Rec. West. Aust. Mus. 1985, **12** (1): 147-183

New Scleractinia from Australian Coral Reefs

J.E.N. Veron*

Abstract

Eleven new species of Scleractinia are described. These belong to ten different genera, one of which *(Australomussa)* is new, another of which *(Hydnophora)* has been given a new taxonomic position (in the Merulinidae). A new merulinid genus, *Paraclaverina,* has been erected for *Clavarina triangularis.* Six of the 11 new species are known only from Western Australia, two only from eastern Australia, while the remaining three are known from both coasts.

Introduction

Since completing *Scleractinia of eastern Australia* (Veron and Pichon, 1976, 1980, 1982; Veron *et al.*, 1977; Veron and Wallace, 1984) the author has worked on corals at several sites on the Western Australian coast, notably the Rowley Shoals, Scott Reef, Dampier Archipelago and Houtman Abrolhos Islands and has also examined the extensive collection of corals in the Western Australian Museum.

A total of 276 described species of Scleractinia are now recognised from Western Australia (Veron and Marsh, in prep.). Of these, 256 also occur in eastern Australia and are described in the abovementioned monograph. The remainder are a mixture of described and undescribed species. Of the latter, only some are described in this paper as the remainder require further research.

Five species described in this study occur on the east coast. Two of these are described but unnamed in *Scleractinia of eastern Australia;* the remaining three have been found subsequent to the completion of the respective parts of that study. Underwater colour photographs of most of the species described in this paper will be included in the author's *Corals of Australia and the Indo-Pacific* (in press).

Material and Methods

The methods used in this study were similar to those employed for *Scleractinia of eastern Australia* and are described in Part I of that series (Veron and Pichon 1976). All species described below were studied both *in situ* and in the laboratory. Before giving a new name to a species all relevant previous descriptions and/or type specimens were checked. Where appropriate the nominal species concerned are discussed.

* Australian Institute of Marine Science, PMB No. 3, Townsville MC Queensland 4810.

Place names cited in the text are indicated in Figure 1. Type specimens as indicated below, have been deposited in the Western Australian Museum. The remaining specimens indicated in the 'material studied' sections are in the collection of the Australian Institute of Marine Science.

