

Rugose corals

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Following the pioneer studies of Linnaeus (1745, 1758), rugose corals from Gotland have been described in numerous papers. In early studies species were characterized by external features alone (e.g. Hisinger 1831, 1837; Milne-Edwards & Haime 1851; Lindström 1865) or by external features combined with some internal characters based on one or two thin sections (e.g. Lindström 1870, 1882, 1896; Dybowski 1873; Lang & Smith 1927; Smith & Tremberth 1929). Wedekind (1927) attempted a monographic description of a substantial part of the rugose coral fauna of Gotland but he used an extremely narrow concept of species, in a number of which internal characters were not studied at all. A few recent papers on rugose corals also include material from Gotland (Weyer 1973, 1974; etc.).

Koch (1882) described in some detail the budding of corallites in colonial Rugosa from Gotland. First attempts at ontogenetic studies in solitary forms were published by Ryder (1926) and Vollbrecht (1928). Minato's (1961) very interesting paper on some rugose corals from Gotland unfortunately lacked both locality and stratigraphical data. Neuman (1974) emphasised that during ontogeny, morphological features of solitary forms display a great variation in shape as well as construction. There is also some variation at the same ontogenetic stage between different specimens of a species. For a safe specific identification, study of serial sections, including both adult and pre-adult growth stages, is normally required.

At present the following groups of rugose corals from Gotland are being studied monographically: *Acervularia* by Hanken, and the genera *Phaulactis*, *Araeopoma*, *Saucrophyllum*, and *Arachnophyllum* by Neuman.

Because of the lack of modern monographic studies of the Gotland rugose fauna, it is not only difficult to identify, but in many cases also to define a species. Most of the specimens from Vattenfallet were sectioned, and on average two to four dry peels produced from each sectioned corallite (in total approximately 800 peels). In addition, the calices of several specimens were carefully cleaned, with those in colonial forms being prepared by means of a new method elaborated by Hanken (ms. in preparation). The type specimens of species described by Lindström (1865, 1870, 1882, 1896), Ryder (1926), Wedekind (1927), and Vollbrecht (1928) were available for study and comparison. However, despite these factors some of the identifications remain uncertain and may be subject to change when monographic studies are completed.

The total number of specimens of rugose corals in the material from Vattenfallet is 550, distributed among the following families: Streptelasmataidae

(260), Halliidae (99), Arachnophyllidae (37), Acervulariidae (9), Calostylidae (13), Spongophyllidae (5), Ptenophyllidae (8), Trysplatmatidae (57), Cystiphylidae (34), and Goniophyllidae (4). In addition, there are 20 pre-adult streptelasmatids or halliids and 4 unidentified specimens. In this contribution Hanken is responsible for identification of colonial rugose corals (acervulariids and 5 colonies of *Tryplasma*) and Neuman for solitary corals (all other material).

For distribution in the Vattenfallet section see Fig. 25.

Annotated faunal list

Streptelasmatidae

Dinophyllum involutum Lindström, *Dalmanophyllum dalmani* (Edwards and Haime), *Rhegmaphyllum conulus* (Lindström), *Rhegmaphyllum?* sp. a, *Schlotheimophyllum patellatum* (Schlotheim), *Kodonophyllum telescopium* Wedekind, *Crassilasma* sp. a.

Halliidae

Holophragma calceoloides Lindström, *Phaulactis cyathophylloides* Ryder, *P.* sp. a, *P.* sp. b.

Phaulactis cyathophylloides and *P.* sp. a. seem to be identical during the early growth stages of the corallite and juvenile specimens can therefore not be identified at species level.

Arachnophyllidae

Entelophyllum visbyense Wedekind, *E.* sp. a, *Kyphophyllum lindstroemi* Wedekind.

Acervulariidae

Acervularia brevisseptata Weissermel, *A.* sp. a, *A.* sp. b.

Calostylidae

Calostylis concavotabulata Ma. Weyer (1973, Pls. 1–2) figured the ontogeny of the species based on material from Visby cementfabrik. The material from Vattenfallet seems to be conspecific.

Spongophyllidae

Ketophyllum hoegbomi Wedekind, *K.* sp. a (a single specimen).

Ptenophyllidae

Spongophylloides (*Actinocystis*) sp. a.

