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NOTES ON THE GENUS *POLYCYATHUS* DUNCAN, 1876 AND A DESCRIPTION OF THREE NEW SCLERACTINIAN CORALS FROM THE INDO-PACIFIC.

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Verheij E. & M. Borel Best: Notes on the genus *Polycyathus* Duncan, 1876 and a description of three new scleractinian corals from the Indo-Pacific.
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Key words: Scleractinia; *Polycyathus*; new species; Indo-Pacific.
Three new *Polycyathus* species are described. Their affinities with other *Polycyathus* species and the affinities of the genus *Polycyathus* with other genera are discussed.
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INTRODUCTION

A large number of ahermatypic, colonial corals was collected during field trips of the first author near Furana Island, Maldives Islands, and to the Spermonde Archipelago, S.W. Sulawesi, Indonesia, in 1985. The second author collected material during a field trip to Cebu, Mactan Island in the Philippines in 1981. Among these species, three species of the genus *Polycyathus* Duncan, 1876 proved to be new and are described here.

All collected specimens were desposited in the coral collection of the Rijksmuseum van Natuurlijke Historie (RMNH) in Leiden, The Netherlands.

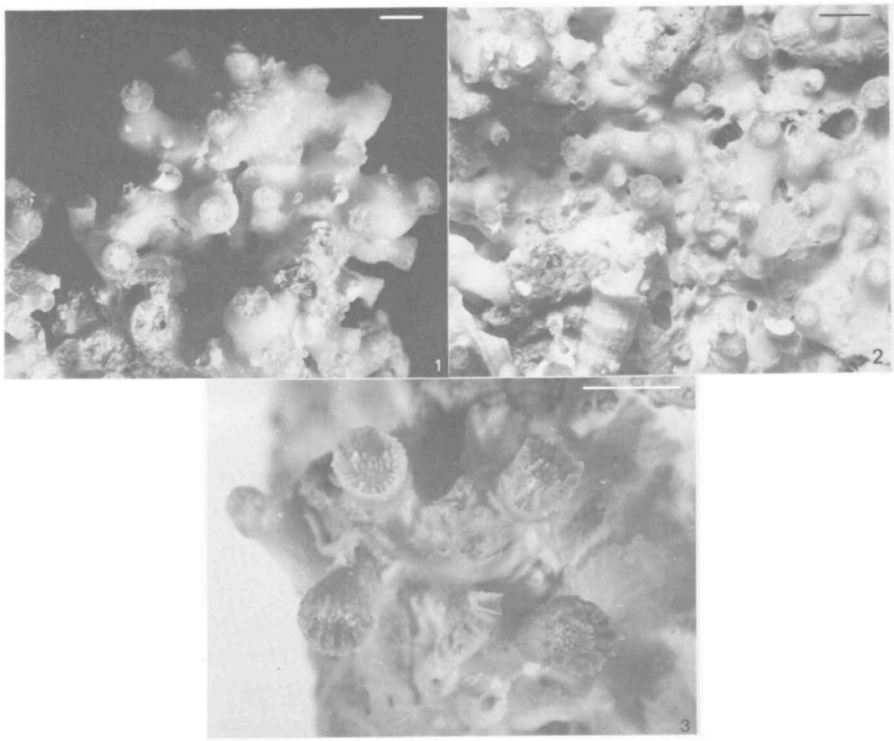
In the discussion the taxonomic position of the genus *Polycyathus* will be enunciated.

DESCRIPTION OF THE SPECIES

Polycyathus hodgsoni spec. nov.
(figs. 1-3)

Material examined. — Holotype: RMNH 17566, 1 colony (ca. 250 corallites), loc.: Cebu Mactan Island, Philippines. Paratype: RMNH 17567, 1 colony (ca. 35 corallites), loc.: Furana Island, Maldives.

Characters. — The colony is phaceloid. The number of corallites in a colony amounts to several hundreds. The corallites are cylindrical (fig. 2), sometimes thickened at their base and are connected by the coenosteum or by stoloniferous expansions (fig. 2). The largest corallites have a circular to slightly oval calyx, their diameter varies between 2 and 3 mm, their height at-



Figs. 1-2: *Polycyathus hodgsoni,* holotype, RMNH 17566 (fig. 1, scale = 2,5 mm; fig. 2, scale = 2,5 mm). Fig. 3: *Polycyathus hodgsoni*, paratype, RMNH 17567 (scale 2,5 mm).

tains a maximum of 5 mm. The fossula has a maximal depth of 1,5 mm in the largest corallites.