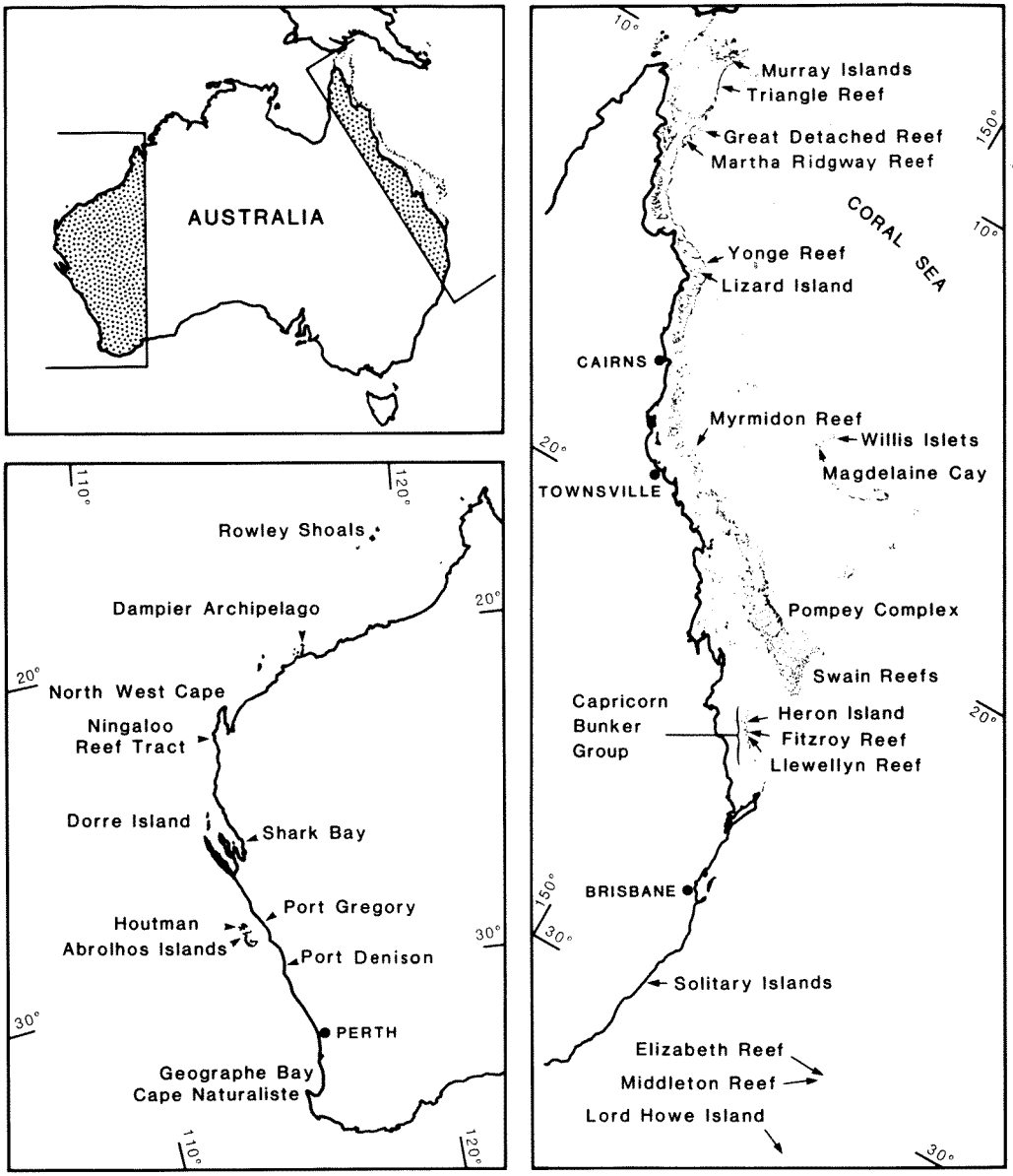


Figure 1 Place names cited in the text.

Systematics

Family Acroporidae Verrill, 1902

Genus *Montipora* De Blainville, 1830

Montipora capricornis sp. nov.

Figure 2

Montipora sp. 2 (Veron and Wallace 1984).

Holotype

WAM 158-84 (Figures 94 and 96, Veron and Wallace 1984); a plate-like corallum 179 mm maximum diameter; from Llewellyn Reef, southern Great Barrier Reef, Queensland, in an enclosed lagoon with turbid water and soft substrate covered with rubble at 4 m depth; collected by J.E.N. Veron in 1980.

Paratype

WAM 159-84 (Figures 95 and 97, Veron and Wallace 1984); a columnar corallum 139 mm high (excluding non-corallite basement); from Fitzroy Reef, southern Great Barrier Reef, Queensland; habitat a lagoon with substrate of sand and rubble at 4 m depth; collected by J.E.N. Veron in 1980. The corallites and coenosteum are very similar to those of the holotype, the difference between the two specimens being one of growth form only.

Diagnosis

In structure, *M. capricornis* resembles only *M. turgescens* Bernard, 1897 which has smaller calices and a much finer coenosteum. It is readily recognised *in situ* by its large immersed calices without coenostial elaborations.

Description

'Coralla are flat plates or columns, the former usually in tiered whorls, with or without small nodular expansions on the upper surface and with a well-developed epitheca' (Veron and Wallace 1984). Corallites are immersed, 0.9-1.4 mm diameter and uniformly spaced irrespective of the corallum surface contours. In some coralla calices face different directions. Septa are in two cycles. Primary septa consist of rows of thick spines approximately $^{2}/_{3}$ R*, usually irregular in length. Secondary septa are thinner, irregular, often incomplete, and less than $^{1}/_{3}$ R. The coenosteum is characteristically coarse and spongy.

