

BEAUFORTIA

SERIES OF MISCELLANEOUS PUBLICATIONS

ZOOLOGICAL MUSEUM OF THE UNIVERSITY OF AMSTERDAM

No. 227

Volume 17

February 20, 1970

A new species of *Polycyathus* Duncan, 1876 from New Caledonia and a new record of *Polycyathus senegalensis* Chevalier, 1966 (Madreporaria)

MAYA WIJSMAN-BEST

ABSTRACT

A new species of Madreporaria, *Polycyathus fulvus*, is described from New Caledonia. Zooxanthellae have been found symbiotic in its polyps, although the genus is ahermaphroditic. Another *Polycyathus*, *P. senegalensis* Chevalier, 1966, is recorded from the Caribbean area; it was previously known from the eastern tropical Atlantic only. These two records extend the known range of the genus and show it to have a circumequatorial distribution in warm and warm-temperate waters.

I. *Polycyathus fulvus* nov.spec. (figs. 1, 2, 3, 4)

During six months, from April to September 1968, the author did field work on the madreporarian corals around Nouméa, New Caledonia, enjoying the hospitality of Dr. and Mrs. Catala-Stucki in the Aquarium of Nouméa. The study was supported by a grant from the Netherlands' Foundation for the Advancement of Tropical Research (WOTRO).

As a first result, the present paper reports on some colonies to be referred to the genus *Polycyathus* Duncan, 1876. This genus was already commented upon earlier (Best, 1968). The morphology and ecology of the colonies are described, wherefrom it is concluded that a new species is involved.

Material. —

Holotype: one colony; region of Nouméa, Baie de Prony; depth 30—50 cm; 7 September 1968; collection ZMA COEL. 5544.

Paratypes: three colonies; same locality and data; collection ZMA COEL. 5545, 5546, 5547.

Description of colony and corallites. — The colony is quite small (up to 3 cm diameter); the holotype consists of 11 corallites, including young forms.

Received: November 4, 1969

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The corallites rise up from the stony ore base up to 1 cm; in other colonies even up to 1.5—2.0 cm. The thecae are not always straight, very often they are more or less bent. Their base is usually narrower than the calice, which gives them a conical aspect. Reproduction takes place by extratentacular budding, the buds being formed near the base of the corallites. The calice is round to oval, with a diameter of 6 mm maximally. The costae are distinct near the calice, but they vanish towards the base; only some stripes are sometimes visible. Small triangular teeth are found all over the skeleton, and especially on the septa they create a rough surface. There are four complete cycli of septa, and the beginning of a fifth is present in the larger specimens. The first two cycles are equal in length and are both slightly exsert. The paliform lobes in front of the four cycles are also strongly granulated. The pali in front of the shorter third cycle consist often of a few paliform lobes in a row, lengthening the septa up to the columella. The fourth cycle does the same, provided there is enough room. As a result the pali of the principal septa are fused with the ones from the subsidiary septa. By this process triangular spaces within the corallites are formed. The columella is a continuation of the paliform lobes with strong dentations. The calice is not deep, in the young corallites up to 3 mm but in the larger ones 1 or 2 mm.

Polyps. — The living part of this coral is light yellow brown, the polyp is rather small, with long (up to 2 cm) and thin tentacles and of the same transparent brownish colour.

The paratypical series shows no variation of importance.

Ecology. — The Baie de Prony is in direct connection with the ocean and, unlike most of the coast of New Caledonia, not protected by a barrier reef. It reaches deep into the mainland and is partly enclosed by some protruding mountains, and hence the water is quiet. At the most inland point the shallows near the shore, where at low tide there is no more than 30 to 50 cm water, consist of rocks, made up of heavy and hard nickel ore. Here I met just accidentally with an assemblage of about ten individual colonies on about one square meter. The water is very turbid and of a red colour, due to the sediments brought down by some rivers. I was very much surprised to find this little settlement, the only animals in the neighbourhood.

