Geol. Paläont. Mitt. Innsbruck, ISSN 0378–6870, Band 23, S. 127–191, 1998

A NEW CORAL FAUNA FROM THE CAMPANIAN OF NORTHERN SPAIN (TORALLOLA VILLAGE, PROV. LLEIDA)

Rosemarie C. Baron-Szabo

With 4 figures, 5 tables and 12 plates

Abstract:
A new coral fauna is described from the Puimanyons Olisthostrome Member of the Vallcarga Formation (Campanian) in the Torallola area, north Spain. Taxonomic diversity is emphasized by the appearance of 36 genera belonging to 2 orders and 9 suborders. Four species are new: *Placophyllia bandeli* n. sp., *Barysmilia iberica* n. sp., *Latohelia circularia* n. sp., and *Gyrodendron leptonema* n. sp.. Within the European Province the coral fauna from Torallola represents one of its most complex Campanian coral communities.

Zusammenfassung:
Vom Puimayons Olisthostrom Member der Vallcarga Formation (Campan), bei Torallola, Nordspanien, wird erstmalig eine Korallenfauna beschrieben. Ihre taxonomische Diversität wird durch das Auftreten von 36 Gattungen, welche 2 Ordnungen und 9 Unterordnungen entstammen, aufgezeigt. Vier Arten werden neu beschrieben: *Placophyllia bandeli* n. sp., *Barysmilia iberica* n. sp., *Latohelia circularia* n. sp. und *Gyrodendron leptonema* n. sp.. Innerhalb der europäischen Provinz stellt die Korallenfauna von Torallola eine der komplexesten Korallenvergesellschaftungen des Campan dar.

1. Introduction

In the European Province (BARON-SZABO, 1997) during the Late Cretaceous coral assemblages became more and more restricted to localities in central and southern regions (e.g. TURNSEK, 1978; TURNSEK & POLSAK, 1978; M. BEAUVAIS, 1982; LÖSER, 1994; TURNSEK, 1994; BARON-SZABO, 1997). Rich coral associations are known from numerous locations in southern France (FROMENTEL, 1861–1887; ALLOITEAU, 1954), Austria (FELIX, 1903; OPPENHEIM, 1930; BARON-SZABO, 1997), Slovenia (TURNSEK & BUSER, 1976; TURNSEK, 1978), Central Greece (HACKEMESSER, 1936), the Czech Republic (POCTA, 1887; TRAUTH, 1911; ELIÁSOVÁ, 1994, 1997) and Germany (BÖLSCHE ,1871; LÖSER, 1989, 1994, 1998). In northern Spain, several coral bearing localities of the Upper Cretaceous have been reported, mainly of Turonian to Santonian or Maastrichtian age (e.g. BATALLER, 1936, 1937; ROSELL, 1967; PONS, 1973; VIDAL, 1980; REIG ORIOL, 1989, 1992).

This paper presents data complementary to that of the working group of K. BANDEL, Hamburg.

Remarks

According to HACKEMESSER (1936) the material from Central Greece he investigated was determined to be Cenomanian in age. Recent studies of the rudists from the same locality carried out by T. STEUBER, Erlangen, indicate that the location was described too unprecisely by HACKEMESSER (1936). Therefore, in the following when referring to the work by HACKEMESSER (1936) descriptions will be accompanied by a question mark.

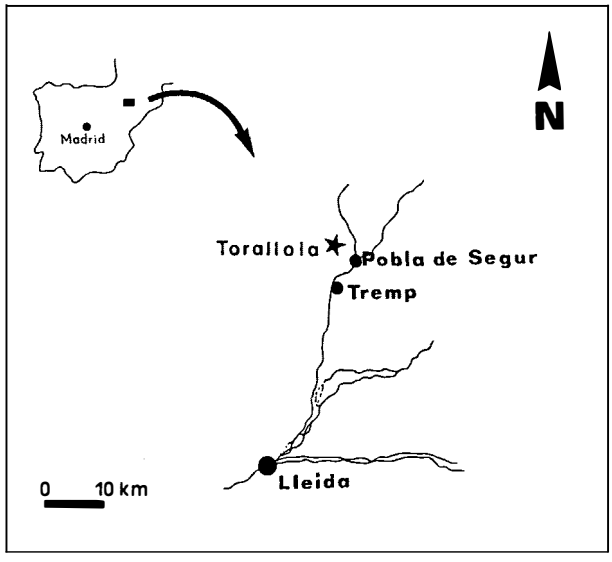


Fig. 1: Location map of fossiliferous outcrops of the the Puimayons Olisthostrome Member. The asterisk indicates the section investigated.

2. Location and Material

The study area is located about 3 km NW of Pobla de Segur, south of Torallola village (Fig. 1). The corals are derived from the Puimayons Olisthostrome Member of the Vallcarga Formation (NAGTEGAAL, 1972; GALLEMI et al., 1983). Based on rudists and echinoderms, the age of the fossils of the Puimayons Olisthostrome Member was determined to be Campanian (ROSELL et al., 1972). The Puimayons Olisthostrome Member consists of lithoclasts that are mainly derived from erosion of Aptian to Albian shallow-water carbonate platform environments. During the Campanian, a rocky to gravelly shore environment established, where corals thrived on a substratum of a truncated Aptian to Albian succession.

Specimens studied in this paper were collected during field investigations by the members of the working group of K. BANDEL, Hamburg.

All specimens are characterized by small size of the colonies or coralla, respectively. The colonial corals have diameters ranging from 2 to 5 cm, rarely up to about 10 cm. The size of solitary corals is given in descriptions. The material is stored at the Humboldt Museum, Berlin (Inventary numbers: MB.K. 1100-1199).

3. Systematic descriptions

Abbrevations for the dimensions in the text are as follows: d =corallite diameter; dl = diameter of lumen; c-c = distance between centers of calices; s=number of septa; s/mm = density of septa; diss/mm = density of dissepiments; h = height of corallum.

Note that the diameters of colonies range from 2 to 5 cm, rarely reaching up to 10 cm.

Chapters on the distribution of species do not include the present occurrence.

Class Anthozoa EHRENBERG, 1834
Subclass Zoantharia BLAINVILLE, 1830
Order Scleractinia BOURNE, 1900

Suborder Archaeocoeniina ALLOITEAU, 1952
Family Actinastraeidae ALLOITEAU, 1952

Genus *Actinastrea* D'ORBIGNY, 1849

Type species: *Astraea geminata* GOLDFUSS, 1826

Actinastrea benaixensis ALLOITEAU, 1954
(Pl. 1, Fig. 1)

*1954 *Actinastrea benaixensis* n.sp. – ALLOITEAU, p. 61-62, Pl. V, Fig. 6, Pl. VIII, Fig. 8.

Dimensions:
d: 1.2–2 mm
c-c: 1.2–2 mm
s: (14) 16 (24)

Description: The corallum has a massive or encrusting cerioid form. Corallites are closely united by their walls and have a subpolygonal or irregular outline. Septa are generally 16 in number, corresponding to two cycles arranged in 8 equal systems. Septal development in seven to nine systems are present. The eight largest septa extend to the columella and are thickened at the point of meeting. The eight others are smaller and fuse with the older ones. Septa are compact, non- or subconfluent, and irregularly granulated on their lateral

sides. The columella is styliform or slightly depressed and forms a prominent knob in the calice. The wall is septothecal. A poorly developed endothecal wall consists of a few delicate dissepiments in the peripheral regions of the calice. Microstructural features are not preserved.
Distribution: Campanian of France (Ariège).
Material: K.1100; K.1101.1-11.

Actinastrea exigua ALLOITEAU, 1954
(Pl. 4, Fig. 3)

*1954 *Actinastrea exigua* n. sp. – ALLOITEAU, p. 82-83, Pl. I, Fig. 2, Pl. X, Fig. 3.

Dimensions:
d: 0,8–1.2 mm
c-c: 1–1.3 mm
s: (7) 10–15
Description: The corallum is massive and cerioid. Calices are small, polygonal or rounded-polygonal, with fused walls. Septa number from 10 to 15, the usual being 12, corresponding to two cycles arranged in 6 systems. In a few calices the septal arrangement is in 5 systems or is irregular. Septa are compact, nonconfluent, and finely granulated on their sides. Primary septa reach the center where they unite with the columella. Secondary septa are thinner, two of them often being slighty larger than the rest. The columella is small and styliform. The wall is septothecal. The endothecal wall is formed by rare dissepiments. The microstructure is not preserved.
Distribution: Upper Santonian of France (Provence).
Material: K.1102; K.1103.1-8.

Actinastrea bastidensis ALLOITEAU, 1954
(Pl. 1, Fig. 5)

*1954 *Actinastrea bastidensis* n. sp.- ALLOITEAU, p. 84-87, Pl. III, Fig. 4, Pl. X, Fig. 4.

Dimensions:
d: (1) 1.5–2.2 mm
c-c: 1.5–2.2 mm
s: 20–26
Description: The corallum forms a massive or lamellar cerioid colony with corallites united by their walls. Calices are polygonal in outline. Septa are thin, compact, non- or subconfluent, costate, granulated on their lateral surfaces, and are generally 24 in number and arranged in 6 systems. Septal development in seven or eight systems is sometimes present. Six to ten septa extend to and fuse with the columella. The columella is styliform. The wall is septothecal. The endotheca consists of very thin vesicular or subtabulate dissepiments. Microstructural features are not preserved.
Distribution: Upper Santonian of France (Corbière).
Material: K.1104; K.1105.1-3.

Genus *Columactinastraea* ALLOITEAU, 1952

Type species: *Columactinastraea renennsis* ALLOITEAU, 1952

Columactinastraea formosissima (SOWERBY, 1831)
(Pl. 1, Fig. 3)

*1831 *Astraea formosissima* n. sp. – SOWERBY, in SEDGWICK & MURCHISON, Pl. 37, Fig. 6.
1841 *Astraea reticulata:* MICHELIN, p. 20 and 301, Pl. V, Fig. 1.
1849 *Stephanocoenia formosa* (GOLDFUSS) – MILNE-EDWARDS & HAIME, p. 301.
1857 *Stephanocoenia formosissima* (SOWERBY) – MILNE-EDWARDS, p. 266.
1884 *Stephanocoenia formosissima* (SOWERBY) – FROMENTEL, p. 536, Pl. 147, Fig. 2.
1914 *Stephanocoenia formosissima* (SOWERBY) – FELIX, pars 7, p. 237.
1930 *Stephanocoenia formosissima* (SOWERBY) – OPPENHEIM, p. 474-476, Pl. XXXVI, Figs. 9, 9a.

Dimensions:
d: (1) 1.5–2.8 mm

c-c: 1.5–3 mm
s: 20–30

Description: The corallum is massive and cerioid with calices slightly projecting. Corallites are polygonal in outline.Costosepta are arranged in two to three complete cycles in 6 systems. In general, the beginning of a fourth cycle is visible. Primary and secondary septa are the same thickness, but differ in length. Secondary and tertiary septa alternate significantly in length. Septa are compact and non- or subconfluent. Their lateral surfaces have numerous delicate granulations. The columella is styliform or sublamellar, and commonly attached to one of the primary septa. There are 6 to 10 pali forming a crown around the columella. The wall is septothecal with rare pores. The endotheca is made of vesicular dissepiments. Microstructural features are not preserved.

Distribution: Turonian-Senonian of south France, Santonian-Campanian of Austria (Gosau Group; see WAGREICH & FAUPL, 1994).

Material: K.1106; K.1107.1-10

Columactinastraea guadelupae (WELLS, 1932)
(Pl. 1, Fig. 2)

v*1932 *Stephanocoenia* (?) *guadelupae*: WELLS, p. 235, Pl. 32, Figs. 8, 9, Pl. 39, Fig. 3.

1944 *Stephanocoenia guadelupae* WELLS – WELLS, p. 433, Pl. 69, Figs. 3,4.

Dimensions:

	Torallola	WELLS
d:	(2.5) 3–4.5	2.5–4 mm
dl:	1.8–2.5	(1,7)2.2 mm
c-c:	3–4.5	— mm
s:	(20) 24	24

Description: The corallum is in the form of a massive, nodular colony. Calices are rounded or subpolygonal in outline. Costosepta are arranged in three complete cycles in 6 systems, alternating in length. Primary and secondary septa can be of the same thickness. Their inner ends have separate pali that appear to form a ring of (8–) 12 around the columella. Septa are compact, non- or subconfluent and laterally spinose. The columella is styliform or substyliform. The wall is a well-developed septotheca with rare pores. The endotheca consists of vesicular or subtabulate dissepiments. The microstructure is not preserved.

Distribution: Upper Aptian-Lower Albian of Venezuela (Barranquin Formation), Middle Albian of Texas.

Material: K.1108.

Remarks: The Torallola material closely agrees with the type material of *Columactinaatraea guadelupae* (WELLS).

Columactinastraea pygmaea (FELIX, 1903)
(Pl. 2, Fig. 1)

*1903b *Astrocoenia pygmaea* n. sp. – FELIX, p. 54, Pl. 3, Figs. 4-5.

1914 *Astrocoenia pygmaea:* FELIX, pars 7, p. 235.

1954 *Actinastraea pymaea* (FELIX) – ALLOITEAU, p. 52–53, Pl. 4, Fig. 6, Pl. 8, Fig. 2.

1975 *Actinastraea pymaea* (FELIX) – BEAUVAIS et al., p. 44–45, Pl. 4, Figs. 1a–b.

1978 *Columactinastraea pygmaea* (FELIX) – TURNSEK, in TURNSEK & POLSAK, p. 147, 168, Pl. 3, Figs. 1–4.

1994 *Columactinastraea pygmaea* (FELIX) – TURNSEK, p. 9, Pl. 2, Fig. 1–3.

Dimensions:
d: 1–1.5 mm
c-c: 1–1.5 mm
s: (8-) 16

Description: The corallum i s massive and cerioid with polygonal calices united by their walls. Septa are compact, nonconfluent and thin. Near the wall they become thickened. Their lateral surfaces have rare small granules. In general, there are two complete cycles of 16 septa in 8 systems, those of the first extending nearly to the columella, and those of the second cycle being half as long. Paliform lobes vary in size and number. Together with a small, spongy-papillose columella they fill the centre of the calice. The wall is septothecal with few lacunes, and the endotheca consists of vesicular dissepiments. The microstructure is not preserved.

Distribution: Santonian-Campanian of southern France, Slovenia and Croatia, Campanian of Portugal.
Material: K.1109; K.1110.1-24.

Suborder Stylinina ALLOITEAU, 1952
Family Agatheliidae L. & M. BEAUVAIS, 1975

Genus *Multicolumnastraea* VAUGHAN, 1899

Type species: *Heliastraea cyathiformis* DUNCAN, 1865

Remarks: The systematic position of *Multicolumnastraea* VAUGHAN has been much discussed: VAUGAHN & WELLS, 1943, assigned it to the Faviidae; ALLOITEAU, 1952, transferred the genus to the Echinoporidae MILNE-EDWARDS & HAIME, 1857, and according to L. & M. BEAUVAIS, 1975, it belongs in the Actinacididae VAUGAHN & WELLS, 1943. On the basis of: 1) the development of peritheca; 2) the presence of compact septa having 3) special lateral ornamentation, *Multicolumnastraea cyathiformis* (DUNCAN) is placed in the family Agatheliidae.

Multicolumnastraea cyathiformis (DUNCAN, 1865)
(Pl. 6, Fig. 4)

1865 *Heliastraea exsculpta* n. sp. – DUNCAN, in DUNCAN & WALL, p. 7, 8, 11.
v* 1865 *Heliastraea cyathiformis* n. sp. – DUNCAN, in DUNCAN & WALL, p. 7, 8, Pl. I, Figs. 1a–b.
1867 *Heliastraea exsculpta* DUNCAN – DUNCAN, vol. IV, p. 24.
1867 *Heliastraea cyathiformis* DUNCAN – DUNCAN, vol. IV, p. 24.
v1899 *Multicolumnastraea cyathiformis* (DUNCAN) – VAUGHAN, p. 236, Pl. XXXVII, Figs. 5, Pl. XXXVIII, Fig. 1.
1919 *Multicolumnastraea cyathiformis* (DUNCAN) – VAUGHAN, p. 194.
1934 *Multicolumnastraea cyathiformis* (DUNCAN) – WELLS, p. 90.
1956 *Multicolumnastraea cyathiformis* (DUNCAN) – WELLS, p. F 406, Fig. 302.3.
1994 *Multicolumnastraea cyathiformis* (DUNCAN) – LIAO & XIA, p. 177, Pl. LIII, Figs. 5–8.

Dimensions:
dl: 1.5–2.5 (3) mm
d: 2.5–3.5 (4.5) mm
c-c: 2.5–4 mm
s: 20–26(28)

Description: The corallum forms a massive, plocoid colony with calices circular in outline. Increase is by intercalicular gemmation. Calices are regularly disposed over the surface of the colony. Septa are costate, non- or subconfluent, compact, irregularly anastomosed and arranged in three cycles and 6 systems. Their lateral surfaces are strongly ornamented with spiniform granules or vertical carinae. Their inner ends have claviform thickenings or rare auriculae. Paliform lobes are rare. The septa of the first and second cycle extend to the columella. The remaining ones alternate in length. Intercorallite areas are crossed by the costae when corallites are close together; when they are more distant, costae merge into a porous, reticulated coenenchyme. The columella is spongy or parietal-papillose. The wall is septoparathecal or septothecal, rarely synapticulothecal. The endotheca consists of thin vesicular dissepiments. The peritheca is well-developed, entirely granulose, and formed by numerous tabulate or slightly arched dissepiments. The microstructure is poorly preserved. In places small minitrabeculae (septa) or compound medium-sized trabeculae (wall) can be seen.
Distribution: Campanian (-Maastrichtian?) and Eocene of Jamaica, Campanian-Maastrichtian of Tibet.
Material: K.1111; K.1112.1-2.

Suborder Heterocoeniina BEAUVAIS, 1982

Remarks: According to KOLODZIEJ (1995) distinguishing the Suborder Heterocoeniina is not justified and he included it in the Amphiastreina. He

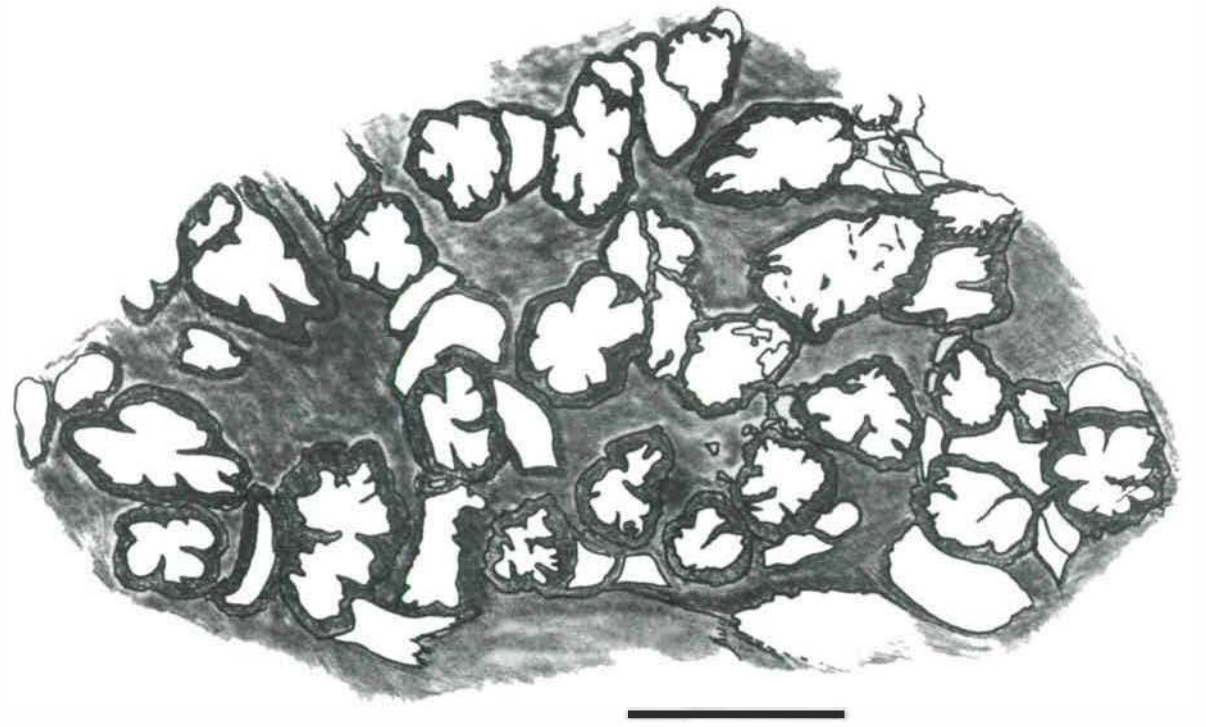


Fig. 2: Transverse section of *Heterocoenia verrucosa* REUSS, 1854. Diagram of corallites; scale bar: 2 mm, sample K.1115.

based his conclusion upon microstructural studies of Upper Jurassic and the Lower Cretaceous corals, proposing that 'the wall consists of medium-sized and thick, compound polyaxial main trabeculae give off secondary trabeculae' and 'septa are formed by minitrabeculae with weakly (Amphiastraeoidea) or well-developed secondary trabeculae (Heterocoeniidea)'. However, in the specimens at hand the microstructural development of septa and wall can be identical, and therefore disagree with the taxonomic concept as proposed by KOLODZIEJ (1995). On the other hand, the microstructural features he proposed as the base for the Suborder Amphiastraeina are apparently not restricted to the amphiastraeids and heterocoeniids. For instance, these characteristics are reported from genera of the stylinid group (*Multicolumnastraea, Agathelia*), the faviid group (e.g. *Favia, Placophyllia*), the astrocoeniid group (e.g. *Stephanocoenia*) and the hemiporitid group (e.g. *Nefocoenia*).

Family Heterocoeniidae OPPENHEIM, 1930

Genus *Heterocoenia* MILNE-EDWARDS & HAIME, 1848

Type species: *Lithodendron exiguum* MICHELIN, 1847

Heterocoenia exigua (MICHELIN, 1846)

(Pl. 2, Fig. 3)

*1846 *Lithodendron exigue* n.sp. – MICHELIN, p. 305, Pl. 72, Fig. 7.

1849 *Heterocoenia exiguis* (MICHELIN) – MILNE-EDWARDS & HAIME, tome 10, p. 308, Pl. 9, Figs. 13–13a.

1854 *Heterocoenia provincialis* (MICHELIN) – REUSS, p. 100, Pl. X, Figs. 3-4.

1857 *Heterocoenia reussi* MILNE-EDWARDS,

n.sp.-MILNE-EDWARDS, tome II, p. 284.
1857 *Heterocoenia exigua* (MICHELIN) – MILNE-EDWARDS, p. 283.
1879 *Heterocoenia exigua* (MICHELIN) – FROMENTEL, p. 500.
1879 *Heterocoenia reussi* MILNE-EDWARDS – FROMENTEL, p. 501.
1903a *Heterocoenia provincialis* (MICHELIN) – FELIX, p. 234, Pl. XIX, Fig. 11.
v1903a *Heterocoenia reussi* MILNE-EDWARDS – FELIX, p. 235, Pl. XVII, Fig. 12.
pars1914 *Heterocoenia provincialis* (MICHELIN) – FELIX, pars 7, p. 154.
1914 *Heterocoenia reussi* MILNE-EDWARDS – FELIX, pars 7, p. 154, partim.
1930 *Heterocoenia exigua* (MICHELIN) – OPPENHEIM, p. 269-270.
1982 *Heterocoenia exigua* (MICHELIN) – BEAUVAIS, tome III, Tab. 14.