Living colonies are a uniform purple, blue or brown.

Habitat preference and growth form

Montipora capricornis is common in some lagoons of the southern Great Barrier Reef (Veron and Wallace 1984). It has also been found on protected upper and lower reef slopes of the Swain Reefs. Columnar growth forms have

* R = calice radius

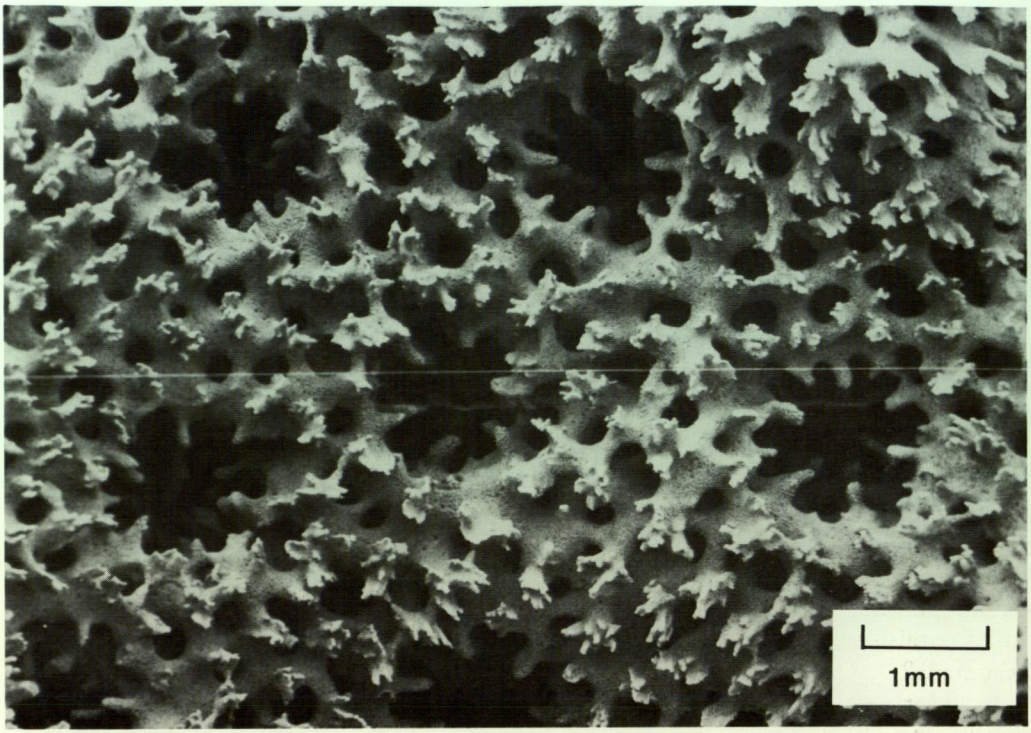


Figure 2 Electronmicrograph of the corallites of the holotype of *Montipora capricornis.*

been found only in lagoonal biotopes where water circulation is minimal. Flat plates occur in the same biotopes and some colonies combine both growth forms.

There is little correlation between growth form and skeletal structure. Coralla from protected lagoons have a relatively porous coenosteum and the greatest calice diameters.

Distribution

From both eastern (Capricorn, Bunker and Swain Reefs) and Western (North West Cape, Dorre Island and Houtman Abrolhos Islands) Australia.

Etymology

Named after the Capricorn group of islands of the Great Barrier Reef where this species was originally found.

Additional material studied

Fitzroy Reef (4 specimens), Llewellyn Reef (1 specimen), North West Cape, Dorre Island and Houtman Abrolhos Islands (1 specimen each).

Genus *Acropora* Oken, 1815

Acropora abrolhosensis sp. nov.

Figures 3 and 4

Holotype

WAM 160-84; an arborescent corallum 372 mm high; from Rat Island, Houtman Abrolhos Islands, Western Australia, on an upper reef slope with consolidated, nearly horizontal substrate at 3 m depth; collected by J.E.N. Veron in 1983.

