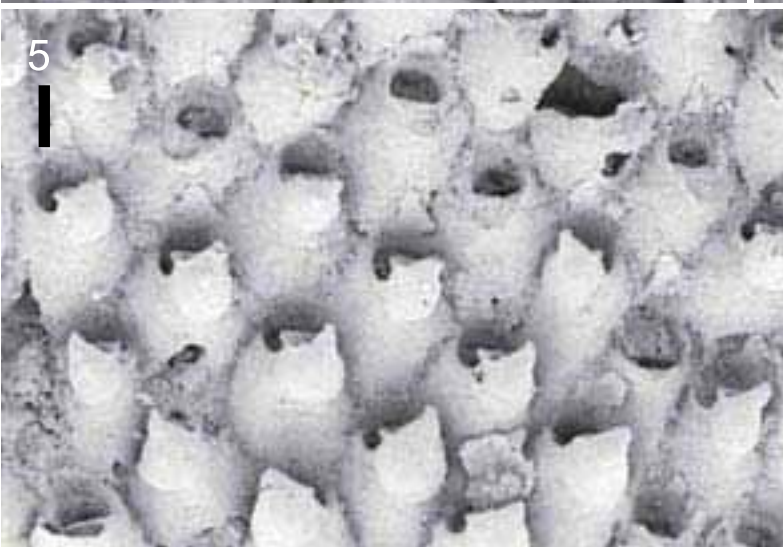
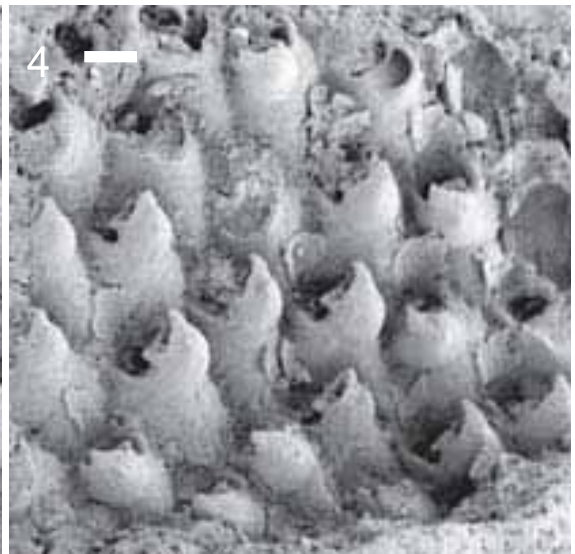
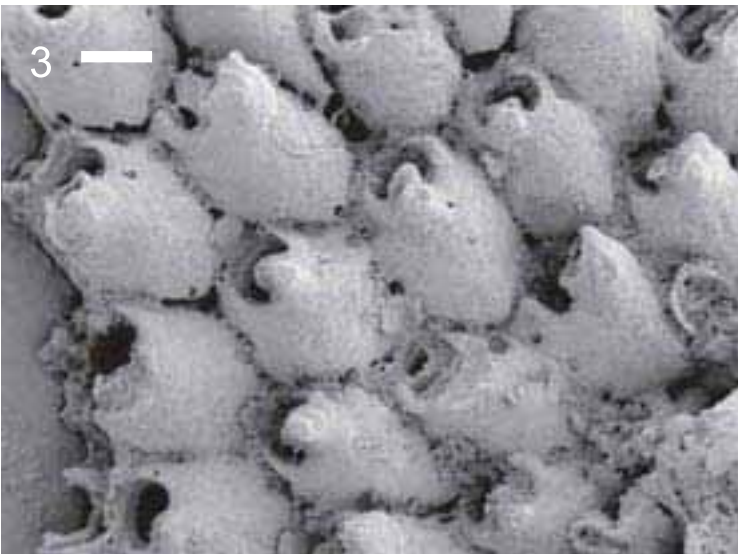
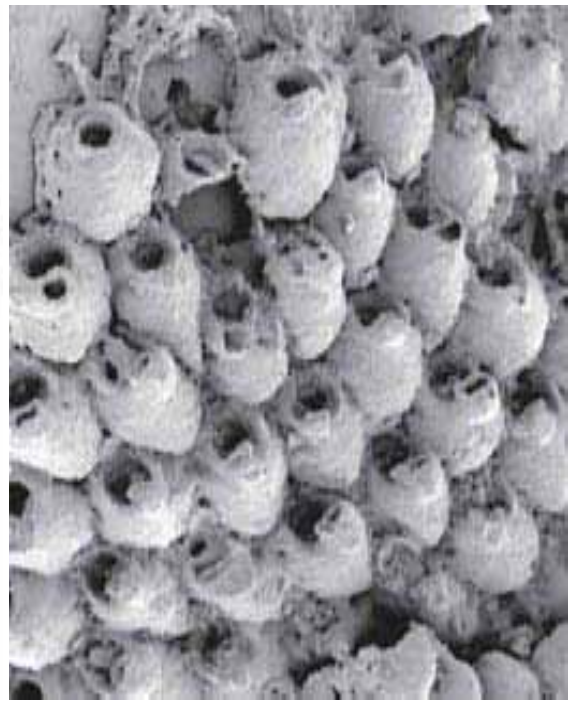
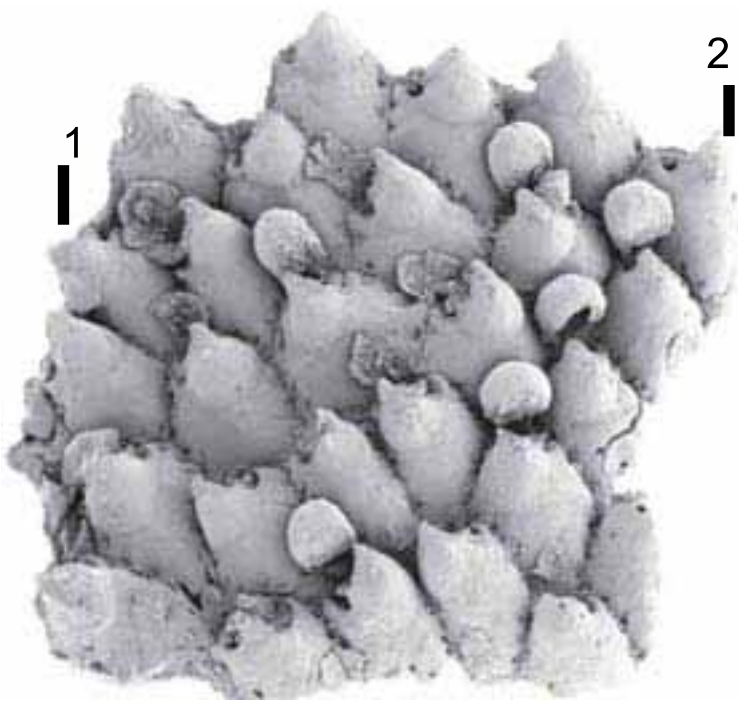