Dimensions:
d: (1) 1.2–2.2 mm
c-c: 2–3 (4) mm
s: 6–12

Description: The corallum is in the form of a lamellar, massive, knobby, or branching, subfasciculate or plocoid colony. Calices are irregularly distributed over the upper surface of the colony or occur on the extremities of the branches. Gemmation is due to extracalicinal and intracalicinal-marginal budding. Corallites are surrounded by a thick coenenchyme. Septa are granulate on their sides, arranged in 3 systems, radially or bilaterally. In a few calices septa are arranged in 6 systems. Three (or six) of the primary septa, one septum of which is distinctly longer, extend more than halfway to the center of the corallites. Secondary septa reach half the length of the primaries. Tertiary septa are rudimentary only. The inner ends of the septa are cuneiform, ramified or claviform. There is no columella. The endotheca is formed by thin tabulate or slightly arched dissepiments. The exotheca consists of long subtabulate dissepiments. The wall is septothecal. The microstructure is made of mini, medium-sized or thick, simple or compound trabeculae.

Distribution: Turonian of south France, Santonian-Campanian of Austria (Gosau Group).
Material: K.1113; K.1114.1-11.

Heterocoenia verrucosa REUSS, 1854
(Text-Fig. 2)

*1854 *Heterocoenia verrucosa* n.sp. – REUSS, p. 101, Pl. X, Figs. 7-8.
1879 *Heterocoenia verrucosa* REUSS – FROMENTEL, p. 501.
v1903a *Heterocoenia verrucosa* REUSS – FELIX, p. 237.
1930 *Heterocoenia verrucosa* REUSS – OPPENHEIM, p. 272, Pl. XXXI, Fig. 14.
1937 *Heterocoenia verrucosa* REUSS – BATALLER, p. 101.
1982 *Heterocoenia verrucosa* REUSS – BEAUVAIS, tome III, p. 16–17, Pl. LI, Figs. 3–4.

Dimensions:
d: (0.6) 0.8–1.5 mm
c-c: (0.8) 1–2 mm
s: 1–6 (+s)

Description: The corallum forms a massive, lamellar, frondescent or branching, plocoid or subfasciculate colony with corallites scattered irregularly over the upper surface. Gemmation is extracalicinal and intracalicinal-marginal. Septa are compact and very short, rarely reaching one third the diameter of the calice. Only the main septum extends to the center of the corallite. Septa have small granulations laterally and are arranged in 3 systems, radially or bilaterally. Their inner ends are cuneiform, ramified or claviform. There is no columella. The wall is septothecal. The endotheca is made of thin vesicular or subtabulate dissepiments. The exotheca consists of large vesicular dissepiments. The microstructure is poorly preserved. In a few parts of the septa and the wall compound medium-sized or thick trabeculae can be seen.

Distribution: Santonian of Austria (Gosau Group), Upper Santonian of north Spain (Catalonia).
Material: K.1115; K.1116.1-15.

Fig. 3: Transverse section of *Hydnophora styriaca* (MICHELIN, 1847). Diagram of corallites; scale bar: 2 mm, sample K.1124.

Heterocoenia dendroides REUSS, 1854
(Pl. 3, Figs. 1, 2, Pl. 7, Fig. 6)

*1854 *Heterocoenia dendroides* n.sp. – REUSS, p. 100, Pl. X, Fig. 5.
1879 *Heterocoenia dendroides* REUSS – FROMENTEL, p. 500, Pl. 132, Fig. 1.
v1903a *Heterocoenia dendroides* REUSS – FELIX, p. 236.
1930 *Heterocoenia dendroides* REUSS – OPPENHEIM, p. 270, Pl. XXXI, Figs. 12-13.
?1937 *Heterocoenia dendroides* REUSS – BATALLER, p. 98.
1982 *Heterocoenia dendroides* REUSS – BEAUVAIS, tome III, p. 15–16, Pl. LI, Figs. 1–2.

Dimensions:
d: (1.8) 2–3 (3.5) mm
c-c: 2.5–5 mm
s: (1–) 6

Description: The corallum is in the form of a massive plocoid or subfasciculate colony with circular or slightly elliptical corallites. Gemmation is by extracalicinal or intracalicinal-marginal budding. Septa arecompact, laterally spinose, being mainly developed in 3 systems, radially arranged. The main septum is well-developed and very long, almost reaching the counterseptum. Remaining septa are very short and thorn-like. The development of the wall, endo- and exotheca, and the microstructure corresponds to the skeletal structures of the previously described species.

Distribution: Santonian of south France and Austria (Gosau Group). ? Maastrichtian of north Spain (Catalonia).

Material: K.1117; K.1118.1-4.

Genus *Canleria* ELIÁSOVÁ, 1996

Type species: *Canleria clemens* ELIÁSOVÁ, 1996

Canleria clemens ELIÁSOVÁ, 1996
(Pl. 2, Figs. 2, 4)

v*1996 *Canleria clemens* n. sp. – ELIÁSOVÁ, p. 255–256, pl. I, figs. 1a, 1b, 2, pl. II, figs. 1a, 1b, 2–4.

Dimensions:
d: 2.2–4mm
dl: 1.2–2mm
c-c: 2.5–4 (5) mm
s: 14–18

Description: The corallum forms a lamellar plocoid colony with calices scattered irregularly over the upper surface. The corallites are surrounded by a coenenchyme when they are distant, but when they are close together they are fused by their perithecal walls. Septa are thin, costate, compact and arranged in two complete cycles in 5, 6 or 7 systems. In some calices, the beginning of a third cycle is pesent. The oldest septa extend to the center of the calice where they become strongly flexuous, forming a false columella. Secondary and tertiary septa alternate in length and thickness. The lateral surfaces of septa have delicate spiniform granules, acanthine or apophysal ornamentations. There is no columella. The wall is septothecal. The

endotheca is made of thin tabulate or slightly arched dissepiments. The exotheca is formed by large vesicular dissepiments. The microstructure is not preserved.

Distribution: Upper Cenomanian of the Czech Republic.

Material: K.1119; K.1120; K.1121.1-2.

Suborder Faviina VAUGHAN & WELLS, 1943
Family Faviidae GREGORY, 1900

Genus *Hydnophora* FISCHER VON WALDHEIM, 1807

Type species: *Hydnophora demidovii* FISCHER VON WALDHEIM, 1807

Hydnophora styriaca (MICHELIN, 1847)
(Pl. 12, Fig. 4, Text-Fig. 3)

*1847 *Monticularia styriana* n. sp. – MICHELIN, p. 295, Pl. 68, Fig. 2.
1854 *Hydnophora styriaca* (MICHELIN) – REUSS, p. 111.
1877 *Hydnophora styriaca* (MICHELIN) – FROMENTEL, p. 468–469, Pl. 120, Fig. 2.
v1903a *Hydnophora styriaca* (MICHELIN) – FELIX, p. 279.
v1903a *Hydnophora styriaca multi-lamellosa* (MICHELIN) – FELIX, p. 281.
1930 *Hydnophoraraea styriaca* (MICHELIN) – OPPENHEIM, p. 224-225, Pl. XIV, Fig. 4, Pl. XVIII, Fig. 1.
?1954 *Hydnophora styriaca* (MICHELIN) – KOLOSVÁRY, p. 85, Pl. VI, Figs. 13–16.
1976 *Hydnophoraraea styriaca* (MICHELIN) – TURNSEK, in TURNSEK & BUSER, p. 55, 78, Pl. 11, Figs. 4–6.
v1979 *Hydnophoraraea* cf. *styriaca* (MICHELIN) – SCHOLZ, p. 62–65, Text-Figs. 50, 51.
1982 *Hydnophora styriaca* (MICHELIN) – BEAUVAIS, tome I, p. 88 ff., Pl. V, Fig. 6, Pl. VII, Fig. 4, Pl. LXII, Figs. 3, 4 (older synonyms cited herein).
v1996 *Hydnophora styriaca* (MICHELIN) – BARON-SZABO, in BARON-SZABO & STEUBER, p. 11, Pl. II, Figs. 2, 4.
v1997 *Hydnophora styriaca* (MICHELIN) – BARON-SZABO, p. 52, Pl. 3, Fig. 2.

Dimensions:
d (collis): 1.5–3 (3.5) mm
length of collis: 1.5–3.5 mm
c-c (collis): 1.5–4 mm
s/collis: 6–10 (14)

Description: The corallum forms an encrusting or convex hydnophoroid colony with irregularly shaped short collines. Thick septa are developed in one or two generations. The beginning of a third generation is observed. The secondary and tertiary septa show the tendency to alternate in length. Lateral surfaces of the septa are covered with granules varying in size and shape. Intercorallite areas are filled with trabecular extensions of inner ends of septa. The columella is papillose or lamellar. Endotheca consists of thin vesicular dissepiments. The exotheca is formed by long tabulate and slightly arched dissepiments. The wall is septo- or septoparathecal, rarely parathecal. The microstructure consists of simple minitrabeculae forming mid-septal lines. In places the centers of calcification are from 5–20 µm apart.

Distribution: Lower Aptian, Lower Coniacian and Santonian-Campanian of Austria (Allgäu Schrattenkalk and Gosau Group), Aptian of Greece, Senonian of France and ? Hungary, Senonian Breccia of Slovenia

Material: K.1122; K.1123.1-7; K.1124.

Hydnophora turbinata FROMENTEL, 1877
(Pl. 12, Fig. 2)

*1877 *Hydnophora turbinata* n. sp. – FROMENTEL, p. 470, Pl. 109, Fig. 2.
1914 *Hydnophora turbinata* (D'ORBIGNY) – FELIX, p. 107.

Dimensions:
d (collis): 0.7–1 (1.5) mm
length of collis: (0.8) 1–1.5 mm

c-c (collis): 0.7–1.2 (1.5) mm
s/collis: (4) 6–8 (10)

Description: The corallum forms a lamellar, knobby or encrusting hydnophoroid colony with short, regularly shaped collines. Septa are compact, thick, usually being 6 to 8 in number, having claviform inner ends. Their lateral surfaces have spiniform and rounded granules. Septa are not definitely arranged in generations. The development of the wall, endo- and exotheca, the columella and the microstructure corresponds to the skeletal structures of the previously described species.

Remarks: FROMENTEL based the description of *Hydnophora turbinata* upon the form *Meandrina turbinata*, representing a specimen from the collection of D'ORBIGNY. FROMENTEL (1877) and FELIX (1914) refer to D'ORBIGNY as being the first author of this species. However, since FROMENTEL (1877: 470) and not D'ORBIGNY gave the first documentation and illustration of this form FROMENTEL has the priority of authorship.

Distribution: Cenomanian of France.

Material: K.1125; K.1126.1-10.

Genus *Kobyphyllia* BARON-SZABO, 1997

Type species: *Plesiophyllia recta* KOBY, 1884

Kobyphyllia acrisionae (FELIX, 1903)
(Pl. 7, Fig. 5, Pl. 12, Fig. 3)

*1903a *Plesiophyllia acrisionae* n. sp. – FELIX, p. 241–242, Text-Fig. 23.
1914 *Plesiophyllia acrisionae* FELIX – FELIX, pars 7, p. 161.
?1930 *Plesiophyllia acrisionae* FELIX – OPPENHEIM, p. 294-297, Pl. XXXIII, Figs. 11, 11a.
v1997 *Kobyphyllia acrisionae* (FELIX) – BARON-SZABO, in BARON-SZABO & FERNANDEZ-MENDIOLA, p. 47, Figs. 4 D, G.

Dimensions:
long diameter of calice (D): 36–45 mm
short diameter of calice (d): 25–29 mm
s: 124– ca. 200
d/D: 0.64–0.69

Description: The solitary corallum is cuneiform and attached by a wide base. The calice is deep and elliptical in outline. The wall is thick and covered with costae corresponding to all septa. Septa are exsert, entirely laterally granulate. They are arranged in cycles of unclear systems. The first 20 to 30 septa extend to the columella, and are of the same length, but differing in thickness. Their inner ends are significantly thickened. Septa of younger generations are much thinner and alternate in length. The columella is lamellar. The wall is septothecal. In places there is a thin epithecal wall. The endotheca consists of numerous vesicular dissepiments. Septal microstructure consists of simple nonbranching minitrabeculae present along a median line.

Remarks: OPPENHEIM'S material apparently lacks a lamellar columella, but otherwise it accords with *Kobyphyllia* well.

Distribution: Albian of northern Spain, Santonian-Campanian of Austria (Gosau Group).

Material: K.1127; K.1128.

Family Placosmiliidae ALLOITEAU, 1952

Genus *Placophyllia* D'ORBIGNY, 1850

Type species: *Lithodendron dianthus* GOLDFUSS, 1826

Remarks: ELIÁSOVÁ (1990) described *Placophyllia rugosa* from the Upper Jurassic-Lower Cretaceous of the Czech Republic with having the microstructure of a neorhipidacanth type. Because this microstructural feature is typical of forms of the Rhipidogyrina RONIEWICZ, she transferred *Placophyllia* from the faviid Placosmiliidae to her newly created Placophylliidae (Rhipidogyrina). However, in the specimens at hand the microstructure of the faviid type is present, thus closely corresponding to the descriptions of the original material by VAUGHAN & WELLS, 1943.

Placophyllia cf. *curvata* TURNSEK, 1974
(Pl. 2, Figs. 6, 7)

*1974 *Placophyllia curvata* n. sp. – TURNSEK, in TURNSEK & BUSER, p. 98, 115, Pl. 8, Figs. 1–2, Pl. 9, Figs. 1–2.
1980 *Placophyllia curvata* TURNSEK – KUZMICHEVA, in CHERNOV et al., p. 96–97, Pl. XXXV, Figs. 4a, b.
1981 *Placophyllia curvata* TURNSEK – TURNSEK, in TURNSEK & MIHAJLOVIC, p. 20, Pl. 16, Figs. 3–5.
v1993 *Placophyllia curvata* TURNSEK – BARON-SZABO, p. 159, Pl. 4, Fig. 1.
v1997 *Placophyllia* cf. *curvata* TURNSEK – BARON-SZABO, p. 70-71, Pl. 6, Figs. 3–4.

Dimensions:
d: 5–7 mm
s: 26–40 (46)

Description: The corallum is phaceloid, with circular or slightly elliptical calices. Septa are costate, compact, with rare lateral granules and are arranged in three to four cycles in 6 systems. Their inner ends are cuneiform or irregularly thickened. Primary and secondary septa can be of the same length but differ in thickness. They extend to the center of the calice. Tertiary septa are about half the length of the oldest septa. Quaternary septa are short and thin. In this species, the columella is well-developed, lamellar and may be attached to the trabecular prolongations of the principal septa. The endotheca is formed by vesicular dissepiments. The wall is septothecal. The microstructure of this coral species is composed of simple minitrabeculae and compound medium sized trabeculae forming mid-septal lines (septa) and mainly compound trabeculae (wall).

Distribution: Barrêmian-Aptian of Slovenia and the Ukraine, Aptian of Serbia, Upper Aptian-Lower Albian of north Spain, Lower Coniacian of Austria (Gosau Group).

Material: K.1129; K.1130.

Remarks: The Torallola specimens have a larger number of septa, but otherwise agree with *Placophyllia curvata* TURNSEK well.

Placophyllia bandeli n. sp.
(Pl. 10, Figs. 1, 4, 6)

Derivatio nominis: in the honour of PROF. DR. Klaus Bandel.

Holotypus: K.1131.

Locus typicus: Torallola, Prov. Llèida, north Spain.

Stratum typicum: Campanian, Puimayons Olisthostrome Member, Vallcarga Formation.

Diagnosis: *Placophyllia* with calices being circular or slightly elliptical in outline with an average diameter from 10 to 12 mm, and septa numbering from 48 to 56.

Material: K.1131; K.1132; K.1133.1-6.

Dimensions:
long diameter of calice: 9–12 mm
short diameter of calice: 7–10 mm
s: (42) 48–56

Description: The corallum forms a dendro-phaceloid colony with calices being circular or slightly elliptical in outline. The septa are compact, thin, costate, laterally covered with spiniform granules and arranged in four complete cycles. In some calices the beginning of a fifth cycle is present. The septa of the first two cycles extend to, and may fuse with, the columella. They are slightly unequal in thickness. Their inner ends are claviform or rhopaloid. Tertiary septa are about three quarters the length of the older septa and have slightly thickened inner ends. Quaternary and quinaries are very thin, cuneiform and alternate in length. Tertiary septa, alomg with septa of younger cycles can be fused to those of the preceeding cycle. The columella is lamellar. The wall is septothecal or parathecal epicostal. The endotheca is made of numerous vesicular dissepiments. In places an epithecal wall is present. The septal microstructure consists of monoaxial trabeculae giving off secondary ones and forming straight or zig-zag mid-septal lines.

Comparison: The new species agrees with *Placophyllia curvata* TURNSEK by the manner of budding and the curved growth of the corallites, and is distinguished from it by the greater diameter of the polyps and larger number of septa.

Family Heliastraeidae ALLOITEAU, 1952
Subfamily Heliastraeinae ALLOITEAU, 1952

Genus *Plesiastraeopsis* ALLOITEAU, 1957

Type species: *Astrea vesparia* MICHELIN, 1841

Plesiastraeopsis sp.
(Pl. 5, Fig. 3)

Dimensions:
dl: 1.8–2 mm
d: 3–3.5 mm
c-c: 3–3.5 mm
s: 24 (26)
Description: The corallum is in the form of a plocoid colony with corallites being circular in outline. Calices are regularly disposed on the surface of the colony. Septa are costate, non- or subconfluent, compact or subcompact, thin, are 24 in number and arranged in three cycles and 6 systems. They regularly alternate in length. The inner ends of the septa can be swollen, and some of them have separate pali. Their flanks have spiniform granulations. Septa of the first cycle extend to the columella. The columella is spongy-papillose. The wall is septoparathecal. The endotheca consists of thin vesicular dissepiments, occurring in the periphal region of the calice. Microstructure is poorly preserved, although in places simple mini- or medium-sized trabeculae can be seen.
Remarks: Because the specimen only represents a small fragment of a colony it is not assigned to a species.
Material: K.1134.

Suborder Meandriina ALLOITEAU, 1952
Family Meandriidae ALLOITEAU, 1952
Subfamily Meandriinae VAUGHAN & WELLS, 1943

Genus *Glenarea* POCTA, 1887

Type species: *Glenarea cretacea* POCTA, 1887

Glenarea poctai ELIÁSOVÁ, 1991
(Pl. 1, Figs. 4, 6)

v*1991 *Glenarea poctai* n. sp. – ELIÁSOVÁ, p. 100–101, Pl. 1, Fig. 2, Pl. II, Figs. 1, 2, Pl. III, Figs. 1a, b, Pl. IV.

Dimensions:
d: 2–4.5 mm
c-c: 2.5–4 mm
s: 16–24
s/mm: 6–8/2
Description: The corallum is massive and cerioid with calices united by their walls which are thin and irregular. Corallites are polygonal or rounded in outline. Septa number from 12 to 18 and are arranged in vaguely bilateral or radial systems. Septa are costate, thin, compact, nearly equal in thickness, and non- or subconfluent. Their lateral surfaces have fine granulations. Usually one to seven septa extend to the center of the calice where they may unite with a trabecular lamellar columella. Septa of younger generations can be fused to those of the preceding generations. The wall is a septo- or septoparatheca. Endotheca is formed by long, thin, tabulate or slightly arched dissepiments. Microstructure is poorly preserved, apparently consisting of simple minitrabeculae forming zigzag mid-septal lines.
Distribution: Upper Cenomanian-Lower Turonian of the Czech Republic.
Material: K.1135; K.1136.1-8.

Genus *Phragmosmilia* ALLOITEAU, 1952

Type species: *Trochosmilia inconstans* FROMENTEL, 1862

Phragmosmilia lineata (GOLDFUSS, 1826)
(Pl. 2, Fig. 5)

*1826 *Turbinolia lineata* n. sp. – GOLDFUSS, p. 108, Pl. XXXVII, Figs. 18a–b.
1848 *Turbinolia lineata* GOLDFUSS – MILNE-EDWARDS & HAIME, 3e sér., tome IX, p. 335.

1851 *Trochocyathus lineatus* (GOLDFUSS) – MILNE-EDWARDS & HAIME, p. 23.

1982 *Phragmosmilia lineata* (GOLDFUSS) – BEAUVAIS, tome I, p. 227-228, Pl. XX, Fig. 1 (older synonymscited herein).

Dimensions:
long diameter of calice (D): 14–17 mm
short diameter of calice (d): 11–12 mm
s: ca. 100
d/D: 0.65-0.8

Description: The corallum is simple, trochoid or turbinate, slightly elliptical in outline. Septa are costate, compact and arranged in 5 complete cycles and 6 systems, alternating in thickness. Their lateral surfaces are covered with spiniform or thick rounded granulae, and with vertical carinae. Septa of the first two or three cycles extend to, or nearly to, the columella. They are usually subequal in length but differ in thickness. Quaternary and quinary septa reach about three quarters of the length of the preceeding septa. Their inner ends are slightly thickened. The columella is thin and lamellar, discontinuous. Endotheca consists of numerous vesicular dissepiments. The wall is septothecal, but in places an epithecal stereozone is present. Septal microstructure features minitrabeculae forming mid-septal zigzag lines and giving off secondary trabeculae.

Distribution: Santonian-Campanian of Austria (Gosau Group).

Material: K.1137; K.1138.1-2.

Genus *Aulosmilia* ALLOITEAU, 1952

Type species: *Trochosmilia archiarci* FROMENTEL, 1863

Aulosmilia aspera (SOWERBY, 1831)
(Pl. 3, Fig. 5, Text-Fig. 4)

*1831 *Turbinolia aspera* n. sp. – SOWERBY, p. 417, Pl. XXXVII, Fig. 1.

pars 1857 *Montlivaultia rudis* n. sp. – MILNE-EDWARDS, vol. II, p. 314.

1864 *Placosmilia arcuata* MILNE-EDWARDS & HAIME-FROMENTEL, p. 219, Pl. XIX, Figs. 1–4.

pars 1914 *Trochosmilia chondrophora* FELIX – FELIX, pars 7, p. 213.

1974 *Aulosmilia aspera* (SOWERBY) – L. & M. BEAUVAIS, p. 485.

1978 *Aulosmilia aspera* (SOWERBY) – TURNSEK, p. 72, 104-105, Pl. 3, Figs. 1–4.

1982 *Aulosmilia aspera* (SOWERBY) – BEAUVAIS, tome I, p. 218-220, Pl. XVIII, Fig. 6, Pl. XIX, Fig. 2.

Fig. 4: Section of wall and septal plan of *Aulosmilia aspera* (SOWERBY, 1831). Diagrammatic view; scale bar: 3 mm, sample K.1140.

Dimensions:
long diameter of calice (D): 11–16 mm
short diameter of calice (d): 8–10 mm
s: ca. 100
d/D: 0.67-0.73

Description: The corallum is simple, trochoid or turbinate, and slightly compressed. Septa are compact, costate, thin, straight, flanks entirely granulate, and developed in 5 compete cycles in 6 systems. Their inner ends are claviform, rhopaloid or irregularly thickened. The first 12 to 24 septa extend to the columella. They slightly alternate in length and thickness. Septa of younger cycles are much thinner, alternating in length. The columella is lamellar and thin. The endotheca is made of vesicular dissepiments. The wall is septothecal or septoparathecal. Rarely, an epithecal wall is present. Septal microstructure is poorly preserved. In places simple minitrabeculae forming straight mid-septal lines can be seen.
Distribution: Coniacian-Santonian of Austria (Gosau Group), Middle Coniacian-Upper Santonian of south France, Santonian-Campanien of Slovenia.
Material: K.1139; K.1140; K.1141.

Subfamily Euphylliinae ALLOITEAU, 1952

Genus *Rennensismilia* ALLOITEAU, 1952

Type species: *Trochosmilia didyma* FROMENTEL, 1862 (non GOLDFUSS, 1826)

Rennensismilia chondrophora (FELIX, 1903)
(Pl. 3, Figs. 3, 4)

*1903a *Trochosmilia chondrophora* n. sp. – FELIX, p. 327, Pl. 24, Fig. 12.
1954 *Trochosmilia chondrophora* FELIX – KOLOSVÁRY, p. 101, Pl. 9, Figs. 11–13.
1961 *Trochosmilia chondrophora* FELIX – SURARU, p. 660, Pl. 7, Figs. 27–28.
1978 *Rennensismilia chondrophora* (FELIX)-TURNSEK, p. 79, 110, Pl. 10, Figs.1–5.

