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CRETACEOUS SCLERACTINIAN CORAL *PREVERASTRAEOPSIS* GEN. N. FROM CENTRAL GREECE

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Abstract. The aulastraeoporid coral *Preverastraeopsis* gen. n. represented by one species *Phyllocoenia major* Hackemesser, 1936 from the Cenomanian (?Aptian-Cenomanian) of Central Greece is described. The new genus, characterized by astreoid colony structure is not known to date in the family Aulastraeoidae Alloiteau. The genus is related to *Preverastraea* Beauvais, which differs from *Preverastraeopsis* by cerioid colony with corallite wall in structural continuation with the septa. In the latter the radial elements are of costo-septal type, free in their external ends.

Riassunto. Viene qui descritto il corallo aulastraeoporide *Preverastraeopsis* gen. n., rappresentato dalla specie *Phyllocoenia major* Hackemesser, 1936, proveniente dal Cenomaniano (?Aptiano-Cenomaniano) della Grecia centrale. Il nuovo genere, caratterizzato da una struttura della colonia di tipo astreoide, viene incluso nella famiglia Aulastraeoidae Alloiteau. Il genere ha relazioni con *Preverastraea* Beauvais, che differisce da *Preverastraeopsis* per la colonia di tipo cerioide con la parete dei coralliti in continuità strutturale con i setti. In quest'ultimo genere gli elementi radiali sono di tipo costo-settale, liberi alla loro terminazione esterna.

Introduction

Cretaceous (Cenomanian) specimens collected by Carl Renz and described by Hackemesser (Hackemesser 1936) as *Phyllocoenia diplothecata* and *P. felixi* (family Stylinidae) were included by Morycowa (in Morycowa & Marcopoulou-Diacantoni 1997, 2002) in the genus *Preverastraea* Beauvais (Beauvais 1976), suborder Rhipidogyrina Roniewicz (Roniewicz 1976) on account of their neorhipidacanth microstructure and structural resemblance to this coral group.

However, the character of some other Hackemesser's species from the genus *Phyllocoenia* (cf. Morycowa & Marcopoulou-Diacantoni 1997: 259), i.e. *Phyllocoenia major* seems not to agree with the diagnosis of the genus *Preverastraea* Beauvais. This species is included here in a new genus *Preverastraeopsis.*

The genus *Preverastraea* Beauvais is characterized by cerioid colony [compare *Preverastraea diplothecata* (Hackemesser), Pl. 2] with distinct rhipidotheca (the term of Morycowa & Marcopoulou-Diacantoni 2002; cf. also Morycowa & Kołodziej 2001), whereas *Preverastraeopsis* gen. n. has astreoid colony structure (Pl. 1).

It should be mentioned that *Preverastraeopsis major* (Hackemesser) was a rare component of the Cretaceous scleractinian coral fauna. The only undoubted occurrence of the species is from the Cenomanian (?Aptian-Early Cenomanian, Löser 2007) of Central Greece, Kiona mountains (Panourgias = old name Dremisa).

Material

The results presented here are based on the Cretaceous coral specimens from the Carl Renz collection (Natural History Museum in Basel) described by Max Hackemesser (1936) as *Phyllocoenia major* (D 6125) and *Phyllocoenia diplothecata* (D 6121). They come from Central Greece (Panourgias = formerly Dremisa in Kiona mountains). The age of this fauna has been dated by Hackemesser (1936) as Cenomanian but Löser (2007) placed it in the ?Aptian-Early Cenomanian.

The specimens and thin sections discussed are housed at the Natural History Museum in Basel.