Diagnosis

Acropora abrolhosensis is distinguished from other arborescent species by its large radial corallites which have one size range and also by its prominent, thick-walled axial corallites. This species is readily recognised *in situ* as well as in the laboratory.

Description

Colonies are arborescent forming open to sub-caespitose thickets with relatively straight branches. Sub-branches branch at approximately 60°; they are tapered, with radial corallites forming irregular rows or spirals. Radial corallites are of one size range except near branch tips where small corallites occur irregularly. Mature radial corallites are tubular, up to 3.2 mm diameter, with rounded, outward facing calices 1.2-1.6 mm diameter. Primary septa are complete, approximately ½R except for the directive septa which usually adjoin. Secondary septa are usually absent. Axial corallites are prominent, up to 3.9 mm diameter, with calices <1.8 mm diameter. Septa are in two complete cycles, primary septa reaching the calice centre. The coenosteum is finely costate on the corallites, becoming uniformly spinulose elsewhere.

Living colonies are brown, blue or pink with paler branch tips.

Habitat preference and growth form

Acropora abrolhosensis is common along Western Australian fringing reefs and lagoons where it may form monospecific stands up to 5 m diameter. These stands are similar in appearance to those of other arborescent *Acropora,* especially *A. formosa, A. pulchra* and *A. horrida.* Small isolated colonies are also common, especially in biotopes partly exposed to wave action, and these usually have a more compact, even sub-caespitose growth form.

Distribution

Known only from Western Australia.

Etymology

So named because of the abundance of this species at the Houtman Abrolhos Islands.