Dimensions:
long diameter of calice (D): 9–23 mm
short diameter of calice (d): 6–10 mm
s: 90–108
d/D: 0.5–0.7

Description: The corallum is simple, flabellate, elliptical in outline. Septa are costate, thin, compact, have cuneiform inner ends, and are developed in 5 cycles and 6 systems. Laterally they are irregularly, but distinctly covered with delicate spiniform granules. Septa of the first three cycles are subequal in length and thickness, and extend to the center of the calice where they become flexuous. Quaternary and quinary septa are much thinner, alternating in length. There is no columella. The endotheca consists of few thin vesicular dissepiments. The wall is septothecal, rarely septoparathecal. Frequently, an epithecal wall can be seen. Septal microstructure consists of simple minitrabeculae forming straight mid-septal lines.
Distribution: Senonian of Romania and Slovenia, Santonian-Campanian of Austria (Gosau Group).
Material: K.1142; K.1143.1-3.

Family Smilotrochidae ALLOITEAU, 1952

Genus *Smilotrochus* MILNE-EDWARDS & HAIME, 1851

Type species: *Turbinolia compressa* MORRIS, 1843

Smilotrochus palmerae (WELLS, 1933)
(Pl. 4, Figs. 4, 6)

*1933 *Blagrovia palmerae* n. sp. – WELLS, p. 43–44, Pl. 1, Fig. 10, Pl. 3, Figs. 1–2.

Dimensions:
long diameter of calice (D): 8–11 mm
short diameter of calice (d): 5–8 mm
s: 48–70
d/D: 0.56–0.8
Description: The corallum is simple, ceratoid or trochoid, slightly depressed. Septa are developed in four complete cycles in 6 unequal systems. In a few coralla the beginning of a fifth cycle is present. Septa are compact, slightly costate, straight or curved, and become flexuous and thickened to-

ward the center of the calice. Their lateral surfaces have spiniform or rounded granules. Primaries reach the axial region where they may fuse. The septa of the second cycle and half the septa of the third cycle are subequal in thickness and length, reaching about three quarters of the length of the primaries. Quaternary septa alternate with the remaining tertiary septa. Quinary septa are very thin and short. There is no columella. The wall is septothecal. The endotheca consists of rare thin vesicular dissepiments. Septal microstructure is made of small trabeculae forming mid-septal lines.

Distribution: Upper Albian of Texas.

Material: K.1144; K.1145.1-14.

Remarks: According to VAUGHAN & WELLS (1943) and WELLS (1956) the genus *Blagovia* DUNCAN 1880 represents a younger synonym of *Smilotrochus* MILNE-EDWARDS & HAIME.

The specimens at hand closely agree with the illustrations and descriptions of *Smilotrochus palmerae* (WELLS, 1933).

Family Dendrogyriidae ALLOITEAU, 1952

Genus *Meandroria* ALLOITEAU, 1952

Type species: *Meandrina radiata* MICHELIN, 1847

Meandroria tenella (GOLDFUSS, 1826)

(Pl. 4, Fig. 2)

*1826 *Meandrina tenella* n. sp. – GOLDFUSS, Bd. I, p. 63, Pl. XXI, Fig. 4.

1849 *Meandrina koninckii:* MILNE-EDWARDS & HAIME, tome IX, 3. series, p. 284.

v1854 *Leptoria koninckii* (MILNE-EDWARDS & HAIME) – REUSS, p. 110, Pl. XV, Figs. 1–4.

1881 *Meandrina bronni* KLIPSTEIN – QUENSTEDT, vol. VI, p. 885, Pl. 164, Fig. 1.

1892 *Leptoria koninckii* (MILNE-EDWARDS & HAIME) – MALLADA, p. 160.

v1903a *Leptoria koninckii* (MILNE-EDWARDS & HAIME) – FELIX, p. 276–277, Text-Figs. 38–39.

1930 *Leptoria koninckii* (MILNE-EDWARDS & HAIME) – OPPENHEIM, p. 384–387, Pl. XXVII, Fig. 7, Pl. LIII, Fig. 1, Pl. XLVI, Fig. 10.

non1937 *Leptoria koninckii* (MILNE-EDWARDS & HAIME) – BATALLER, p. 157.

?1954 *Leptoria koninckii* (MILNE-EDWARDS & HAIME) – KOLOSVÁRY, p. 78, Pl. VI, Figs. 8–12.

1957 *Meandroria koninckii* (MILNE-EDWARDS & HAIME) – ALLOITEAU, p. 172.

1976 *Meandroria koninckii* (MILNE-EDWARDS & HAIME) – TURNSEK, in TURNSEK & BUSER, p. 57, 79-80, Pl. 13, Figs. 1–4, Pl. 14, Figs. 1–3.

1980 *Meandroria koninckii* (MILNE-EDWARDS & HAIME) – VIDAL, p. 47–48, Pl. XII, Figs. 1–2.

1982 *Meandroria tenella* (GOLDFUSS) – BEAUVAIS, tome I, p. 210–212, Pl. XVIII, Figs. 2–3, Pl. XIX, Fig. 1 (older synonyms are cited herein).

v1989 *Meandroria tenella* (GOLDFUSS) – HÖFLING, p. 57.

Dimensions:

d (series): 2–3 mm

s/mm: 6–7/2

Description: The corallum is lamellar and meandroid with corallites being arranged in long, tholiform, parallel or ramified series. Ambulacra are absent. Septa are compact, costate, confluent, finely granulated laterally, and developed in two generations. Frequently, the beginning of a third generation is present. Primary and secondary septa are of the same length but differ in thickness. Their inner margins can be significantly thickened. Septa of the third generation are short and extend about one third the length of the older septa. The columella is lamellar and mainly continuous. The wall is septothecal. The endotheca is composed of subtabulate and vesicular dissepiments. Septal microstructure consists of simple minitrabeculae, forming dark mid-septal lines.

Distribution: Santonian of northeastern Spain, Senonian of Slovenia, Santonian-Campanian of

Austria (Gosau Group), Upper Santonian of southern France, ?Senonian of Hungary.
Material: K.1146.

Genus *Phyllosmilia* FROMENTEL, 1862

Type species: *Turbinolia basochesi* DEFRANCE, 1828

Phyllosmilia aegiale FELIX, 1903
(Pl. 7, Fig. 1)

*1903a *Phyllosmilia aegiale* n. sp. – FELIX, p. 346, Pl. XXIV, Figs. 9–11.
1914 *Phyllosmilia aegiale* FELIX – FELIX, pars 7, p. 223.
1930 *Phyllosmilia aegiale* FELIX-OPPENHEIM, p. 523, Pl. XXIX, Figs. 4–4a.
1937 *Phyllosmilia aegiale* FELIX – BATALLER, p. 250.
1956 *Phyllosmilia aegiale* FELIX – BENDUKIDZE, p. 111.
1982 *Phyllosmilia aegiale* FELIX – BEAUVAIS, tome I, p. 150–152, Pl. XII, Fig. 5.
non1995 *Phyllosmilia aegiale* FELIX – ABDEL-GAWAD & GAMEIL, p. 18, Pl. 18, Fig. 1, Pl. 19, Fig. 2.

Dimensions:
long diameter of calice (D): 14–18 mm
short diameter of calice (d): 4.5–6 mm
height of corallum (h): 9–14 mm
d/D: 0.32–0.44
h/D: 0.6–0.79
s/mm: 12–16/5
basal angle: 80°–95°
Description: The solitary corallum is flabelliform, with strongly compressed calicular opening, enlarging rapidly above the base. Septa are costate, compact, straight, and are developed in two to three generations. Their flanks are covered with small spiniform granules. Generally, septa of the first two generations are of the same length but differ in thickness. They may extend to and fuse with the columella. Their inner margins are claviform or rhopaloid. Tertiary septa are significantly thinner and shorter. The columella is lamellar and thin. The wall is a well-developed septotheca forming a subperipheral stereozone. The endotheca consists of thin vesicular dissepiments, occurring in the periphal areas of the lumen. Exotheca and epitheca are present. Septal microstructure comprises simple minitrabeculae giving off secondary ones.
Remarks: The specimens assigned to *Phyllosmilia aegiale* by ABDEL-GAWAD & GAMEIL (1995: 18) disagree with the generic concept of *Phyllosmilia* FROMENTEL by: 1) lacking a lamellar columella and 2) the septal development (opposing septa join).
Distribution: Coniacian-Santonian of Austria (Gosau Group), Santonian-Campanian of Georgia, Upper Santonian of north Spain (Catalonia).
Material: K.1147; K.1148.1-4.

Phyllosmilia felixi BEAUVAIS, 1982
(Pl. 5, Figs. 1, 2, 4)

v1903a *Trochosmilia* cf. *didymophila* FELIX – FELIX, p. 332. pl. XVIII, fig. 7.
v*1982 *Phyllosmilia felixi* n. sp. – BEAUVAIS, tome I, p. 152–153, Pl. XII, Fig. 6.

Dimensions:
long diameter of calice (D): 12–15 mm
short diameter of calice (d): 4–6 mm
height of corallum (h): 10–13 mm
d/D: 0.31–0.43
h/D: 0.8–1
s/mm: 16–18/5
basal angle: 80°–95°
Description: The solitary corallum is flabelliform, with an elliptical or compressed calice. Septa are compact, straight, costate, and are developed in three complete generations. In places the beginning of a fourth generation can be seen. The septal flanks have spiniform or rounded granules. Inner margins of septa are claviform, rarely rhopaloid. Septa of the first two generations are nearly equal in length and reach the axial region. The remaining ones alternate in length and thick-

ness. The columella is lamellar. The endotheca is made of few thin dissepiments. The wall is septothecal, partly forming a stereozone. Exotheca and epitheca are present. Septal microstructure is poorly preserved. Simple minitrabeculae forming mid-septal lines are observed.

Distribution: Santonian of Austria (Gosau Group).

Material: K.1149; K.1150.1-8.

Phyllosmilia didymophila (FELIX, 1903)

(Pl. 7, Fig. 2)

v*1903a *Trochosmilia didymophila* n. sp. – FELIX, p. 332–334, Pl. XXIV, Fig. 3 non Fig. 6.
1914 *Trochosmilia didymophila* FELIX – FELIX, pars 7, p. 214.
1936 *Phyllosmilia catalaunica* n. sp. – BATALLER, p. 45, Figs. 40–44.
1937 *Phyllosmilia catalaunica* BATALLER – BATALLER, p. 251, Fig. on p. 251.
1945 *Phyllosmilia catalaunica* BATALLER – BATALLER, p. 58, Fig. on p. 99.
1980 *Phyllosmilia catalaunica* BATALLER – VIDAL, p.49-50, Pl. IX, Figs. 1–3.
1982 *Phyllosmilia didymophila* (FELIX) – BEAUVAIS, tome I, p. 156-157, Pl. XIII, Fig. 7.

Dimensions:
long diameter of calice (D): 23–28 mm
short diameter of calice (d): 6–7 mm
height of corallum (h): 15–17 mm
d/D: 0.25–0.26
h/D: 0.61-0.65
s/mm: 12–16/5
basal angle: 95°–110°

Description: The simple corallum is flabelliform, with a compressed calice. Septa are compact, costate, straight, developed in three to four generations and alternate in length and thickness. Their lateral surfaces are covered with small spiniform granules. Inner ends can be irregularly thickened. The columella is lamellar. The wall is a septotheca. The endotheca consists of numerous thin, vesicular dissepiments. Exotheca and epitheca are present. Microstructural features are not preserved.

Remarks: The descriptions and illustrations of *Phyllosmilia catalaunica* BATALLER closely agree with the type material of *Phyllosmilia didymophila* (FELIX), suggesting that they are synonymous.

Distribution: Coniacian-Santonian of north Spain (Catalonia), Upper Santonian of Austria (Gosau Group).

Material: K.1151; K.1152.

Genus *Diploctenium* GOLDFUSS, 1826

Type species: *Diploctenium cordatum* GOLDFUSS, 1826

Diploctenium lunatum (BRUGUIÈRE, 1792)

(Pl. 7, Fig. 3)

*1792 *Madrepora lunata* n. sp. – BRUGUIÈRE, tome I, p. 461, Pl. 24, Figs. 5–6.
pars 1826 *Diploctenium cordatum:* GOLDFUSS, p. 105, Pl. XXXVII, Fig. 16.
1849 *Diploctenium lunatum* (BRUGUIÈRE) – MILNE-EDWARDS & HAIME, 3e sér., tome X, p. 248.
1851 *Diploctenium lunatum* (BRUGUIÈRE) – MILNE-EDWARDS & HAIME, p. 50.
1864 *Diploctenium lunatum* (BRUGUIÈRE) – FROMENTEL, p. 248, Pl. XIV, Fig. 3.
1892 *Diploctenium lunatum* (BRUGUIÈRE) – MALLADA, p. 160.
v1903a *Diploctenium lunatum* (BRUGUIÈRE) – FELIX, p. 347, Fig. 65.
1930 *Diploctenium angusterimatum* (BRUGUIÈRE) – OPPENHEIM, p. 533, Pl. XLI, Figs. 10, 10a.
1937 *Diploctenium lunatum* (BRUGUIÈRE) – BATALLER, p.243.
1941 *Diploctenium lunatum* (BRUGUIÈRE) – ALLOITEAU, p. 51, Pl. XXI, Figs. 1–3.
1952b *Diploctenium lunatum* (BRUGUIÈRE) – ALLOITEAU, p. 542–543, Fig. 4.
1965 *Diploctenium lunatum* (BRUGUIÈRE) – BENDUKIDZE, p. 20–24, Pl. 2–4.

1982 *Diploctenium lunatum* (BRUGUIÈRE) – BEAUVAIS, tome I, p. 164–167 (older synonyms cited herein).

Dimensions:
height of corallum from stem to upper surface: 9–19 mm
height of corallum from the extremities to upper surface: 8–21 mm
short diameter: 2.5–5 mm
long diameter: 10–42 mm

Description: The corallum is flabelliform, elongate elliptical or arched so strongly that the extremities of its longer axis may descend below the stem. Septa are compact, straight, costate and developed in two to three generations. Septa of the first generation extend to, and may fuse with, the columella. Secondary septa are nearly equal in thickness, slightly alternating in length. Tertiary septa are much thinner and reach about three quarters of the length of the secondary ones. The septal flanks are covered with delicate spiniform granules. Their inner ends can be slightly thickened. The columella is thin, lamellar and discontinuous. The endotheca consists of thin dissepiments. The wall is septothecal. Microstructural features cannot be observed.

Remarks: BENDUKIDZE (1956, 1965) studied the stages of ontogeny of specimens of *Diploctenium lunatum* (BRUGUIÈRE). She concluded that skeletal elements and their dimensions in this species are directly dependent upon environment. Moreover, within the same specimen each stage of ontogeny closely corresponds to a different species of *Diploctenium.* These results completely disagree with the generic concept proposed by ALLOITEAU (1952a, b) (see also discussion in BEAUVAIS 1982, tome I: 164 ff.). It seems necessary to investigate more specimens of different species of this genus to evaluate the pertinent taxonomical criteria. Specimens at hand closely agree with the descriptions and illustrations of *Diploctenium lunatum* by BENDUKIDZE (1956, 1965).

Distribution: Upper Cretaceous of Romania, Santonian-Campanian of Austria (Gosau Group), Turonian and Santonian-Maastrichtian of north Spain (Catalonia), Upper Santonian of south France (Provence and Corbière).

Material: K.1153; K.1154.1-7.

Suborder Rhipidogyrina RONIEWICZ, 1976
Family Rhipidogyridae KOBY, 1905

Genus *Barysmilia* MILNE-EDWARDS & HAIME, 1848

Type species: *Dendrophyllia brevicaulis* MICHELIN, 1841

Barysmilia iberica n. sp.
(Pl. 6, Figs. 1–3)

Derivatio nominis: according to the occurrence on the Iberian peninsula.

Holotypus: K.1155.

Locus typicus: Torallola, Prov. Llèida, north Spain.

Stratum typicum: Campanian, Puimayons Olisthostrome Member, Vallcarga Formation.

Diagnosis: The species is characterized by the small corallite diameter, which ranges from 2–4 mm and the septal development, being predominantly in 5 and 6 systems.

Material: K.1155; K.1156.1-4.

Dimensions:
d (long diameter): 2.5–4 mm
d (short diameter): 2–2.5 mm
c-c: 2–3 mm
s: 18–30 (in late budding stages the number of septa may be higher)

Description: The corallum forms a massive or branching, plocoid or subplocoid colony. In areas of intensive gemmation the forming of a subcerioid colony with calices being irregularly polygonal in outline are present. Increase is by intracalicular budding, resulting in permanent monostomatous to tristomatous conditions. Septa are compact, non-confluent and non-costate or show slighty costate conditions, being restricted to the outer margins of the corallite. They are arranged in 3 unequal systems: the first cycle, consisting of 6 septa is followed by 5 secondary and 11 tertiary septa. Development of younger septal cycles is always influenced by corallite division. In some ca-

lices the first cycle is formed by 7 primary followed by 6 secondary septa. Septa of the first two cycles differ in thickness but are equal in length and extend to the center of the calice where they may fuse with the columella. Septa of younger cycles alternate in length and thickness. The inner ends of primary and secondary septa are claviform or rhopaloid. Younger septa can have thickened or cuneiform inner ends. Septal flanks are covered with spiniform and rounded granules. The columella is well-developed and lamellar. The wall is septothecal or septoparathecal. The endotheca consists of thin tabulate and vesicular dissepiments. The exotheca is made of subtabulate and vesicular dissepiments. In areas of incomplete separation of the polyps several calices can be directly united by their walls. The microstructure is poorly preserved, but in places neorhipidacanth trabeculae can be seen.

Comparison: This new species is distinguished from the forms *Barysmilia tuberosa* REUSS, *B. gigantea* (OPPENHEIM) and *B. irregularis* (REUSS) by the smaller dimensions of the corallites and the development of the septa in 5 and 6 systems.

Suborder Fungiina VERRILL, 1865
Family Thamnasteriidae VAUGHAN & WELLS, 1943

Genus *Thamnasteria* LESAUVAGE, 1823

Type species: *Astrea dendroidea* LAMOUROUX, 1821 (=*Thamnasteria lamourouxi* LESAUVAGE, 1823)

Thamnasteria hoffmeisteri (WELLS, 1933)
(Pl. 6, Fig. 6)

v*1933 *Thamnasteria hoffmeisteri* n.sp. – WELLS, p. 107–108, Pl. 2, Figs. 21, 10, Figs. 18–19.

Dimensions:
d: 1.5–3 mm
c-c: (1.5) 2.5–4 mm
s: (12) 16–20
s/ mm: 6–8/2

Description: The corallum forms a massive, thamnasterioid colony with irregularly spaced corallites. Septa, of which 8 to 12 extend to the center of the calice, are confluent, subcompact or irregularly perforated, subequal in size, laterally covered with granules and pennulae. Some of the septa appear to unite and before them are paliform lobes. The number of the pali cannot be determined exactly, but not more than one crown seems to be present. The columella is styliform and may be joined to the trabecular prolongations of the inner ends of a few septa. The endotheca is made of subtabulate or vesicular dissepiments. Synapticulae are numerous. There is no corallite wall. Microstructural features are not preserved.

Distribution: Upper Cenomanian of Texas (Buda Limestone).

Material: K.1157; K.1158.

Genus *Koilomorpha* ALLOITEAU, 1952

Type species: *Meandrina arausiaca* MICHELIN, 1841

Koilomorpha cyathosericites (OPPENHEIM, 1930)
(Pl. 6, Fig. 5, Pl. 11, Fig. 3, Pl. 12, Fig. 1)

*1930 *Meandraraea cyathosericites* n. sp. – OPPENHEIM, p. 215, Pl. XXXVIII, Figs. 5, 5a.
1982 *Koilomorpha cyathosericites* (OPPENHEIM) – BEAUVAIS, tome II, p. 99.

Dimensions:
c-c (same series): 5–7 mm
c-c (adjacent series): 6–8 mm
s/mm: 7–9/2

Description: The corallum is lamellar and thamnasterioid with calices arranged in long meandroid series. Adjacent series are separated by tholiform collines. There is no corallite wall. Septa are confluent, compact or subcompact, and equal in thickness, with flanks containing irregularly de-

veloped granules and pennulae. About 20 to 30 septa extend to the center and join the columella. Some of the smaller septa appear to unite. The inner margins of the septa are coarsely perforate. The columella is spongy-papillose or parietal and merges with the perforate inner margins. Synapticulae are abundant and irregularly placed. The endotheca consists of numerous thin, slightly arched dissepiments. Septal microstructure is poorly preserved, with only a few medium-sized simple trabeculae observed.
Distribution: Santonian-Campanian of Austria (Gosau Group).
Material: K.1159; K.1160.1-2.

Genus *Astraraea* FELIX, 1900

Type species: *Thamnastraea multiradiata* REUSS, 1854

Astraraea senessei ALLOITEAU, 1939
(Pl. 5, Fig. 5)

v1903a *Astraea media* (SOWERBY) – FELIX, p. 187–188.
*1939 *Astraraea senessei* n. sp. – ALLOITEAU, p. 20, Pl. I, Fig. 9.
1982 *Astraraea senessei* ALLOITEAU – BEAUVAIS, tome II, p. 34, Pl. XXV, Fig. 2.

Dimensions:
c-c: (2.5) 3–6 mm
s/mm: 5–6/2
Description: The corallum forms a lamellar, thamnasterioid colony. The calices are superficial and scattered without order over the upper surface of the colony. There are no corallite walls and septa are confluent between calices. Septa, of which 6 to 9 extend to the columella, are thick, equal in size with irregular perforations, united by numerous synapticulae. Septal flanks are covered with rare coarse granules. The columella is pappilose. Endotheca is well-developed, consisting of numerous vesicular or subtabulate dissepiments. Microstructure is not preserved.
Distribution: Santonian-Campanian of Austria (Gosau Group), Upper Santonian of south France.
Material: K.1161.

Family Agathiphylliidae
VAUGHAN & WELLS, 1943

Genus *Parasynastraea* ALLOITEAU, 1957

Type species: *Parasynastraea cenomaniensis* ALLOITEAU, 1957

Remarks: ALLOITEAU (1957) assigned *Parasynastraea* to the Family Acrosmiliidae ALLOITEAU, 1952. Because his Family Acrosmiliidae contains only solitary forms *Parasynastraea* is here transferred to the Agathiphylliidae on the basis of: (1) a synapticulothecal wall; (2) well developed columella; and (3) the presence of both simple and compound trabeculae.

Parasynastraea tignaria (OPPENHEIM, 1930)
(Pl. 8, Figs. 1, 5, 6)

*1930 *Meandraraea tignaria* n. sp. – OPPENHEIM, p. 214, Pl. XIX, Fig. 3.
1936 *Latimeandraraea tignaria* (OPPENHEIM) – HACKEMESSER, p. 57–58.
1982 *Parasynastraea tignaria* (OPPENHEIM) – BEAUVAIS, tome II, p. 145.

Dimensions:
c-c: (2) 2.5–4
s: (20) 22–36
s/mm: 6–8 (9)/2
Description: The corallum is cerio-thanmasterioid, forming colonies composed of isolated calices as well as united corallites in short series. Septa are confluent, rarely subconfluent, moderate to thick, subcompact with perforated inner ends. Anastomosing of septa is present commonly. Lateral surfaces of the septa are covered with granules and pennulae, which vary significantly both in size and shape. The columella is well-developed,

small, and parietal-papillose. Synapticulae are numerous and well-developed near the wall. Endotheca consists of subtabulate or vesicular dissepiments. The wall is an incomplete synapticulotheca. Microstructure is poorly preserved, but in places medium-sized or thick simple and compound trabeculae are seen.

Remarks: The specimens at hand agree closely with BEAUVAIS' description (1982, tome II: 145) of the holotype.