Systematic paleontology

Suborder **Rhipidogyrina** Roniewicz, 1976

Family Aulastraeoporidae Alloiteau, 1957

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Holotype	Authors	c-c	d	s	den. gran.	Remarks
Renz coll., specimen no. D 6125, Natur. Mus. Basel	Hackemesser, 1936, p. 18, pl. 2, fig. 8	12-18	5-9	to 24		
"	Morycowa unpub. data	9-18	5-11	24 (3 cycles) lonsdaleoid septa present	5-7/1 mm	colony asteroid, septa bicuneiform
"	Löser 2007, p. 11	15-18	17-18	24 lonsdaleoid septa present		colony cerioid and astreoid, septa thin
"Further material"	Löser 2007, p. 11, figs 7, 8	8-19 (35)	15-20 (25)	"		"

Tab. 1 - Material and measurements (in mm): d - diameter of calices; c-c - distance between centres of corallites; s - number of septa in corallite; den. gran. - density of granules measured along the septal face, in transverse section.

Among the species described by Hackemesser (1936) as *Phyllocoenia*, later included partly into the genus *Preverastraea* Beauvais, corals of cerioid and astreoid colony structures are present. *Preverastraea* Beauvais is a well known genus, characterized by cerioid colony structure (Beauvais 1976) whereas the astreoid coral, *i.e*. *Phyllocoenia major*, is included here in a new genus *Preverastraeopsis.*

Genus *Preverastraeopsis* gen. n.

Type species: *Phyllocoenia major* Hackemesser, 1936 (Renz coll., no. D 6125, Naturhistorisches Museum Basel).

Derivation of the name: Because is close to the Cretaceous genus *Preverastraea* Beauvais, 1976.

Stratigraphic and geographic range: The investigated material comes from the Cenomanian (? Aptian-Early Cenomanian; Löser 2007) from Central Greece; Kiona mountains, Panourgias (Renz coll., no. D 6125).

Species included: Only *Phyllocoenia major* Hackemesser (Hackemesser, 1936). Some other taxa mentioned in the synonymy of this species by Löser (2007) are different when comparing them with the holotype.

Diagnosis: Colony astreoid. Radial elements of costo-septal type with neorhipidacanth microstructure. Lonsdaleoidal septa present. Costo-septal faces bear abundant, regular, sharp granules. Trabecular projections occur irregularly on the lateral-internal part of S1 septa. Internal septal margin smooth. Columella lacking. Endotheca dissepimental. Budding intercalicular. Monotypic taxon.

Remarks. The new genus is related to *Preverastraea* Beauvais, from which it differs in asteroid, not cerioid colony (cf. Pl. 2C and E), and radial elements of costo-septal, not septal type.

The microstructural and micromorphological radial element features of the *Preverastraeopsis* gen. n. are comparable to the other Cretaceous (from the Aptian-Cenomanian interval) genera from the family Aulastraeoporidae Alloiteau. These characteristics are well documented for solitary *Aulastraeopora* Prever, phaceloid *Apocladophyllia* Morycowa, cerioid *Preverastraea* Beauvais (Morycowa & Marcopoulou-Diacantoni 1997, 2002; Morycowa & Kolodziej 2001) and recently described from the Valanginian, thamnasterioid genus *Oedalmiopsis* Roniewicz (Roniewicz 2008).

The genus *Preverastraeopsis* bears a striking resemblance to the Upper Triassic *Palaeastraea* Kühn (family Reimaniphylliidae Melnikova; Roniewicz 1989), in colony structure, form of radial elements, their micromorphology and type of skeletal microstructure. However, the difference between these genera lies in considerably smaller trabeculae composing the mid-septal zone in the latter. Roniewicz (1989: 69) gives their diameters [eg. in *Palaeastraea grandissima* (Frech)] as 35-50 μm.

What is observed in these Cretaceous corals in relation to the remote in time Reimaniphylliidae can be defined as heterochronic evolutionary parallelism.