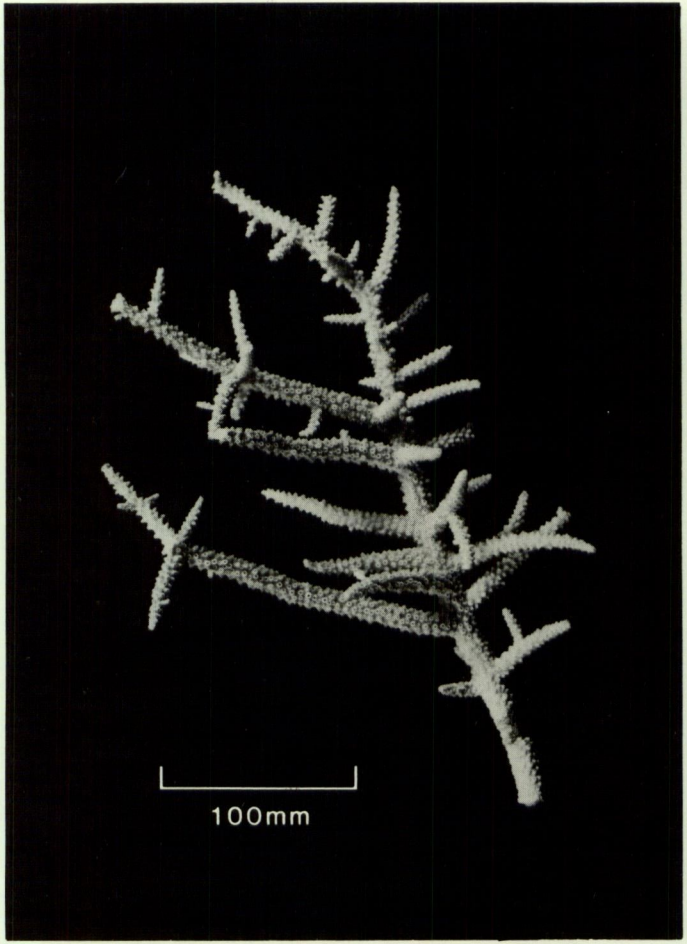


Figure 3 The holotype of *Acropora abrolhosensis.*

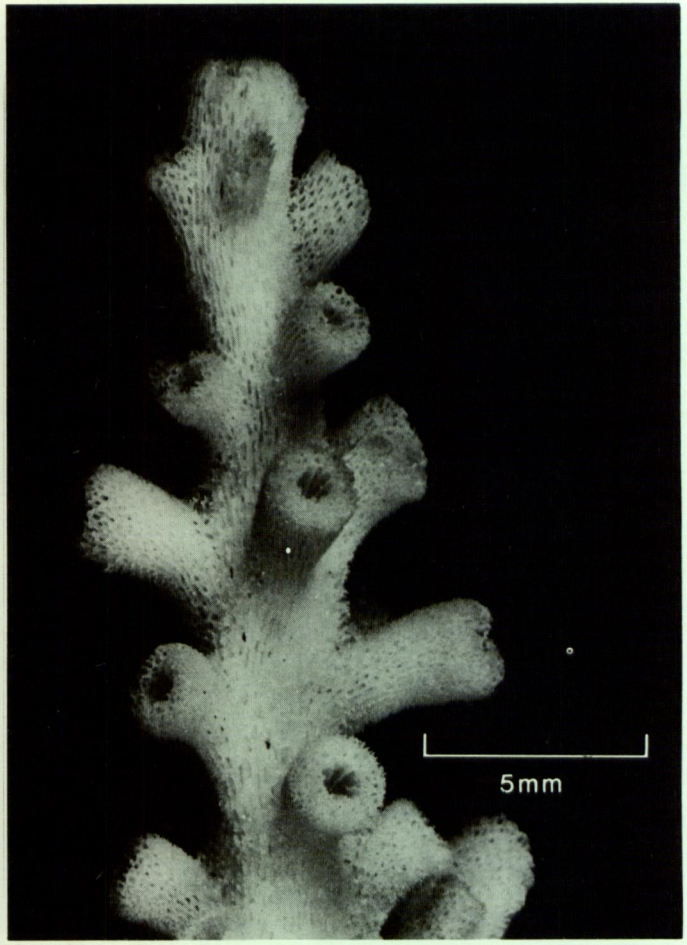


Figure 4 A branch tip of the holotype of *Acropora abrolhosensis* showing characteristically tubular radial corallites with rounded, outward facing calices.

Additional material studied

Houtman Abrolhos Islands (1 specimen), Dampier Archipelago (2 specimens), Rowley Shoals (2 specimens).

Genus *Astreopora* De Blainville, 1830

Astreopora explanata sp. nov.

Figures 5 and 6

Holotype

WAM 161-84; a piece of a plate 168 mm across; from Beacon Island, Houtman Abrolhos Islands, Western Australia, on a lower reef slope with a partly consolidated, nearly horizontal substrate at 10 m depth; collected by J.E.N. Veron.

Diagnosis

Astreopora explanata is readily distinguished from all other Australian *Astreopora* by its growth form (see remarks below). Several other Australian species including *A. cucullata* Lamberts, 1980, *A. moretonensis* Veron and Wallace, 1984 and *A. macrostoma* Veron and Wallace, 1984 may be plate-like, but plates are always encrusting and never form tiers or whorls.

Description

Mature colonies consist of flat plates arranged in overlapping tiers or whorls. Plates are bifacial only near their margins, the edge zone being 10-30 mm wide. The epitheca is well developed. Plates of tiered colonies may be <20 mm thick (100 mm from the margin); simple colonies may consist of one thick plate only, or rarely, are submassive.

Corallites are conical to immersed. Thick plates have mainly conical corallites up to 5 mm diameter, becoming immersed at the plate margin. Thin plates usually have mixed corallites. Calices are 1.6-2.1 mm diameter. Twelve septa can usually be distinguished at the calice margin where they are slightly exsert. They are usually in two readily distinguished cycles. Primary septa slope steeply reaching ½-¾R deep within the corallite. Each has a few twisted spines which form a rudimentary columella tangle. Costae consisting of a few elaborated spines are developed on conical corallites. The coenosteum is very porous, coarse and lightly calcified.

