

**ONTOGENETICAL DEVELOPMENT IN *DASMIOPSIS LAMELLICOSTATUS* (REUSS 1854)
(SCLERACTINIA; MEANDRINIDAE), A RARE CORAL FROM THE UPPER CRETACEOUS
GOSAU-GROUP (HOFERGRABEN; AUSTRIA)**

**ONTOGENETISCHE ENTWICKLUNG VON *DASMIOPSIS LAMELLICOSTATUS* (REUSS 1854)
(SCLERACTINIA; MEANDRINIDAE), EINER SELTENEN KORALLE VON DER
OBERKRETAZISCHEN GOSAU-GRUPPE (HOFERGRABEN; ÖSTERREICH)**

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ZUSAMMENFASSUNG

Erstmalig wird die ontogenetische Entwicklung anhand von Exemplaren der sehr seltenen Art *Dasmiopsis lamellicostatus* (Reuss 1854) vom Hofergraben (Coniac/Santon) der österreichischen Gosau-Gruppe festgestellt und dokumentiert. In Juvenilstadium ist das Korallum zirkular mit regelmäßig alternierenden Septen und erhält im Verlauf seiner ontogenetischen Entwicklung einen sehr elliptischen Querschnitt mit 12 fast gleich entwickelten, dominanten Septen innerhalb 5 kompletter Zyklen.

ABSTRACT

For the first time the ontogenetical development of specimens of the rare taxon *Dasmiopsis lamellicostatus* (Reuss, 1854) from the Austrian Gosau-Group at Hofergraben (Coniacian/Santonian) is documented. In the juvenile stage the corallite is circular in outline with septa regularly alternating, becoming elliptical in later ontogenetical stages with 12 septa which are both dominant and nearly equal within a septal arrangement of 5 cycles.

I. INTRODUCTION

Scleractinian corals from the Austrian Gosau-Group have been the subject of numerous studies since their first documentations by Goldfuss (1826-33), Sowerby (in Sedgwick, Murchison 1832), and Peters (1852). Reuss (1854) published the first monographic work, followed by extended re-evaluations by Felix (1903) and Oppenheim (1930). Investigations carried out in more recent years focused on the morphological and ecological features (e.g., Beauvais 1982; Höfling, 1989; Sanders, Baron-Szabo 1997; Baron-Szabo 1997, 2002, and in press.; Sanders, Baron-Szabo, in prep.), microstructural implications (e.g., Beauvais 1982; Sorauf 1999; Baron-Szabo in press.), as well as the taxonomic diversity of these corals (e.g., Beauvais 1982; Höfling, 1985; Baron-Szabo, 1997, 1999, 2001, 2002, in press.).

Despite the abundance of scleractinian corals in the Gosau-Group, the taxon *Dasmiopsis lamellicostatus* (Reuss, 1854) has remained a very rarely known form, documented by as little as 10 specimens (Reuss 1854; Felix 1903; Oppenheim 1930; Beauvais 1982; Baron-Szabo 2002). Besides the species *lamellicostatus* the genus *Dasmiopsis* is represented by only one other species, that is *Dasmiopsis neocomiensis* (Fromentel) from the Lower Cretaceous of France.

Studies on the ontogenetical development in scleractinian corals have generally been neglected. Recent investigations however, have shown the significance of such studies when re-evaluating the validity of scleractinian species (Baron-Szabo, in press.). Examination of ontogenetical stages in specimens of e.g. *Flabellomilia*, *Cunolites*, *Diploctenium*, *Aulosmilia*, and *Placosmilia* from the Gosau-Group have led to the conclusion that e.g. in *Cunolites* up to 19 species corresponded to different ontogenetical stages of the one species (*Cunolites polymorphus*).

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As a part of an ongoing study of various aspects of the type localities of the Gosau-Group two more specimens have been discovered. They were collected in 2002 from the Hofergraben, Salzkammergut, by Harry Lobitzer from the Geological Survey of Austria, Vienna.

The purpose of the present paper is to document these specimens and for the first time investigate the ontogenetical development of the rare taxon *Dasmiopsis lamellicostatus* (Reuss, 1854).

II. MATERIAL/GEOGRAPHIC-STRATIGRAPHIC SITUATION

The corals (two specimens: HG 5-22 and HG 5-27) were collected from the marls of the Hofergraben (=Sattelgraben, pers. comm. Harry Lobitzer 2003) which represents a 'locus classicus' of the Gosau-Group. Geographically, the Hofergraben (=Sattelgraben) is located southeast of the Gosau village. Stratigraphically, it is assigned to the Coniacian/Santonian boundary (see papers on the stratigraphy and localities of the Gosau-Group by e.g., Hradecka, Lobitzer, and Svabenicka, in this volume). The specimen HG 5-22 is complete but its skeletal elements are rather poorly preserved. The specimen HG 5-27 is a fragment in aragonitic preservation. The specimens are housed at the Geological Survey Austria, Vienna (Geologische Bundesanstalt Wien).

