Nomenclatural note about the fossil coral genus *Coelosmilia* (Cretaceous)

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Abstract

The coral genus name *Coelosmilia* is generally applied to small solitary corals of the Late Cretaceous. The genus was established twice: *Coelosmilia* Orbigny, 1850 is a solitary coral related to *Trochoidomeandra* Morycowa, 1971, known from the Late Albian to early Late Cenomanian. *Stelloria* Orbigny, 1849 may be a senior synonym. However, *Coelosmilia* Milne Edwards & Haime, 1851 is a nomen dubium, because the provenance and age of the type of its type species is unknown.

Key words: Corals, Cretaceous, taxonomy, Scleractinia.

1. Introduction

The scleractinian suborder Caryophylliina Vaughan & Wells, 1943 currently encompasses 19 families and about 180 genera, of which 85 occurred during the Cretaceous, according to the traditional literature (Alloiteau 1952, 1957, Vaughan & Wells 1943, Wells 1956, and later literature). This view is not shared by taxonomists working on extant corals of this suborder since it is considered paraphyletic (Romano & Cairns 2000). Most of these genera are small, solitary ahermatypic forms. These corals preferentially live in deeper marine environments. The taxonomy of at least the fossil forms is poorly investigated. The specimens are all small, and, therefore, the sizes of figures in historic literature are also small. They show, with a few exceptions, complete and unsectioned specimens that do not allow for taxonomic assignment.

In older reports (see Felix 1914 or Löser et al. 2002 for reference) and more recent literature (Guerrero Kommritz 2004, Guerrero Kommritz & Hillmer 2004, Helm 2013, Krüger 1980, Kues & Lucas 2001, Stühmer et al. 1986, Turnšek et al. 2003, Wittler & Legant 1999), the caryophylliid genus (or subgenus) name *Coelosmilia* was applied to a type of small, solitary coral. Currently, 15 Cretaceous species are assigned to it. The genus is generally assigned to the family Parasmiliidae. Vaughan & Wells (1943) synonymized the genus with *Desmophyllum* (subfamily Desmophyllinae). This small study is an attempt to revise the enigmatic taxon *Coelosmilia* (that was not only once but twice established) and the genus *Stelloria* Orbigny, 1849, which seems to be related to *Coelosmilia*.

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2. Material

The material discussed here come from localities that are commented on and provided with additional references in Löser et al. (2005):

England, Devonshire, Exeter, Haldon Hill (GB.246); Upper Greensand, Late Albian. Specimen NHM R05519.

France, Sarthe, Le Mans (F.283); Sable du Perche Fm, Middle to early Late Cenomanian (Naviculare Zone). Specimens MNHN M03560, MHNLM 2003.1.7403.

France, Charente-Maritime: Ile d'Aix (F.52); Early Cenomanian. Specimen MNHN A26585.

Abbreviations: MHNLM, Musée Vert, Le Mans, France ; MNHN, Muséum National d'Histoire Naturelle, Paris, France; NHM, The Natural History Museum, London, England. c, diameter of the calice; s, number of septa.

The abbreviations used in the synonymy lists follow Matthews (1973): *, earliest valid publication of the specific name; v, the specimen was observed by the author.

3. Systematic palaeontology

Order Scleractinia Bourne, 1900

Suborder Heterocoeniina Beauvais, 1974

Family Trochoidomeandridae Turnšek & Mihajlović, 1981

Genus *Coelosmilia* Orbigny, 1850

Type species: *Anthophyllum sulcatum* Michelin, 1846, by monotypy. The type of the type species is not available at the MNHN. It comes from the Middle to Upper Cenomanian of the Sable du Perche Fm, close to Le Mans (Sarthe, France).

Original diagnosis: Orbigny (1850: 181) did not provide a diagnosis.

Diagnosis: Solitary turbinate coral. Calicular outline circular. Coral surface plane. Septa compact. Microstructure of septa unknown. Septa in cross section slightly thicker close to the wall, becoming slightly thinner toward the centre. Symmetry of septa radial and regularly hexameral. Cycles of septa subregular. Septal cycles differ in length and thickness. Septa not connected to each other. Septal distal margin smooth (probably due to preservation), lateral face with long and thick apophysal septa, inner margin smooth. Pali or paliform lobes absent. Costae hardly present. Synapticulae, columella, endotheca, and wall absent. Epitheca present.

Remarks: The genus always has been attributed to Milne Edwards & Haime, 1848 (or 1849, 1850; correct references cannot be given) but also was independently named by Orbigny (1850: 181). Orbigny attributed the genus to Milne Edwards & Haime as authors with *Anthophyllum sulcatum* Michelin, 1846 as type species. Because the type species is available, the description of the new genus even without a description becomes available under ICZN Art. 12.2.5. Milne Edwards & Haime established the genus again in 1851 (p. XXV) without referring to Orbigny (see below).