Living colonies are brown to dark green in colour, usually with pale margins to plates.

Habitat preference and growth form

Colonies are well developed in habitats protected from strong wave action where coral diversity is high. Coralla from shallow water tend to be relatively thick with conical corallites. Those from deeper or turbid water tend to form *Montipora*-like whorls and have mainly immersed corallites.

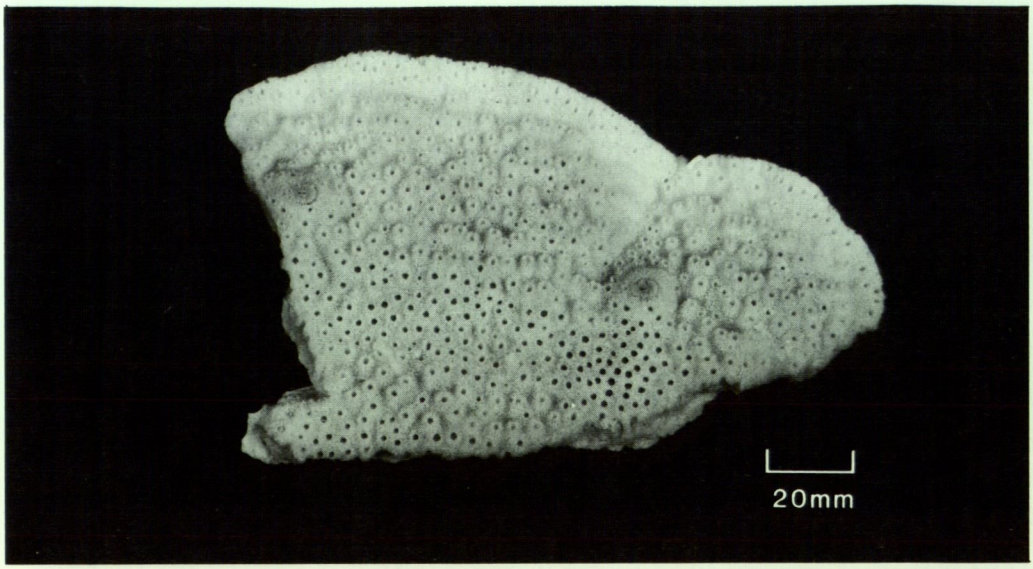


Figure 5 The holotype of *Astreopora explanata.*

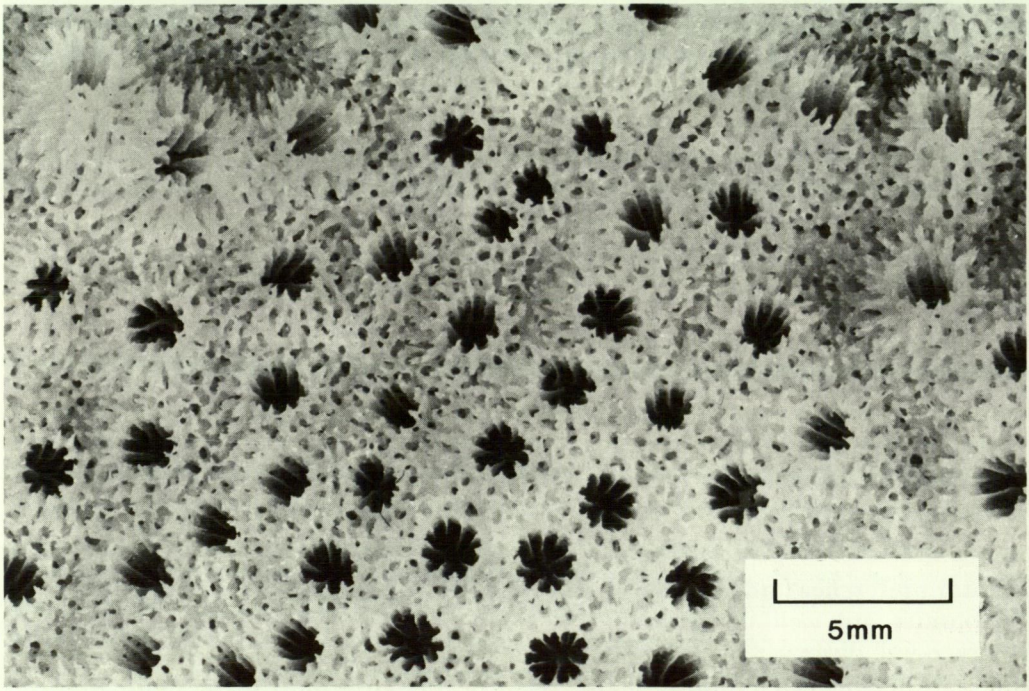


Figure 6 Corallites of the holotype of *Astreopora explanata.*

Remarks

Astreopora myriophthalma, the only common *Astreopora* of Western Australia, is usually massive but becomes flattened on steeply sloping substrates. These colonies do not form tiers or whorls and have larger corallites than *A. explanata* from similar habitats. However, as with most *Astreopora* species, lack of conservative corallite characters does not allow these species to be reliably separated on corallite characters alone.

Of non-Australian *Astreopora,* only *A. expansa* Brüggemann, 1877 from an unknown locality has a similar growth form. The holotype (figured by Lamberts 1982: 92) has small, widely spaced, immersed corallites with short septa in two cycles, the larger extending down to the clearly visible calice floor. No columellae are developed. The eroded coenosteum is fine. There is little to suggest that this specimen is a variant of the present species and without a type locality its identity is unlikely to be resolved.

Distribution

Known only from Western Australia, from the Rowley Shoals south to the Houtman Abrolhos Islands.

Etymology

The name alludes to the explanate growth form of this species.

Additional material studied

Houtman Abrolhos Islands (4 specimens), Dampier Archipelago (1 specimen), Rowley Shoals (3 specimens).

Family Poritidae Gray, 1842

Genus *Porites* Link, 1807

Porites (Porites) heronensis sp. nov.

Figures 7-9

