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MORPHOLOGY, TAXONOMY AND DISTRIBUTION OF THE CRETACEOUS CORAL GENUS *AULASTRAEOPORA* (LATE BARREMIAN-EARLY CENOMANIAN; SCLERACTINIA)

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Abstract. The Cretaceous coral genus *Aulastraeopora* is being revised, mainly on the basis of sample material. This genus of solitary growth form is characterised by medium-sized to large specimens, compact septa in a regular hexameral or tetrameral symmetry and lonsdaleoid septa. Related genera are *Preverastraea* and *Apoplacophyllia*, which only differ by their cerioid-astreoid and phaceloid growth forms. There are four species of *Aulastraeopora*. The genus, which occurred world-wide, is restricted to the period from the Late Barremian to the Late Cenomanian, being most common in the Aptian to Early Albian. Forty-one samples are either known from the literature or have been to hand. This makes *Aulastraeopora* a rare genus.

Riassunto. Il genere Cretacico *Aulastraeopora* Prever, 1909 è stato revisionato principalmente sulla base di materiale raccolto sul terreno. Si tratta di un corallo solitario, di dimensioni medio-grandi, caratterizzato da setti compatti disposti secondo una simmetria tetramera regolare, o da setti lonsdaleoidi a simmetria esamera. I generi più simili sono *Preverastraea* e *Apoplacophyllia* che differiscono solo per essere colonie di tipo cerioide-astreoide o facelloide. Esistono quattro specie di *Aulastraeopora*. Il genere cosmopolita, ristretto all'intervallo Barremiano superiore - Cenomaniano superiore, si è sviluppato soprattutto durante l'Aptiano e Albiano inferiore. Il genere è comunque piuttosto raro, dati i soli quarantuno esemplari noti fra letteratura e materiale raccolto.

Introduction

In 1909 Prever created the genus *Aulastraeopora*, based on material from the Aptian of the Monti d'Ocre (Ocre mountains) in Italy. In this genus Prever (1909) collected solitary as well colonial species of the same skeletal structure. The genus remained unknown; Wells (1932) established *Blothrocyathus* from the Aptian of Texas (which later turned out to be a junior synonym of *Aulastraeopora*). After studying the type material, Beauvais (1976) separated the colonial coral species from *Aulastraeopora* and created a new genus, *Preverastraea*. The genus *Aulastraeopora* was partly revised by Löser (1998). But as a result of the re-examination of the Italian type material, the collection of new material in Europe and Mexico, and the study of various coral type collections, the knowledge existing in this field was extended. New findings about the family Aulastraeoporidae and the similar genus *Preverastraea* have meanwhile been published (Löser 2007) and will not be repeated herein. Nine species are currently assigned to *Aulastraeopora* and its junior synonym *Blothrocyathus*, and four of them are admitted. Using previously unpublished material from France, Greece, Mexico, and Spain, this genus is being studied in greater detail.

Abbreviations

The following abbreviations are used:

BSP, Bayerische Staatssammlung für Paläontologie und Geologie München, Germany;

ERNO, Universidad Nacional Autónoma de México, Instituto de Geología, Estación Regional de Noroeste, Hermosillo, Mexico;

IGM, Universidad Nacional Autónoma de México, Instituto de Geología, Ciudad de México, Mexico;

MB, Naturkundemuseum der Humboldt-Universität Berlin, Germany;

MGSB, Museo Geológico del Seminario de Barcelona, Spain;

MMG, Museum für Mineralogie und Geologie, Dresden, Germany;

MV, Vinseum, Vilafrance del Penedés, Spain;

NIGP, Academia Sinica, Nanjing Institute of Geology and Palaeontology, China;

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NMB, Naturhistorisches Museum Basel, Switzerland;

PU, Università degli studi di Torino, Dipartimento di Scienze della Terra, Italy;

TMM, Texas Memorial Museum, Austin, USA;

UJ, Jagiellonian University, Instytut Nauk Geologicznych, Kraków, Poland;

USNM, United States National Museum, Washington D.C., USA;

c, outer calicular diameter;

cl, inner calicular diameter (lumen);

cn, calicular diameter of the inner calice;

ccd, distance of calicular centres;

s, number of septa;

sys, septal symmetry;

slo, number of lonsdaleoid septa.

The abbreviations used in the synonymy lists follow Matthews (1973):

*, earliest valid publication of the species name;

?, the assignation of this description to the species is doubtful;

non, the described material does not belong to the species concerned;

p, the described material belongs only in part to the species concerned;

v, the specimen was observed by the author.