The diagnosis given here is based on topotypical material that undoubtedly belongs to the same species. An examination that would cause a partial destruction of the specimen, e.g. the preparation of thin sections, was not possible. More topotypical material was searched in various collections without success. The most striking feature is the outer appearance of the coral that is ambivalent: it may be a solitary coral or a colonial meandrinoid coral, where the calicular rows radiate from a central point. *Trochoidomeandra* was originally also considered a meandrinoid colonial coral, but it was later (Turnšek & Mihailović 1981) identified as a solitary one.

Stratigraphic range: Late Albian to Cenomanian.

Included species: Only the type species.

Coelosmilia sulcata (Michelin, 1846)
Fig. 1

* 1846 *Anthophyllum sulcatum*. – Michelin, p. 197, pl. 50, fig. 5.
1850 *Coelosmilia sulcatum*. – Orbigny, (2), p. 181.
1851 *Stelloria elegans*. – Bronn, p. 153, pl. 29.5, fig. 4 [reproduction of Michelin 1846, pl. 50, fig. 5].
1861 *Stelloria sulcata*, Edwards et Haime. – Fromentel, p. 169.
1866 *Coelosmilia sulcata* (d'Orb.). – Beltremieux, p. 45.
v 1873 *Stelloria sulcata*. – Fromentel, p. 475, pl. 121, fig. 3.
1881 *Stelloria sulcata*. – Quenstedt, p. 1012, pl. 182, fig. 53 [reproduction of Michelin 1846, pl. 50: 5].
1936 *Stelloria sulcatum* d'Orbigny 1850. – Wells, p. 130.
1952 *Anthophyllum sulcatum* Michelin 1845. – Alloiteau, p. 652.

Dimensions: MNHN M03560: c 18 x 19mm, s 55; MHNLM 2003.1.7403: c 24 x 25mm, s 51; NHM R05519: c 35 x 40mm, s 48.

Occurrences: Late Albian of England (Devonshire, Exeter, Haldon Hill; NHM R05519). Middle to Late Cenomanian of France (Sarthe, Le Mans; MNHN M03560, MHNLM 2003.1.7403). According to the literature, also in the Early Cenomanian of France (Charente-Maritime, Fouras).

Genus *Stelloria* Orbigny, 1849

Type species: *Stelloria elegans* Orbigny, 1850; subsequent designation in Wells (1936).

Syntypes: Unavailable syntype MNHN 6703 (? Collection Orbigny), available syntype MNHN A26585, both from the Early Cenomanian of Ile d'Aix (Charente-Maritime, France).

Original description: "Calicular centres in form of a 5- or 6-pointed star that form an equal number of very deep valleys separated by collines. These valleys, some short and some large, are connected to other calicular centres and form a meander. Compact tissue." (Orbigny 1849; translated by the author and corrected by B. Lathuilière).

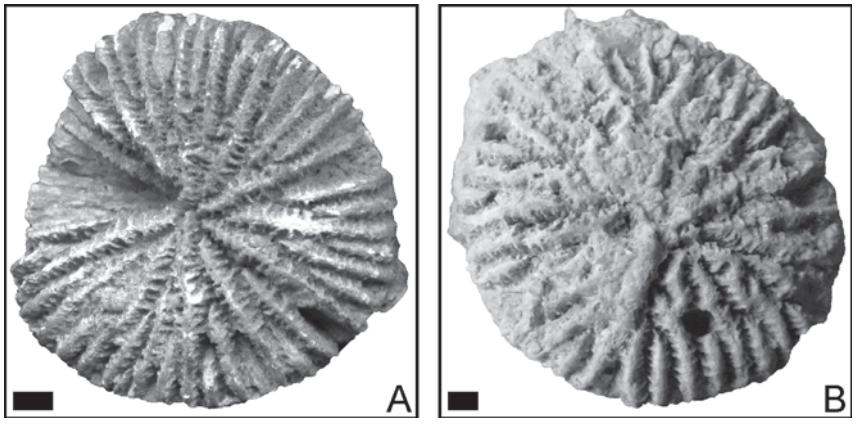

Fig. 1. *Coelosmilia sulcata* (Michelin, 1846); **a**: MNHN M03560; **b**: MHNLM 2003.1.7403. – Scale bar equals 2 mm.