Holotype

WAM 162-84; an encrusting incomplete corallum 126 mm diameter; from Heron Island, Queensland, on an upper reef slope exposed to moderate wave action at 2 m depth; collected by J.E.N. Veron in 1982.

The holotype, as with most specimens of this species, has the central part of many corallites removed, probably by boring organisms. The holotype displays the full range of variation in corallite structure described below.

Diagnosis

Porites heronensis is most similar to *P. lichen* Dana, 1846, both species having similar growth form and shallow corallites. They are readily separated *in situ* by the size of the corallites (much smaller in *P. heronensis*) and by colour in areas

where *P. lichen* is a uniform bright yellow-green. *Porites annae* Crossland, 1952 may also have a similar growth form but branches are usually more elongate. Both *P. lichen* and *P. annae* have very distinct calicular structures.

Description

Coralla are massive, encrusting or columnar. Corallites are shallow, giving colonies a relatively smooth surface. They are 1.1-1.5 mm diameter, with walls up to 1.2 mm thick. Septa are characteristically irregular so that, in most corallites, neither the triplet nor more than two lateral pairs of septa can be distinguished. Up to five tall pali may be present. These are on the lateral pairs and the dorsal directive in corallites where these septa are distinguishable. Each septum has a denticle near the wall. Columellae are style-like to absent. The inner synapticular ring is very well developed linking the inner margins of the septa, and giving the appearance of a trident formation to corallites with distinguishable triplets. Three to five radii are usually well developed. In some coralla there are no skeletal structures in the centre of some or all corallites, possibly the result of parasitism.

Living colonies are cream, green, brown or mottled.

Habitat preferences

At all localities it is usually found in shallow lagoonal habitats.