Material

The material comes from various localities, most of which are listed, commented and provided with additional references in Löser et al. (2005). Details are only provided if not reported in that publication. If no sample number is given, it signifies that the material from the locality concerned was not available for studies.

China

Xizang (= Tibet), Gerze County, Dongco district, Lopu, Xiakangjiang (RC.2381 in Löser et al. 2005); Langshan Fm, Albian. Sample: NIGP 65843.

France

Aude, Padern, Le Crès. This locality was sampled by the author. Most probably it is identical with the locality described by Alloiteau (1948; F.338). Early Albian (Mammillatum Zone). Samples: BSP 2003 XX 4624, 4662.

Greece

Fokída, Agrostylia (GR.3537). Palaeontological data are published in Morycowa & Marcopoulou-Diacantoni (1997, 2002). The stratigraphy is discussed in Löser (2005: 237).

Fokída, Kiona mountains, Panourgias (= Dremisa) (GR.61). Material collected by Carl Renz and revised by Hackemesser (1936) without exact stratigraphy. The sample described herein is very probably from Early Cenomanian sediments. Sample: NMB D 6325.

Fokída, Kiona mountains, Panourgias (= Dremisa), sample locations M1, 24 and 25. Cenomanian in view of the occurrence of the rudist genus *Ichthyosarcolites*, probably Early Cenomanian. A more exact definition is not possible. Material collected by Gero Moosleitner and the author. Samples: BSP 2003 XX 2306, 2256, 5905.

Kozani, Nea Nikopolis (GR.2090); Early Cenomanian. Locality briefly described by Brunn (1956); the gastropod fauna was revised by Kollmann (1987). With *Orbitolina* (*Conicorbitolina*) *corbarica* and *Ichthyosarcolites* sp. it was dated Early Cenomanian. Samples: MMG L. 2307, BSP 2003 XX 5940.

Viotía, Arachova (GR.976); Evangelistria-Schichten, Early Aptian. For details see Baron-Szabo & Steuber (1996). Samples: MB K449, K498, K499, BSP 2003 XX 5580.

Italy

Abruzzi, L'Aquila, Monti d'Ocre; (?) Late Aptian (I.171). For details see Löser (2005, 2006). Various sample locations are distinguished as follows (Parona 1909):

Fossa Agnese (I.1735). Samples: PU 17951, BSP 2003 XX 5400.

Fossa Mezza Spada (I.1732). Samples: PU 17941-47, 17953.

Mexico

Puebla, Tehuacán, San Juan Raya (MEX.97); San Juan Raya Formation, Aptian. Sample: IGM 9206.

Sonora, Municipio Opodepe, Tuape, Cerro de la Espina; Mural Limestone, Cerro La Espina Mbr, Early Albian. This locality corresponds to the sample location of the material described by Baron-Szabo & González-León (2003). The exact location within the Cerro La Espina Mbr is unknown, but the corals are most probably derived from the base. Sample: ERNO 3168.

Sonora, Municipio Opodepe, Tuape, Cerro de la Espina; Mural Limestone, base of the Cerro La Espina Mbr, Early Albian. See Baron-Szabo & González-León (2003) and Löser & Minor (2007). Samples: ERNO L-4218, L-4234, L-4461, L-4462, L-4463, L-4464.

Sonora, Municipio Arizpe, Arizpe, Cerro La Ceja; Mural Limestone, top of the Cerro La Espina Mbr, Early Albian. Sample: ERNO L-4264.

Sonora, Municipio Cucurpe, Cucurpe, La Mesa; Mural Limestone, base of the Cerro La Espina Mbr, Early Albian. Sample: ERNO L-4289.

Sonora, Municipio Ures, Cerro de Oro, sample location 4; Cerro de Oro Formation, Late Barremian to Early Aptian. Early Aptian is more probable than Late Barremian (Löser & Minor 2007). This locality corresponds to the locality described by Baron-Szabo & González-León (1999). Sample: ERNO L-4499.

Spain

Cataluña, Lérida, Com. Alt Urgell, Mun. Coll de Nargó, Montanya de Nargó (E.2335); Senyús Fm, early Late Aptian. The locality was described in detail by Schöllhorn (1998). Sample: BSP 2003 XX 4126.

Cataluña, Tarragona, Com. Baix Penedés, Mun. Sant Martí Sarroca, Can Grau (E.834); Late Aptian. Corals are reported in Bataller (1937), the stratigraphy is discussed in Löser & Decrouez (2000). Sample: MV 12872.

