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CORALS FROM BERMUDA**

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**SOME SHALLOW WATER AHERMATYPIC CORALS
FROM BERMUDA**

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ABSTRACT

Four ahermatypic scleractinian corals from shallow water in caves in Bermuda are described: *Astrangia solitaria* (Lesueur), *Coenocyathus goreau* sp. nov., *Guynia annulata* Duncan, and *Rhizopsammia bermudensis* sp. nov.

INTRODUCTION

Although the living hermatypic coral fauna of the Bermuda reef tract is now fairly well known (Laborel, 1966), the only record of shallow water ahermatypes from this area is a brief reference by Verrill (1901, p. 183) to a small *Astrangia*, that may have been *A. solitaria*, mentioned in a letter to Verrill by G. Browne Goode. The present note is a small addition to this almost unknown part of the Bermuda coral fauna, although a number of species have been recorded from deeper water (Moseley, 1881; Verrill, 1901; Squires, 1959).

In the summer of 1966, during the course of a seminar directed by K. E. Chave at the Bermuda Biological Station (NSF Grant GB-3066), R. N. Ginsburg, E. A. Shinn and J. H. Schroeder blasted some reefs in the North Lagoon (Ginsburg, Shinn and Schroeder, 1967). As a by-product of this investigation, Dr. Schroeder recognized the presence of several corals, living and dead, in cavities in the reef rock and kindly sent them to me.

The corals in question were found in two blasted reefs (Haversack East and Haversack West) at the North East Breakers, about 3.5 nautical miles east of North Rock (HO Chart 27, U.S. Naval Hydrographic Office).

ORDER SCLERACTINIA

SUBORDER FAVIINA

FAMILY RHIZANGIIDAE

Genus *Astrangia* Milne Edwards and Haime 1848

Astrangia solitaria (Lesueur) 1817

Figures 1-5

Caryophyllia solitaria Lesueur, 1817. J. Acad. Natur. Sci. Philadelphia 1:179; pl. 8, fig. 10.

Caryophyllia solitaria Lesueur, 1820. Mém. Mus. Hist. Natur. Paris 6:273; pl. 15, fig. 1.

Caryophyllia solitaria Dana, 1846. U.S. Exploring Exped., Zoophytes p. 383.

Cladocora arbuscula Milne Edwards and Haime, 1849. (*pars*) Ann. Sci. Natur. Zool. Ser. 3, 11:307.

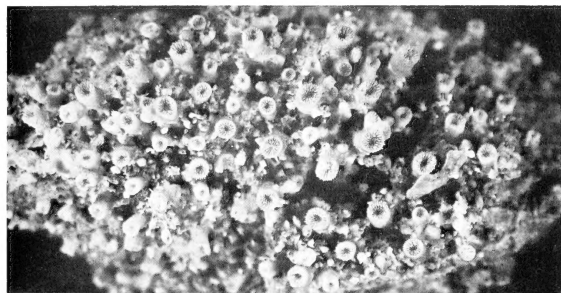
Cladocora arbuscula Milne Edwards and Haime, 1857. (*pars*) Hist. Natur. Corall. 2:595.

Astrangia neglecta et granulata Duchassaing and Michelotti, 1861. Mem. Accad. Sci. Torino Ser. 2, 19:355; pl. 9, figs. 13, 14; pl. 10, figs. 3, 4.

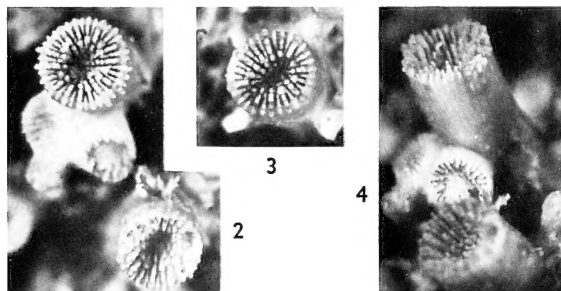
Astrangia neglecta et granulata Duchassaing and Michelotti, 1866. Mem. Accad. Sci. Torino Ser. 2, 23:185.

Astrangia solitaria Verrill, 1864. Bull. Mus. Comp. Zool. Harvard 1(4):47.

Astrangia solitaria Pourtalès, 1871. Illus. Cat. Mus. Comp. Zool. Harvard No. 4:31, 79.



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FIG. 1. *Astrangia solitaria* (Lesueur). YPM No. 8496, ESE of North Rock, Bermuda. $\times 1$.