III. SYSTEMATIC PALAEONTOLOGY

Suborder Faviina Vaughan and Wells 1943
 Family Meandrinidae Gray 1847
 Subfamily Meandrininae Vaughan and Wells 1943

Genus *Dasmiopsis* Oppenheim 1930

Type species

Trochocyathus lamellicostatus Reuss, 1854, Turonian-Campanian (?Santonian) of Austria (Gosau-Group).

Diagnosis

Corallum solitary, trochoid. Outer surface of corallum strongly ribbed. Costae of first 2 cycles normal, those of higher cycles bent toward those of lower cycles and covered by stereome, giving appearance of only 12 costae. Costosepta compact, arranged radially or bilaterally, finely granulated marginally. Columella thick, lamellar. Endothecal dissepiments abundant. Wall consists of a dissepimental stereozone, covered by a multilamellar epitheca.

Remarks

Beauvais (1982, vol. 1, p. 236) stated that he found at the Natural History Museum, Vienna, the specimen originally figured in Reuss (1854, pl. 13, fig. 18) which he designated as the lectotype (Beauvais 1982, pl. 20, figs. 6-7). However, on Plate 20, Beauvais figured 2 obviously different specimens (Figs. 6 and 7), both of which he referred to as 'lectotype'. In addition, he did not give sample numbers or clearly identify the locality they originated from (?Hofergraben or ?Edelbachgraben). Moreover, recent investigations (Baron-Szabo 2002) revealed that none of these figured specimens could be found at the Natural History Museum, Vienna. Therefore, the type material has to be considered lost. However, in the Reuss collection at the Natural History Museum, Vienna, a specimen of *Dasmiopsis lamellicostatus* was found, labeled as *Trochocyathus lamellicostatus*, sample # 534 (Baron-Szabo 2002, pl. 48, figs. 1-2). In case the uncertain situation of the material chosen by Beauvais cannot be resolved, the latter specimen could be designated as the lectotype of the species.

Dasmiopsis lamellicostatus (Reuss 1854)

Plate 1, Figs.

- *1854 *Trochocyathus lamellicostatus* m.: Reuss, p. 79, pl. 13, figs. 17-19.
- v1903 *Trochocyathus lamellicostatus* Reuss: Felix, p. 353.
- 1930 *Dasmiopsis lamellicostatus* Reuss sp.: Oppenheim, p. 542, pl. 20, figs. 6-7a, pl. 26, fig. 13.
- 1978 *Dasmiopsis lamellicostatus* (Reuss, 1854): Turnšek, p. 14 (74), pl. 5, figs. 1-5.
- 1982 *Dasmiopsis lamellicostatus* (Reuss) 1854: Beauvais, vol. 1, p. 235, pl. 20, figs. 6-8, pl. 64, fig. 1 (older synonyms cited therein).
- v2002 *Dasmiopsis lamellicostatus* (Reuss, 1854): Baron-Szabo, p. 68, pl. 48, figs. 1-2.

Dimensions

minimum diameter (adult): 12-18 mm; maximum diameter (adult): 22-30 mm; s (adult): 96+s6; h: 16-22 mm.

*Note that the larger specimen only represents a fragment and therefore its dimensions are estimated.

Characteristics

Trochoid; corallum elliptical to subflabellate in outline in adult stages, nearly circular in juvenile images; costosepta thickened peripherally, becoming very thin and slightly bent toward the center of corallite, arranged in 5 complete cycles in 6 systems in adult stages; the beginning of a sixth cycle can be present; columella lamellar, thick deeper in corallum, thin distally.

Ontogenetical development

In early stages the corallum is nearly circular in outline. When the corallite diameter exceeds 4 mm the corallum becomes slightly oval (minimum diameter/maximum diameter is around 0.8), is elliptical until the corallite reaches a minimum diameter of around 8 mm with a maximum diameter of around 11 mm (minimum diameter/maximum diameter around 0.68), and occurs elliptical-subflabellate in outline when the minimum diameter has reached the size of around 10 mm with a maximum diameter of nearly 20 mm. The ratio of 'minimum diameter/maximum diameter' stays between 0.5-0.6 in every later ontogenetical stage.