Spain, Valencia, Alicante, Sierra de Llorençá; Late Albian. The geology is reported by Castro (1998); the coral fauna is under investigation. Sample: MGSB 74323.

USA

Texas, Hays County, Blanco River, Pleasant Valley Crossing (USA.1210); Lower Glen Rose Limestone, Early Albian. Samples: USNM I-75121; TMM UT-11472.

Details of the localities in Sonora (Mexico) and Texas (USA) are described by Löser & Minor (2007).

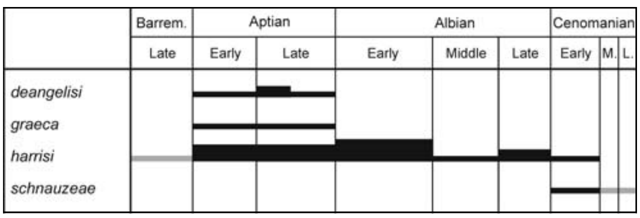


Fig. 1 - Stratigraphic distribution and abundance of *Aulastraeopora* species. The thickness of the bars indicates the number of regions (not localities) in which the species was found. Bars in grey indicate uncertainty as to the stratigraphy of the localities.

Systematic description

The term 'cycle' or 'septal cycle' refers to radial elements of equal width and length. The first three cycles are assumed to have been formed at the same time (Milne-Edwards 1857: 45).

Order **Scleractinia** Bourne, 1900

Suborder **Rhipidogyrina** Roniewicz, 1976

Family Aulastraeoporidae Alloiteau, 1957

Aulastraeopora Prever, 1909
(= *Blothrocyathus* Wells, 1932)

Type species: *Aulastraeopora deangelisi* Prever, 1909 by subsequent designation in Wells (1933: 65).

Remarks on the type species. The selection of the type species was not accompanied by selection of its lectotype (see below).

Diagnosis. Solitary coral. The septa are compact and free. Six or four septal systems in bilateral-radial symmetry. One septum may be larger. Inner margin of septa with trabecular extensions. Lonsdaleoid septa present. The endotheca is formed by rich vesicular dissepiments (marginal) and tabulae (central). An inner calice formed by dissepiments may be present. The wall is septothecal; its structure is identical with that of the septa.

Description. Solitary coral of varying calicular diameter and height. Compared with other solitary corals in the Cretaceous, *Aulastraeopora* forms medium-sized to large specimens. The septa are straight or slightly bent, free and compact. They appear in regular cycles in a tetrameral or hexameral symmetry. The cycles are distinguished by their septal thickness and length. The septal surface bears numerous small spines, which are expression of the secondary trabeculae. One septum may be larger and reach to the centre of the calice. The inner part of the septa has small, occasionally branching trabecular extensions. In addition to the septa which run from the wall to the centre of the calice, there are also lonsdaleoid septa running from the dissepimental rings (or the inner calice) to the centre of the calice. They are short and may appear in two generations. Although regular, they may or may not be present in the whole calice. It should be noted that lonsdaleoid septa are not a regular feature of the genus; their number may vary greatly. The endotheca consist of dense and regular tabulae in the central part of the calice and of numerous thin and vesicular dissepiments in the margins which in a transverse section may appear as one or more regular dissepimental rings. In certain colonies this ring (called 'pseudo-wall' or 'internal wall' by various authors and herein referred to as 'inner calice') is made up not only of dissepiments but also of skeletal elements having the same structure as septa and wall. The ring may be thick or thin. Inside the inner calice the septa usually become thinner and develop trabecular extensions. The wall is often not preserved. It shows the same structure as the septa and at its inner face the same ornamentation.

There are no columella and synapticulae. The septal microstructure was studied in great detail by Morycowa & Kołodziej (2001) and also commented upon by Löser (2007).

Synonyms. *Blothrocyathus* Wells, 1932.

Comparison. Related genera are *Preverastraea* Beauvais, 1976 and *Apoplacophyllia* Morycowa in Morycowa & Marcopoulou-Diacantoni, 2002.