PLATE 140



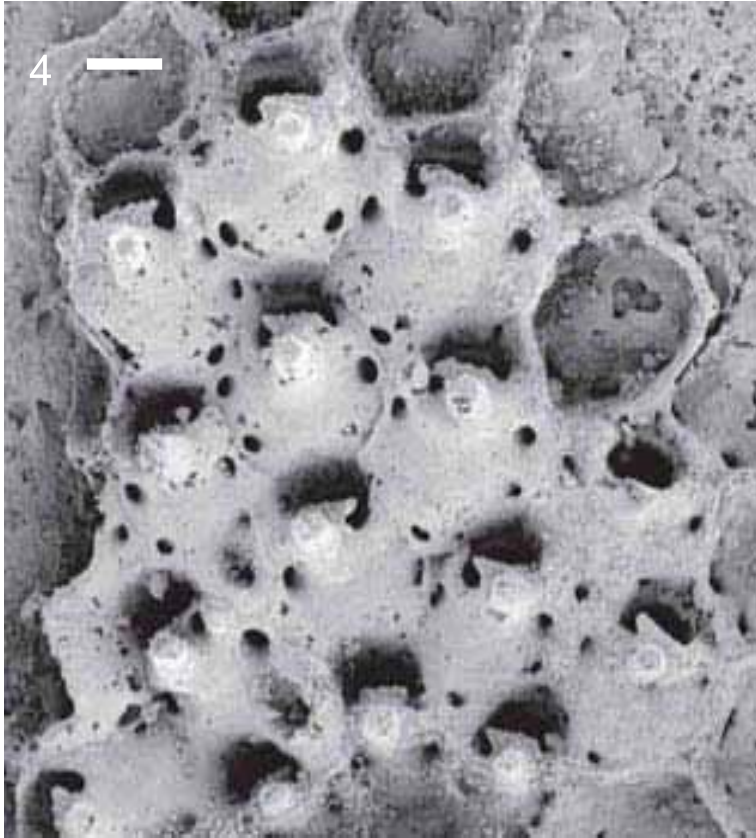
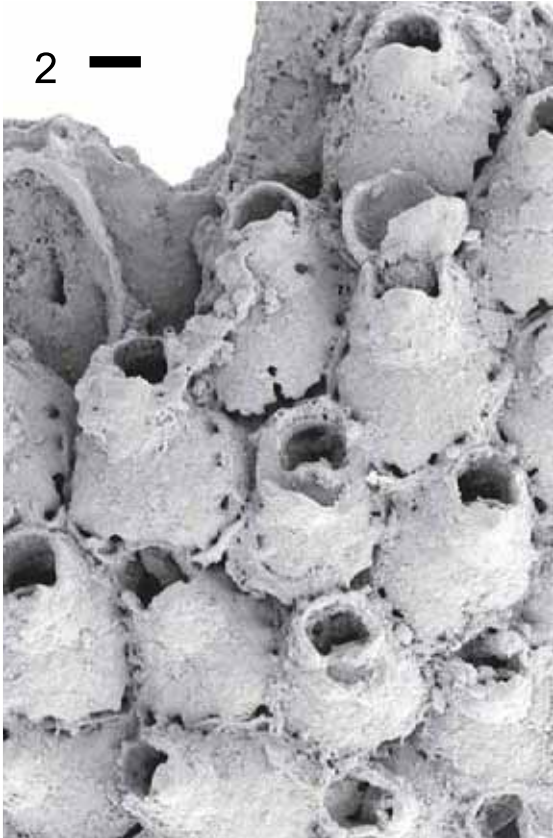