Discussion. — Although the two rows of pali in combination with the formation of a real colony typify the present form as a *Polycyathus* (compare e.g. the left hand corallite on fig. 4), the second row is usually not easily distinguishable, since the pali are more like paliform lobes situated as continuations of the septa in the undeepest fossa.

In this respect the new species resembles *Polycyathus verrilli* Duncan, 1889 and *Polycyathus andamanensis* Alcock, 1893, the types of which I examined in the Indian Museum, Calcutta. Here I could compare them also with the type of *Polycyathus difficilis* Duncan, 1876, in which the presence of a second row is very apparent; the habit of that species is like *Polycyathus mediterraneus* Best, 1968. Duncan's specimen of *P. verrilli* has very small corallites: diameter 3 mm, height 2 mm, the peritheca of this corallum shows grooves, caused by the percurrent costae. In the type of *P. andamanensis* the

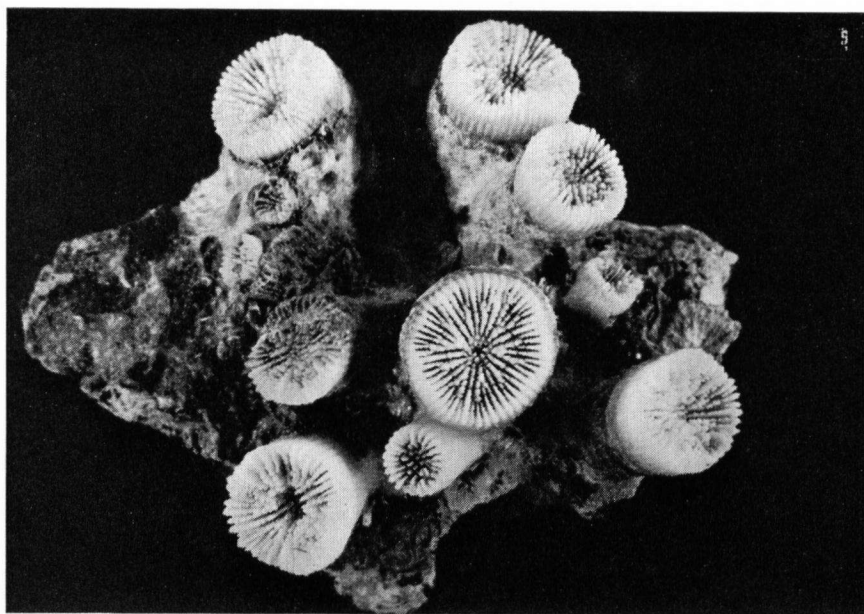


FIG. 1. *Polycyathus fulvus* nov. spec. Holotype. Diameter largest corallite 6 mm.

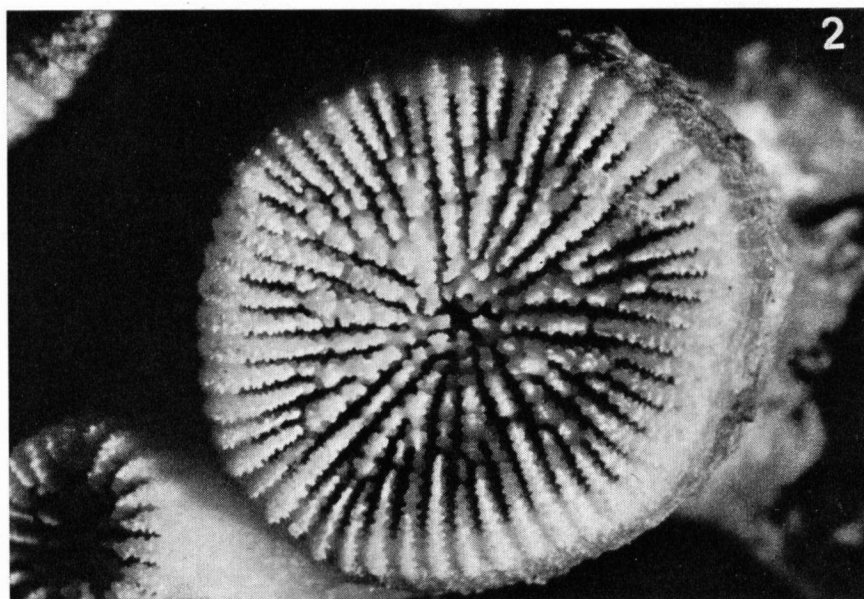


FIG. 2. *Polycyathus fulvus* nov. spec. Holotype (largest corallite).