Distribution. The genus occurs from the Late Barremian to the Cenomanian. In the Cerro de Oro Formation in Sonora (Mexico) the Late Barremian is a bit doubtful, because the age of the Formation is only confined by the occurrence of the orbitolinid foraminifera *Palorbitolina lenticularis*, which ranges from the Late Barremian to the very early Late Aptian (Schroeder 1964). As commented elsewhere (Löser & Minor 2007; Löser 2007), a Late Aptian age is more probable for the Cerro de Oro Formation than a Late Barremian one. The occurrence of *Aulastraeopora* in the Late Cenomanian is due to the imprecise dating of sediments in the Kiona massif (Greece) by rudist bivalves belonging to the genus *Ichthyosarcolites*. It is possible that the genus only reached the Early Cenomanian (as proven by orbitolinid foraminifera in the Kozani region). Thus, it is possible that the genus *Aulastraeopora* only ranges from the Aptian to the Early Cenomanian. It is most common in the Aptian to Early Albian (Fig. 1) and shows the same distribution patterns as *Preverastraea*.

Aulastraeopora is a very rare genus. Most examined samples origin from a few localities: the Late Aptian of the Monti d'Ocre in Italy, the Aptian and Cenomanian of various Greek localities, and the Late Barremian to Early Albian of Sonora (Mexico). Outside these places, the genus is only indicated by a few specimens (USA, France) or just a single one (China, Mexixo/Puebla, Spain).

Species. The species are distinguished on the basis of the septal symmetry and septal cycles. The diameter of the calice and the number of lonsdaleoid septa are not suitable for species identification. In the following description of the species, constant characteristics such as the microstructure, septal ornamentation, endotheca and wall are not repeated. The term 'septa' always refers to septa connected to the wall and does not include lonsdaleoid septa.

Aulastraeopora deangelisi Prever, 1909

Pl. 1, fig. 1-7

*v 1909 *Aulastraeopora deangelisi* Prever, p. 138, text-fig. 32-37

v 1909 *Aulastraeopora dalpiazi* - Prever, p. 139, text-fig. 38, 39

v 1909 *Aulastraeopora rosae* - Prever, p. 139, text-fig. 40

v 1909 *Aulastraeopora octaviae* - Prever, p. 144, text-fig. 50, 51

v 1976 *Aulastraeopora deangelisi* Prever - Beauvais, p. 24, pl. 5, fig. 2abc, pl. 6, fig. 2

v non 1994 *Aulastraeopora deangelisi* Prever - Liao & Xia, p. 75, pl. 58, figs. 1, 2

v 1996 *Aulastraeopora deangelisi* Prever, 1909 - Baron-Szabo & Steuber, p. 19, pl. 9, figs. 1, 3

v 1998 *Aulastraeopora deangelisi* Prever 1909 - Löser, p. 63, text-fig. 1, pl. 1, figs. 1, 2

Types. Prever (1909) named six specimens *Aulastraeopora deangelisi* (PU 17942-47), of which four are depicted (17942, 45, 46, and one unidentified specimen). Specimen 17942 is the one that is most often illustrated (see below). Unfortunately, this specimen consists of four thin sections and only a few remaining fragments. These thin sections were probably obtained from two or more specimens. Thin section 17942D (illustrated in Prever, 1909, text-fig. 35, in Beauvais, 1976, pl. 5, fig. 2c, in Löser, 1998, pl. 1, fig. 1, and in this article again as pl. 1, fig. 1) is designated herein as lectotype. Specimens PU 17942 A, B, C, and PU 17943-47 become automatically paralectotypes. For a part of these paralectotypes (PU 17942B, C, 17944, 17947) it is doubtful whether they (mainly thin sections with a few small fragments) belong to *Aulastraeopora*, since some are poorly preserved and others are only available in the form of longitudinal thin sections, which do not allow identification. It is possible that PU 17942B is derived from the same specimen as PU 17942D since both present a comparable size and skeletal texture. Surely identical with the selected lectotype of *Aulastraeopora deangelisi* are: PU 17942A, 17943, 17945, 17946. It is not possible to exclude specimens from the original type series, even if they are poorly preserved or they identity with the lectotype is unsure.

Dimensions

c	7.5 - 18 (21) mm
cl	(5.5) 8 - 14 (18) mm
cn	2 - 5 (7) mm
sys	6
s	6 + 6
slo	12 - 36

Description. A species with a small calicular diameter. The lectotype shows three large and three slightly shorter septa of the first cycle, and another six much shorter septa of the second cycle. Lonsdaleoid septa may develop in one to three cycles. Due to the poor state of preservation, they were hardly found at all in material from the type locality but found in great abundance in the well-preserved material depicted by Baron-Szabo & Steuber (1996).