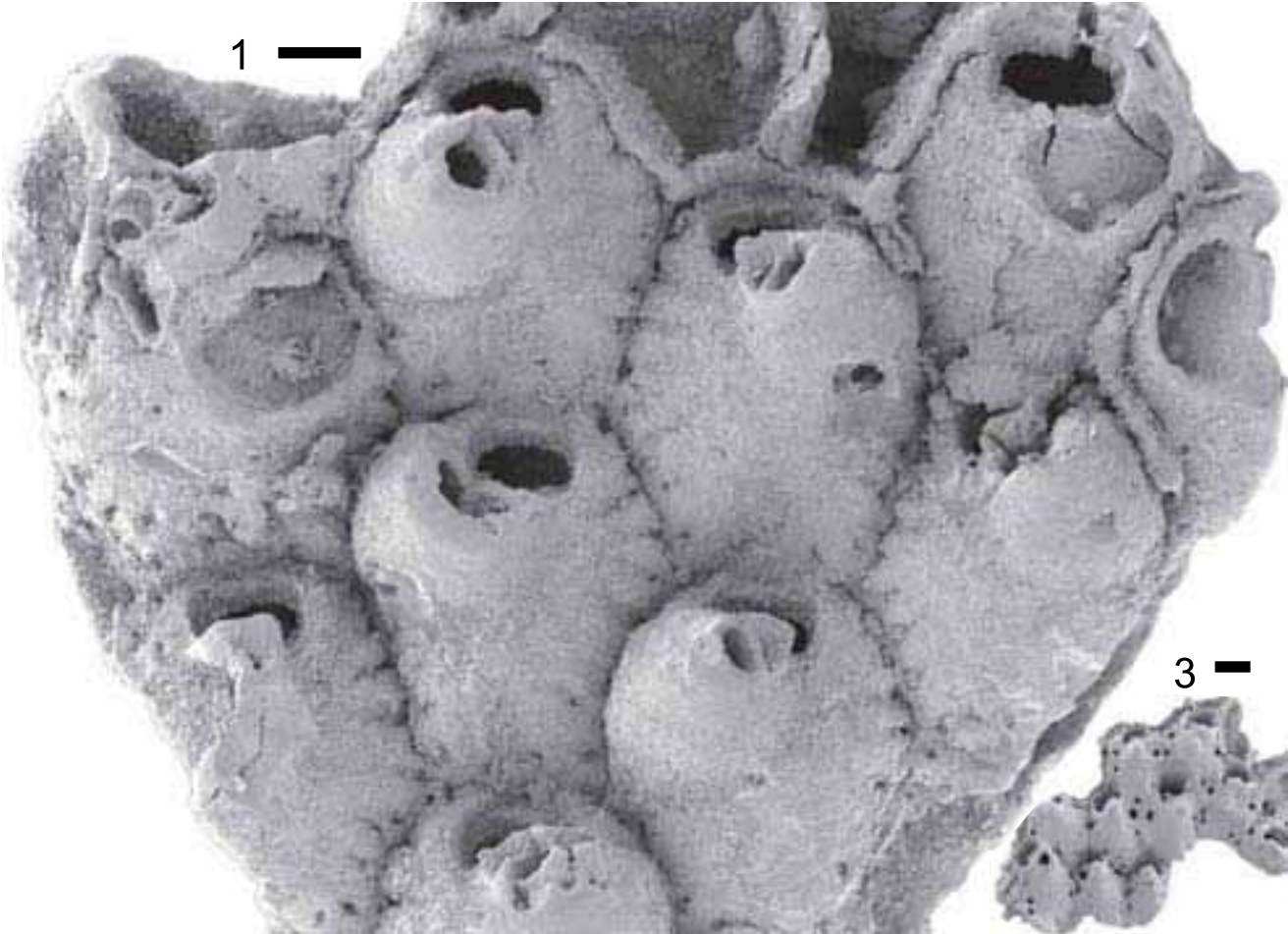
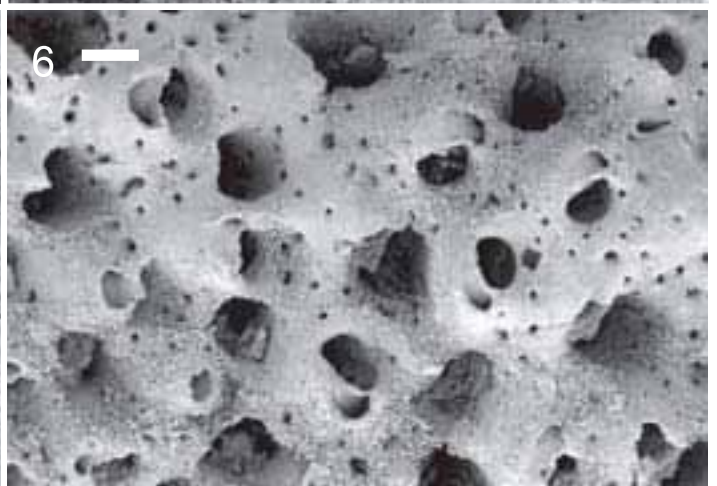