Remarks: ORBIGNY (1849) established the new genus with two species: *S. rustica* and *S. elegans*. These species were described later (ORBIGNY 1850). The designation of *Anthophyllum sulcatum* as type species by ALLOITEAU (1952) is invalid (and is so if this species is considered to be synonymous with *S. rustica*, an opinion that is not shared here). The only available type specimen of the type species (MNHN A26585) is represented by a fragment of a well-preserved colonial coral, but it lacks a polished section or cutting marks that would indicate thin sections have been obtained from the sample. This sample does not coincide with the original diagnosis and may belong to the genus *Hydnophoropsis*.

The only existening illustration of *Stelloria elegans* (BRONN 1851, pl. 29.5, fig. 4) is a re-figuration of *Stelloria sulcatum* in MICHELIN (1846), the type species of *Coelosmilia* ORBIGNY, 1850. The original diagnosis of *Stelloria* may correspond to this material, and hence both genera may be synonymous.

Included species: The genus is monospecific. Species other than type species assigned to *Stelloria* belong to other genera; *S. arcotica* STOLICZKA, 1873 and *S. incrustans* DUNCAN, 1879 belong to *Eugyra* and *S. rustica* probably to *Heterocoenia* or *Canleria* (based on the poorly preserved syntype MNHN A26584). The species *Anthophyllum sulcatum* MICHELIN, 1846 (type species of *Coelosmilia* ORBIGNY, 1850) often has been assigned to *Stelloria*.

Suborder Caryophylliina VAUGHAN & WELLS, 1943

Family Parasmiliidae VAUGHAN & WELLS, 1943

Genus *Coelosmilia* MILNE EDWARDS & HAIME, 1851

Type species: *Parasmilia poculum* MILNE EDWARDS & HAIME, 1848 by original designation in MILNE EDWARDS & HAIME (1851). The locality of the type species is unknown, and the type specimen is not available, which makes the genus a nomen dubium.

Original diagnosis: "Differs from *Parasmilia* by not having any rudiments of a columella."

Included species: Fifteen Cretaceous and four Cenozoic species are currently assigned to the genus, although often it cannot be decided whether the authors who assigned their material to this genus had the genus established by ORBIGNY (1850) or MILNE EDWARDS & HAIME (1851) in mind. Some of these species belong to *Plesiosmilia*, while some belong to *Parasmilia*. *Parasmilia* represents a taxonomic problem because the type is without a polished section, and the morphology of the calicular centre is difficult to decipher. For those *Coelosmilia* species where the type material is unavailable, it is difficult to decide to which genus they belong. The list below gives all species currently assigned to this genus (following LÖSER 2000, taking later assignation into account), with few updated generic assignments. Only few species can be assigned to another genus because most type material is lost or so poorly preserved that it does not allow determination.

Coelosmilia americana C. F. ROEMER, 1889
Coelosmilia aprutina PREVER, 1909 = *Paramontlivaltia*
Turbinolia aurora EICHWALD, 1846
Coelosmilia brevis NIELSEN, 1922
Coelosmilia carpathica KÜHN & ANDRUSOV, 1930
Coelosmilia chihuahuensis BÖSE, 1910
Coelosmilia cupuliformis REUSS, 1854
Coelosmilia cylindrica DUNCAN, 1869
Coelosmilia edwardsi ORBIGNY, 1850
Coelosmilia forojuliensis ACHIARDI, 1875
Coelosmilia gracilis PREVER, 1909 = *Plesiosmilia*
Coelosmilia indica GREGORY, 1900
Coelosmilia miocenica SISMONDA, 1871
Coelosmilia niobe KOLOSVÁRY, 1954 = *Plesiosmilia*
Parasmilia poculum MILNE EDWARDS & HAIME, 1848
Coelosmilia regularis TOMES, 1899
Coelosmilia rugosa PREVER, 1909
Coelosmilia sacheri REUSS, 1854
Turbinolia texana CONRAD, 1857
Coelosmilia vicentina ACHIARDI, 1866
Coelosmilia woodwardi DUNCAN, 1869

4. Conclusions

Coelosmilia ORBIGNY, 1850 is a solitary coral closely related to *Trochoidomeandra* MORYCOWA, 1971. *Coelosmilia* MILNE EDWARDS & HAIME, 1851 is a nomen dubium. *Stelloria* ORBIGNY, 1849 is a nomen dubium, but it may be confused with *Coelosmilia* ORBIGNY, 1850 and could be a senior synonym of this genus. Because the description of *Stelloria* does not coincide with the type specimen, it is recommended to apply *Coelosmilia* ORBIGNY, 1850 at the moment instead of *Stelloria* ORBIGNY, 1849.

5. References

ALLOITEAU, J. (1952): Embranchement des coelentérés. – In: PIVETEAU, J. (ed.): Traité de Paléontologie (1): 376–684; Paris (Masson).

ALLOITEAU, J. (1957): Contribution à la systématique des Madréporaires fossiles. 462 pp.; Paris (Masson).