Remarks. In Löser (1998) the four species established by Prever (*A. dalpiazi*, *A. deangelisis*, *A. octaviae*, *A. rosae*) were kept separated. After studying the type material again and after gaining experience with the very similar genus *Preverastraea*, they were joined under a common name. The abundance of lonsdaleoid septa is not considered a proper feature for distinguishing species.

Occurrence and material. Early Aptian: Greece (Viotía) Arachova (MB K 498). Early Late Aptian: Spain (Cataluña, Lérida, Com. Alt Urgell, Mun. Coll de Nargó) Montanya de Nargó (BSP 2003 XX 4126). Late Aptian: Italy (Abruzzi, L'Aquila) Monte d'Ocre, Fossa Mezza Spada (PU 17942D, transverse thin section, lectotype of *Aulastraeopora deangelisi*; PU 17942A, transverse thin section, paralectotype of *Aulastraeopora deangelisi*; PU 17942B+C, two longitudinal thin sections, paralectotype of *Aulastraeopora deangelisi*, assignation to this species uncertain; PU 17943, one transverse thin section, paralectotype of *Aulastraeopora deangelisi*; PU 17944, longitudinal thin section, paralec-

PLATE 1

Fig. 1 - *Aulastraeopora deangelisi* Prever, 1909. Thin section of a transverse section. Late Aptian of Fossa Mezza Spada, Monti d'Ocre, L'Aquila, Italy. PU 17942D (lectotype of *Aulastraeopora deangelisi* Prever, 1909). x 4.8.

Fig. 2 - *Aulastraeopora deangelisi* Prever, 1909. Thin section of a longitudinal section. Late Aptian of Fossa Mezza Spada, Monti d'Ocre, L'Aquila, Italy. PU 17942B (paralectotype of *Aulastraeopora deangelisi* Prever, 1909). x 4.

Fig. 3 - *Aulastraeopora deangelisi* Prever, 1909. Thin section of a transverse section. Late Aptian of Fossa Mezza Spada, Monti d'Ocre, L'Aquila, Italy. PU 17946B (paralectotype of *Aulastraeopora deangelisi* Prever, 1909). x 5.9.

Fig. 4 - *Aulastraeopora deangelisi* Prever, 1909. Thin section of a transverse section. Late Aptian of Fossa Mezza Spada, Monti d'Ocre, L'Aquila, Italy. PU 17941C (holotype of *Aulastraeopora dalpiazi* Prever, 1909). x 5.6.

Fig. 5 - *Aulastraeopora deangelisi* Prever, 1909. Thin section of a longitudinal section. Late Aptian of Fossa Mezza Spada, Monti d'Ocre, L'Aquila, Italy. PU 17941B (holotype of *Aulastraeopora dalpiazi* Prever, 1909). x 6.4.

Fig. 6 - *Aulastraeopora deangelisi* Prever, 1909. Thin section of a transverse section. Late Aptian of Fossa Mezza Spada, Monti d'Ocre, L'Aquila, Italy. PU 17953 (holotype of *Aulastraeopora rosae* Prever, 1909). x 6.2.

Fig. 7 - *Aulastraeopora deangelisi* Prever, 1909. Thin section of a transverse section. Late Aptian of Fossa Agnese, Monti d'Ocre, L'Aquila, Italy. PU 17951A (holotype of *Aulastraeopora octaviae* Prever, 1909). x 3.3.