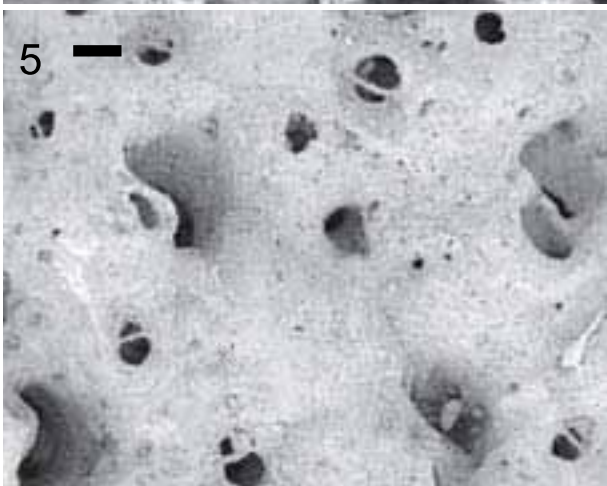
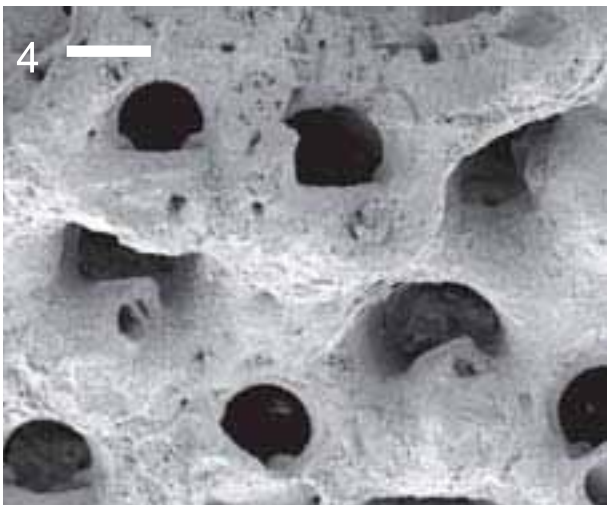
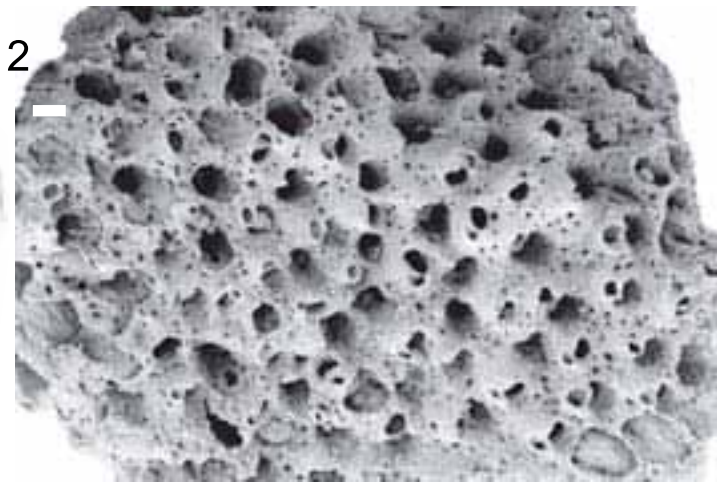