The septa are arranged in 3 cycles, their number varies between 20 and 24 in the largest corallites. Septa of lower order cycles are large and slightly exsert, those of higher order are smaller and not exsert. Septa are slightly granulated, their margin is never dentated and they are never fused with other septa. In front of all septa, except those of the last cycle, pali are distinctive. Each palus consists of one spine which is slightly granulated. The pali are arranged in one cycle. The columella is formed by a number of trabeculae which resemble the pali but are placed deeper in the calyx. The number of trabeculae forming the columella varies between 12 and 15.

The wall is imperforate. Costae are slightly developed, they are distinct on the thecae and sometimes on the coenosteum and are alternating in size. The thecae are minutely granulated.

Asexual reproduction takes place by extratentacular budding from lower parts of the wall or coenosteum or by budding off new corallites on the stoloniferous expansions.

Habitat. — The corals have been found in caves at the deeper parts of the reef of the Maldives and Philippines. The corals were never exposed to direct sunlight. The specimens have been found deeper than 35 m.

Affinities. — This new species differs from almost all other *Polycyathus* species by its low number of septa. Only *P. hondaensis* (Durham & Barnard, 1952) has such a low number of septa but the number of trabeculae forming the columella in that species is almost twice as high as the number of trabeculae in *P. hondaensis*.

Etymology. — The species is named after G. Hodgson, who kindly showed the Marigondon cave, where the specimens were collected.

Polycyathus marigondoni spec. nov.
(figs. 4-6)

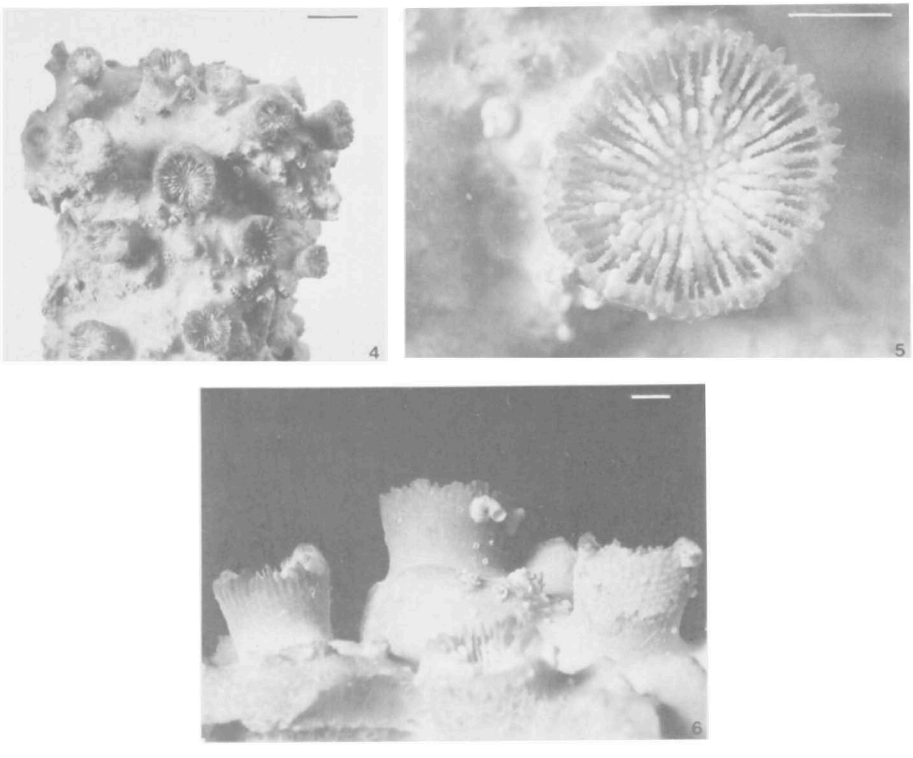
Material examined. — Holotype: RMNH 17564, 1 colony (24 corallites), loc.: Cebu Mactan Island, Philippines. Paratype: RMNH 17565, 1 colony (15 corallites), loc.: Cebu Mactan Island, Philippines.

Characters. — The colony is phaceloid. The number of corallites in a colony amounts to several dozen, they are (sub)cylindrical (fig. 5) and are connected by the coenosteum (fig. 4). The largest corallites have a circular to oval calyx, their diameter varies between 5 and 6,5 mm, their height attains a maximum of 7 mm. The fossula has a maximal depth of 1,5 mm in the largest corallites.