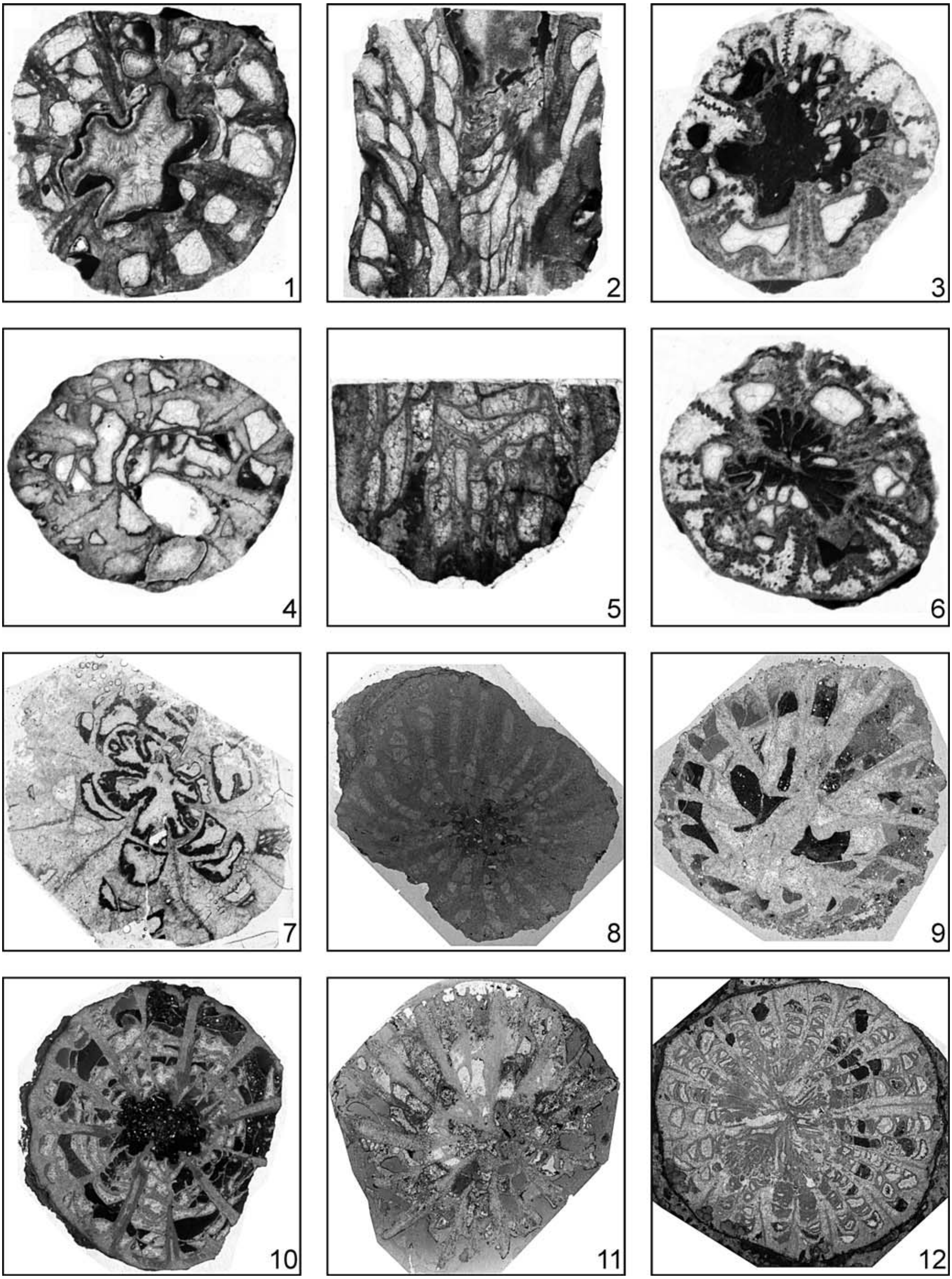
Fig. 8 - *Aulastraeopora harrisi* (Wells, 1932). Thin section of a transverse section. Early Albian of Cerro La Espina Tuape, Municipio Opodepe, Sonora, Mexico. ERNO L-4461B. x 2.9.

Fig. 9 - *Aulastraeopora harrisi* (Wells, 1932). Thin section of a transverse section. Early Albian of Cerro La Espina Tuape, Municipio Opodepe, Sonora, Mexico. ERNO L-4463B. x 3.8.

Fig. 10 - *Aulastraeopora harrisi* (Wells, 1932). Thin section of a transverse section. Early Albian of Le Crès, Padern, Aube, France. BSP 2003 XX 4624A. x 2.7.

Fig. 11 - *Aulastraeopora harrisi* (Wells, 1932). Thin section of a transverse section. Aptian of San Juan Raya, Tehuacán, Puebla, Mexico. IGM 9206. x 2.2.

Fig. 12 - *Aulastraeopora harrisi* (Wells, 1932). Thin section of a transverse section. Early Aptian of Arachova, Viotía, Greece. MB K499. x 1.4.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totype of *Aulastraeopora deangelisi*, assignation to this species uncertain; PU 17945, one transverse and one longitudinal thin section, paralectotype of *Aulastraeopora deangelisi*; PU 17946, one transverse and one longitudinal thin section, paralectotype of *Aulastraeopora deangelisi*; PU 17947, longitudinal thin section, paralectotype of *Aulastraeopora deangelisi*, assignation to this species uncertain; PU 17941, with two transverse and one longitudinal thin section, holotype of *Aulastraeopora dalpiazi*; PU 17953, with one transverse thin section, holotype of *Aulastraeopora rosae*). Fossa Agnese (PU 17951, with one transverse and one longitudinal thin section, holotype of *Aulastraeopora octaviae*).