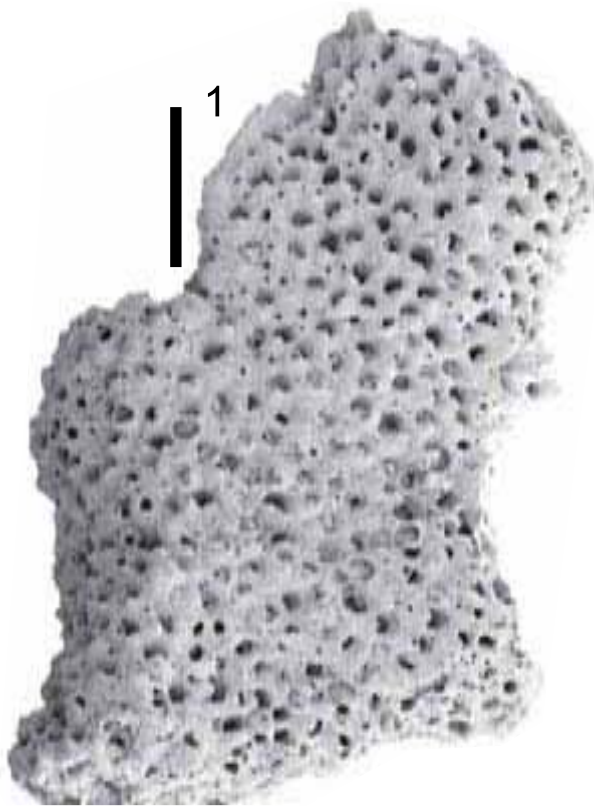
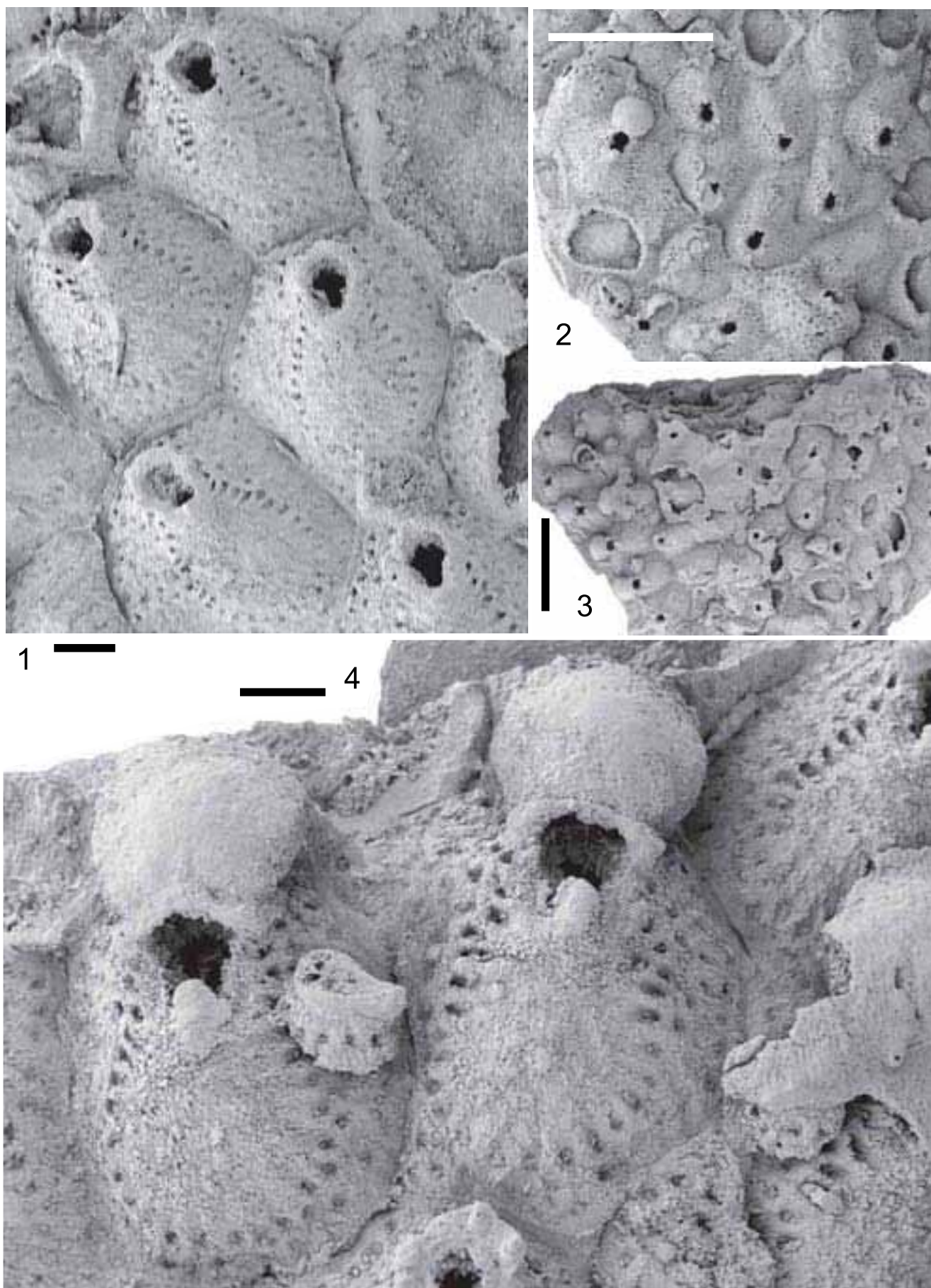