Septa are developed in 6 systems throughout ontogenetical development. In juvenile stages septa regularly alternate in length and thickness. In a corallite having a maximum diameter of around 8 mm, septa of the first 2 cycles are nearly equal. Their dominance, indicated by thick and large costae which give the corallum its strongly ribbed outer surface, remains during every later ontogenetical stage. For information on the number of septa corresponding to the corallite diameter see Table 1.

Distribution

Turonian-Campanian of Austria (Gosau-Group), Santonian-Campanian of Slovenia and Croatia.

number of septa/ septal cycles	size of corallite diameter
24/ 3 cycles in 6 systems	4.2 x 5 mm
48/ 4 cycles in 6 systems	8 x 11 mm
96 (+s6)/ 5 cycles in 6 systems	10 x 20 mm (and larger)

Table 1: Number of septa and arrangement of septal cycles corresponding to the size of corallite diameter during ontogenetical development in specimens of *Dasmiopsis lamellicostatus* (Reuss 1854) from the Gosau-Group at Hofergraben.

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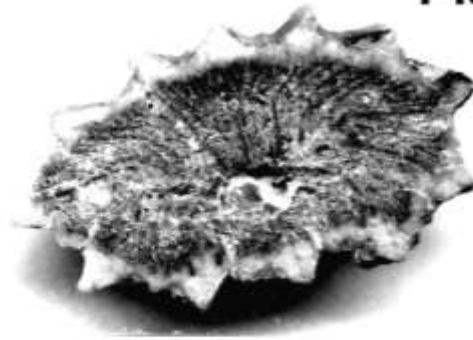
Plate 1

- Fig. 1 Sample HG 5-22, upper surface, lateral view; x 3.
- Fig. 2 Sample HG 5-27, upper surface, cross view of latest adult stage, polished; x 3.
- Fig. 3 Sample HG 5-27, upper surface, lateral view; x 2.5.
- Fig. 4 Sample HG 5-22, upper surface, cross view of latest adult stage, polished; x 3.3.
- Fig. 5 Sample HG 5-22, cross view in peel, latest adult stage; x 5.
- Fig. 6 Sample HG 5-22, cross view, intermediate ontogenetical stage, polished; x 3.
- Fig. 7 Sample HG 5-22, cross view, late juvenile stage, polished; x 5.5.
- Fig. 8 Sample HG 5-22, cross view, early juvenile stage, polished; x 7.

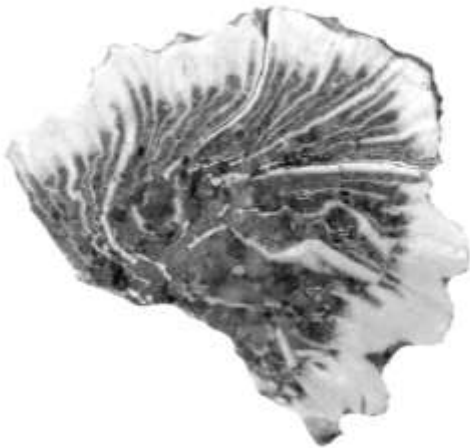
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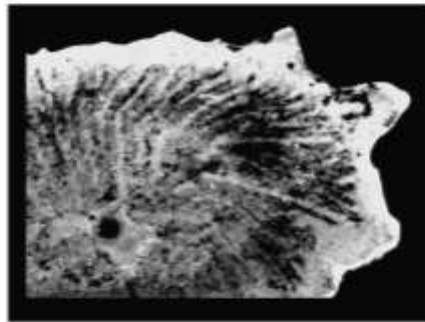
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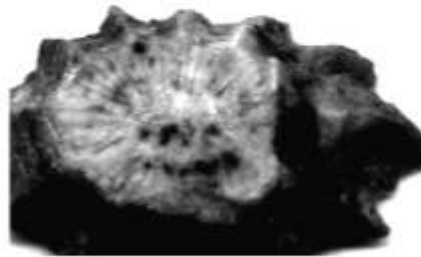
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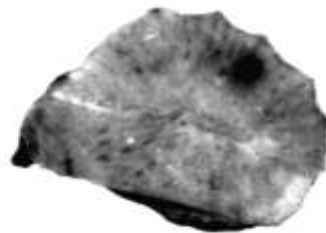
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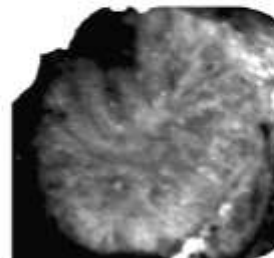
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