Distribution: ?Cenomanian of Greece, Santonian-Campanian of Austria (Gosau Group).

Material: K.1162; K.1163; K.1164.1-5.

Family Pachyphylliidae BEAUVAIS, 1982

Genus *Pachyphyllia* ALLOITEAU, 1957

Type species: *Phyllocoenia toucasi* FROMENTEL, 1884

Pachyphyllia toucasi (FROMENTEL, 1884)
(Pl. 5, Figs. 6, 7)

*1884 *Phyllocoenia toucasi* n. sp. – FROMENTEL, p. 549, Pl. 153, Fig. 1.
1957 *Pachyphyllia toucasi* (FROMENTEL) – ALLOITEAU, p. 126, Pl. 5, Fig. 16.
non 1995 *Phyllocoenia toucasi* FROMENTEL – ABDEL-GAWAD & GAMEIL, p. 17–18, Pl. 18, Figs. 4–5.

Dimensions:
d: 4–7 mm
c-c: (4) 6–10 (12) mm
s: 32–45

Description: The corallum forms a massive or branching plocoid colony with irregularly distributed calices. Corallites are circular or elliptical in outline. Costosepta are compact, thick in the region of the wall and much thinner towards the center, nonconfluent, spinulose laterally, and may become flexuous toward the columella. They are arranged in two to three cycles in 10 systems. Ten septa of the first cycle extend to, and may fuse with, the columella. The septa of younger cycles are thinner and alternate in length. The columella is well developed and lamellar or trabecular. The endotheca consists of rare tabulate dissepiments. Peritheca is formed by subtabulate dissepiments. The wall is septothecal or synapticulothecal, rarely septoparathecal. Microstructure contains simple (and possibly compound) small trabeculae forming dark median lines.

Remarks: ALLOITEAU's (1957) re-examination of the type material of *Phyllocoenia toucasi* FROMENTEL indicated that it disagreed with the generic concept of *Phyllocoenia* MILNE-EDWARDS & HAIME in a number of important features, e.g.: (1) a well developed, mainly lamellar columella; (2) a rudimentary endotheca; (3) the presence of synapticulae; and (4) a septothecal or synapticulothecal wall. However, the specimens assigned to *Phyllocoenia toucasi* FROMENTEL by ABDEL-GAWAD & GAMEIL (1995) do not correspond to ALLOITEAU's description of the type material since their material has an endothecal wall and lacks both a columella and synapticulae.

Distribution: Santonian of France.

Material: K.1165; K.1166.1-18.

Family Actinacididae VAUGHAN & WELLS, 1943

Genus *Actinacis* D'ORBIGNY, 1849

Type species: *Actinacis martiniana* D'ORBIGNY, 1849

Actinacis parvistella OPPENHEIM, 1930
(Pl. 11, Fig. 1)

1881 *Actinacis haueri* REUSS-QUENSTEDT, VI, p. 900, Pl. 178, Fig. 28.
1911 *Actinacis haueri quenstedti*: TRAUTH, p. 81.
*1930 *Actinacis parvistella* n. sp.-OPPENHEIM, p. 9, Pl. I, Figs. 3-3a.

1930 *Actinacis multilamellata* n. sp. – OPPENHEIM, p. 13, Pl. XV, Fig. 2.
v1933 *Actinacis valverdensis* n. sp. – WELLS, p. 120, Pl. 11, Figs. 1-2.
1982 *Actinacis parvistella* OPPENHEIM – BEAUVAIS, p. 273, Pl. XLIX, Figs. 1–2, Pl. LXIX, Fig. 3.
1982 *Actinacis multilamellata* OPPENHEIM – BEAUVAIS, p. 274, Pl. XLIX, Figs. 3–4, Pl. LXIX, Fig. 2.

Dimensions:
d: 0.8–1.2 (1.5) mm
c-c: 1.5–3.5 mm
s: (18) 22–28

Description: The corallum forms an encrusting-lamellar or subdendroid colony, consisting of finger-like branches. Circular or slightly oval calices are scattered irregularly and have an average diameter of 1 mm. They are separated by vermiculate coenosteum. Costosepta, of which 4 to 10 extend to the columella, are generally developed in three complete cycles. They are compact or subcompact, regularly alternating, thin and straight. Anastomosis of septa is a common feature. All septa are thickened near the wall. Their lateral surfaces have minor spiniform granulations. The columella is trabecular or sublamellar. The wall is an incomplete (para-) synapticulotheca. Rare dissepiments are developed near the wall. Endotheca is absent. The microstructure is poorly preserved, but in places isolated centers of calcification are seen.

Remarks: On the basis of the studies carried out by BEAUVAIS (1982) the forms *Actinacis parvistella* OPPENHEIM and *Actinacis multilamellata* OPPENHEIM are considered to be synonymous. However, *Actinacis valverdensis* WELLS closely agrees with both of these species.

Distribution: Middle Albian of Texas, Lower Coniacian of southern France, Upper Coniacian-Santonian of Austria (Gosau Group).

Material: K.1167; K.1168.1-9.

Genus *Thamnarea* ÈTALLON, 1864

Type species: *Thamnarea arborescens* ÈTALLON, 1864

Thamnarea lithodes FELIX, 1903
(Pl. 8, Fig. 3)

v*1903a *Thamnarea lithodes* n. sp. – FELIX, p. 182–183, Pl. XXIII, Fig. 6, Text-Fig. 8.

Dimensions:
c-c: 1.5–3.5 mm
s/mm: (6) 8–10/2

Description: The thamnasterioid corallum is massive or lamellar, with calices arranged regularly on the upper surface. Septa are costate, confluent, irregularly perforated and equal in thickness. Septal flanks are covered with granules and pennulae. Eight to twelve septa reach the center of the calice, where their perforated inner ends merge with the spongy-parietal columella. Synapticulae are numerous. Endotheca and exotheca are made of rare slightly arched dissepiments. The wall is an incomplete synapticulotheca. Microstructural features are not preserved.

Distribution: Santonian-Campanian of Austria (Gosau Group).

Material: K.1169; K.1170.1-2.

Suborder Microsolenina MORYCOWA & RONIEWICZ, 1995
Family Latomeandridae ALLOITEAU, 1952

Genus *Thamnoseris* FROMENTEL, 1861

Type species: *Thamnoseris incrustans* FROMENTEL, 1861

Thamnoseris arborescens FELIX, 1891
(Pl. 8, Fig. 2)

*1891 *Thamnoseris arborescens* n. sp – FELIX, p. 152, Pl. XXV, Figs. 11, 11a, 15.
1914 *Thamnoseris arborescens* FELIX – FELIX, p. 45.
non v 1944 *Actinaraea arborescens* (FELIX) – WELLS, p. 440, Pl. 72, Figs. 1–5, Pl. 74, Fig. 1.

1966 *Thamnoseris* cf. *arborescens* FELIX – KUZMICHEVA, p. 61.
v1971 ?*Thamnoseris carpathica* n. sp. – MORYCOWA, p. 106–108, Pl. XXVIII; Fig. 32.
1972 *Thamnoseris* cf. *arborescens* FELIX – KUZMICHEVA, p. 116.
1981 *Thamnoseris carpathica* MORYCOWA – TURNSEK, in TURNSEK & MIHAJLOVIC, p. 29, Pl. 31, Figs. 4, 5.
1989 *Thamnoseris carpathica* MORYCOWA-LÖSER, p. 135–136, Text-Fig. 37.
v1997 *Thamnoseris arborescens* FELIX – BARON-SZABO, p. 88–89, Pl. 16, Figs. 2, 4.
1998 *Thamnoseris carpathica* MORYCOWA – LÖSER, p. 11.

Dimensions:
d: 2.5–3.5 (5) mm
c-c: 2.5–4 (5) mm
s: (20) 24-36
s/mm: 5-7 (8)/2

Description: In this species, the corallum is massive thamnasterioid or subcerioid. The calices are polygonal or circular in outline, and are formed by extracalicinal or extracalicinal-marginal budding. The calices can be grouped in short monocentric series.

Costosepta are not arranged in definite cycles. They are equal in length and thickness, thick, confluent and subcompact. Their inner ends terminate in paliform swellings or dissociate to form true paliform lobes. The septal faces are covered with granules varying in size and shape. Septal anastomosis is common. The columella is parietal. Synapticulae are abundant and appear throughout the entire colony. The endotheca is formed by thin vesicular dissepiments. The wall is an incomplete synapticulotheca. The microstructure has compound trabeculae that are both medium and thick.

Distribution: Neocomian-Aptian of Mexico, Hauterivian of the Crimea, Barrêmian-Lower Aptian of Serbia, Lower Aptian of Romania, Lower Cenomanian of Germany, Lower Coniacian of Austria (Gosau Group).

Material: K.1171; K.1172.1-12.

Genus *Fungiastraea* ALLOITEAU, 1952

Type species: *Astraea laganum* MICHELIN, 1841

Fungiastraea exigua (REUSS, 1854)
(Pl. 4, Fig. 5)

v*1854 *Thamnastraea exigua* n. sp. – REUSS, p. 119, Pl. 18, Figs. 5–6.
1857 *Thamnastraea exigua* REUSS – MILNE-EDWARDS & HAIME, vol. II: 556.
v1903a *Thamnastraea exigua* REUSS – FELIX, p. 209-210, Text-Fig. 15.
1911 *Thamnastraea exigua* REUSS – TRAUTH, p. 69, Pl. 3, Fig. 3.
1930 *Synastraea exigua* (REUSS) – OPPENHEIM, p. 166, Pl. 31, Figs. 12, 12a.
1971 *Fungiastraea* aff. *exigua* (REUSS) – MORYCOWA, p. 111–112, Pl. 28. Fig. 2.
v1993 *Fungiastraea* cf. *exigua* (REUSS) – BARON-SZABO, p. 162, Pl. 4, Figs. 3a, b.
v1997 *Fungiastraea exigua* (REUSS) – BARON-SZABO, p. 88, Pl. 16, Fig. 3.

Dimensions:
c-c: 2.5–4 mm
s: (18) 22–36
s/mm: 7–10/2

Description: The thamnasterioid corallum is massive or lamellar, with circular or elliptical calices, that can be elongated and deformed by division. Septa are subcompact, confluent, moderate in size, and have the tendency to fuse. Their flanks have pennulae and unequal granulations. The columella is variably developed: weak or strong, spongy or papillose. Synapticulae are well developed and are irregularly present. The endotheca consists of thin vesicular dissepiments. Microstructural features are not preserved.

Distribution: Lower Aptian of Romania and Austria (Schrattenkalk), Aptian-Albian of northern Spain, Lower Coniacian-Campanian of Austria (Gosau Group), Senonian of the Czech Republic.

Material: K.1173; K.1174.1-8.

Genus *Ovalastrea* D,ORBIGNY, 1849

Type species: *Astrea caryophylloides* GOLDFUSS, 1826

Ovalastrea anomalos (WELLS, 1934)
(Pl. 10, Fig. 3)

v*1934 *Favioseris anamalos* n. sp. – WELLS, p. 82–83, pl. 4, figs. 19, 20.

Dimensions:
long diameter of calice: 3.5–6 mm
short diameter of calice: 3.5–4 mm
c-c: 4–6.5 mm
s: 32–46
s/mm: 4–6/1

Description: The plocoid corallum forms a massive colony with slightly protuberant calices that are circular or irregularly elliptical in outline. The septa are costate, subcompact, confluent, sub- or nonconfluent, and are arranged in three to four cycles in 6 systems that regularly alternate with respect to both length and thickness. The lateral surfaces of the septa have a variety of ornamentations: delicate spiniform granulations, rounded coarse granules, or pennulae. Inner ends of septa may be irregularly thickened and dissociate to ? paliform lobes. Together with the parietal-pappilose columella they fill the axial part of the calice.

The wall is synapticulothecal or septothecal. The endotheca is composed of numerous thin vesicular dissepiments. Synapticulae are mainly restricted to the vicinity of the wall. The microstructure is poorly preserved, but in places polycentric (and monaxial ?) thick trabeculae are present.

Distribution: Campanian (-Maastrichtian ?) of Jamaica.

Material: K.1175.

Genus *Latohelia* LÖSER, 1987

Type species: *Synhelia reptans* POCTA, 1887

Latohelia circularia n. sp.
(Pl. 9, Figs. 1–4, Pl. 10, Fig. 2)

Derivatio nominis: according to the circular calices.

Holotypus: K.1177.

Paratypus: K.1176.

Locus typicus: Torallola, Prov. Llèida, north Spain.

Stratum typicum: Campanian, Puimayons Olisthostrome Member, Vallcarga Formation.

Diagnosis: The species is characterized by its circular calices with a diameter from 1.5–2.5 mm and the number of costae, which equal the number of septa.

Material: K.1176; K.1177; K.1178; K.1179.1-20.

Dimensions:
plocoid
dl: (1.3) 1.5–2.5 (3) mm
c-c: (2) 3–5 (8) mm
s: 30–60
dendroid
dl: 1.5–2.5 (3) mm
c-c: 3–7 mm
s: 30–54

Description: The corallum occurs as a massive plocoid or dendroid colony with circular calices, unless distorted by fission. Increase is by intracalicinal, extracalicinal and extracalicinal-marginal budding. Septa are costate, subcompact, sub- or nonconfluent, rarely confluent, thin, straight, and arranged in three groups in irregular systems. Septa of the first group, being 10 to 20 in number, reach about one third the diameter of the calice. The 10 to 20 septa of the second set slightly alternate in length and thickness. Youngest septa are very short and thin. Septal flanks are covered with spiniform or rounded granules and pennulae. Septal anastomosis is present commonly. Paliform lobes are numerous, positioned axial to the primary and secondary septa. The columella is well-developed, parietal-papillose. Frequently, synapticulae can be seen. The wall is synapticulothecal or septothecal, rarely septoparathecal. The endotheca is composed of thin vesicular dissepiments. The microstructure consists of com-

pound (and simple?) medium sized to thick trabeculae.
Comparison: The new species is distinguished from *Latohelia reptans* (POCTA) by the smaller diameter of the calice and the number of septa being equal to the number of costae.

Genus *Microphyllia* D,ORBIGNY, 1849

Type species: *Meandrina soemmeringi* MÜNSTER, 1829

Microphyllia maeandrinoides (REUSS, 1845)
(Pl. 10, Fig. 5)

*1845 *Astraea maeandrinoides* n.sp.-REUSS, p. 61, Pl. 43, Figs. 2a-c.
1994 *Microphyllia maendrinoides* (REUSS)-ELIÁ_OVÁ, p. 4-5, Pl. II, Figs. 3a-c, Pl. IV, Fig. 2, Pl. VIII, Fig. 1 (older synonyms are cited herein).
1998 *Microphyllia maendrinoides* (REUSS)-LÖSER, 11.

Dimensions:
length of serie: 4-11 mm
d (serie): 2,5-6 mm
c-c (serie): 2-4 mm
s/mm: 7-10/2
Description: The corallum forms a subcerioid or meandroid colony. Calices and calicular series are separated by tectiform collines. Septa are thin, perforate, non- or subconfluent, frequently uniting, with lateral surfaces covered with granules varying in size and shape, as well as abundant pennulae. Trabecular prolongations of the inner ends of septa fill the central regions of the calice or calicinal series, respectively. The columella is parietal, irregularly developed. The endotheca consists of numerous thin vesicular dissepiments. The wall is septothecal or synapticulothecal. Microstructure is not preserved.
Distribution: Lower Cenomanian of Germany, Upper Cenomanian-Lower Turonian of the Czech Republic.
Material: K.1180; K.1181.

Genus *Gyrodendron* QUENSTEDT, 1880

Type species: *Gyrodendron lobatum* QUENSTEDT, 1880

Gyrodendron leptonema n. sp.
(Pl. 11, Figs. 2, 4, Pl. 12, Figs. 5, 6)

Derivatio nominis: according to the thin septa.
Holotypus: K.1182.
Paratypus: K.1183.
Locus typicus: Torallola, Prov. Llèida, north Spain.
Stratum typicum: Campanian, Puimayons Olisthostrome Member, Vallcarga Formation.
Diagnosis: The species is characterized by its irregularly ramified polycentric series of thin septa, being 48 to 70 in well-defined centers, and numbering from 6 to 9 in 2 mm.
Material: K.1182; K.1183; K.1184.1-5.

Dimensions:
d (series): (4) 6–12 (14) mm
d (calice): (5) 6–9 mm
s: 48–ca. 70
s/mm: 6–9/2
Description: The fasciculate corallum is formed by clusters of mainly polycentric corallites. Frequently, monocentric polyps are present. Septa are thin, costate, irregularly perforated and arranged in four to five generations, regularly alternating in length and thickness, with flanks having spiniform or rounded granules and pennulae. The axial region of corallites is filled the trabecular prolongations of inner ends of septa. In places the development of a discontinuous, thin, lamellar columella can be observed. Synapticulae are irregularly scattered. Endotheca is formed by thin vesicular and subtabulate dissepiments. The wall is septothecal or synapticulothecal. The microstructure is characterized by medium-sized to thick compound trabeculae.
Comparison: The new species is distinguished from *Gyrodendron serbica* TURNSEK, 1981 of the Barrêmian-Lower Aptian of Serbia by its development of numerous and thin septa.

Genus *Dimorphastraea* d'Orbigny, 1849

Type species: *Dimorphastraea grandiflora* d'Orbigny, 1850

Dimorphastraea parvistella Oppenheim, 1930

(Pl. 11, Fig. 5)

*1930 *Dimorphastraea parvistella* n. sp. – Oppenheim, p. 194, Pl. XLVI, Figs. 2–2a.
1982 *Dimorphastraea parvistella* Oppenheim – Beauvais, tome II, p. 92–93.

Dimensions:
c-c (serie): (2) 2.5–4 (5) mm
c-c (adjacent series): 3.5–5 mm
s/mm: 7–9 (10)/2

Description: In this species, the colonial corallum is massive or lamellar. The corallites are distributed over the upper surface in regular concentric series. Collines separating the series of corallites are tholiform or flat.

The septa are confluent, irregularly perforated, equal in thickness, and laterally display rounded granules and pennulae. Seven to fourteen septa reach the center of the calice and join the weakly developed parietal-papillose columella. Paliform lobes are common. Synapticulae are well-developed and numerous. A corallite wall is lacking. Endotheca consists of vesicular dissepiments. Microstructure is not preserved.

Distribution: Lower Coniacian and Upper Santonian of south France, Santonian of Austria (Gosau Group).

Material: K.1185; K.1186.

Family Cunnolitidae Alloiteau, 1952

Genus *Cunnolites* Barrère, 1746

Type species: *Porpites ellipticus* Guettard, 1774 (=*Cyclolites elliptica* Lamarck, 1801).

Cunnolites sp.

(Pl. 4, Fig. 1, Pl. 8, Fig. 4)

Dimensions:
see table 4.

Description: Corallum simple, free, circular or slightly elliptical in outline. Base flat or slightly concave, generally covered by a thick, concentrically wrinkled epitheca, convex above, with an elongated fossette. Septa thin, straight and porous or subcompact. Septal flanks covered with numerous granules and pennulae. According to the thickness of septa 5–6 generations can be distinguished, irregularly alternating in length. Those of the first three generations are subcompact. Septa of the remaining generations are fenestrate. There is no columella. The endotheca consists of thin vesicular dissepiments. Synapticulae are numerous. The wall is synapticulothecal. Microstructural features not preserved.

Remarks: Determination of the Torallola specimens to species level is not possible, because each sample can be assigned to several species, e.g.: sample K.1189 can be assigned to: *Cunnolites macrostoma* (Reuss, 1854), *C. mitissimus* (Oppenheim, 1930), or *C. jamaicaensis* Wells, 1934; sample K.1190.2 can be assigned to: *C. mitissimus* (Oppenheim, 1930), *C. jamaicaensis* Wells, 1934, or *C. reussi* (Fromentel, 1870); sample K.1190.4 can be assigned to: *C. sotorius* (Quenstedt, 1880), *C. macrostoma* (Reuss, 1854), or *C. regularis* (Leymerie, 1881); sample K.1190.11 can be assigned to: *C. sellatus nefgrabensis* Beauvais, 1982, or *C. undulata* (Reuss, 1854); while sample K.1190.19 can be assigned to: *C. merigonensis* Alloiteau, 1957, or *C. regularis* (Leymerie, 1881).

Material: K.1187; K.1188; K.1189; K.1190.1-19.

Suborder Caryophylliina Vaughan & Wells, 1943
Family Caryophylliidae Gray, 1847
Subfamily Caryophylliinae Gray, 1847

Genus *Protrochocyathus* Alloiteau, 1958

Type species: *Protrochocyathus madagascariensis* Alloiteau, 1958

Protrochocyathus subarcuatus ALLOITEAU, 1958

(Pl. 7, Fig. 4)

*1958 *Protrochocyathus subarcuatus* n. sp. – ALLOITEAU, p. 133–134, Pl. XXIII, Fig. 1, Pl. XXXI, Fig. 12.

Dimensions:
long diameter of calice: 9–10 mm
short diameter of calice: 7–9 mm
s: (40) 48

Description: The simple corallum is turbinate or subturbinate, and circular in outline. Septa are compact, laterally finely granulate and arranged in three to four groups in irregular systems. The first group consists of 6 to 10 principal septa extending to, or nearly to, the columella. The second set comprises 6 to 10 septa which are smaller and thinner than those of the first and which extend about half-way to the columella. Septa of the last groups are distinctly smaller and thinner. Paliform lobes which are extremely elongated and stick-like lie irregularly in front of the septa of the oldest groups. The columella is well-developed and is composed of twisted segments. There are no dissepiments. The wall is a septotheca. Septal microstructure has simple mini-trabeculae which form dark mid-septal lines.

Distribution: Albian of Madagascar.

Material: K.1191; K.1192.1-4.

Subfamily Parasmiliinae VAUGHAN & WELLS, 1943

Genus *Dendrosmilia* MILNE-EDWARDS & HAIME, 1848

Type species: *Dendrosmilia duvaliana* MILNE-EDWARDS & HAIME, 1848

Dendrosmilia crassa (REUSS, 1854)

(Pl. 9, Figs. 5, 6)

*1854 *Aplosmilia crassa* n. sp. – REUSS, p. 105, Pl. XI, Figs. 7–9.

1903a *Dendrosmilia crassa* (REUSS) – FELIX, p. 282–284, Pl. XVII, Fig. 13, Text-Fig. 45.

v1997 *Dendrosmilia crassa* (REUSS) – BARON-SZABO, in BARON-SZABO & FERNANDEZ-MENDIOLA, p. 48, Figs. 5 D, F.

Dimensions:
long diameter of calice: 3.5–6 mm
short diameter of calice: 1.5–3 mm
s: 20–30, in late budding stages the number can reach 40

Description: The phaceloid corallum has slightly elliptical or very elongated calices. Corallites are tall and dichotomous, increasing by fission. New corallites project upward and outward at a slight angle from the parent corallites.

Septa are compact, costate and thin, becoming thickened near the wall. Laterally, they are covered with rounded granules and long spines. According to the length and thickness four generations of regularly alternating septa can be distinguished. Trabecular prolongations of the inner ends of septa reach the center of the calice. Together with a weakly developed spongy-trabecular columella they fill the axial region of corallites. The wall is a thick septotheca or septoparatheca. Stereome is present. In places an epithecal wall can be seen. Endotheca consists of thin subtabulate dissepiments. The microstructure is characterized by simple mini- or medium-sized trabeculae, which give off secondary trabeculae.

Distribution: Albian of north Spain, Santonian-Campanian of Austria (Gosau Group).

Material: K.1193; K.1194.