PLATE 142





GUIDE FOR AUTHORS

Acta Musei Nationalis Pragae, Series B – Historia Naturalis, Sborník Národního muzea v Praze, řada B – Přírodní vědy, publishes original scientific monographs and articles of larger sizes that have not been published elsewhere.

General requirements:

Texts in English are preferred. Manuscripts are accepted in DOC or RTF format on a common data medium (CD, ZIP, FDD 3.5) or via e-mail (as an attachment sent to the editor's address). In all cases, one hardcopy (A4 of proper print quality) is also required. **Text requirements:** Left-hand alignment, double vertical spacing, single standard font (e.g.: Times New Roman, Courier New), font size 12, without hyphenation or any embedded images, with low double quotation marks (" "). References to other authors within the text should consist of the last name only, and should be written in small capitals (not full capitals) (e.g.: STERNBERG, 1820). No *italics* except for Latin names of genus- and species-groups. If notes are required, use endnotes instead of footnotes.

Manuscript arrangement: Title page should contain: (1) title of paper, (2) names and address(es) of author(s), (3) bibliographic information arranged as follows: Novák, J. et Jones, K. L. (1995): Title of paper (see (1)). – Acta Mus. Nat. Pragae, Ser. B, Hist. Nat., 50(1-4): 12-95, Praha. ISSN 0036-5343., (4) English abstract (max. 200 words), (5) key words in English (max. 15 words). The main text (6) shall be followed by (7) list of references, (8) endnotes, if any, (9) tables with captions, (10) text-figure captions, and (11) photographic plate captions.

References: The list of references must contain all publications cited the text, listed alphabetically according to authors' names (see examples below). Papers published in Czech and other non-congress languages are recommended to be referred to in the original language of the paper, but with an English translation in square brackets (see example D below) and the language identification given in round ones [e.g. (in Czech) and/or (with German summary) etc.]. For citations of papers published in non- Latin alphabets, the author should transfer the title into the Latin alphabet using transliteration. Author must also specifically cite publications issued in electronic journals or periodicals, not just the web-site (see E below).

Examples of references:

- (A) Drinnan, A. N., Crane, P. R., Friis, E. M., Pedersen, K. R. (1990): Lauraceous flowers from the Mid-Cretaceous of eastern North America. – Bot. Gaz., 151(2): 370-384.
- (B) Macák, F. (1966): Křídový útvar v sz. Čechách (svrchní turon až santon); Kandidátská práce. – MS, ČGS: 1-82. Praha.
- (C) Nováček, J., Nováčková, A. (1988): Malá čísla. – In: Novák, J. (ed.): Biometrika, Academia, Praha, pp. 20-40.
- (D) Samylina, V. A. (1956): Novyje cikadofity iz mezozoiskich otloženij Aldana [New cycadophytes from the Mesozoic sediments of the Aldan River]. – Bot. Žurnal, 41: 1334-1339 (in Russian).
- (E) Tychsen, A., Harper, D. A. T. (2004): Ordovician-Silurian distribution of Orthida (Palaeozoic Brachiopoda) in the greater Iapetus ocean region. – Palaeontologia Electronica, 7(1): 15pp. <http://palaeo-electronica.org>.
- (F) Velenovský, J. (1885): Die Gymnospermen der böhmischen Kreideformation. – Ed. Grégr, Prag, 34 pp.

Illustrations:

Text figures: Final figure and diagram scales will be fitted to the width of a text column (84 mm) or page size (174 x 238 mm). All symbols should be suitable for final size reduction, and the submitted figures must not be smaller, or more than double, the required size. Line drawings are accepted in computer-drawn (600, or rather 1200 dpi) or hand-drafted form. The latter must be drawn in black ink on high-quality white card. Diagrams are accepted as XLS (source data containing), TIFF or EPS, tables as separate DOC or XLS files (e.g., „tab1.doc“, „tab2.xls“..). If greyscale is used, figures should be submitted in 1:1 scale (see column/page size above).

Plates: Photos are accepted mounted onto white cards of print-page-size (see above). Numbering or lettering must be designated on an accessory copy or a clear sketch. One high-quality copy should be added.