PLATE 1

Preverastraeopsis major (Hackemesser, 1936). C. Renz collection, holotype no. D 6125, Naturhistorisches Museum Basel.
A) fragment of the colony in transverse section with discernible astreoid corallite connections; B) enlarged fragment of Fig. A showing corallite with bicuneiform radial elements of first three orders and lonsdaleoid of those of the highest order (arrow). The traces of the mid-septal zone formed by recrystalized trabeculae and lateral trabeculae subperpendicular to it visible as dark spots and lines; C) central part of corallite in transverse thin section (cf. Fig. A) showing internal septal margins with septal outgrowths (arrows) in lateral septal surfaces; D) peripheral parts of two corallites showing nonconfluent radial elements; E) longitudinal thin section to illustrate vesicular dissepiments in the marginal corallite part and subhorizontal in its central part; F) magnified fragment of the septum showing outlines of trabeculae forming mid-zone (C) and lateral trabeculae disposed subperpendicularly to mid-septal zone (arrows).

PLATE 2

Preverastraea diplothecata (Hackemesser, 1936). C. Renz collection, holotype no. D 6121, Naturhistorisches Museum Basel).
A) colony in transverse section (polished surface) presenting cerioid corallite structure; B) enlarged fragment of the same polished surface showing corallites connected by wall; C) detail of transverse thin section presented in Fig. E showing the trabecular wall (rhipidotheca) and regular granules in the lateral septal faces; D) enlarged septal portion with traces of mid-septal zone (C) with linear concentration of medium sized trabeculae and well-developed lateral trabeculae (arrows) visible as trabecular centres or bundles of fibres emerging on the septal surfaces as granules; E) transverse thin section from the colony presented in Fig. A. Note the trabecular wall and internal parathecal pseudowall “interior calice” (in transverse thin section a calice lumen); F) longitudinal thin section presenting the arrangement of the endothecal dissepiments.