Subclass Octocorallia HAECKEL, 1866
Order Coenothecalia BOURNE, 1900
Family Helioporidae MOSELEY, 1876

Genus *Polytremacis* D,ORBIGNY, 1849

Type species: *Heliopora blainvillei* MICHELIN, 1841

***Polytremacis edwardsana* (STOLICZKA, 1873)**
(Pl. 1, Fig. 7)

*1873 *Heliopora edwardsana* n. sp. – STOLICZKA, p. 53–54, Pl. XI, Fig. 11.
1900 *Heliopora edwardsi* STOLICZKA – GREGORY, p. 299.
1911 *Heliopora tenera* n. sp. – TRAUTH, p. 89, Fig. 6, Pl. IV, Fig. 3.
1914 *Heliopora edwardsi* STOLICZKA – FELIX, pars 6, p. 141.
1914 *Heliopora tenera* TRAUTH – FELIX, pars 7, p. 248.
1936 *Heliopora edwardsana* STOLICZKA – HACKEMESSER, p. 76–77, Pl. 6, Fig. 11.
1964 *Polytremacis edwardsana* (STOLICZKA) – MORYCOWA, p. 55–57, Pl. XII, Figs. 1a–e.
1971 *Polytremacis tenera* (TRAUTH) – MORYCOWA, p. 136-139, Fig. 41, Pl. XL, Fig. 1.
1981 *Polytremacis edwardsana* (STOLICZKA) – SCOTT, p. 465.
1982 *Polytremacis tenera* (TRAUTH) – BEAUVAIS, tome III, p. 36-38, Pl. LIII, Fig. 7, Pl. LVIII, Fig. 5.

Dimensions:
d: 0.7–0.9 (1,1) mm
c-c: 1.3–3.5 (4) mm
s: 14–18 (22)
tubes/1 mm^2: 20–25

Description: The colony is massive or lamellar. Calicinal tubes are circular in outline and imbedded in a vermiculate exoskeleton, composed of very small rounded or elliptical tubes. Septa are very short and thorn-like. Calicular tabulae are well-developed and slightly arched.

Remarks: The descriptions and illustrations of the species *Polytremacis tenera* (TRAUTH) closely agree with *Polytremacis edwardsana* (STOLICZKA), suggesting that they are synonymous. Moreover, the specimens from Torallola unite characteristics of both species.

Distribution: Barremian-Lower Aptian of Poland, Lower Aptian of Romania, Lower Albian of Mexico and Arizona (Mural Limestone), ?Cenomanian of Greece, Cenomanian (?-Turonian) of India, Senonian of the Czech Republic, Santonian-Campanian of Austria (Gosau Group), Upper Santonian of south France.

Material: K.1195; K.1196.1-3.

4. Paleogeographical and paleoecological comparison

The coral fauna of Torallola corresponds well to Upper Cretaceous coral communities, especially to the Campanian coral assemblages of central and southern European regions (Tables 1, 2 and 3). The majority of the Torallola corals shows great affinities to associations of southern France (e.g. Corbière and Provence) and Austrian Gosau localities. Within the European province this newly described coral association represents one of the most complex coral faunas of the Upper Cretaceous.

Taxonomically the Torallola community represents a very diverse association with 36 genera belonging to 9 (!) suborders. Ecologically the fauna is characterized by a large number of growth forms as well as by a complex stenotopic nature (Table 5), reflecting the variety of ranges of tolerance of single corals species. Those assemblages seem to indicate communities living in shallow seas with optimal light and nutrient supply (BARON-SZABO 1997). However, the appearance of a highly diverse coral association, consisting of only small-sized individual specimens suggests that the corals lived under favourable but unstable ecological conditions.

Acknowledgements

I am especially grateful to Klaus Bandel (Hamburg) for providing the material. I also thank James Sorauf (Binghamton), Dragica Turn_ek (Ljubljana) and Hannes Löser (Dresden) for comments on the manuscript. Thanks are furthermore due to Gerd Schreiber (Berlin) for his help with the preparation of the material.

References

ABDEL-GAWAD, G. J. & GAMEIL, M. (1995): Cretaceous and Paleocene coral faunas in Egypt and Greece. – Coral Res. Bull., **4,** 1–36, Dresden.

ALLOITEAU, J. (1939): Polypiers récoltés par M. P. SÉNESSE dans le Santonien de la Jouane, Commune de Sougraigne (Aude).- Bull. Soc. géol. France, (5), **9**, 3–21, Paris.

ALLOITEAU, J. (1941): Révision de collection H. MICHELIN. Polypiers d'anthozoaires (1): Crétacé. – Mém. Mus. Nat. d'Hist. Nat., (N.S.), **16** (1), 1–100, Paris.

ALLOITEAU, J. (1952a): Madréporaires post-paléozoiques – [In]: PIVETEAU, J.: Traité de Paléontologie, Bd. 1, 539–684, Paris (Masson).

ALLOITEAU, J. (1952b): Sur la genre *Diploctenium* GOLDFUSS dans le Crétacé supérieur français. – Bull. Soc. géol. France, (6), **2**, 537–573, Paris.

ALLOITEAU, J. (1954): Le genre *Actinastrea* D'ORBIGNY, 1849 dans le Crétacé supérieur Francais. – Annales Hérbert et Haug, **8**, 9–104, Paris.

ALLOITEAU, J. (1957): Contribution à la systématique des Madréporaires fossiles. – Thèse C.N.R.S., 1–462, Paris.

BARON-SZABO, R. C. (1993): Korallen der höheren Unterkreide („Urgon") von Nordspanien (Playa de Laga, Prov. Guernica). – Berliner geowiss. Abh., (E) 9, 147–181, Berlin.

BARON-SZABO, R. C. (1997): Zur Korallenfazies der ostalpinen Kreide (Helvetikum: Allgäuer Schrattenkalk; Nördliche Kalkalpen: Brandenberger Gosau), Taxonomie, Paläoökologie. – Zitteliana, **21,** 3–98, München.

BARON-SZABO, R. C. & FERNANDEZ-MENDIOLA, P. A. (1997): Cretaceous scleractinian corals from the Albian of Cabo de Ajo (Cantabria Province, N-Spain). – Pal. Z., **71** (1/2), 35–50, Stuttgart (Schweizerbart'sche Verlagsbuchhandlung).

BARON-SZABO, R. C. & STEUBER, T. (1996): Korallen und Rudisten aus dem Apt im tertiären Flysch des Parnass-Gebirges bei Delphi-Arachowa (Mittelgriechenland). – Berliner geowiss. Abh., (E) 18, 3-75; Berlin.

BATALLER, J. R. (1936): Contribución al estudio de los poliperos Crétacios de Cataluña. – Iberica, **1103**, 38-46, Barcelona.

BATALLER, J. R. (1937): La fauna corallina del Cretacic de Catalunya i regiones limitrofes. – Arxius Esc. Sup. Agric., **3** (1), 1-299, Barcelona.

BATALLER, J. R. (1945): Enumeración de las especies nuevos del Crétacico de España. – Mem. Real. Acad. Cient. Art. Barcelona, (3), **27,** 11, 1–71, Barcelona.

BEAUVAIS, L. & BEAUVAIS, M. (1975): Une nouvelle famille dans le sous-ordre des Stylinida ALLOITEAU: les Agatheliidae nov. fam. (Madréporaires mésozoiques). – Bull. Soc. géol. France, (7), **17**, 4, 576–581, Paris.

BEAUVAIS, M. P. (1982): Révision systématique des Madréporaires des couches de Gosau (Crétacé supérieur, Autriche). – Trav. Lab. Paléont. Invert., tome I–V, Paris.

BEAUVAIS, M. P., BERTHOU, Y. & LAUVERJAT, J. (1975): Le gisement campanien de Mira (Beira litorale, Portugal): sedimentologie, micropaleontologie, révision des Madreporaires.- Comunic. Serv. Geol. Port., **59**, 37–58, Lisboa.

BENDUKIDZE, N. S. (1956): Upper Cretaceous corals from the Godogani and Udzlouri areas. – Trudy geol. inst. AN Gruz. SSR, (ser. geol.), **9**, 2, 79–125, Tbilisi.

BENDUKIDZE, N. S. (1965): To the ecology, ontogeny and systematics of the genus *Diploctenium*. – [In]: SOKOLOV, B.S. & IVANOVSKIY, A. B. (eds.): Skleraktinii mezozoya SSSR (Trudy 1 Vsesoyuznogo simpoziuma po izucheniyu iskopaemykh korallov, 4), **20–24**, Moskva (Nauka).

BÖLSCHE, W. (1871): Die Korallen des unteren Pläner. – [In:] GEINITZ, H. B.: Das Elbthalgebirge in Sachsen (1:) Der untere Quader. – Palaeontographica, **20**, 46–57, Stuttgart (Schweizerbart'sche Verlagsbuchhandlung).

DEFRANCE, (1820-28): Dictionaire des Sciences naturelles, Paris.

DUNCAN, P. M. (1865): In DUNCAN & WALL.

DUNCAN, P. M. (1867): A monograph of the British fossil corals (4, 1): Corals from the zone of Ammonites planorbis and Ammonites angulatus in the Liassic formation. – Pal. Soc. monogr., **20**, 1–43, London.

DUNCAN, P. M. & WALL, G. P. (1865): Notice of the Geology of Jamaica, with descriptions of Cretaceous, Eocene and Miocene corals. – Quart. Jour. Geol. Soc., **21**, 1–14, London.

ELIÁSOVÁ, H. (1990): Coraux des calcaires d'Ernstbrunn (Jurassique supérieur – Crétacé inférieur dans les Carpates externes, zone de Waschberg, Tchécoslovaquie). – Casopis Min. Geol., **35** (2), 113–134, Praha.

ELIÁSOVÁ, H. (1991): Révision du genre *Glenarea* POCTA (Scleractiniaire du Cénomanien supérieur-Turonien inférieur de la Boheme, Tchécoslovaquie). – Casopis Min. Geol., **36** (2–3), 97–102, Praha.

ELIÁSOVÁ, H. (1994): Latomeandridés (Scléractiniaires) du Crétacé supérieur de Bohême (République tchéque).- Vest. Cesk. geol. úst., **69** (2), 1-17, Praha.

ELIÁSOVÁ, H. (1996): „*Canleria* gen. nov. (Scleractinia,

Heterocoeniina)". Cénomanien supérieur, République tchéque. – Vest. Cesk. geol. úst., **71** (3), 255–258, Praha.

ELIÁSOVÁ, H. (1997): Coraux crétacés de Bohême (Cénomanien supérieur; Turonien inférieur-Coniacien inférieur), République tchèque. – Vest. Cesk. geol. úst., **72** (3), 245–266, Praha.

FELIX, J. (1890/91): Versteinerungen aus der mexicanischen Jura- und Kreide-Formation. – Palaeontographica, **37**, 140–194; Stuttgart.

FELIX, J. (1900): Über zwei neue Gattungen aus den ostalpinen Kreideschichten. – Sitzungsber. Naturforsch. Ges. Leipzig, 37–40, Leipzig.

FELIX, J. (1903a): Studien über die korallenführenden Schichten der oberen Kreideformation in den Alpen und in den Mediterrangebieten. – Palaeontographica, **49**, 163–359, Stuttgart.

FELIX, J. (1903b): Korallen aus dem portugiesischen Senon. – Zeitschr. Deutsch. Geol. Ges., **55**, 45–55, Berlin.

FELIX, J. (1914): Fossilium Catalogus. – I: Animalia, Pars 5–7: Anthozoa Cretacea, 1–273, Neubrandenburg.

FROMENTEL, E. (1858-1861): Introduction à l'étude des Polypiers fossiles. – Mém. Soc. Émul., 5, 1–357, Besançon.

FROMENTEL, E. (1862–1887): Zoophytes, terrain crétacé. – [In]: D'ORBIGNY, A. (ed.): Paléontologie Française, t. VIII: Zoophytes, 1–624; Paris (Masson).

GALLEMI, J., MARTINEZ, R. & PONS, J.M. (1983): Coniacian-Maastrichtian of the Tremp Area (South Central Pyrenees). – Newsl. Stratigr. **12**, 1, 1–17, Berlin.

GOLDFUSS, A. (1826-1833): Petrefacta Germaniae – 1–252, Düsseldorf (Arnz).

GREGORY, W. (1900): *Polytremacis* and the ancestry of Helioporidae. – Proceed. Roy. Soc. London, **66**, 291–305, London.

HACKEMESSER, M. (1936): Eine kretazische Korallenfauna aus Mittel-Griechenland und ihre paläobiologischen Beziehungen. – Palaeontogr., (A), **84**, 1–97, Stuttgart.

KOLOSVÁRY, G. (1954): Les coralliaires du crétacé de la Hongrie. – Annales de l,institut géologique de la Hongrie, **42**, 124–163, Budapest.

KUZMICHEVA, E. I. (1966): Stratigraphical and facial distribution of hexacorals (scleractinians) in the Neocomian of the Mountain Crimea.- Prirod. trud. res. levober. Ukrainy ikh ispolz, 58-63, Moskau.

KUZMICHEVA, E. I. (1972): New data on the ecology of Early Cretaceous scleractinians from the Crimea, Malyy Kavkaz and Middle Asia. – Byull. Mosk. obsh. ispyt. prir. otd. geol., 47 (6), 112–120, Moskau.

KUZMICHEVA, E. I. (1980): Corals. – [In]: CHERNOV, V., YANIN, B. & GOLOVINOVA, M.: Urgonskie otlozheniya sovietskikh Karpat, 90–108, Moskva.

LESAUVAGE, M. (1823): Mémoire sur un genre nouveau de polypier fossile.- Mém. Soc. d,Hist. Nat. Paris, **1**, 241–244, Paris.

LIAO, W. & XIA, J. (1994): Mesozoic and Cenozoic scleractinian corals from Xizang. – Palaeontologica Sinica, 184, ser. B, **31**, 1–252, Beijing.

LÖSER, H. (1987): Zwei neue Gattungen der Korallen aus der Sächsischen und Böhmischen Oberkreide. – Vest. Cesk. geol. úst., **62** (4), 233–237, Praha.

LÖSER, H. (1989): Die Korallen der Sächsischen Oberkreide (1): Hexacorallia des Cenomans. – Abh. Staatl. Mus. Min. Geol. Dresden, **36**, 88–154, Dresden.

LÖSER, H. (1994): La fauna corallienne du mont Kassenberg à Mülheim-sur-la-Ruhr (Bassin crétacé de Westphalie, Nord Ouest de l, Allemagne). – Coral Res. Bull., **3**, 1–93, Dresden.

LÖSER, H. (1998): Die Korallen der Sächsischen Oberkreide – eine Zwischenbilanz und Bemerkungen zu Korallenfaunen des Cenomans. – Abh. Staatl. Mus. Min. Geol. Dresden, **43**; Dresden (in press).

MALLADA, L. (1892): Catalogo general de las especies fosiles encontradas en España. – Boletin de la Comision del Mapa geologico de España, **18**, 1–253,, Madrid.

MICHELIN, H. (1840-1847): Iconographie zoophytologique. Descriptions par localités et terrains des polypiers fossiles de France et pays environnantes. – 1–348, Paris (Bertrand).

MILNE-EDWARDS, H. & HAIME, J. (1848–1851): Recherches sur la structure et la classification des polypiers fossiles et récents.- Ann. Sci. Nat., ser. 3, **9-16**, London.

MILNE-EDWARDS, H. & HAIME, J. (1851); A monograph of the British fossil corals. II. Corals from the oolitic formations. – Palaeontological Soc., London, 72–145, London.

MILNE-EDWARDS, H. & HAIME, J. (1857–1860): Histoire naturelle des Coralliaires ou polypes proprement dits. – Tome I (1857), 1–326, Tome II (1857), 1–633, Bd. III (1860), 1–560, Atlas pl. 1-31, Paris.

MORRIS, J. (1843): A catalogue of British fossils. – 1–222, London.

MORYCOWA, E. (1964): Hexacorallia des couches de Grodzisze (Néocomien, Carpathes). – Acta Palaeont. Polon., **9** (1), 3–114; Warszawa.

MORYCOWA, E. (1971): Hexacorallia et Octocorallia du Crétacé inférieur de Rarau (Carpathes orientales rou-

maines). – Acta Palaeont. Polon., **16** (1–2), 3–149, Warszawa.

NAGTEGAAL, P.J.C. (1972): Depositional history and clay minerals of the Upper Cretaceous basin in the South-Central Pyrenees, Spain. – Leid. Geol. Meded. **47**, 251–275, Leiden.

OPPENHEIM, P. (1930): Die Anthozoen der Gosauschichten in den Ostalpen. – I–XXVIII, 1–576, Berlin-Lichterfelde (Selbstverlag).

D'ORBIGNY, A. (1849/1850): Prodrôme de Paléontologie stratigraphique universelle. – Tome I (1849): 1–394, Tome II (1850): 1–428; Paris (Masson).

POCTA, P. (1887): Die Anthozoen der Böhmischen Kreideformation. – Abh. Kön. Böhm. Gesell. Wiss., **7**, 1–60, Praha.

PONS, J. M. (1973): Estudio estratigráfico y paleontológico de los yacimientos de Rudistas del Cretácico superior del Prepirineo de la Provincia de Lérida. – Public. Geol. Univ. Auton. Barcelona, (1977), **3**, 1–103, Barcelona (Bellaterra).

QUENSTEDT, F. A. (1880): Petrefactenkunde Deutschlands (6): Röhren- und Sternkorallen (2), 625–912, Leipzig (Fues).

QUENSTEDT, F. A. (1881): Petrefactenkunde Deutschlands (6): Röhren- und Sternkorallen (3), 913–1094, Leipzig (Fues).

REIG ORIOL, J. M. (1989): Sobre varios géneros y especies de escleractinias fósiles del Cretácico Catalán. – 1–69, Barcelona.

REIG ORIOL, J. M. (1992): Madreporarios cretacicos de España y Francia. – 1–67; Barcelona.

REUSS, A. E. (1845-46): Die Versteinerungen der böhmischen Kreideformation. – 1–148, Stuttgart (Schweitzerbart'sche Verlagsbuchhandlung).

REUSS, A. E. (1854): Beiträge zur Charakteristik der Kreideschichten in den Ostalpen, besonders im Gosauthale und am Wolfgangsee. – Denkschr. k.k. Akad. Wiss., **7**, 73–133; Wien.

ROSELL, J. (1967): Estudio geológico del sector del Prepirineo comprendido entre los rios Segre y Noguera Riba gorzana (Provincia Lérida). – Pirineos, **21** (75–78), 9–225, Jaca.

ROSELL, J., OBRADOR, A. & PONS, J. M. (1972): Significación sedimentológica y paleogeográfica del nivel arcilloso con corales des Senoniense superior de los alrededores de Pobla de Segur (Provincia Lérida). – Act. Geol. Hisp., **7** (1), 7–11, Barcelona.

SCHOLZ, H. (1979): Paläontologie, Aufbau und Verbreitung der Bioherme und Biostrome im Allgäuer Schrattenkalk. – Diss. Techn. Univ., 1–133, München.

SCOTT, W. R. (1981): Biotic relationships an Early Cretaceous coral-algal-rudist reefs, Arizona. – J. Paleont., **55** (2), 463–478; Tulsa.

SEDGWICK, A. & MURCHISON, R. J. (1831): A sketch of the structure of the Eastern Alps, with sections through the newer formations on the northern flanks of the chain etc.- Trans. Geol. Soc., II. ser., **III**, 1–301, London.

SOWERBY (1831): In SEDGWICK & MURCHINSON.

STOLICZKA, F. (1873): Cretaceous fauna of southern India. – Mem. Geol. Surv. India, Palaeont. India, **IV** (4), 131–202, Calcutta.

TRAUTH, F. (1911): Die oberkretazische Korallenfauna von Klogsdorf in Mähren. – Mähr. Landesmus., Z., **11**, 1–104, Brünn.

TURNSEK, D. (1978): Solitary Senonian corals from Stranice and MT Medvednica (NW Yugoslavia). – Razpr. Slov. Akad. Znan. Umet. (4), **21** (3), 66–125, Ljubljana.

TURNSEK, D. (1994): Upper Cretaceous reef building colonial corals of Gosau facies from Stranice near Slovenske Konjice (Slovenia). – Razpr. Slov. Akad. Znan. Umet. (4), **35** (1), 3–41, Ljubljana.

TURNSEK, D. & BUSER, S. (1974): The Lower Cretaceous corals, hydrozoans and chaetetids of Banjska Planota and Trnovski Gozd. – Razpr. Slov. Akad. Znan. Umet. (4), **17** (2), 81–124, Ljubljana.

TURNSEK, D. & BUSER, S. (1976): Cnidarian fauna from the senonian breccia of Banjska Planota (NW-Yugoslavia). – Razpr. Slov. Akad. Znan. Umet. (4), **19** (3), 39–88, Ljubljana.

TURNSEK, D. & MIHAJLOVIC, M. (1981): Lower Cretaceous cnidarians from eastern Serbia. – Razpr. Slov. Akad. Znan. Umet. (4), 23 (1), 1–53, Ljubljana.

TURNSEK, D. & POL_AK, A. (1978): Senonian colonial corals from the biolithite complex of Oresje on Mt. Medvednica (NW Yugoslovia). – Razpr. Slov. Akad. Znan. Umet. (4), **21** (4), 129–180; Ljubljana.

VAUGHAN, T. W. (1899): Some Cretaceous and Eocene corals from Jamaica. – Bull. Mus. Comp. Zool., **34** (1), 227–250, Cambridge.

VAUGHAN, T. W. (1919): Fossil corals from central America, Cuba, and Porto Rico, with an account of the American Tertiary, Pleistocene, and recent coral reefs. – Smithonian Institution Bulletin, **103**, 189–524, Washington.

VAUGHAN, T. W. & WELLS, J. W. (1943): Revision of the suborders, families and genera of the Scleractinia. – Spec. Papers, Geol. Soc. Amer., **44**, 1–363, Baltimore.

VIDAL, A. (1980): Los Scleractinia de Collades de Bastús (Con.-Sant., prepirineo de la provincia de Lérida). - Publ. Geol. Univ. Autnd recentcora **11**, 1-94, Barcelona.

WAGREICH, M. & FAUPL, P. (1994): Paleogeography and geodynamic evolution of the Gosau Group of the Northern Calcareous Alps (Late Cretaceous, Eastern Alps, Austria). – Paleogeogr., Paleoclimatol., Paleoecol., **110**, 235–254.

WELLS, J. W. (1932): Corals of the Trinity Group of the Comanchean of Central Texas. – J. Paleont., **6** (3), 225–256, Menashe.

WELLS, J. W. (1933): Corals of the Cretaceous of the Atlantic and Gulf Coastal Plains and Western Interior of the United States. – Bull. Amer. Paleont., **18** (67), 1–207, Ithaca.

WELLS, J. W. (1934): Some fossil corals from the West Indies. – Proceed. U.S. Nat. Mus., **83** (2975), 71–110, Washington.

WELLS, J. W. (1944): Cretaceous, Tertiary and recent corals, a sponge, and an alga from Venezuela. – J. Paleont., **18** (5), 429–447, Menashe.

WELLS, J. W. (1956): Scleractinia. – [In]: MOORE, C. R. (ed.): Treatise on Invertertebrate Paleontology, Part F, 328-444, Lawrence.