Photos in electronic format are preferred. These must meet the following requirements: greyscale or colour (CMYK), minimal resolution 300 dpi (600 dpi is preferred), of print size or slightly larger, mean contrast. The scale and position of all photographs must be clearly stated. Scale is given either by a scale bar or numerically (e.g., „25x“) in the caption. Authors are encouraged to arrange their plates in electronic format by following the instructions given at <http://www.nm.cz/publikace.php>. When completing plates in the former or latter way, author should avoid large vacant areas and as far as possible sort figures from left to right and top-down. Scales should be as unified as possible.

Manuscripts conforming to these requirements will be sent to at least two independent reviewers. Acceptance of the manuscripts will be decided upon by an editorial board. All accepted texts will be sent for language editing. The author will be given 50 separate copies and a PDF file of the paper.

Manuscripts should be sent to the Editor-in-Chief, Dr. Jiří Kvaček, paleontologické oddělení, Národní muzeum, Václavské nám. 68, 115 79 Praha 1, tel.: (+420) 224 497 239, fax: (+420) 224 226 488, e-mail: jiri.kvacek@nm.cz.

58 (2002):

1. – 2. M. Mergl: Linguliformean and craniiformean brachiopods of the Ordovician (Třenice to Dobrotivá Formations) of the Barrandian, Bohemia.
3. – 4. K. Holcová: Silurian and Devonian foraminifers and other acid-resistant microfossils from the Barrandian area.

59 (2003):

1. – 2. F. Šifner: The family Scathophagidae (Diptera) of the Czech and Slovak Republics (with notes on selected Palaeartic taxa).
3. – 4. A. Krivograd Klemenčič – D. Vrhovšek: Algae in three different waterfalls in Slovenia – the Savica Waterfall, the waterfalls of the Krka River and a small waterfall on Pohorje. – M. Mergl: Silicified brachiopods of the Kotýs Limestone (Lochkovian) in the Bubovice (Barrandian, Bohemia). – R. J. Prokop – V. Petr: *Plasiacystis mobilis*, gen. et sp. nov. a strange "carpoid" (Echinodermata, ?Homoiostelea: Soluta) in the Bohemian Ordovician (Czech Republic). – J. Prokop – A. Nel: New fossil Aculeata from the Oligocene of the České Středohoří Mts. And the Lower Miocene of the Most Basin in northern Czech Republic (Hymenoptera: Apidae, Vespidae).

60 (2004):

1. – 2. Z. Kvaček: In memoriam RNDr. Erwin Knobloch (7.9. 1934 – 11.4. 2004). – Z. Kvaček – H. Walther: Oligocene flora of Bechlejovice at Děčín from the neovolcanic area of the České Středohoří Mountains, Czech Republic.
3. – 4. M. Mergl – D. Massa: Devonian Brachiopods of the Tamesna Basin (Central Sahara; Algeria and North Niger). Part 1. – V. Teodoridis: Flora and vegetation of Tertiary fluvial sediments of Central and Northern Bhemia and their equivalents in deposits of the Most Basin (Czech Republic). – R. J. Horný: *Kosovina*, a new Silurian Tryblidiid genus (Mollusca, Tergomya) from Bohemia (Czech Republic). – J. Háva: World keys to the genera and subgenera of Dermestidae (Coleoptera), with descriptions, nomenclature and distributional records.

61 (2005):

1. – 2. J. Holec: The genus *Gymnopilus* (Fungi, Agaricales) in the Czech Republic with respect to collections from other European countries. – R. J. Horný: Muscle scars, systematics and mode of life of the Silurian Family Drahomiridae (Mollusca, Tergomya). – A. Klemenčič Krivograd – D. Vrhovšek: Algal flora of Krška Jama Cave.
3. – 4. J. Likovský – P. Stránská – P. Veleminský: Findings from the anthropological collections of the Institute of Archaeology in Prague in funds of the National Museum.

62 (2006):

1. – 2. R. J. Horný: The Middle Ordovician tergomyan mollusc *Pygmaeoconus*: an obligatory epibiont on hyolithids. – A. Krivograd Klemenčič – D. Vrhovšek – N. Smolar-Žvanut: Contribution on the algal flora of Slovenia, with emphasis on newly recorded algal taxa. – M. Mergl: Tremadocian trilobites of the Prague Basin, Czech Republic.
3. – 4. Z. Šimůnek: New classification of the genus *Cordaites* from the Carboniferous and Permian of the Bohemian Massif, based on cuticle micromorphology.