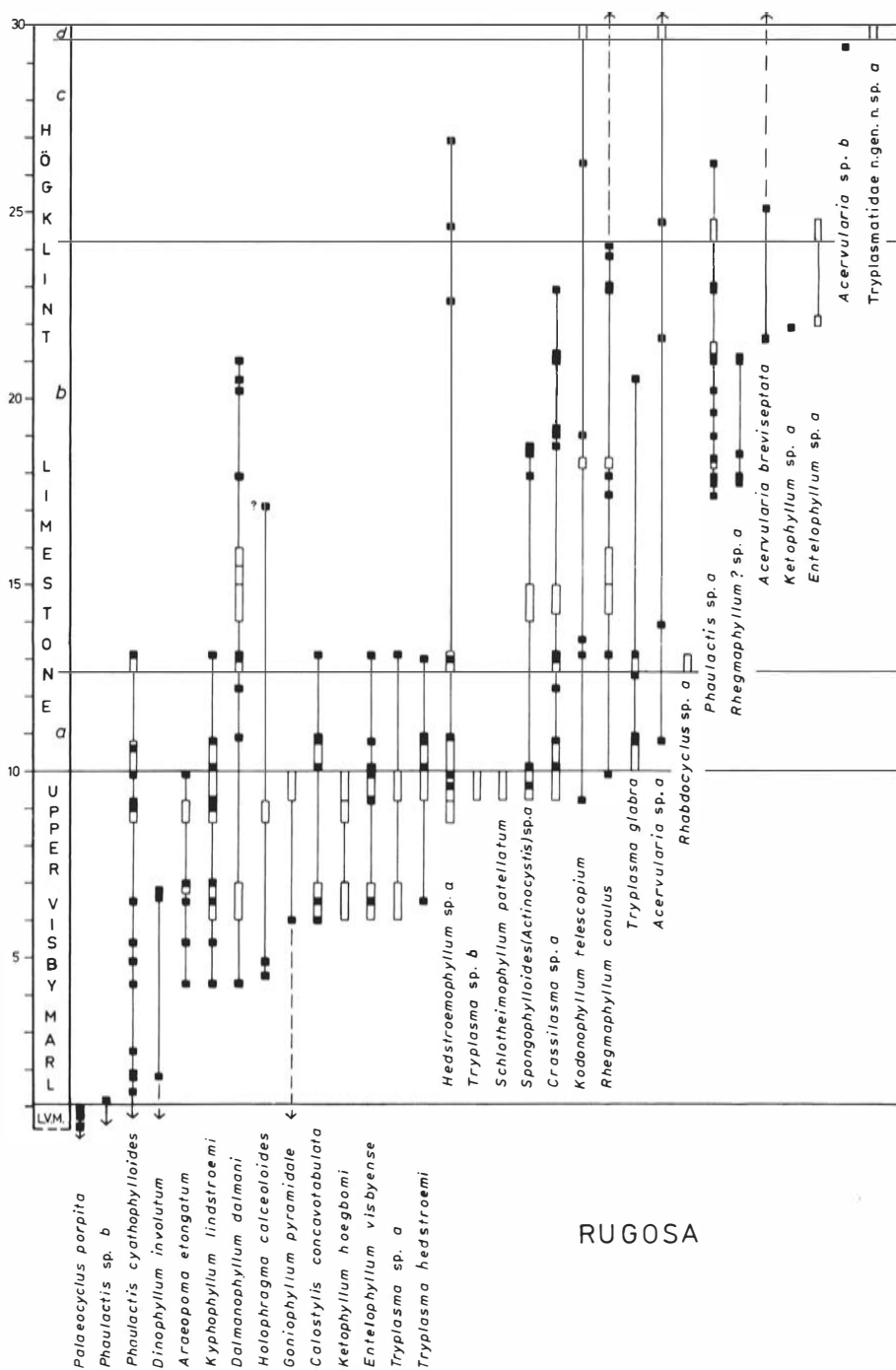


Fig. 25.

Tryplasmatidae

Tryplasma glabra (Lindström), *T. hedstroemi* Wedekind, *T. sp. a*, *T. sp. b*, *Palaeocyclus porpita* (Linnaeus), *Rhabdocyclus sp. a* (one specimen), Tryplasmatidae n. gen., n. sp. (a single specimen). *Tryplasma hedstroemi* and *T. sp. a* are solitary whereas *T. sp. b* is colonial.

Cystiphyllidae

Hedstroemophyllum sp. a, *Araeopoma elongatum* (Lindström).

Taxonomic remarks

As noted above, because of the present unsatisfactory knowledge of ontogeny in many species, including type species, a number of specific and generic taxa remain poorly defined. Many subjective synonyms have been established during this study. A preliminary partial synonymy list is included here for some of the Vattenfallet species, based on examination of the type specimens.