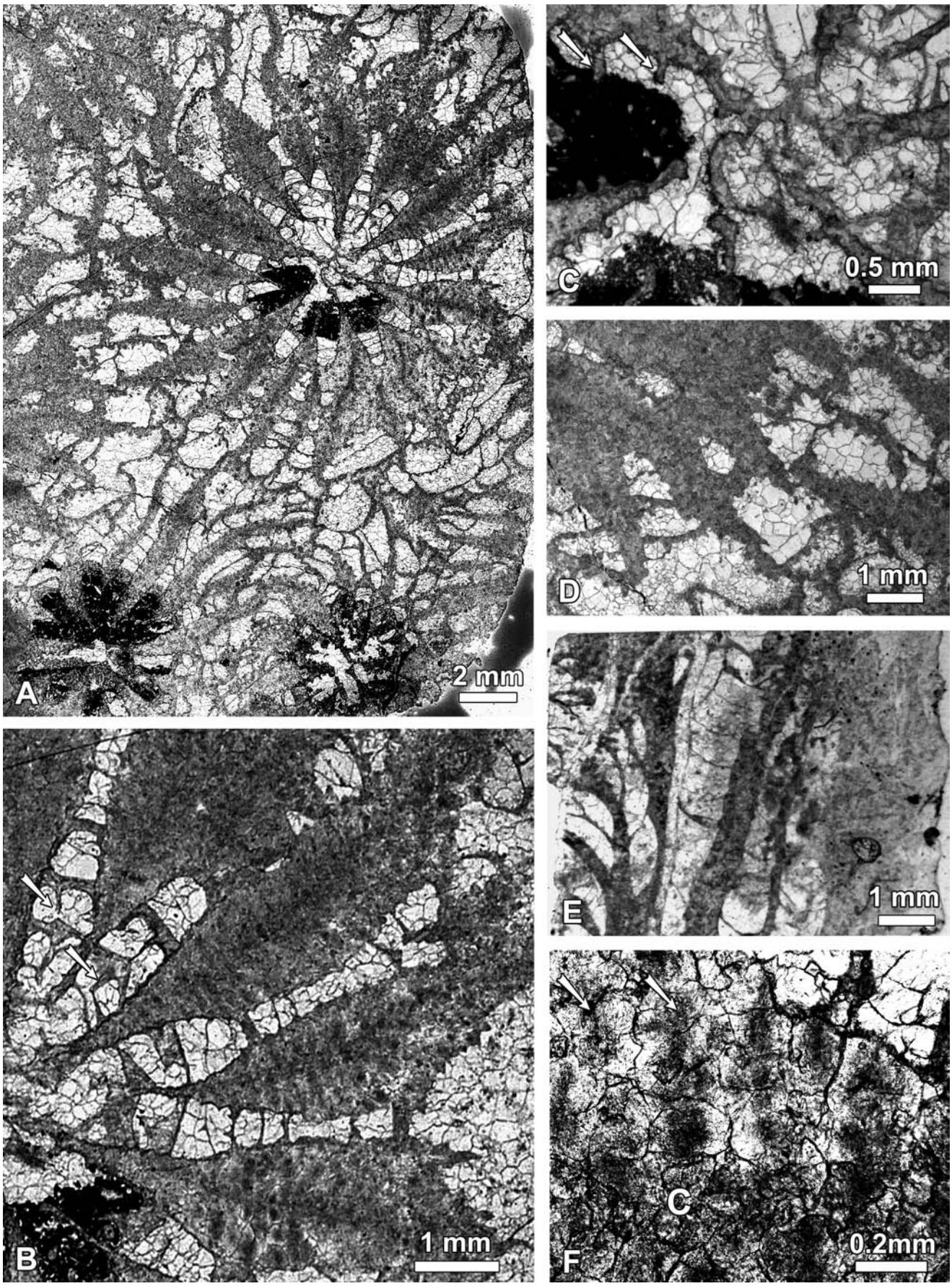

PLATE 1

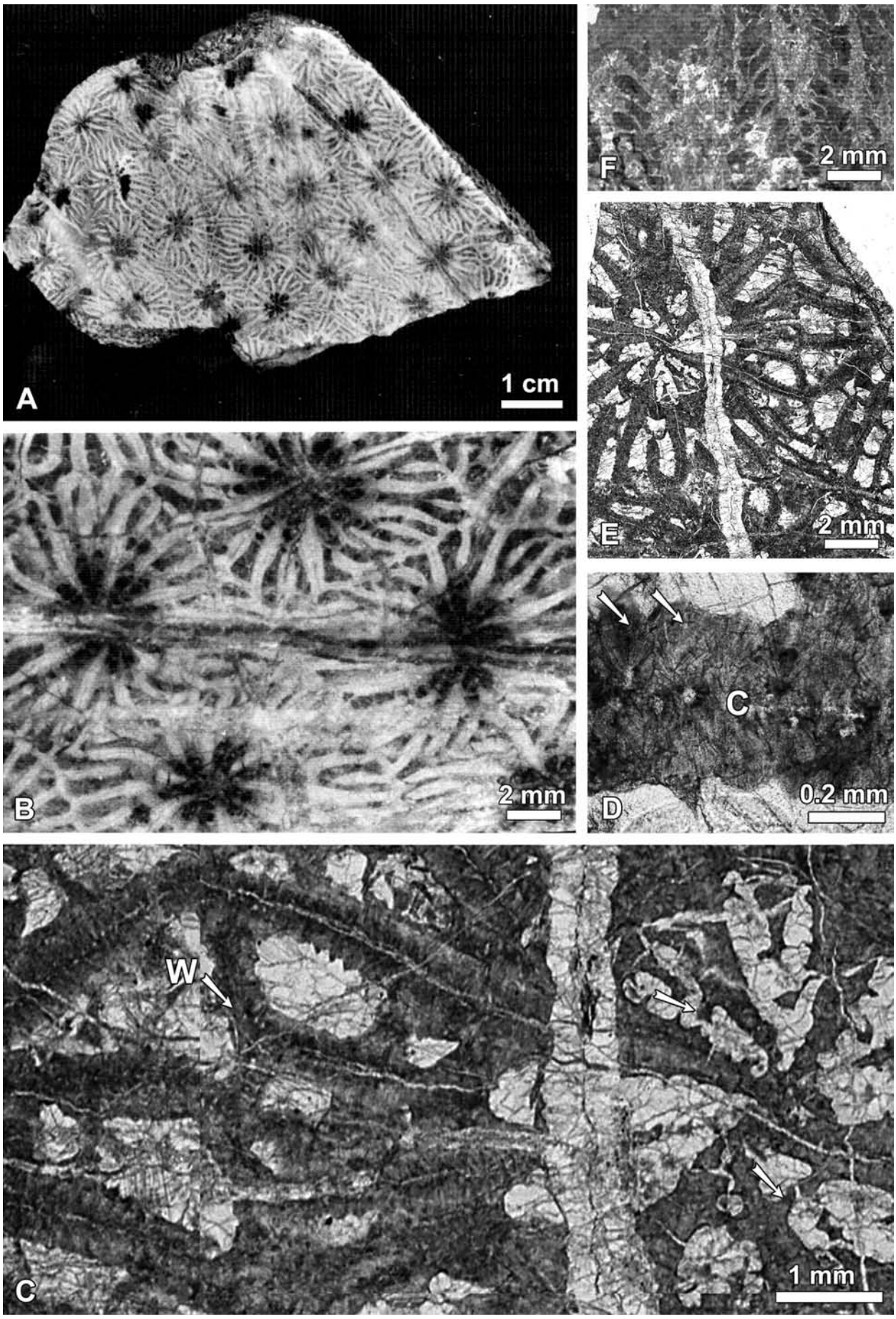

PLATE 2

Preverastraeopsis major (Hackemesser, 1936)

Pl. 1, figs A-F

v 1936 *Phyllocoenia major* Hackemesser, p. 18, pl. 2, fig. 8.

? 2007 *Preverastraea major* (Hackemesser, 1936) – Löser, p. 11, not pl. 1, figs 7, ?8.

Description. Colony astreoid. Radial elements arranged in 6 systems composed of rather regularly developed bicuneiform costo-septa S1-S3 and of irregular lonsdaleoid septa S4, developed on the perithecal pseudowall zone. Costo-septal faces bear abundant, regular, sharp granules. Trabecular projections (cf. Morycowa & Marcopoulu-Diacantoi 2002), also called "lateral septal outgrowths" (Stolarski et al. 2004) occur irregularly on the internal part of S1 septa. Internal septal margins smooth, occasionally slightly broadened, auriculae not detected**.** Endotheca composed by thin vesicular dissepiments in peripheral corallite part and subhorizontal in its central part. Budding intercalicular.