FIGS. 2, 3. Calices of YPM No. 8496. $\times 4$.

FIG. 4. Lateral aspect of corallite of YPM No. 8496. $\times 4$.

FIG. 5. *Astrangia solitaria* (Lesueur). YPM No. 8497. North East Breakers (Haversack West), Bermuda. Dead, elongate corallites. $\times 1$.

- Astrangia solitaria* Pourtalès, 1880. Mem. Mus. Comp. Zool. Harvard 7; pl. 12, figs. 8-12.
- Astrangia solitaria* Duncan, 1890. J. Linn. Soc. London Zool. 20:569.
- Astrangia solitaria* var. *portoricensis* Vaughan. 1901. Bull. U.S. Fish Comm. 1900. 2:298; pl. 1, fig. 6.
- Astrangia solitaria* Duerden, 1902. Mem. Natur. Acad. Sci. 8:522; pl. 5, figs. 43-45; pl. 6, fig. 47.
- Astrangia braziliensis* Vaughan, 1906. Proc. U.S. Natur. Mus. 30:848; pl. 77, figs. 3-6.
- Astrangia solitaria* van der Horst, 1927. Bijdragen tot de Dierkunde 25:159.
- Astrangia solitaria* Lewis, 1960. Can. J. Zool. 38:1135.
- Astrangia solitaria* Almy and Carrión-Torres, 1963. Caribbean J. Sci. 3:155; pl. 15a.
- Astrangia solitaria* Roos, 1964. Studies Fauna Curaçao 20:48.
- Astrangia solitaria* Goreau and Wells, 1967. Bull. Marine Sci. 17:448.

The best description of this species is that by Pourtalès (1871). Increase is mainly by extratentacular budding from the stolonlike expansions between the bases of corallites and occasionally from the sides of corallites, followed by eventual loss of organic connection between polyps. The cylindrical corallites are as much as 20 mm in height with calicular diameters of 3-4 mm. All septae dentate, about 36 in number.

MATERIAL. YPM No. 8496 (Figs. 1-4), from blasted boiler ESE of North Rock, Bermuda, less than 0.7 m below low tide; also YPM No. 8497 (Fig. 5), from cavity in reef rock, North East Breakers (Haversack West), Bermuda: recently dead, with *Coenocyathus goreau*i and *Guynia annulata*.

DISTRIBUTION. Widely spread in shallow water in western Atlantic and West Indies: Guadeloupe (types), Barbados, St. Thomas, Puerto Rico, Haiti, Jamaica (1.5-43 m); Cuba; Florida Reefs, off Florida 573 m (but dead specimens, Pourtalès, 1871); Honduras; Panama; Bahia, Brazil; Fernanda de Noronha.

SUBORDER CARYOPHYLLIINA

FAMILY CARYOPHYLLIIDAE

Genus *Coenocyathus* Milne Edwards and Haime 1848

*Coenocyathus goreau*i sp. nov.

Figures 6-10

DESCRIPTION. Small, subfasciculate colonies, increasing by extratentacular budding from the edge-zone on sides of corallites well below the calicular margin. Corallites gently tapering, up to 20 mm in height with equal, flat,

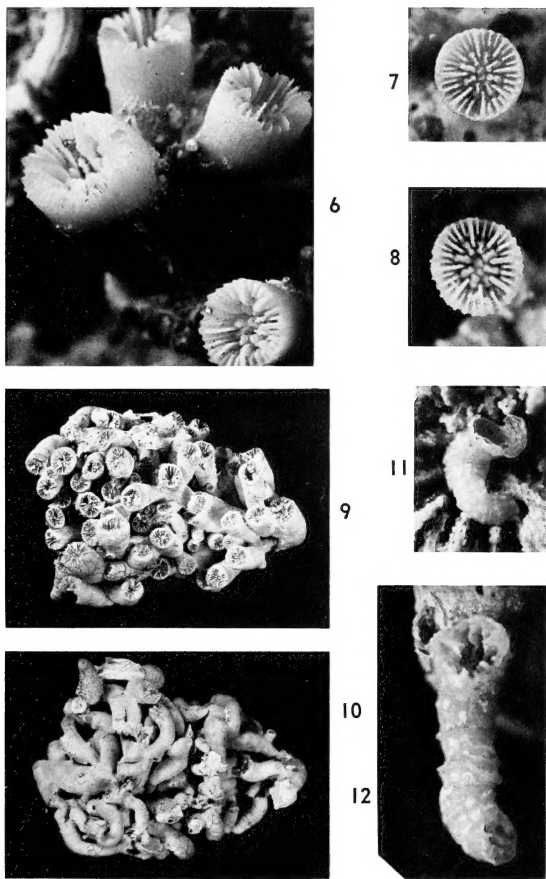


FIG. 6. *Coenocyathus goreau* sp. nov. Holotype, YPM No. 8498. North East Breakers (Haversack East), Bermuda. Group of corallites. $\times 4$.