The septa are arranged in maximally 5 cycles, their number varies between 44 and 52 in the largest corallites. Septa are all of the same size except those of the last cycle. They are exsert and granulated. The septal margin is never dentated. The S3 often are fused with the S4. In front of all septa, except those of the last cycle, pali are distinct. Each palus consists of some spines, maximum three, which are strongly granulated. The pali are arranged in two cycles. The columella is formed by a number of trabeculae which resemble the pali but are placed deeper in the calyx. The number of trabeculae forming the columella varies between 15 and 20.

The wall is imperforate. Costae are slightly developed. They are only distinct on the upper parts of the thecae and not on the coenosteum and are alternating in size. The thecae and often also the coenosteum are minutely granulated.

Asexual reproduction takes place by extratentacular budding from lower parts of the outside wall of the corallites.



Figs. 4-5: *Polycyathus marigondoni,* holotype, RMNH 17564 (fig. 4, scale = 6 mm; fig. 5, scale = 2,5 mm). Fig. 6: *Polycyathus marigondoni*, paratype, RMNH 17565 (scale = 2,5 mm).

Habitat. — This species has only been found in the cave of Marigondon, Philippines where it occurs on the shaded ceiling of the cave. Both colonies were found at a depth of 35 m. There were many more colonies present.

Affinities. — With *Polycyathus funaraensis* spec. nov. this species differs from all the other *Polycyathus* species in the high number of septa, even some septa of the S5 cycle. Septal fusion in this genus is only known from *P. muellerae* (Abel, 1959) and *P. furanaensis*.

Etymology. — The species is named after the cave where it has been found.

Polycyathus furanaensis spec. nov.
(figs. 7-10)

Material examined. — Holotype: RMNH 17561, 1 colony (16 corallites), loc.: Furana Island, Maldives. Paratypes: RMNH 17562, 4 colonies (ca. 35 corallites), loc.: Furana Island, Maldives; RMNH 17563, 2 colonies (21 corallites), loc.: Lanyukang Island, S.W. Sulawesi, Indonesia.

Characters. — The colony is phaceloid. The number of corallites in a colony amounts to several dozens. The corallites are (sub)cylindrical (fig. 10) and are connected mostly by stoloniferous expansions but also by the coenosteum. The larger ones have a circular to oval calyx, their diameter varies between 4 and 6,5 mm, their height attains a maximum of 9 mm. The fossula has a depth of maximum 2,5 mm in the largest corallites.

The septa are arranged in maximally 4 cycles, their number varies between 42 and 50 in the largest corallites. Septa of lower order are large and exsert, those of higher order are smaller and less exsert. Septa are slightly granulated, their margin is sometimes dentated. The S3 often are fused with the S4. In front of all septa, except those of the last cycle, pali are distinct. Each palus consists of maximally three spines, which are slightly granulated. The pali are arranged in one cycle. The columella is formed by a number of trabeculae which resemble the pali but are smaller and placed deeper in the calyx. The number of trabeculae forming the columella varies between eight and twelve.

The wall is imperforate. Costae are moderately developed and distinct on the upper parts of the thecae but sometimes on the whole theca and on the coenosteum. They are all of the same size. The thecae and often also the coenosteum are densely granulated.

Asexual reproduction takes place by budding off new corallites on the stoloniferous expansions or by extratentacular budding from lower parts of the outside wall of the corallites.

Habitat. — This species has only been found in a cave at Furana Island,

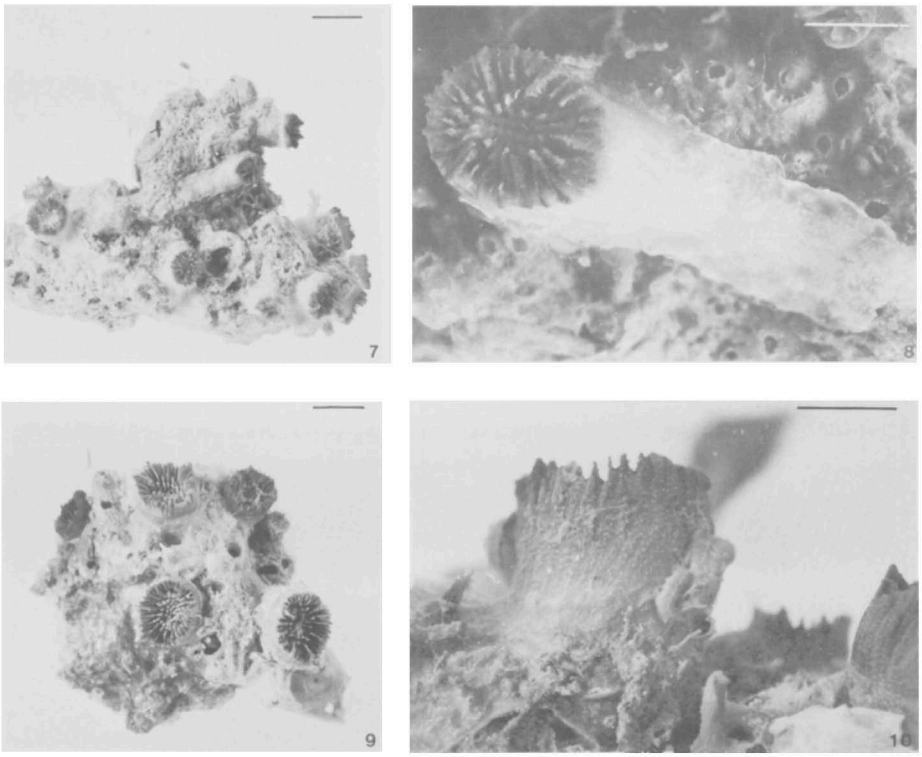
Maldives and in a cave at Lanyukang Island, Indonesia where it occurs on the shaded ceiling. The collected specimens were found at depths between 6 and 52 m.