Author's address:
Dr. Rosemarie C. Baron-Szabo, Institut für Paläontologie der Freien Universität Berlin, Malteserstrasse 74-100, Haus D, D-12249 Berlin, Germany

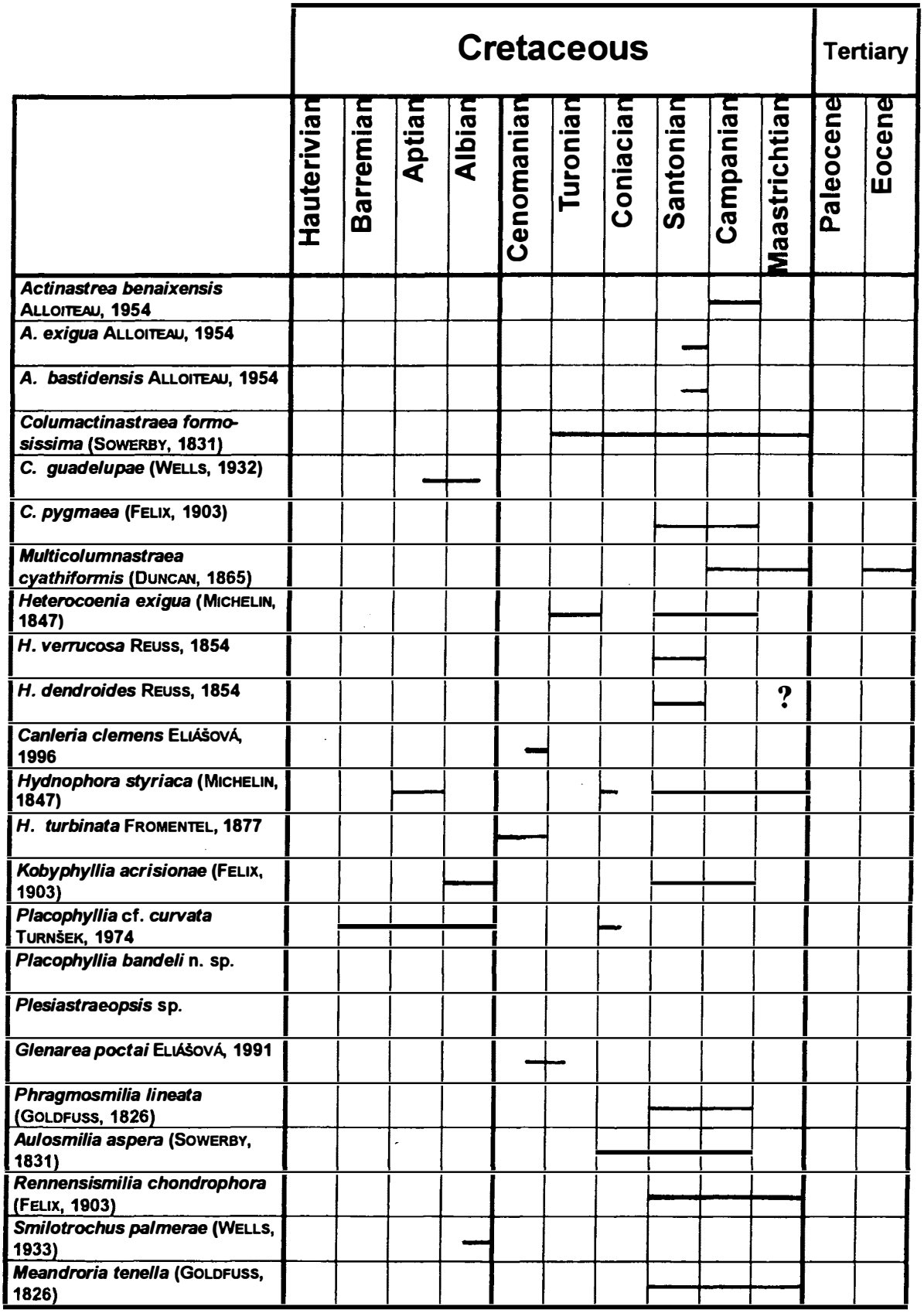


Table 1: Stratigraphic distribution of the Torallola corals (the present occurrence is not included).

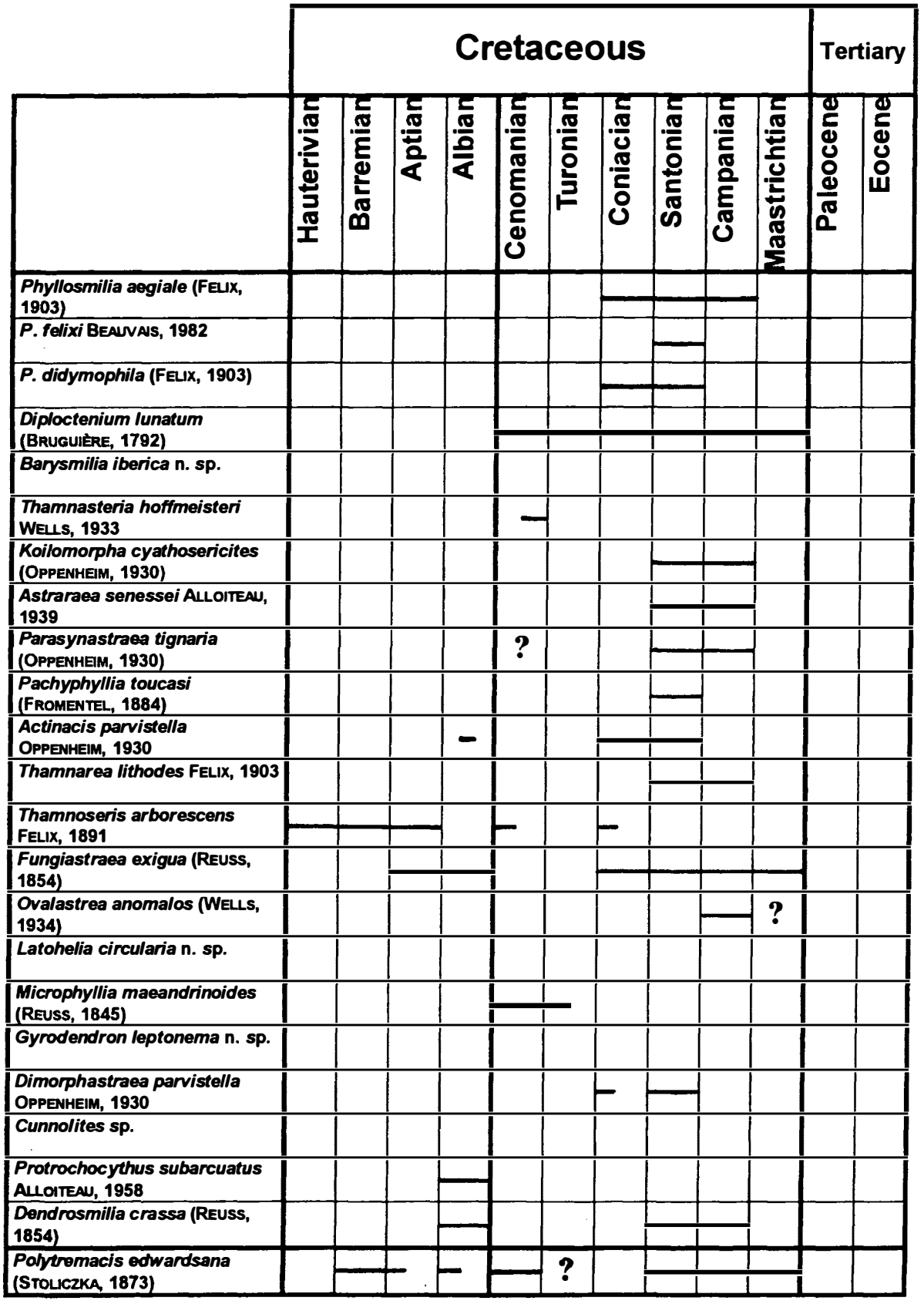


Table 1 (continued).

	Lower Cretaceous												
	Austria	Venezuela	Texas	Greece	Slovenia	Spain	Ukraine	Serbia	Romania	Mexico	Crimea	Madagascar	Poland
Actinastrea benaixensis ALLOITEAU, 1954													
A. exigua ALLOITEAU, 1954													
A. bastidensis ALLOITEAU, 1954													
Columactinastraea formosissima (SOWERBY, 1831)													
C. guadelupae (WELLS, 1932)		X	X										
C. pygmaea (FELIX, 1903)													
Multicolumnastraea cyathiformis (DUNCAN, 1865)													
Heterocoenia exigua (MICHELIN, 1847)													
H. verrucosa REUSS, 1854													
H. dendroides REUSS, 1854													
Canleria clemens ELIÁŠOVÁ, 1996													
Hydnophora styriaca (MICHELIN, 1847)	X			X									
H. turbinata FROMENTEL, 1877													
Kobyphyllia acrisionae (FELIX, 1903)						X							
Placophyllia cf. *curvata* TURNŠEK, 1974					X	X	X	X					
Placophyllia bandeli n. sp.													
Plesiastraeopsis sp.													
Glenarea poctai ELIÁŠOVÁ, 1991													
Phragmosmilia lineata (GOLDFUSS, 1826)													
Aulosmilia aspera (SOWERBY, 1831)													
Rennensismilia chondrophora (FELIX, 1903)													
Smilotrochus palmerae (WELLS, 1933)			X										
Meandroria tenella (GOLDFUSS, 1826)													

Table 2: Paleogeographic distribution of the Torallola corals in the Lower Cretaceous.

	Lower Cretaceous													
	Austria	Venezuela	Texas	Greece	Slovenia	Spain	Ukraine	Serbia	Romania	Mexico	Crimea	Madagascar	Poland
Phyllosmilia aegiale (FELIX, 1903)													
P. felixi BEAUVAIS, 1982													
P. didymophila (FELIX, 1903)													
Diploctenium lunatum (BRUGUIÈRE, 1792)													
Barysmilia iberica n. sp.													
Thamnasteria hoffmeisteri WELLS, 1933													
Koilomorpha cyathosericites (OPPENHEIM, 1930)													
Astraraea senessei ALLOITEAU, 1939													
Parasynastraea tignaria (OPPENHEIM, 1930)													
Pachyphyllia toucasi (FROMENTEL, 1884)													
Actinacis parvistella OPPENHEIM, 1930			X										
Thamnarea lithodes FELIX, 1903													
Thamnoseris arborescens FELIX, 1891								X	X	X	X		
Fungiastraea exigua (REUSS, 1854)	X					X			X				
Ovalastrea anomalos (WELLS, 1934)													
Latohelia circularia n. sp.													
Microphyllia maeandrinoides (REUSS, 1845)													
Gyrodendron leptonema n. sp.													
Dimorphastraea parvistella OPPENHEIM, 1930													
Cunnolites sp.													
Protrochocythus subarcuatus ALLOITEAU, 1958												X	
Dendrosmilia crassa (REUSS, 1854)						X							
Polytremacis edwardsana (STOLICZKA, 1873)									X	X			X

Table 2 (continued).

	Upper Cretaceous																Tertiary
	France	Austria	Croatia	Portugal	Jamaica	Tibet	Czech Republic	Greece	Hungary	Slovenia	Spain	Romania	Serbia	India	Germany	Texas	Jamaica
Actinastrea benaixensis ALLOITEAU, 1954	X																
A. exigua ALLOITEAU, 1954	X																
A. bastidensis ALLOITEAU, 1954	X																
Columactinastraea formosissima (SOWERBY, 1831)	X	X															
C. guadelupae (WELLS, 1932)																	
C. pygmaea (FELIX, 1903)	X		X	X						X							
Multicolumnastraea cyathiformis (DUNCAN, 1865)					X	X											X
Heterocoenia exigua (MICHELIN, 1847)	X	X															
H. verrucosa REUSS, 1854		X									X						
H. dendroides REUSS, 1854	X	X									?						
Canleria clemens ELIÁŠOVÁ, 1996							X										
Hydnophora styriaca (MICHELIN, 1847)	X	X							?	X							
H. turbinata FROMENTEL, 1877	X																
Kobyphyllia acrisionae (FELIX, 1903)		X															
Placophyllia cf. *curvata* TURNŠEK, 1974		X															
Placophyllia bandeli n. sp.																	
Plesiastraeopsis sp.																	
Glenarea poctai ELIÁŠOVÁ, 1991							X										
Phragmosmilia lineata (GOLDFUSS, 1826)		X															
Aulosmilia aspera (SOWERBY, 1831)	X	X								X							
Rennensismilia chondrophora (FELIX, 1903)		X								X		X					
Smilotrochus palmerae (WELLS, 1933)																	
Meandroria tenella (GOLDFUSS, 1826)	X	X							?	X	X						

Table 3: Paleogeographic distribution of the Torallola corals in the Tertiary and Upper Cretaceous (the present occurrence is not included).

	Upper Cretaceous																Tertiary
	France	Austria	Croatia	Portugal	Jamaica	Tibet	Czech Republic	Greece	Hungary	Slovenia	Spain	Romania	Serbia	India	Germany	Texas	Jamaica
Phyllosmilia aegiale (FELIX, 1903)	-	X									X		X				
P. felixi BEAUVAIS, 1982		X															
P. didymophila (FELIX, 1903)		X									X						
Diploctenium lunatum (BRUGUIÈRE, 1792)	X	X									X	X					
Barysmilia iberica n. sp.																	
Thamnasteria hoffmeisteri WELLS, 1933																X	
Koilomorpha cyathosericites (OPPENHEIM, 1930)		X															
Astraraea senessei ALLOITEAU, 1939	X	X															
Parasynastraea tignaria (OPPENHEIM, 1930)		X						?									
Pachyphyllia toucasi (FROMENTEL, 1884)	X																
Actinacis parvistella OPPENHEIM, 1930	X	X															
Thamnarea lithodes FELIX, 1903		X															
Thamnoseris arborescens FELIX, 1891		X													X		
Fungiastraea exigua (REUSS, 1854)		X					X										
Ovalastrea anomalos (WELLS, 1934)					X												
Latohelia circularia n. sp.																	
Microphyllia maeandrinoides (REUSS, 1845)							X								X		
Gyrodendron leptonema n. sp.																	
Dimorphastraea parvistella OPPENHEIM, 1930	X	X															
Cunnolites sp.																	
Protrochocythus subarcuatus ALLOITEAU, 1958																	
Dendrosmilia crassa (REUSS, 1854)		X									X						
Polytremacis edwardsana (STOLICZKA, 1873)	X	X					X	X						X			

Table 3 (continued).

sample number	long diameter (D) (mm)	short diameter (d) (mm)	height of corallum (h) (mm)	length of fossula (f) (mm)	h/D	h/d	f/D
K.1190.7	85	80	35	40	0,41	0,41	0,47
K.1190.8	67	60	30	30	0,45	0,5	0,45
K.1190.0	65	65	30	33	0,46	0,46	0,51
K.1190.3	48	47	18	22	0,38	0,38	0,46
K.1190.4	44	40	20	19	0,46	0,50	0,43
K.1189	35	35	14	15	0,4	0,4	0,43
K.1190.2	27	26	12	10	0,44	0,46	0,37
K.1190.5	24	24	8	9	0,33	0,33	0,38
K.1187	22	22	8	7	0,36	0,36	0,32
K.1190.12	18	18	5	4	0,28	0,28	0,22
K.1190.11	17	15	4	4	0,24	0,27	0,24
K.1190.19	15	15	6	4	0,4	0,4	0,27
K.1190.17	14	14	4	3	0,29	0,29	0,21
K.1190.18	13	13	4	3	0,31	0,31	0,23
K.1190.13	13	13	3	4	0,23	0,23	0,31
K.1190.16	13	13	3	3	0,23	0,23	0,23
K.1188	11	11	3	3	0,27	0,27	0,27
K.1190.6	11	11	3	2	0,27	0,27	0,18
K.1190.14	11	11	3	2	0,27	0,27	0,18
K.1190.10	11	11	3	2	0,27	0,27	0,18
K.1190.1	10	10	3	2	0,3	0,3	0,2
K.1190.15	9	9	3	2	0,22	0,22	0,22

Table 4: Dimensions of the specimens of Cunnolites BARRÈRE. Note that the density of septa is the same in every specimen: **s/mm: 7-10/2.**

species	lithofacies				references
	marls	marly limestones	massive limestones	reefal limestones	
Actinastrea benaixensis ALLOITEAU, 1954				X	ALLOITEAU 1954
A. exigua ALLOITEAU, 1954				?	ALLOITEAU 1954
A. bastidensis ALLOITEAU, 1954				X	ALLOITEAU 1954
Columactinastraea formosissima (SOWERBY, 1831)	X				OPPENHEIM 1930
C. guadelupae (WELLS, 1932)			X		WELLS 1932; WELLS 1944
C. pygmaea (FELIX, 1903)	X	X	X	X	FELIX 1903; ALLOITEAU 1954; BEAUVAIS et al. 1975; TURNŠEK & POLŠAK 1978
Multicolumnastraea cyathiformis (DUNCAN, 1865)	X	X	X	X	DUNCAN 1867; VAUGHAN 1919; WELLS 1934; LIAO & XIA 1994
Heterocoenia exigua (MICHELIN, 1847)	X				FELIX 1903; OPPENHEIM 1930; BEAUVAIS 1982
H. verrucosa REUSS, 1854	X				REUSS 1854; FELIX 1903; BATALLER 1937; BEAUVAIS 1982
H. dendroides REUSS, 1854	X				REUSS 1854; FELIX 1903; OPPENHEIM; BEAUVAIS 1982
Canleria clemens ELIÁŠOVÁ, 1996			X		ELIÁŠOVÁ 1998; ELIÁŠOVÁ, 1997
Hydnophora styriaca (MICHELIN, 1847)	X	X	X	X	REUSS 1854; FELIX 1903; OPPENHEIM 1930; TURNŠEK & BUSER 1976; BEAUVAIS 1982; BARON-SZABO 1997
H. turbinata FROMENTEL, 1877					lithofacies not recorded
Kobyphyllia acrisionae (FELIX, 1903)	X				FELIX 1903; BARON-SZABO & FERNANDEZ-MENDIOLA 1997
Placophyllia cf. *curvata* TURNŠEK, 1974	X	X	X	X	TURNŠEK & BUSER 1974; BARON-SZABO 1993; BARON-SZABO 1997
Placophyllia bandeli n. sp.					
Pleslastraeopsis sp.					
Glenarea poctai ELIÁŠOVÁ, 1991			X		ELIÁŠOVÁ 1991, ELIÁŠOVÁ 1997
Phragmosmilia lineata (GOLDFUSS, 1826)	X				BEAUVAIS 1982
Aulosmilia aspera (SOWERBY, 1831)	X	X		X	L. & M. BEAUVAIS 1974; TURNŠEK 1978; BEAUVAIS 1982
Rennensismilia chondrophora (FELIX, 1903)	X	X	X		FELIX 1903; TURNŠEK 1978
Smilotrochus palmerae (WELLS, 1933)			X		WELLS 1933
Meandroria tenella (GOLDFUSS, 1826)	X	X		X	REUSS 1954; FELIX 1903; TURNŠEK & BUSER 1978; VIDAL 1980; HÖFLING 1989
Phyllosmilia aegiale FELIX, 1903	X				FELIX 1903; OPPENHEIM 1930; BATALLER 1937; BEAUVAIS 1982
P. felixi BEAUVAIS, 1982	X				FELIX 1903; BEAUVAIS 1982
P. didymophila (FELIX, 1903)	X	X			FELIX 1903; OPPENHEIM 1930; BATALLER 1937; VIDAL 1980; BEAUVAIS 1982
Diploctenium lunatum (BRUGUIÈRE, 1792)	X	X		?	FROMENTEL 1884; FELIX 1903; BENDUKIDZE 1965
Barysmilia iberica n. sp.					
Thamnasteria hoffmeisteri (WELLS, 1933)			X		WELLS 1933
Koilomorpha cyathosericites (OPPENHEIM, 1930)	X				OPPENHEIM 1930; BEAUVAIS 1982
Astrarea senesi (ALLOITEAU, 1939)	X			X	FELIX 1903; ALLOITEAU 1939; BEAUVAIS 1982
Parasynastraea tignaria (OPPENHEIM, 1930)	X	X	X		OPPENHEIM 1930; HACKEMESSER 1938; BEAUVAIS 1982
Pachyphyllia toucasi (FROMENTEL, 1884)					lithofacies not recorded
Actinacis parvistella OPPENHEIM, 1930	X	X	X		OPPENHEIM 1930; WELLS 1933; BEAUVAIS 1982
Thamnarea lithodes FELIX, 1903	X				FELIX 1903
Thamnoseris arborescens FELIX, 1891	X	X	X	X	FELIX 1891; MORYCOWA 1971; TURNŠEK & MIHAILOVIC 1981; LÖSER 1989; BARON-SZABO 1997; LÖSER 1997
Funglastraea exigua (REUSS, 1854)	X	X			REUSS 1854; MORYCOWA 1971; BARON-SZABO 1997
Ovalastrea anomalos (WELLS, 1934)			X		WELLS 1934
Latohelia circularis n. sp.					
Microphyllia meandrinoides (REUSS, 1845)	X	X	X	X	ELIÁŠOVÁ 1994; ELIÁŠOVÁ 1997
Gyrodendron leptanema n. sp.					
Dimorphastraea parvistella OPPENHEIM, 1930	X				OPPENHEIM 1930; BEAUVAIS 1982
Cunnolites sp.					
Protrochocyathus ALLOITEAU, 1958		?			ALLOITEAU 1958
Dendrosmilia crassa (REUSS, 1854)	X				FELIX 1903; BARON-SZABO & FERNANDEZ-MENDIOLA 1997
Polytremacis edwardsana (STOLICZKA, 1873)	X	X	X	X	STOLICZKA 1873; HACKEMESSER 1936; MORYCOWA 1964; MORYCOWA 1971; BEAUVAIS 1982

Table 5: Depositional environments reported for the Torallola corals.

Plate 1

Fig. 1: *Actinastrea benaixensis* ALLOITEAU, 1954, cross section, scale bar: 1 mm, sample K.1100.

Fig. 2: *Columactinastraea guadelupae* (WELLS, 1932), upper surface, scale bar: 1 mm, sample K.1108.

Fig. 3: *Columactinastraea formosissima* (SOWERBY, 1831), cross section, scale bar: 1 mm, sample K.1106.

Figs. 4, 6: *Glenarea poctai* ELIÁSOVÁ, 1991: Fig. 6: cross section, slightly oblique, scale bar: 2 mm; Fig. 4: scale bar: 2 mm, sample K.1135.

Fig. 5: *Actinastrea bastidensis* ALLOITEAU, 1954, cross section, scale bar: 1 mm, sample K.1104.

Fig. 7: *Polytremacis edwardsana* (STOLICZKA, 1873), cross section, scale bar: 1 mm, sample K.1195.

Plate 1

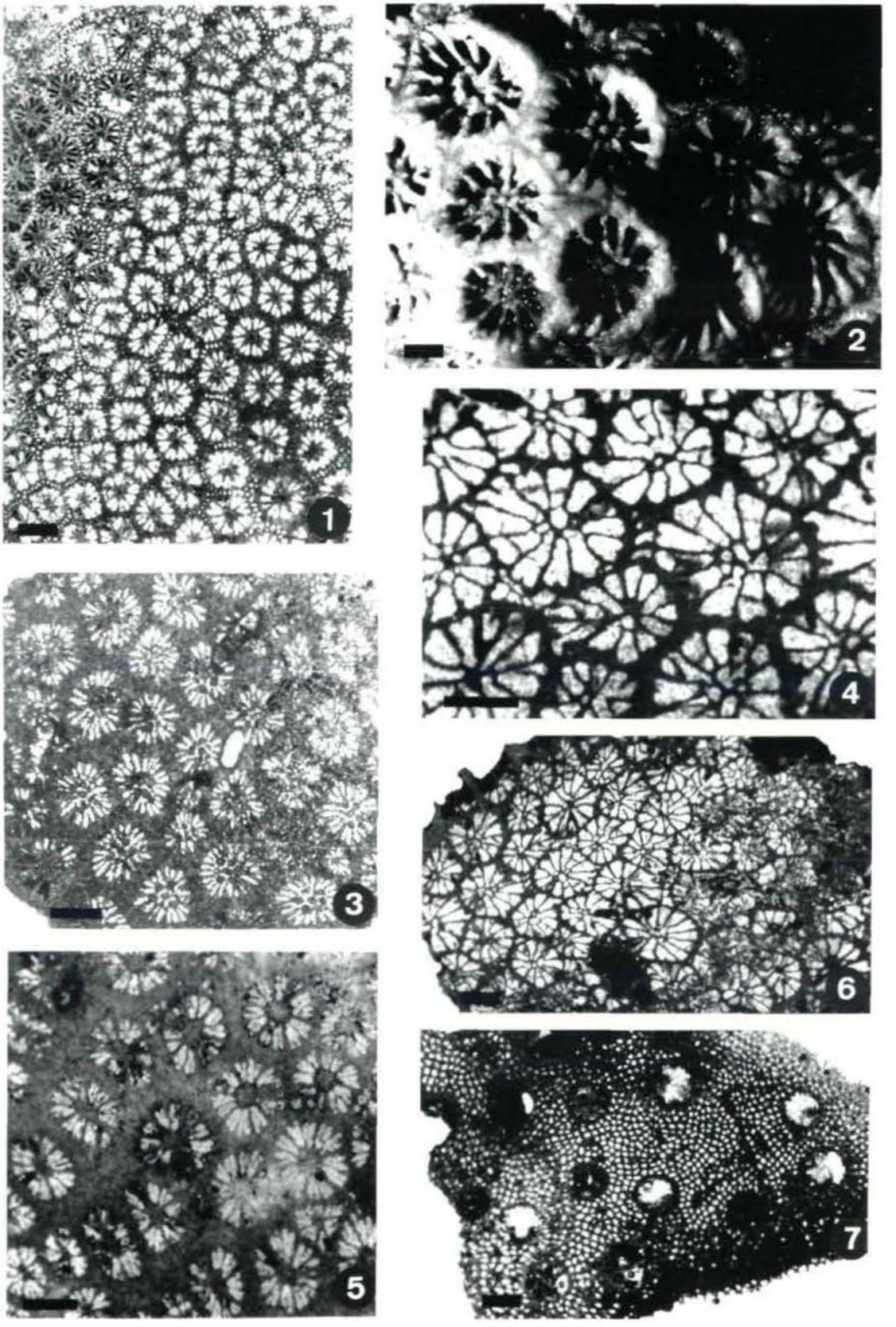


Plate 2

Fig. 1: *Columactinastraea pygmaea* (FELIX, 1903), cross section, scale bar: 3 mm, sample *Canleria clemens* ELIÁ_OVÁ, 1996: Fig. 2: cross section, scale bar: 2 mm; Fig. 4: lateral K.1120.