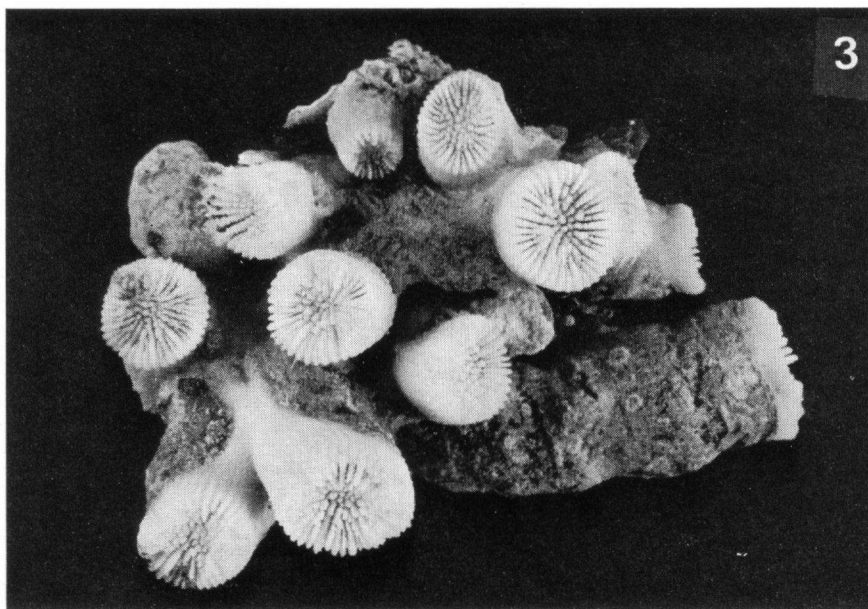


FIG. 3. *Polycyathus fulvus* nov. spec. Paratype. Diameter largest corallite 5 mm.

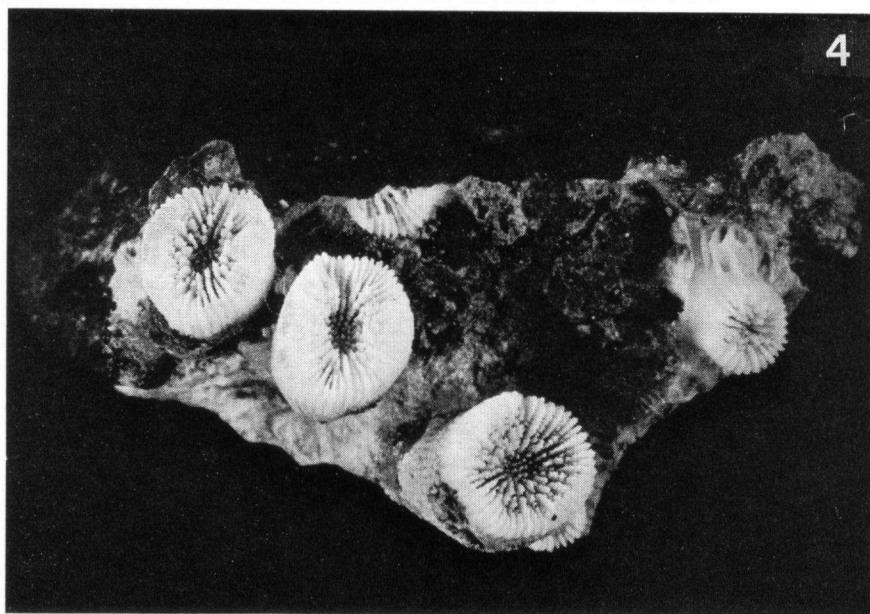


FIG. 4. *Polycyathus fulvus* nov. spec. Paratype, other than the one illustrated in fig. 3
Diameter largest corallite 5.5 mm.