Affinities. — Like *P. marigondoni* this species has a high number of septa. *P. funaraensis* differs from this species in the appearance of stoloniferous expansions and in the number of trabeculae forming the columella.

Etymology. — The species is named after the island where it has been found for the first time.

DISCUSSION

The systematic position of the genus *Polycyathus* Duncan, 1876, to which the newly described species belong, has long been a point of discussion. Thiel



Figs. 7-8: *Polycyathus furanaensis*, holotype, RMNH 17561 (fig. 7, scale = 7 mm; fig. 8, scale = 2,5 mm). Fig. 9: *Polycyathus furanaensis*, paratype, RMNH 17563 (scale = 7,5 mm). Fig. 10: *Polycyathus furanaensis*, paratype, RMNH 17562 (scale = 2,5 mm).

(1941: 17) and Zibrowius (1980: 94) pointed out the problem without however, giving a real alternative. They both mention the resemblance between *Polycyathus* (family Rhizangiidae d'Orbigny, 1851) and *Astrangia* (family Caryophylliidae Gray, 1847).

A comparison of three characters (a. stoloniferous expansions, b. septal dentation, and c. pali in front of all major septa) in nine species of *Polycyathus*, five of *Caryophyllia* and five of *Astrangia* is given in table 1. It is clear that the historically accepted systematic position of the genus *Polycyathus* (family Caryophylliidae) is not as obvious as generally assumed. In our opinion the genus has more characters in common with genera of the family Rhizangiidae, like *Astrangia,* than it has with genera belonging to the family Caryophylliidae, like *Caryophyllia,* and consequently we suggest here to remove *Polycyathus* from the family Caryophylliidae and to place it in the family Rhizangiidae.

Although the genus *Paracyathus* Milne Edwards & Haime, 1848 was not the

	stoloniferous expansions	septal dentation	pali
Rhizangiidae			
Astrangia michelini M. Edwards & Haime	–	+	+/–
A. astreiformis M. Edwards & Haime	+/–	+	+/–
A. danae Agassiz	–	+	–
A. rathbuni Vaughan	+/–	+	+/–
A. solitaria (Lesueur)	+	+/–	+/–
Polycyathus atlanticus Duncan	+/–	+/–	+
P. hondaensis (Durham & Bernard)	+/–	–	+
P. isabela Wells	+/–	+/–	+
P. muellerae (Abel)	+/–	+/–	+
P. palifera (Verrill)	+	+	+
P. senegalensis Chevalier	+/–	+/–	+
P. hodgsoni spec. nov.	+	–	+
P. marigondoni spec. nov.	+/–	–	+
P. furanaensis spec. nov.	+	+/–	+
Caryophylliidae			
Caryophyllia cyathus (Ellis & Solander)	–	–	–
C. alberti Zibrowius	–	–	–
C. ambrosia Alcock	–	–	–
C. inornata (Duncan)	–	–	–
C. smithii Stokes & Broderip	–	–	–

Table 1: Comparison of three characters in the genera *Astrangia, Caryophyllia* and *Polycyathus*. + = present in almost every corallite; +/– = present in 50% of the corallites; – = never or rarely present.

subject of the present study, we suggest, based on the only difference between the two genera, *Polycyathus* (colonial) versus *Paracyathus* (solitary), to place *Paracyathus* also in the family Rhizangiidae.

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