Fig. 3: *Heterocoenia exigua* (MICHELIN, 1847), cross section, scale bar: 4 mm, sample K.1113.

Fig. 5: *Phragmosmilia lineata* (GOLDFUSS, 1826), cross section of corallum, scale bar: 3 mm, sample K.1137.

Figs. 6, 7: *Placophyllia* cf. *curvata* TURNSEK, 1974: Fig. 6: cross section; Fig. 7: longitudinal section, scale bar: 1 mm, sample K.1129.

Plate 2

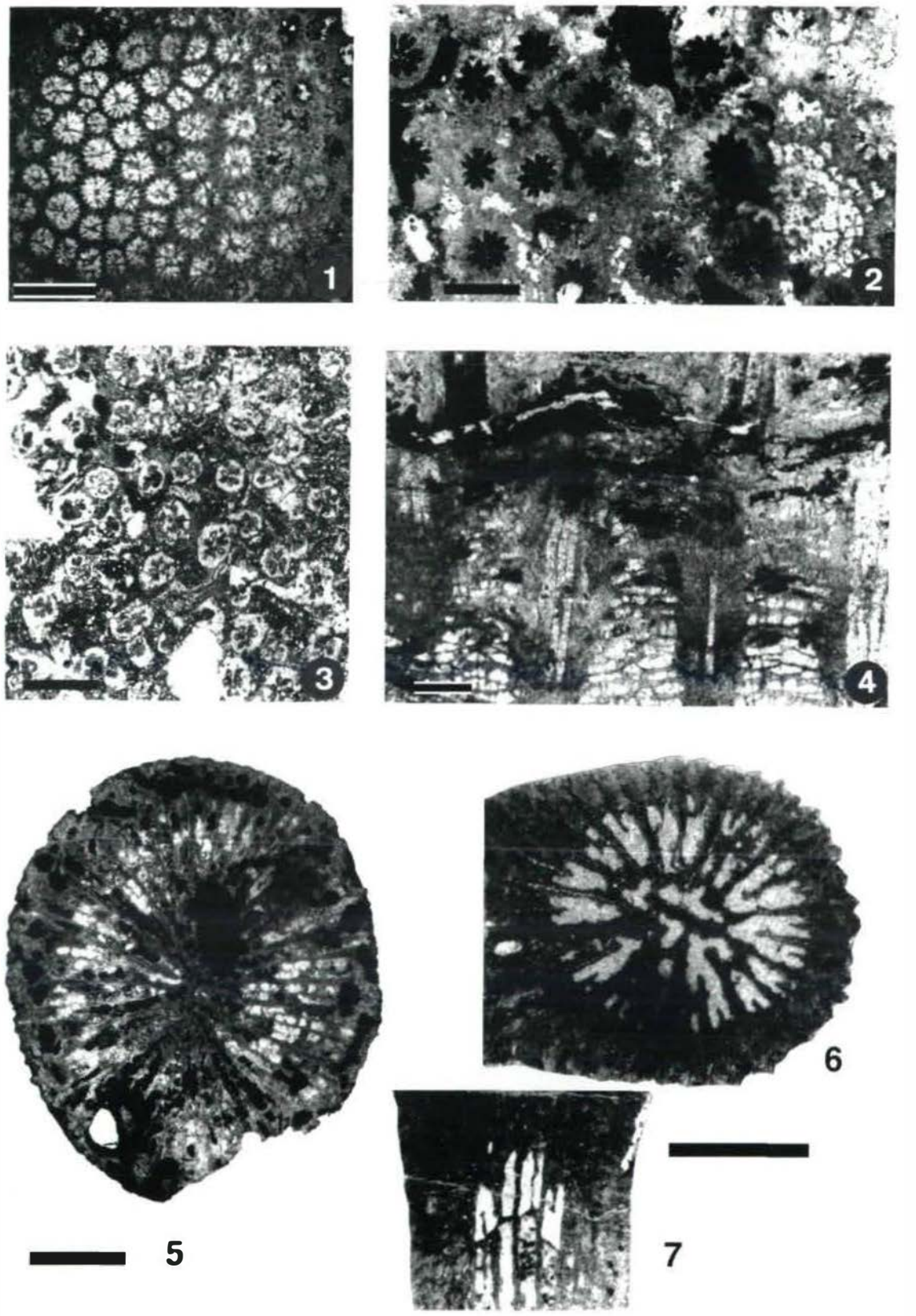


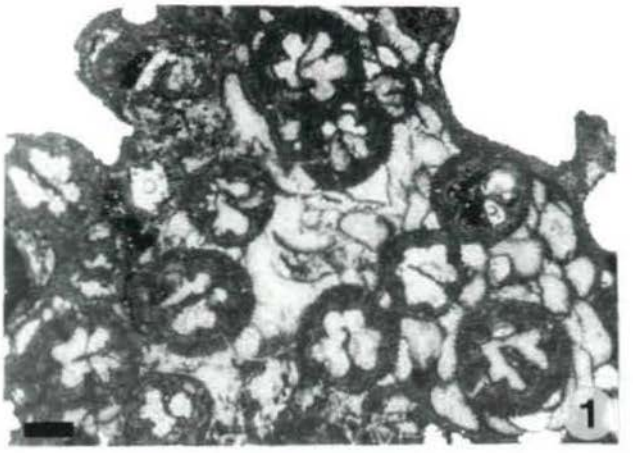
Plate 3

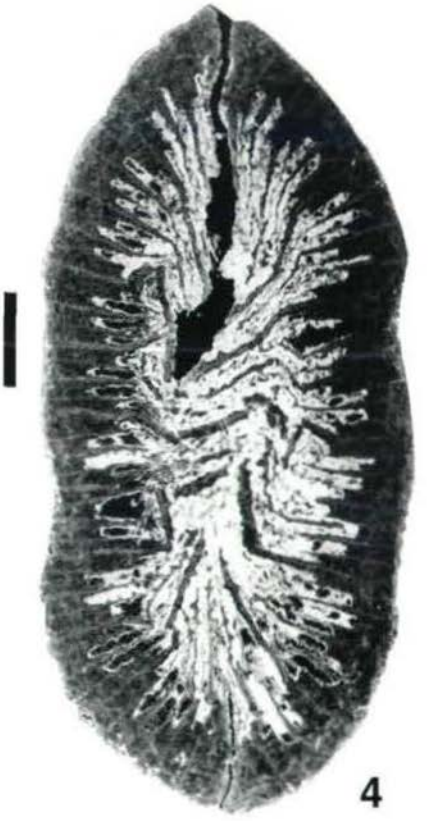
Figs. 1, 2: *Heterocoenia dendroides* REUSS, 1854: Fig. 1: cross section, scale bar: 1 mm; Fig. 2: scale bar: 1 mm, sample K.1117.

Figs. 3, 4: *Rennensismilia chondrophora* (FELIX, 1903): Fig. 3: longitudinal section of corallum, scale bar: 2 mm; Fig. 4: cross section, scale bar: 3 mm, sample K.1142.

Fig. 5: *Aulosmilia aspera* (SOWERBY, 1831), cross section, scale bar: 3 mm, sample K.1139.

Plate 3





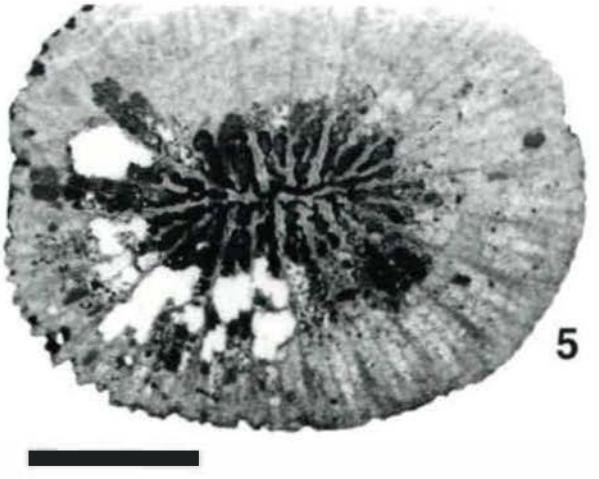


Plate 4

Fig. 1: *Cunnolites* sp, cross section, scale bar: 6 mm, sample K.1187.

Fig. 2: *Meandroria tenella* (GOLDFUSS, 1826), cross section, scale bar: 2 mm, sample K.1146.

Fig. 3: *Actinastrea exigua* ALLOITEAU, 1954, cross section, scale bar: 3 mm, sample K.1102.

Figs. 4, 6: *Smilotrochus palmerae* (WELLS, 1933), Fig. 4: cross section; Fig. 6: longitudinal section scale bar: 4 mm, sample K.1144.

Fig. 5: *Fungiastraea exigua* (REUSS, 1854), cross section, scale bar: 2 mm, sample K.1173.

Plate 4

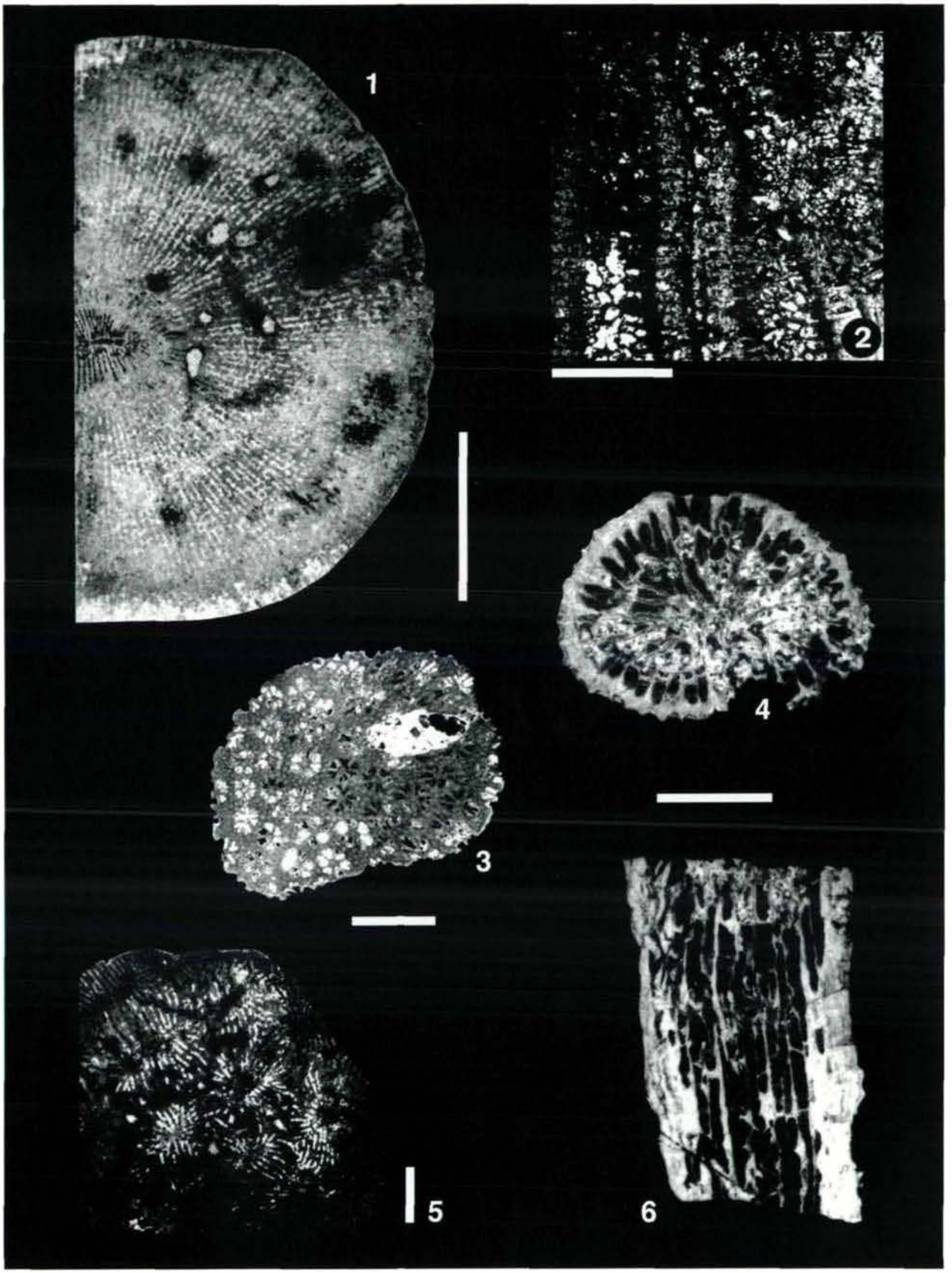


Plate 5

Figs. 1, 2, 4: *Phyllosmilia felixi* BEAUVAIS, 1982; Fig. 1: cross section of corallum, scale bar: 2 mm; Fig. 2: longitudinal section, slightly oblique, scale bar: 1 mm; Fig. 4: transverse section, scale bar: 1 mm, sample K.1149.

Fig. 3: *Plesiastraeopsis* sp., cross section of a fragment, scale bar: 1 mm, sample K.1134.

Fig. 5: *Astraraea senessei* ALLOITEAU, 1939, cross section, scale bar: 3 mm, sample K.1161.

Figs. 6, 7: *Pachyphyllia toucasi* (FROMENTEL, 1884); Fig. 6: transverse section, scale bar: 1 mm; Fig. 7: cross section, scale bar: 3 mm, sample K.1165.

Plate 5

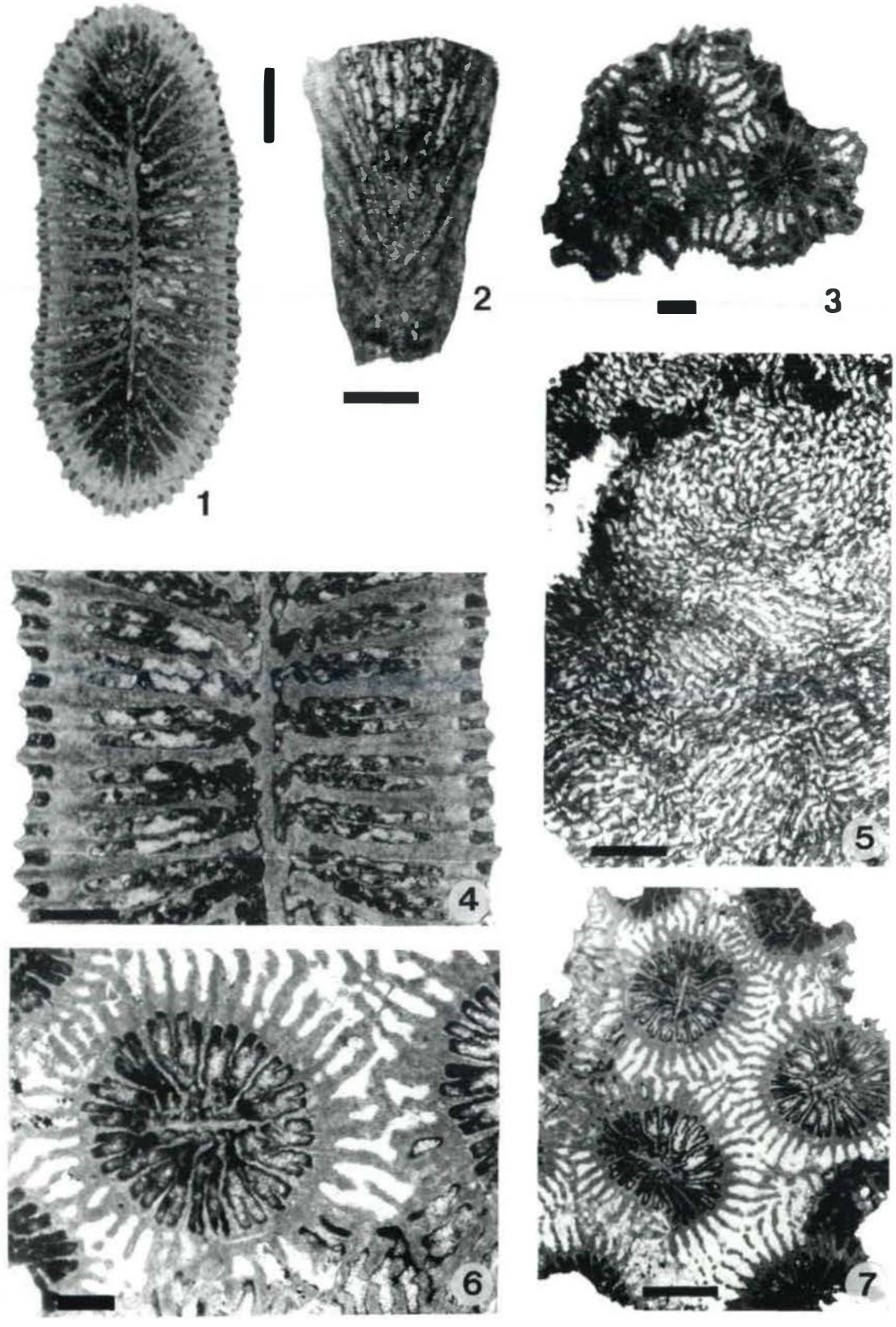


Plate 6

Figs. 1–3: *Barysmilia iberica* n. sp.; Fig. 1: cross section, holotype, scale bar: 1 mm; Fig. 2: transversal section, holotype, scale bar: 1 mm; Fig. 3: longitudinal section, holotype, scale bar: 1 mm, sample K.1155.

Fig. 4: *Multicolumnastraea cyathiformis* (DUNCAN, 1865), cross section, scale bar: 1 mm, sample K.1111.

Fig. 5: *Koilomorpha cyathosericites* (OPPENHEIM, 1930), cross section, scale bar: 2 mm, sample K.1159.

Fig. 6: *Thamnasteria hoffmeisteri* WELLS, 1933, cross section, scale bar: 3 mm, sample K.1157.

Plate 6

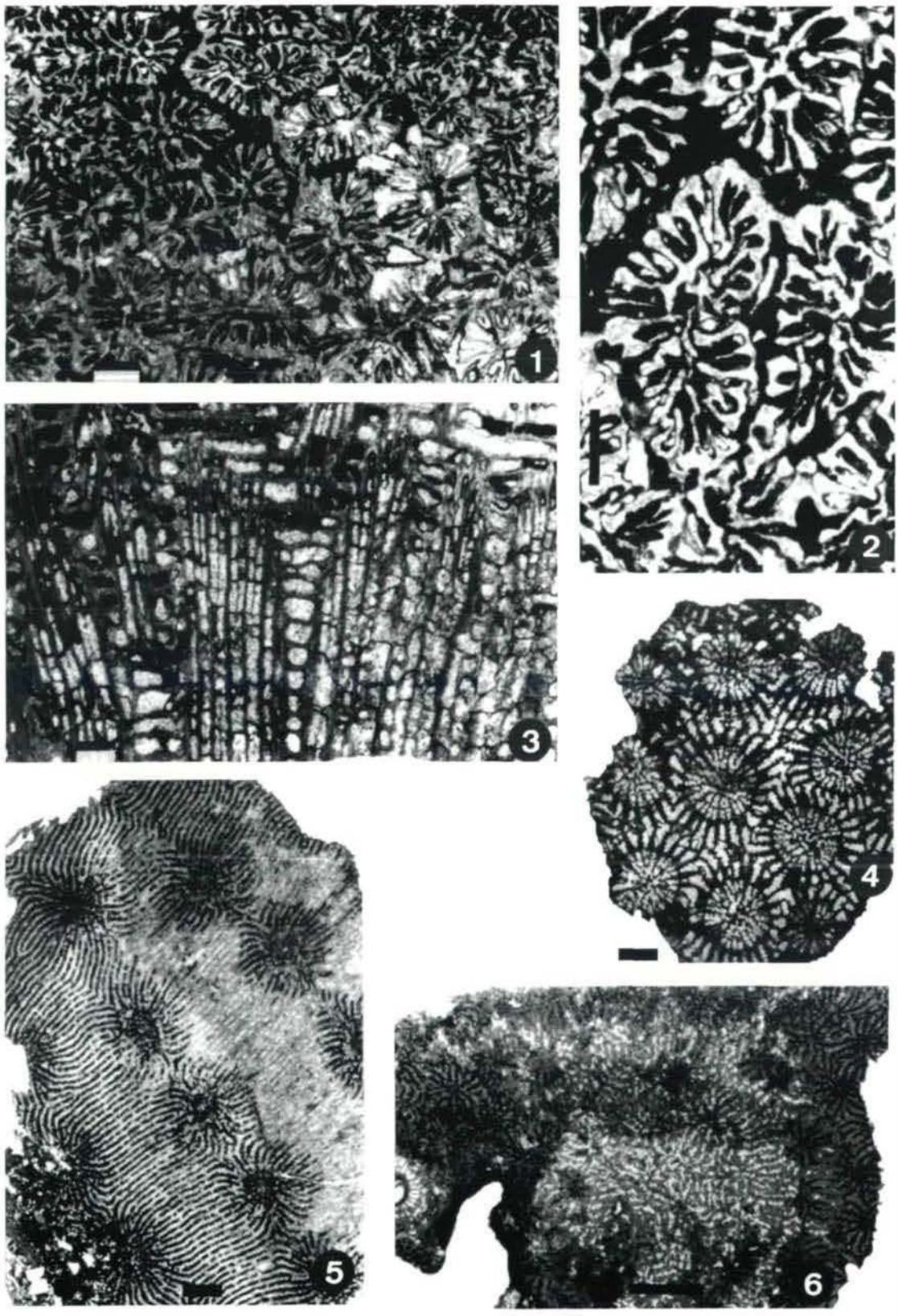


Plate 7

Fig. 1: *Phyllosmilia aegiale* FELIX, 1903, lateral view, scale bar: 3 mm, sample K.1147.

Fig. 2: *Phyllosmilia didymophila* (FELIX, 1903), lateral view, scale bar: 3 mm, sample K.1151.