63 (2007):

1. F. H. C. Hotchkiss – R. J. Prokop – V. Petr: Isolated ossicles of the Family Eospondylidae SPENCER et WRIGHT, 1966, in the Lower Devonian of Bohemia (Czech Republic) and correction of the systematic position of eospondylid brittlestars (Echinodermata: Ophiuroidea: Oegophiurida). – K. Heiřig – O. Fejfar: Die Säugetiere aus dem Untermiozän von Tuchořice in Nordwestböhmen – I. Die fossilen Nashörner (Mammalia, Rhinocerotidae).
2. – 4. H. Walther: In honour of the 70th birthday of Zlatko Kvaček. – H. Walther – Z. Kvaček: Early Oligocene flora of Seifhennersdorf (Saxony). – M. Böhme: Revision of the cyprinids from the Early Oligocene of the České Středohoří Mountains, and the phylogenetic relationships of *Protothymallus* LAUBE 1901 (Teleostei, Cyprinidae, Gobioninae). – W. Schiller: Siliceous microfossils from the Oligocene tripoli-deposit of Seifhennersdorf. – J. Prokop – M. Fikáček: An annotated list of Early Oligocene insect fauna from Seifhennersdorf (Saxony, Germany). – M. Böhme: The frog from Seifhennersdorf.

64 (2008):

1. Z. Pouzar: Jindřich Chrték (1930–2008). – B. Skočdoplová, J. Chrték: Wallroth's collection of vascular plants in the herbarium of the National Museum, Prague. – J. Gaudant: Complements to the anatomical knowledge of *Cyclurus macrocephalus* Reuss (Pisces, Actinopterygii) from the Eocene of Kučlín, Bohemia, Czech Republic.
2. – 4. M. Svobodová: To celebrate the 80th birthday of the outstanding scientist: Professor RNDr. Blanka Pacltová, CSc. – J. Dařková: Bibliography of Professor Blanka Pacltová. – J. A. Doyle – P. K. Endress – G. R. Upchurch, Jr.: Early Cretaceous monocots: a phylogenetic evaluation. – Z. Kvaček: The role of types in palaeobotanical nomenclature. – O. Fatka – R. Brocke: Morphologic Variability in Lower Palaeozoic Acritarchs: Importance for Acritarch Systematics. – G. Machado – M. Vavrdová, P. E. Fonseca – H. Chaminé – F. Tavares Rocha: Overview of the stratigraphy and initial quantitative biogeographical results from the Devonian of the Albergaria-a-Velha Unit (Ossa-Morena Zone, W Portugal). – V. A. Krassilov – T. M. Kodrul: *In situ* pollen of *Alasia*, a supposed staminate inflorescence of *Trochodendroides* plant. – J. Kvaček: New cycad foliage of *Pseudoclenis babinensis* from the Bohemian Cenomanian. – M. Svobodová – M. Vavrdová: *Spesovicornea pacltovae* gen. nov. et sp. nov., a new elateroid sporomorph from the Bohemian Cenomanian (Czech Republic). – W. Krutzsch: Fimmenite aus dem Mitteleozän des Geiseltales. – M. Konzalová – M. Ziemińska-Tworzydło: Some monocot pollen taxa from the Lower Miocene basal coaly deposits of the Czech and Polish parts of the Žytawa (Zittau) Basin. – N. Doláková – M. Kováčová: Pannonian vegetation from the northern part of Vienna Basin. – E. Břizová: Reconstruction of vegetation development in floodplain of the Litavka River in Holocene (Central Bohemia, Brdy Mts.). – P. Tonarová: Revision of *Kettnerites* ŽEBERA, 1935 (Scolecodonta, Silurian of the Barrandian area, Czech Republic): preliminary results. – B. Slodovska, J. – Paruch-Kulczycka: Micropalaeontological taphocoenoses of the Miocene Poznań Formation (Konin area, Central Poland).

65 (2009):

1. – 2. T. Příkryl: A juvenile *Trachinus minutus* (Pisces, Perciformes, Trachinidae) from the Middle Oligocene of Litenčice (Moravia, Czech Republic). – Gyanendra K. Trivedi: Palynofloral diversity in the Kopili Formation (Late Eocene) from north-east India. – R. J. Horný: *Patelliconus* HORNÝ, 1961 and *Mytoconula* gen. n. (Mollusca, Tergomya) from the Ordovician of Perunica. – R. Morávek: Lower Wenlock Chitinozoa from the Bykoř locality (Silurian, Prague Basin, Barrandian area, Czech Republic).
3. – 4. M. Akhmetiev – H. Walther – Z. Kvaček: Mid-latitude Palaeogene floras of Eurasia bound to volcanic settings and palaeoclimatic events – experience obtained from the Far East of Russia (Sikhote-Alin') and Central Europe.

66 (2010):

1. – 2. K. Zágoršek: Bryozoa from the Langhian (Miocene) of the Czech Republic. Part I: Geology of the studied sections, systematic description of the orders Cyclostomata, Ctenostomata and "Anascan" Cheilostomata (suborders Malacostega LEVINSSEN, 1902 and Flustrina SMITT, 1868).