FIGS. 7, 8. Calices of holotype, YPM No. 8498. $\times 4$.

FIGS. 9, 10. *Coenocyathus goreau* sp. nov. YPM No. 8499. North East Breakers (Haversack West). Recently dead colony. $\times 1$.

FIGS. 11, 12: *Guynia annulata* Duncan. YPM No. 8497. North East Breakers (Haversack West), Bermuda. Recently dead corallites attached to *Coenocyathus goreau* (FIG. 11) and *Astrangia solitaria* (FIG. 12). $\times 16$.

strongly granulated costae corresponding to all septa and tending to become obsolete below calice margin. Calices circular, deep, 4–6 mm in diameter, averaging 4.5 mm. Septa arranged 8/8/16–18, nearly equal in thickness, laterally granulated, free on inner edges; the eight primary septa more exsert than the rest and extending nearly to the columella, the eight secondaries slightly less exsert, bearing prominent, stout, crispate pali, and the 16–18 tertiary septa still shorter, extending less than half-way to the columella. Columella composed of two (occasionally one) stout, crispate columns shorter than the encircling pali. In very young corallites 0.4 mm in diameter, there are 6 septa; at 0.7 mm there are 12, arranged 6/6 with a single columellar tubercle. The full complement of 8/8/16 septa is attained at a rather late stage: at 3 mm some calices have 6/6/12 septa with 6 pali, and others from the same stock have 32 septa with 8 pali at the same diameter.

The polyps of the holotype were pale pink when alive.

HOLOTYPE. YPM No. 8498 (Figs. 6–8), from cavity in reef rock North East Breakers (Haversack East), Bermuda. Another colony, YPM No. 8499 (Figs. 9, 10), recently dead, is from Haversack West.

DISTRIBUTION. Known at present only from cavities in reef rock in area of the North East Breakers, Bermuda.

REMARKS. Living species of *Coenocyathus* occur typically in the Mediterranean eastern Atlantic, with the exception of the present species, *C. bowersi* Vaughan (1906) from California, and *C. sagamiensis* Eguchi (1968) from Sagami Bay, Japan. Duchassaing's specimen of *C. cylindrus* from Guadeloupe (1870), preserved in the Paris Museum, is not *Coenocyathus* but is identical to *Caryophyllia maculata* Pourtalès, a quasi-colonial species, as is also *Coenocyathus bartschi* Wells (1947).

Coenocyathus goreau, named in honor of the late T. F. Goreau, is readily distinguished from the other Recent species (*C. cylindrus* Milne Edwards and Haime, *C. dohrni* Doederlein, *C. giesbrechti* Doederlein, and *C. lobatus* Chevalier) by the octamer arrangement of septa and pali in mature calices, and by its smaller mature corallites. In these respects it is like the Pacific *Caryophyllia octopali* Vaughan (1907), a solitary form, and *C. octopali* var. *incerta* Vaughan which is quasi-colonial. *Caryophyllia rugosa* Moseley (1881) is another small octamer species from the Pacific with strongly wrinkled or rugose epitheca.

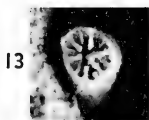
FAMILY GUYNIIDAE

Genus *Guynia* Duncan 1873

Guynia annulata Duncan 1873



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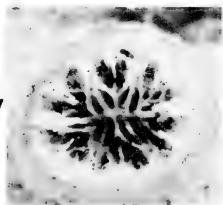
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FIG. 13. *Guynia annulata* Duncan. YPM No. 8497. Corallite with 12 septa (upper 2 mm of calice broken away). $\times 16$.

FIG. 14. *Guynia annulata* Duncan. YPM No. 8497. Lateral aspect of corallite attached to *Astrangia solitaria*. $\times 16$.