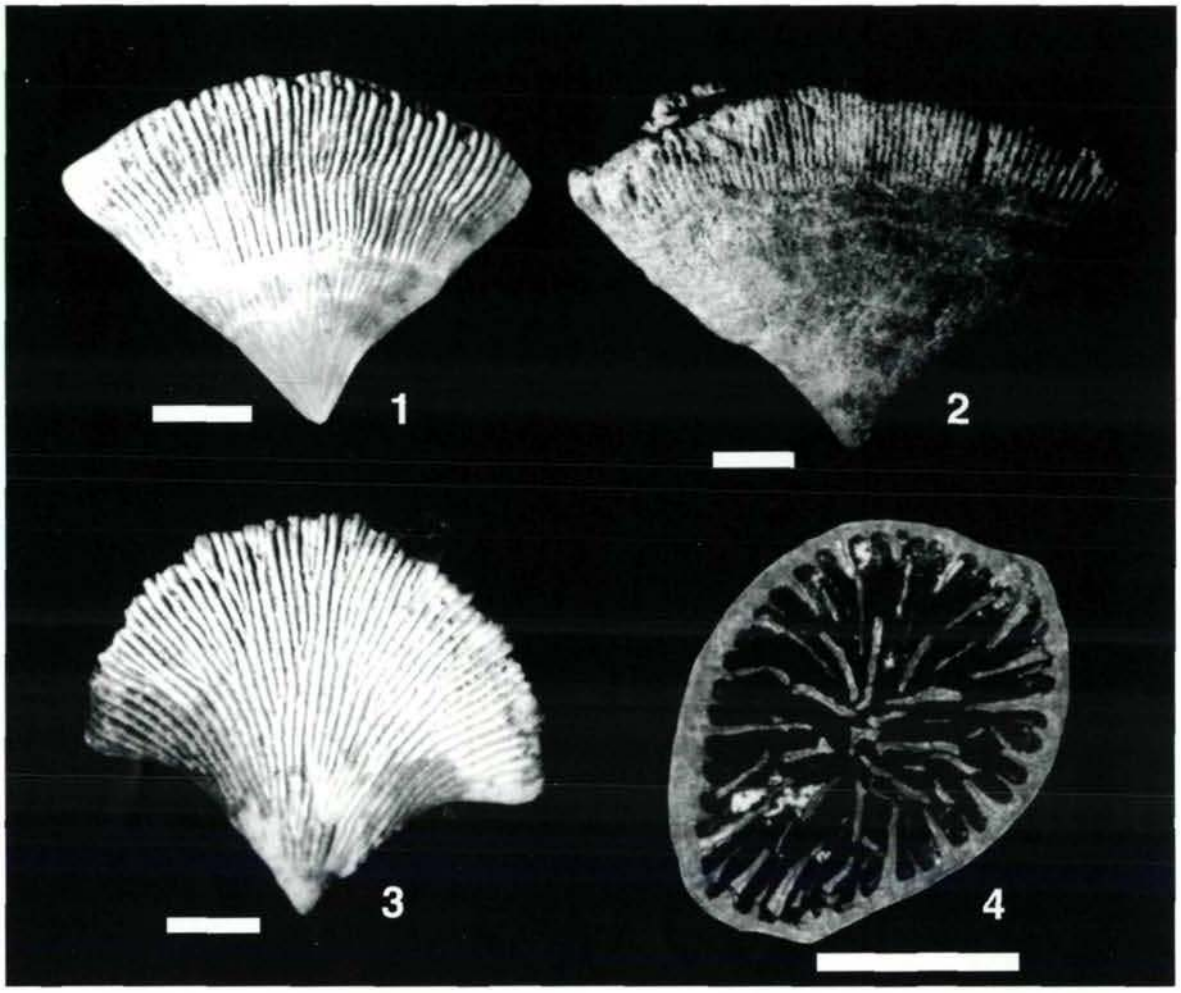
Fig. 3: *Diploctenium lunatum* (BRUGUIÈRE, 1792), lateral view of corallum, scale bar: 3 mm, sample K.1153.

Fig. 4: *Protrochocyathus subarcuatus* ALLOITEAU, 1958, cross section of corallum, scale bar: 2 mm, sample K.1191.

Fig. 5: *Kobyphyllia acrisionae* (FELIX, 1903), cross section, scale bar: 4 mm, sample K.1127.

Fig. 6: *Heterocoenia dendroides* REUSS, 1854, upper surface, scale bar: 2 mm, sample K.1117.

Plate 7



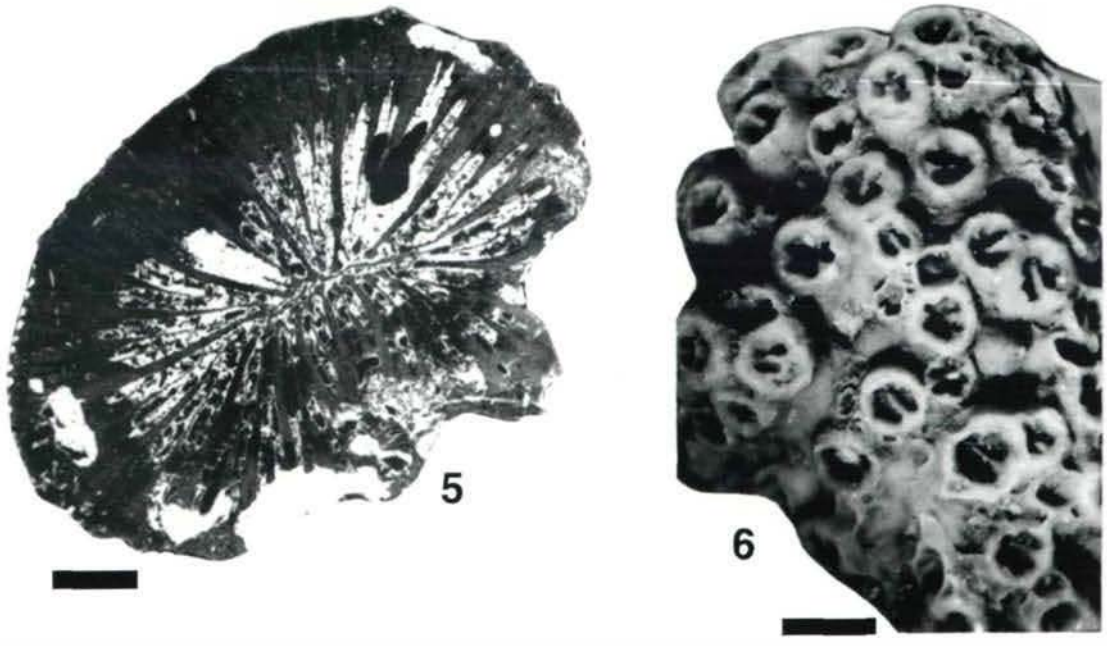


Plate 8

Figs. 1, 5, 6: *Parasynastraea tignaria* (OPPENHEIM, 1930); Fig. 1: cross section, scale bar: 1 mm, sample K.1163; Fig. 5: transverse section, scale bar: 4 mm, sample K.1162; Fig. 6: longitudinal section, scale bar: 1 mm, sample K.1162.

Fig. 2: *Thamnoseris arborescens* FELIX, 1891, cross section, scale bar: 1 mm, sample K.1171.

Fig. 3: *Thamnarea lithodes* FELIX, 1903, cross section, scale bar: 2 mm, sample K.1169.

Fig. 4: *Cunnolites* sp., cross section of corallum, scale bar: 3 mm, sample K.1188.

Plate 8

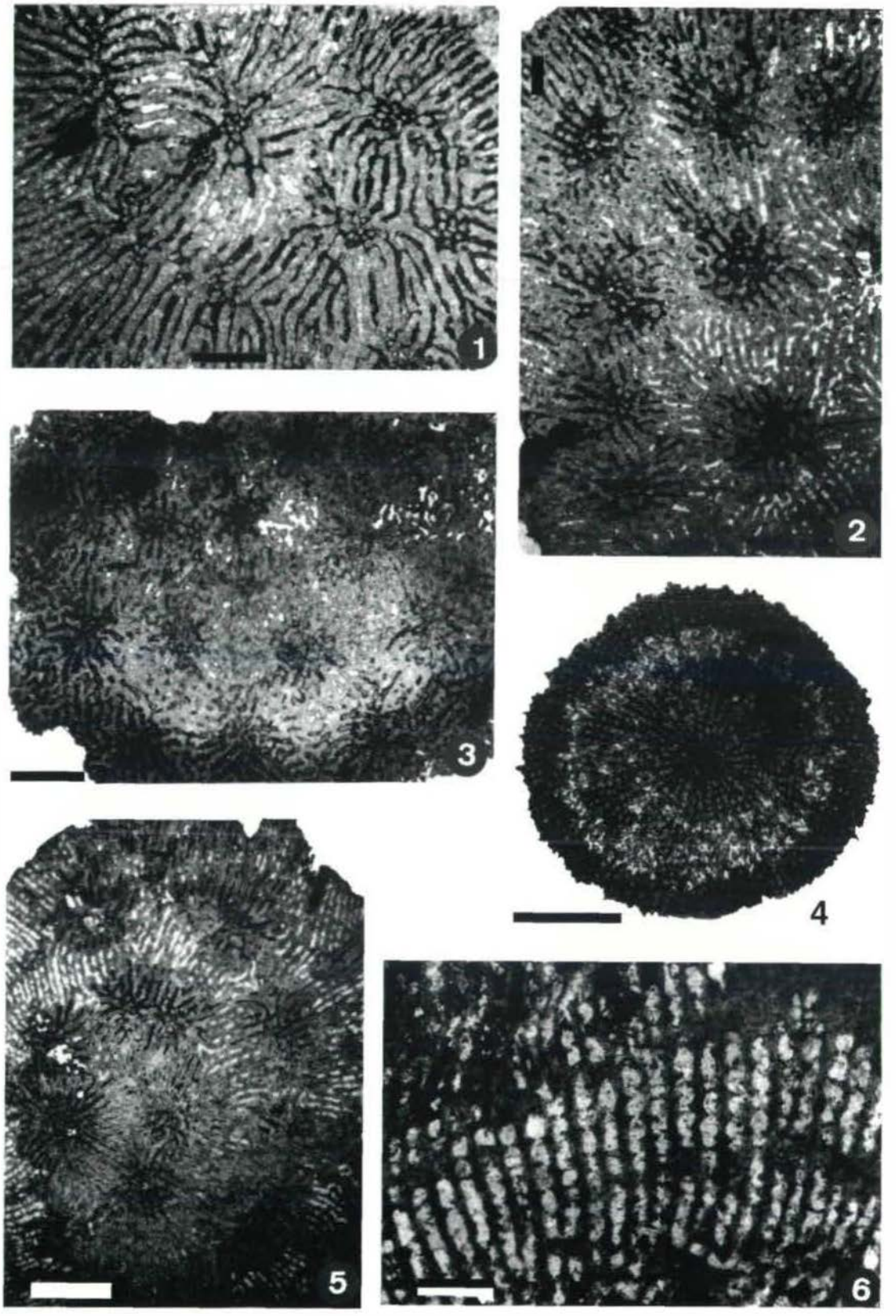


Plate 9

Figs. 1–4: *Latohelia circularia* n. sp.; Fig. 1: cross section, paratype, scale bar: 1 mm, sample K.1176; Fig. 2: cross section, holotype, scale bar: 1 mm, sample K. 1177; Fig. 3: transverse section, holotype, scale bar: 4 mm, sample K.1177; Fig. 4: lateral view of a branch, scale bar: 2 mm, sample K.1178.

Figs. 5, 6: *Dendrosmilia crassa* (REUSS); Fig. 5: cross section, scale bar: 1 mm; Fig. 6: lateral view, scale bar: 1 mm, sample K.1193.

Plate 9

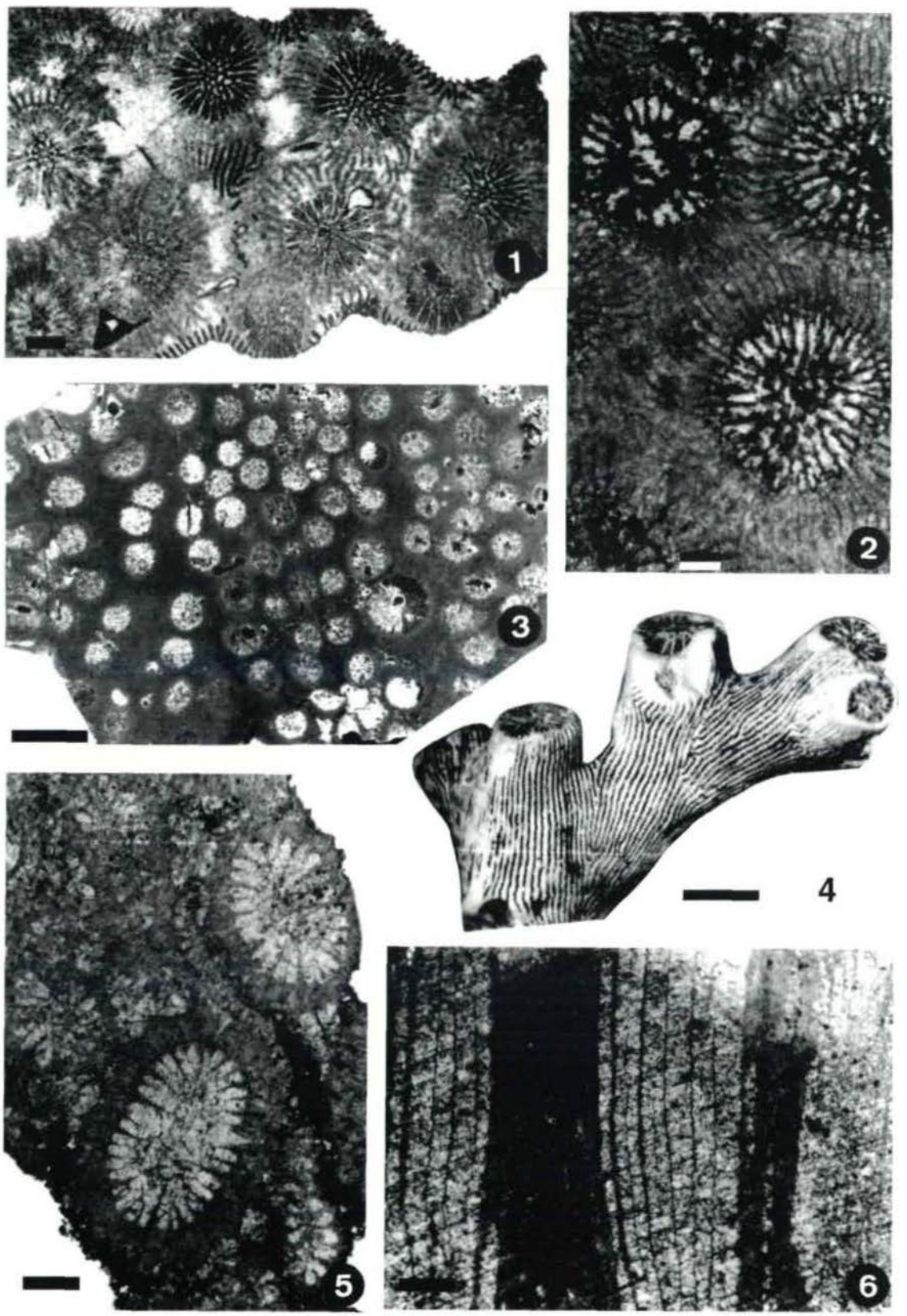


Plate 10

Figs. 1, 4, 6: *Placophyllia bandeli* n. sp.; Fig. 1: cross section of a corallite, holotype, scale bar: 1 mm, sample K.1131; Fig. 4: transverse section of another specimen, scale bar: 2 mm, sample K.1132; Fig. 6: cross section, holotype, scale bar: 4 mm, sample K.1131.

Fig. 2: *Latohelia circularia* n. sp., holotype, longitudinal section, scale bar: 1 mm, sample K.1177.

Fig. 3: *Ovalastrea anomalos* (WELLS, 1934), cross section, scale bar: 1 mm, sample K.1175.

Fig. 5: *Microphyllia maeandrinoides* (REUSS, 1845), cross section, scale bar: 1 mm, sample K.1180.

Plate 10

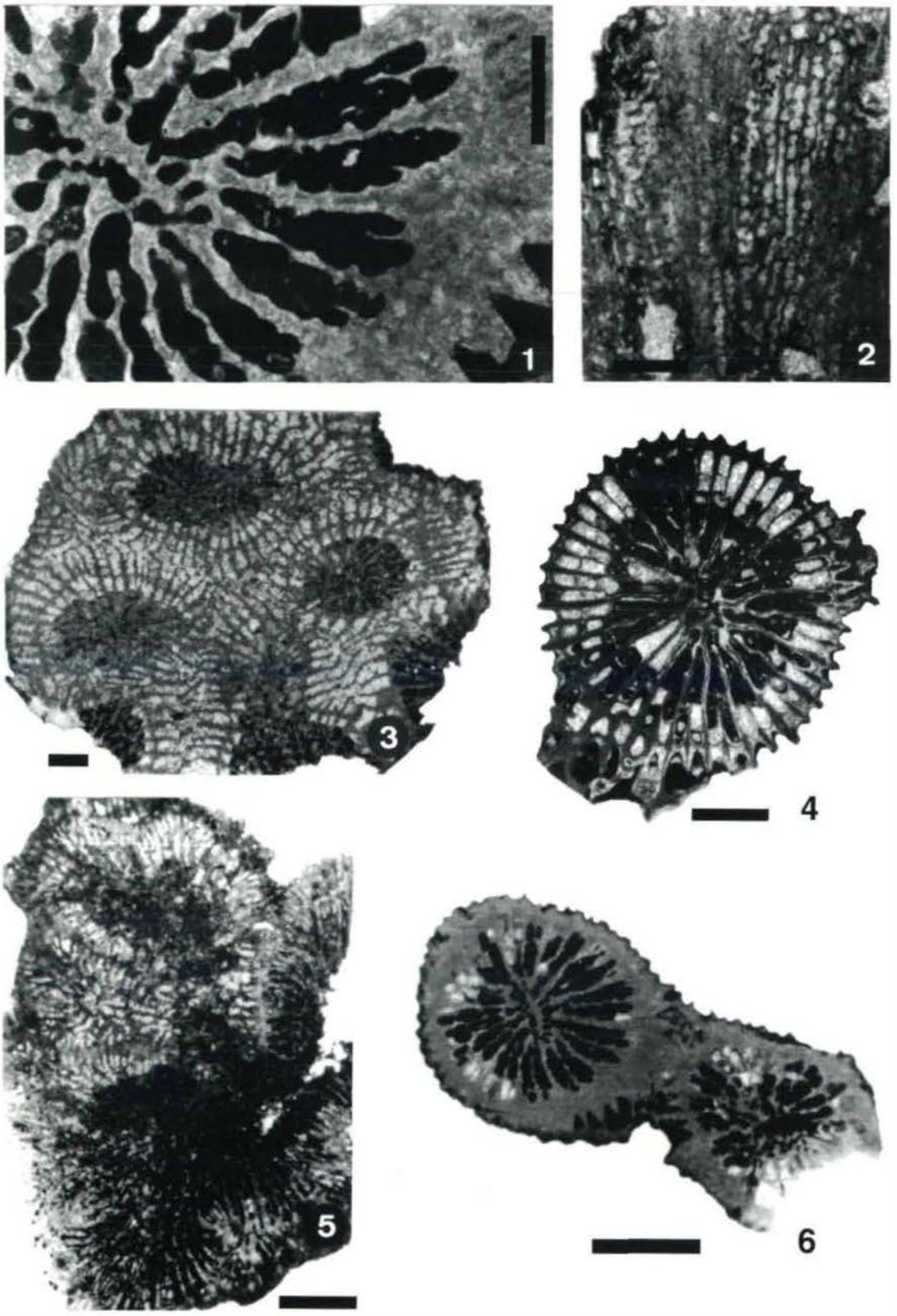


Plate 11

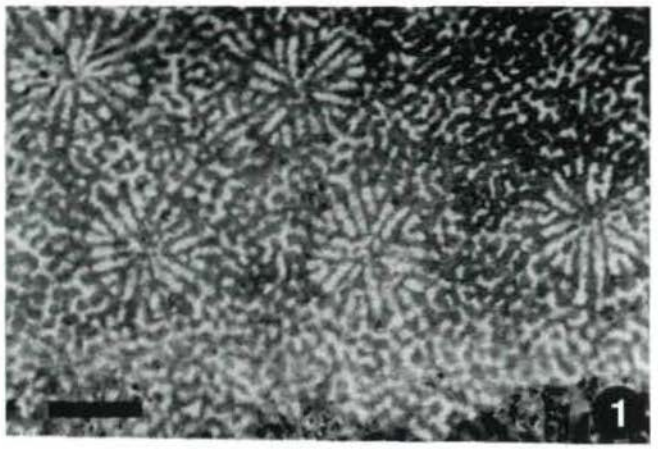
Fig. 1: *Actinacis parvistella* OPPENHEIM, 1930, cross section, scale bar: 1 mm, sample K.1167.

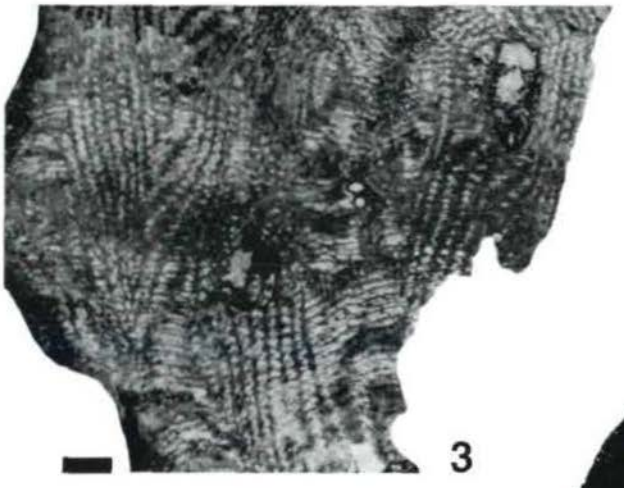
Figs. 2, 4: *Gyrodendron leptonema* n. sp.; Fig. 2: cross section, paratype, scale bar: 5 mm; Fig. 4: longitudinal section, paratype, scale bar: 1 mm, sample K.1183.

Fig. 3: *Koilomorpha cyathosericites* (OPPENHEIM, 1930), longitudinal section, slightly oblique, scale bar: 2 mm, sample K.1159.

Fig. 5: *Dimorphastraea parvistella* OPPENHEIM, 1930, cross section, scale bar: 4 mm, sample K.1185.

Plate 11





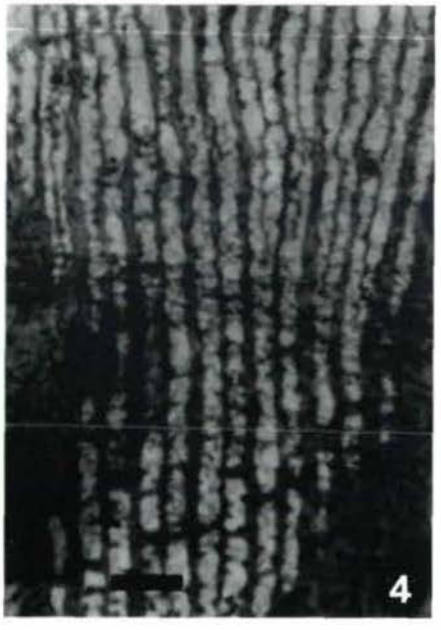


Plate 12

Fig. 1: *Koilomorpha cyathosericites* (OPPENHEIM, 1930), cross section, scale bar: 2 mm, sampleK.1159.
Fig. 2: *Hydnophora turbinata* FROMENTEL, 1877, cross section, scale bar: 1 mm, sample K.1125.
Fig. 3: *Kobyphyllia acrisionae* (FELIX, 1903), cross section, scale bar: 2 mm, sample K.1127.
Fig. 4: *Hydnophora styriaca* (MICHELIN, 1847), cross section, scale bar: 1 mm, sample K.1122.
Figs. 5, 6: *Gyrodendron leptonema* n. sp.; Fig. 5: horizontal view, holotype, scale bar: 1 mm; Fig. 6: cross section, holotype, scale bar: 4 mm, sample K.1182.

Plate 12