BELTREMIEUX, E. (1866): Faune fossile du départment de la Charente-Inférieure. – Annales de la Section de Sciences Naturelles de l'Academie de La Rochelle, **7** (1864–1865): 13–92.

BRONN, H.G. (1851): Lethaea geognostica (3rd edition) (2, 3:) Meso-Lethaea (5, 4:) Kreide-Gebirge. 412 pp.; Stuttgart (Schweizerbart).

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

FROMENTEL, E. (1861): Introduction à l'étude des polypiers fossiles. – Mémoires de la Société d'émulation du Doubs, (3), **5**: 1–357 pp.

FROMENTEL, E. (1873): Zoophytes, terrain crétacé (9). – In: ORBIGNY, A. DE (ed.): Paléontologie française, **8**: 385–432.

GUERRERO KOMMRITZ, J. & HILLMER, G. (2004): Die Gattungen *Parasmilia* und *Trochosmilia* (Scleractinia) aus der Schreibkreide Norddeutschlands. – Geologisches Jahrbuch, (A), **157**: 69–97.

GUERRERO KOMMRITZ, J. (2004): Hexakorallen aus der Ober-Kreide Norddeutschlands. 88 pp.; Marburg (Tectum).

International Commission on Zoological Nomenclature. (1999): International code of zoological nomenclature. 260 pp.; London (International Trust for Zoological Nomenclature).

HELM, C. (2013): Korallen. – In: Fossilien aus dem Campan von Hannover, 66–72; Hannover (privately published).

Krüger, F. J. (1980): Die Kreidegrube Höver, ein Fenster zum Untercampan. – Mineralien Magazin, **4** (5): 198–204.

Kues, B. S. & Lucas, S. G. (2001): Nearshore fauna of the Tucumcari Formation (Lower Cretaceous, Albian), Quay County, New Mexico. – New Mexico Geological Society Guidebooks, **52**: 229–249.

Löser, H. (2000): Repertoire of species. – Catalogue of Cretaceous Corals, **1**: 1–137.

Löser, H. et al. (2002): List of citations. – Catalogue of Cretaceous Corals, **2**: 1–784.

Löser, H. et al. (2005): List of localities. – Catalogue of Cretaceous Corals, **3**: 1-366.

Matthews, S. C. (1973): Notes on open nomenclature and on synonymy lists. – Palaeontology, **16**: 713–719.

Michelin, H. (1846): Iconographie zoophytologique. Description par localités et terrains des polypiers fossiles de France, (6): 185–248; Paris (Bertrand).

Milne Edwards, H. & Haime, J. (1851): A monograph of the British fossil corals (1): Introduction. Tertiary and Cretaceous. – Palaeontographical Society Monographs, **3**: i–lxxxv, 1–71.

Orbigny, A. de (1849): Note sur les polypiers fossiles. 12 pp.; Paris (Masson).

Orbigny, A. de (1850): Prodrôme de Paléontologie stratigraphique universelle des animaux mollusques et rayonnés (1–2). 394 + 428 pp.; Paris (Masson).

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

Romano, S. & Cairns, S. D. (2000): Molecular phylogenetic hypotheses for the evolution of scleractinian corals. – Bulletin of Marine Science, **67** (3): 1043–1068.

Stühmer, H. H., Schmid, F. & Spaeth, C. (1986): Fossilien Helgolands (2:) Oberkreide. 208 pp.; Otterndorf (Niederelbe-Verlag).

Turnšek, D. & Mihajlović, M. (1981): Lower Cretaceous Cnidarians from eastern Serbia. – Razprave Slovenska akademija znanosti in umetnosti, (4), **23**: 1–54.

Turnšek, D., LeMone, D. V. & Scott, R. W. (2003): Tethyan Albian corals, Cerro de Cristo Rey uplift, Chihuahua and New Mexico. – In: Scott, R. W. (ed.): Bob F. Perkins Memorial Volume. – Special Publications in Geology, **1**: 147–185.

Vaughan, T. W. & Wells, J. W. (1943): Revision of the suborders, families and genera of Scleractinia. – Geological Society of America, Special Papers, **44**: 1–363.

Wells, J. W. (1936): The nomenclature and type species of some genera of recent and fossil corals. – American Journal of Science, (5), **31**: 97–134.

Wells, J. W. (1956): Scleractinia. – In: Moore, R. C. (ed.): Treatise on Invertebrate Paleontology, F328–F444; Lawrence (University Press of Kansas).

Wittler, F. & Legant, J. (1999): Zur Korallenfauna der Turon- und Unterconiac-Ablagerungen (Oberkreide) im Stadtgebiet von Dortmund. – Dortmunder Beiträge zur Landeskunde, **33**: 143–156.

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