Microstructure. Partly original aragonite skeleton shows traces of neorhipidacanth microstructure preserved in traces. Septal mid-line straight, composed of trabeculae approximately 100-200 μm in diameter. Lateral trabeculae mainly visible as fascicles ca. 120-200 μm in diameter, sub-perpendicular to the mid-septal zone and emerging on the septal surface in the form of sharp, regular dense granules, 5-7 per 1mm.

Remarks. It should be noted that *Preverastraea major* (Hackemesser) presented by Löser (2007, pl. 1, figs 7) shows cerioid corallite structure with well exposed wall and thus differs from the holotype *Preverastraea major* from the Renz collection. Also, the corallite wall is present in the species which Löser placed in the synonymy of *P. major*, i.e. *Bogdanovicoenia bogdanovi* Kuzmicheva, 2007 (=*Amphiastraea bogdanovi* Kuzmicheva, 1980) and *Stiboriopsis sonoraensis* Baron-Szabo & Gonzales-Leon, 1999.

With regard to *Preverastraea robusta* Morycowa (in Morycowa & Marcopoulou-Diacantoni 2002), which raises doubts about whether it is (see Löser 2007) a junior synonym of *P. major* Hackemesser, it should be stated that the latter is a cerioid form and undoubtedly represents the genus *Preverastraea*.

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