Aulastraeopora graeca Morycowa in Morycowa & Marcopoulou-Diacantoni, 2002

2002 *Aulastraeopora graeca* Morycowa in Morycowa & Marcopoulou-Diacantoni, p. 21, fig. 13

Types. The type (UJ 158P 88) was not available for studies.

Dimensions

	Holotype
c	32 - 35 mm
sys	6
s	6 + 6 + 12 + 24

Remarks. A detailed description and good illustration were provided by Morycowa so that no amendment is needed. No new material of this species was found.

Occurrence and material. ?Aptian: Greece (Fokída) Agrostylia.

Aulastraeopora harrisi (Wells, 1932)

Pl. 1, fig. 8-12

*v 1932 *Blothrocyathus harrisi* Wells, p. 242, pl. 30, figs. 6, 6 a, 7, pl. 31, figs. 3, 4

v 1944 *Blothrocyathus harrisi* Wells - Shimer & Shrock, p. 117, pl. 42, figs. 22

v 1994 *Blothrocyathus harrisi* Wells - Liao & Xia, p. 78, text ill. 46, pl. 8, fig. 9

v 1996 *Aulastraeopora* sp. - Baron-Szabo & Steuber, p. 19

v 1998 *Aulastraeopora harrisi* (Wells 1932) - Löser, pl. 3, fig. 1

? 1990 *Budaia qiekanensis* He & Xiao, p. 158, pl. 22, fig. 1

v 2003 *Aulastraeopora* sp. - Baron-Szabo & González León, p. 208, fig. 6F, 7E

Types. Wells designated a holotype (TMM UT-11472 A) and two paratypes (USNM I-75121, UT-11472 B). No thin sections of these types are available. The material is silicified and does not allow the preparation of thin sections. The type locality was visited by the author, who wished to obtain more material, without success. No other locality in Texas yielded *Aulastraeopora* species.

Dimensions

c	10 - 75 mm
cl	9 - 70 mm
cn	5 - 40 mm
sys	6
s	6 + 6 + 12 + s4
slo	up to 12

Description. A species of varying calicular diameter. The holotype has a height of 280 mm and a maximum diameter of 55 mm, the paratypes are fragments with a maximum diameter of 75 mm. The septa appear in three regular cycles, which differ clearly in length and thickness. A fourth cycle of only a few septa may appear. Lonsdaleoid septa are rare in the type material, probably on account of the poor preservation.

Remarks. *A. harrisi* is the species that covers the widest range of ages and extends over the largest geographic area.

Occurrence and material. Late Barremian - Early Aptian: Mexico (Sonora, Municipio Ures), Cerro de Oro (ERNO L-4499). Aptian: (?) China (Xizang, Rutog County, Risum district) Jaggang village, Qiekan; Mexico (Puebla, Tehuacán), San Juan Raya (IGM 9206). Early Aptian: Greece (Viotía) Arachova (BSP 2003 XX 5580, MB K499, MB K449). Late Aptian: Italy (Abruzzi, L'Aquila) Monti d'Ocre, Fossa Agnese (BSP 2003 XX 5400); Spain (Cataluña, Tarragona, Com. Baix Penedés, Mun. Sant Martí Sarroca) Can Grau (MV 12872). Albian: China (Xizang, Gerze County, Dongco district), Lopu, Xiakangjiang (NIGP 65843). Early Albian: France (Aude) Padern, Le Crès (BSP 2003 XX 4624, 4662). Mexico (Sonora, Municipio Cucurpe), Cucurpe, La Mesa (ERNO L-4289). Mexico (Sonora, Municipio Arizpe), Arizpe, Cerro La Ceja (ERNO L-4264). Mexico (Sonora, Municipio Opodepe), Tuape, Cerro de la Espina (ERNO 3168, ERNO L-4218, L-4234, L-4461, ERNO L-4462, L-4463, L-4464). USA (Texas, Hays County) Blanco River, Pleasant Valley Crossing (TMM UT-11472 A, USNM I-75121, UT-11472 B). Late Albian: Spain (Valencia, Alicante) Sierra de Llorençá (MGSB 74323). Early Cenomanian: Greece (Kozani) Kozani, Nea Nikopolis (BSP 2003 XX 5940). Cenomanian: Greece (Fokída) Kiona massif, Panourgias (BSP 2003 XX 5905)