FIG. 15. *Rhizopsammia bermudensis* sp. nov. Holotype, YPM No. 8500. North East Breakers (Haversack East), Bermuda. $\times 1$. (At extreme right center is solitary corallite of *Coenocyathus goreauii*).

FIG. 16, 17. *Rhizopsammia bermudensis* sp. nov. Calices of holotype. $\times 4$.

- Guynia annulata* Duncan, 1873. Zool. Soc. London Trans. 8:335; pl. 47, figs. 9-16.
- Guynia annulata* Pourtalès, 1874. Illus. Cat. Mus. Comp. Zool. Harvard No. 8:44; pl. 9, figs. 3, 4.
- Guynia annulata* Pourtalès, 1878. Bull. Mus. Comp. Zool. Harvard 5:209.
- Guynia annulata* Pourtalès, 1880. Bull. Mus. Comp. Zool. Harvard 6:112.
- Guynia annulata* Rossi, 1961. Rés. Sci. "Calypso" Fasc. 5:34.
- Guynia* sp. nov. Goreau and Wells, 1967. Bull. Marine Sci. 17:449.
- Guynia annulata* Zibrowius, 1968. Bull. Soc. Zool. France 93:327-328.

This inconspicuous, photophobic coral, whose polyp has not yet been observed, is very easily overlooked. Its very small size, scolecoïd growth form, deep calice and lateral attachment give it the aspect of calcareous worm tubes amongst which it commonly occurs, but from which it is distinguished by the whitish spots on the thin wall and the presence of septa. The Bermuda specimens and some from Jamaica appear to have 12 rather than 16 septa, a condition, if constant, that might indicate a distinct species, although some Jamaican examples have 16. In his original description of the species, Duncan noted that of the specimens from the one haul on Adventure Bank, three had 12 septa. Zibrowius (1968) noted 12 septa in specimens from caves near Marseilles.

MATERIAL. YPM No. 8497 (Figs. 11-14), from cavity in reef rock, North East Breakers (Haversack West), Bermuda: recently dead, associated with *Astrangia solitaria* and *Coenocyathus goreau*.

DISTRIBUTION. Mediterranean: Adventure Bank, 178 m (types); Santorin (Thera), Cyclades Is.; Crete, 30 m; off Marseilles in caves, 3 m; Bermuda; West Indies: Barbados, 183 m, Saba Bank, 274 m, Martinique, 591 m, Jamaica, 60-80 m.

SUBORDER DENDROPHYLLIINA
FAMILY DENDROPHYLLIIDAE
Genus *Rhizopsammia* Verrill 1869
Rhizopsammia bermudensis sp. nov.

Figures 15-17

DESCRIPTION. Colonial, encrusting, increasing by extratentacular budding from reptant edge-zone. Corallites low (5-10 mm), slightly compressed-cylindrical (6 × 8 mm), irregularly spaced 2-10 mm apart, extensively interconnected basally by thin, expanded coenosteum. Calices deep (2-4 mm). Corallite walls thin, porous, with low, rounded, equal costae corresponding to the septa and extending over the coenosteum. Septa in four

complete cycles (48); those of the first cycle exert, peripherally spongy, axially imperforate, laterally and marginally smooth. All other septa non-exsert, highly perforate, inserted following the Pourtalès plan characteristic of most dendrophylliids. Columella deep, elongate, slender, formed by union of trabecular processes from the septa of the first two cycles.

The polyps of the holotype were a rich salmon pink when alive.

HOLOTYPE. YPM No. 8500 (Figs. 15-17). Cavity in reef rock, North East Breakers (Haversack East), Bermuda.

DISTRIBUTION. Known at present only from region of the North East Breakers, Bermuda.

REMARKS. Until very recently, when Chevalier (1966) described a new species of *Rhizopsammia* from West Africa, living species of this genus were thought to be confined to the tropical Pacific from Panama westward to Indonesia. The present species further increases the known range of the genus.

The corallites of *R. bermudensis* are much larger than those of the West African form, *R. manuelensis* Chevalier, the only other Atlantic species, and have more septa and a less robust columella. Of the Pacific species, *R. pulchra* Verrill (Panama), *R. minuta* van der Horst (Indonesia, Japan, and Marshall Islands), and *R. nuda* van der Horst (Singapore), all have smaller corallites. *R. verrilli* van der Horst (Indonesia) and *R. chamissoi* Wells (Bikini Atoll) have larger calices and stouter columellas.

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