calices are considerably larger, with a diameter up to 8 mm; it is a small colony with septa full of a very distinct granulation, differing from *P. verrilli* mainly in size and in the dentation of the septa. All these species are plocoid. Apparently the differences between our specimens and *P. verrilli* and *P. andamanensis* are not great.

The present species is based upon material from an extreme habitat, so it could be possible that it would fall within the range of variation of the widespread Indo-Pacific species, carrying the name *P. verrilli*. However, I consider the following main characters of specific importance: the few cycles of pali in the form of lobes that continue from the first three or four cycles of septa, with the pointed granules all-over; the presence of an incomplete fifth cycle; the high conical form of the corallite. I hope the new material collected, as Dr. C. S. Gopinadha Pillai (Madras) writes me, in the Gulf of Mannar, will throw more light on the interrelationship of the forms concerned.

Polyps of *Polycyathus* have not been described prior to my former publication. On examining them in the Aquarium of Nouméa I found in those of *P. fulvus* the symbiotic, unicellular dinoflagellates or zooxanthellae, which characterize the hermatypic reef-forming corals. Of course this is quite exceptional in the group of ahermatypic corals (broadly spoken those of the deep sea), to which the genus *Polycyathus* and even the whole subfamily of the Caryophyllinae, belongs.

As I stated in my paper on madreporarian corals of the region of Banyuls-sur-Mer, France (Best, in the press), the variation in the number of zooxanthellae in *Cladocora cespitosa* Linnaeus, 1767 (decreasing in relation to the dropping light intensity) convinced me that hermatypy is rather an adaptation to local environment than of systematic importance. The other characters, however, make me think that the present form should be classified as a new species. Its name is derived from the yellow brownish colour of the polyps.

II. *Polycyathus senegalensis* Chevalier, 1966

Some corals dredged by the Caribbean Fishery Development project¹⁾ off the coast of Suriname in the western Atlantic Ocean and sent to Amsterdam by Drs. L. J. K. Kleijn, were identified by me as *Polycyathus senegalensis*. Sincere thanks are due to the staff members of the project and especially to Mr. Kleijn.

This species has originally been described from a specimen dredged off Dakar (Senegal) in 50 to 100 m. My identification was later on confirmed by Dr. J. P. Chevalier (in litt.), who was kind enough to compare the small colonies with the type specimen.

Five colonies (the largest of which has a diameter of 20 mm, consisting of 7 corallites) are fixed on the shell of a mollusc, *Xancus laevigata* (Anton,

¹⁾ This material was collected by the M/V Calamar, one of the ships of the UNDP/FAO, at station 463 (08° N, 56° W), on 21 June 1968 at a depth of 87 m.

1839). The largest corallite has a diameter of 4 mm at the base and 6.5 mm at the upper part of the calyx. The height of this corallite is 8 mm.

It does not seem necessary to go into further details of the skeleton structure, because the presently discussed specimens hardly show any differences from those extensively described by Chevalier.

CONCLUSION

In addition to the several established localities in the Indian Ocean (Gulf of Persia, Andaman Islands and Mergui Archipelago); Mediterranean Sea (Beirut, Genoa, Marseilles and Banyuls) and the eastern Atlantic (Dakar and St. Helena), the present records from the Pacific and the western Atlantic show the genus *Polycyathus* to be circumequatorial in warm and warm-temperate waters.

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Drs. M. WIJSMAN-BEST

Zoölogisch Museum der Universiteit van Amsterdam
Plantage Middenlaan 53
Amsterdam-C. — The Netherlands