Aulastraeopora schnauzeae Löser, 1998

v 1936 cf. *Montlivaultia pauciradiata* From./Dasmiopsis Opp. - Hackemesser, p. 34

v* 1998 *Aulastraeopora schnauzeae* Löser, p. 66, pl. 1: 3, 4, pl. 2: 1, 2, pl. 3: 2

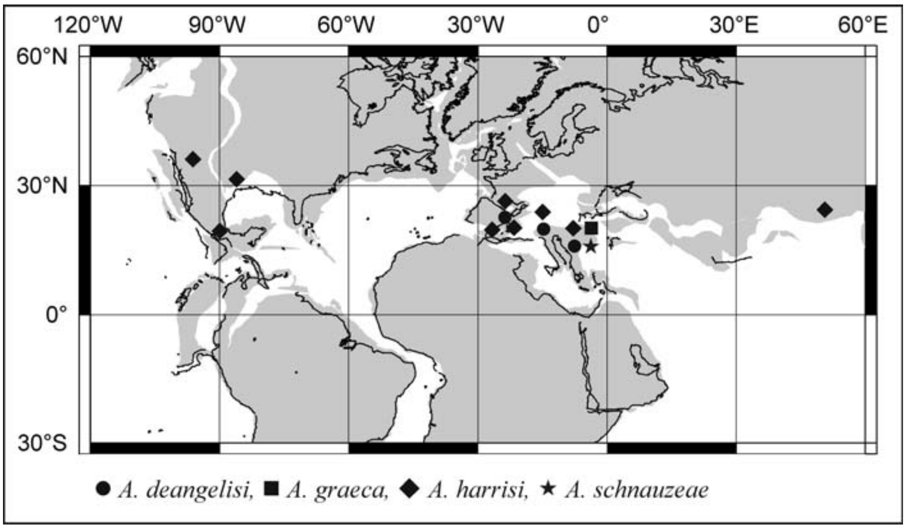

Fig. 2 - Paleobiogeographic distribution of the various species of *Aulastraeopora*. Plate tectonic reconstruction (-112 Ma) with plates moved relative to the magnetic reference frame (created using Advanced Tectonic Reconstruction Service, Ocean Drilling Stratigraphic Network, http://www.odsn.de); present day shorelines in black, plate fragments in grey.

Types. Holotype MMG L. 2307.

Dimensions

	Holotype
c	85 mm
cn	37 - 50 mm
sys	4
s	4 + 4 + 8
slo	256

Remarks. As no new material has been found since the creation of the species, there is nothing to add. *Aulastraeopora schnauzeae* is the strangest *Aulastraeopora* species due to its tetrameral symmetry and a very large number of (?) lonsdaleoid septa.

Occurrence and material. Cenomanian: Greece (Fokída) Kiona massif, Panourgias (NMB D 6325). Early Cenomanian: Greece (Kozani) Kozani, Nea Nikopolis (MMG L. 2307). Cenomanian: Greece (Fokída) Kiona massif, Panourgias (BSP 2003 XX 2256, 2306).

Other species

Blothrocyathus archaeum Kuzmicheva, 2002 does not belong to *Aulastraeopora*; it lacks lonsdaleloid septa and its septa have a different (? montlivaltiid) microstructure.

Conclusions

The late Early Cretaceous to early Late Cretaceous coral genus *Aulastraeopora* is reconsidered on the basis of newly collected material. This solitary coral genus is characterised by compact septa in a regular hexameral or tetrameral symmetry and by lonsdaleoid septa. The wall is of the same structure as the septa. The genus *Blothrocyathus* is considered synonymous with *Aulastraeopora*. Related genera are *Preverastraea* and *Apoplacophyllia*, which only differ in that they are colonial corals and have various growth forms. Four species of *Aulastraeopora* can be distinguished. Two species (*A. graeca*, *A. schnauzea*) are endemic in the Pelagonian zone. More common are *A. deangelisi* and *A. harrisi*. *A. deangelisi* is restricted to various outcrops in Spain, France, and Italy corresponding to the Central Tethys. *A. harrisi* has a much wider distribution and was indicated for an area from the Caribbean to the eastern Tethys (Fig. 2). The genus is restricted to the period from the ?Late Barremian to the (?Early) Cenomanian, being most common in the Aptian to Early Albian (Fig. 1). Forty-one samples are known from the literature or have been to hand, which makes this a rare genus.

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