Rhegmaphyllum conulus (Lindström, 1868)

Synonym: *Rhegmaphyllum slitense* Wedekind, 1927. For further information, see Weyer (1974:162–163).

Crassilasma Ivanowsky, 1962

The genus (type species: *C. simplex*) was defined by Ivanowsky (1962, 1963, 1965). *Crassilasma sp. a* shows the following features characteristic of the genus: Irregularly twisted septa, strongly dilated during early ontogeny; in later stages of ontogeny the dilatations of the major septa become reduced axially; tabulae rare and convex.

Phaulactis cyathophylloides Ryder, 1926

Synonyms: *Lycophyllum tabulatum* Wedekind, 1927, *L. irregulare* Wedekind, 1927, *L. torquatum* Wedekind, 1927, *L. sp.* (Wedekind 1927, Pl. 5:12–13), *Lykocystiphyllum hoegklinti* Wedekind, 1927, *L. oppositum* Wedekind, 1927, *Aulacophyllum sp.* (Wedekind 1927, Pl. 17:11–12), *Phaulactis irregularis* (Wedekind) (in Minato 1961, Pls. 5–7, 17). A more detailed revision may reveal further synonyms. In *Phaulactis* the internal morphology seems to vary widely within a species, probably as a response to various growth conditions. One or two transverse sections of each corallite examined by most previous authors did not reveal the range of intraspecific variation of morphological structures.

Entelophyllum visbyense Wedekind, 1927

Synonym: *E. anschuetzi* Wedekind, 1927.

Kyphophyllum lindstroemi Wedekind, 1927

Synonyms: *Kyphophyllum tenue* Wedekind, 1927, *K. cylindricum* Wedekind, 1927, *K. conicum* Wedekind, 1927, *K. biseriale* Wedekind, 1927 (Pl. 30: 23).

Acervularia sp. *a*

Probable synonym: *Rhabdophyllum conglomeratum* Wedekind, 1927.

Ketophyllum hoegbomi (Wedekind, 1927)

Synonyms: *Dokophyllum annulatum* Wedekind, 1927, *D. lindstroemi* Wedekind, 1927 (Pl. 9:6–12), *D. sp.* (Wedekind 1927, Pl. 9:1–3).

Tryplasma hedstroemi (Wedekind, 1927)

Synonyms: *Pholidophyllum hedstroemi* var. *attenuata* Wedekind, 1927, *P. cylindricum* Wedekind, 1927 (Pl. 3:5), *P. intermedium* Wedekind, 1927, *P. intermedium* var. *articulatum* Wedekind, 1927, *P. tenue* Wedekind, 1927 (Pl. 3:12), *P. coniforme* Wedekind, 1927 (Pl. 3:14), *P. crassum* Wedekind, 1927 (Pl. 3:15), *Zelophyllum hoegklinti* Wedekind, 1927 (Pl. 6:11–13). This species resembles *Tryplasma loveni* (Edwards and Haime) as defined by Hill (1936:206, Pl. 30:46–47) but has a much higher frequency of tabulae.

Hedstroemophyllum sp. *a*

Probable synonyms: *Hedstroemophyllum articulatum* Wedekind, 1927 (Pl. 21:1–2), *H. crassum* Wedekind, 1927, *H. stolleyi* Wedekind, 1927 (Pl. 21:5–9), *H. tenue* Wedekind, 1927 (Pl. 21:10–11), *H. weissermeli* Wedekind, 1927, *H. rugosum* Wedekind, 1927. *Hedstroemophyllum* is very similar to *Holmophyllum* Wedekind, 1927. A thorough study of type material is required in order to understand the relationships between these genera.

Remarks

In terms of numerical abundance of rugose corals, *Crassilasma* sp. *a* (186 specimens), *Dalmanophyllum dalmani* (37) and *Phaulactis cyathophylloides* (28) comprise the main elements of the fauna. The greatest taxonomic diversity at Vattenfallet is in the upper part of the Upper Visby Marl, Högklint *a*, and the base of Högklint *b*. Hanken observed that five of the six colonies of *Acervularia* were worn prior to final deposition.

Details of the vertical range of various rugose coral species in the stratigraphical interval under consideration are poorly known. *Phaulactis cyathophylloides*, *Dinophyllum involutum* and *Goniophyllum pyramidale* also occur in the Lower Visby Marl, and the two latter species range farther into the underlying *Arachnophyllum* Beds. *Rhegmaphyllum conulus* and *Acervularia*

brevisseptata are common in the Slite Beds. The former species is here recorded for the first time from the Höglint Limestone.

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