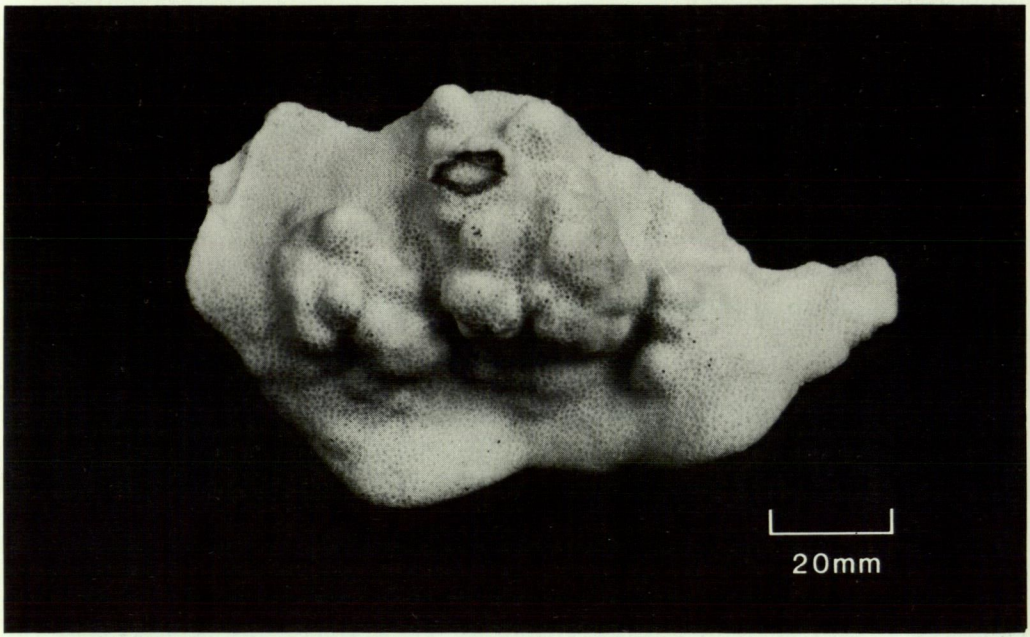
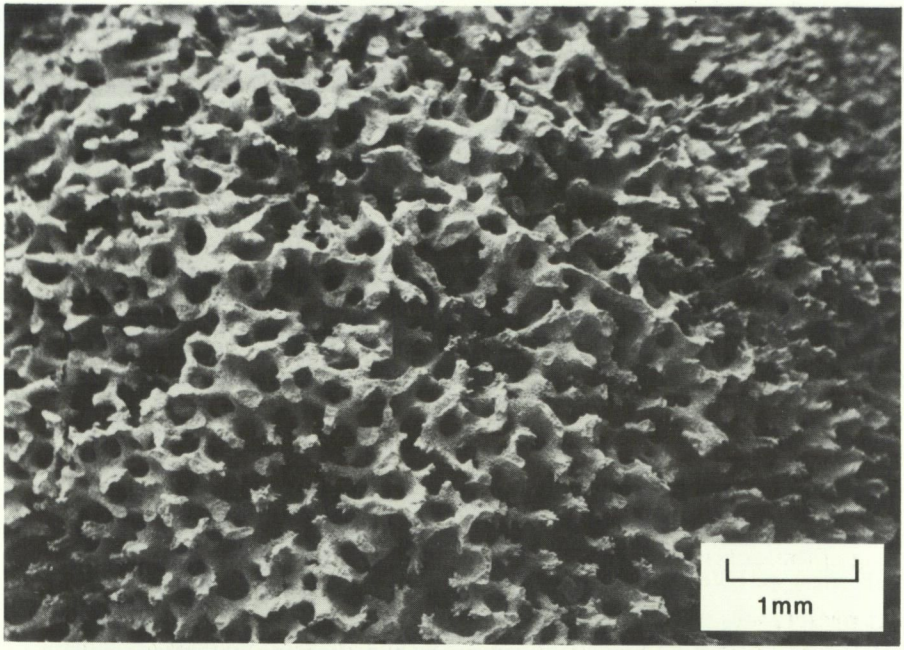
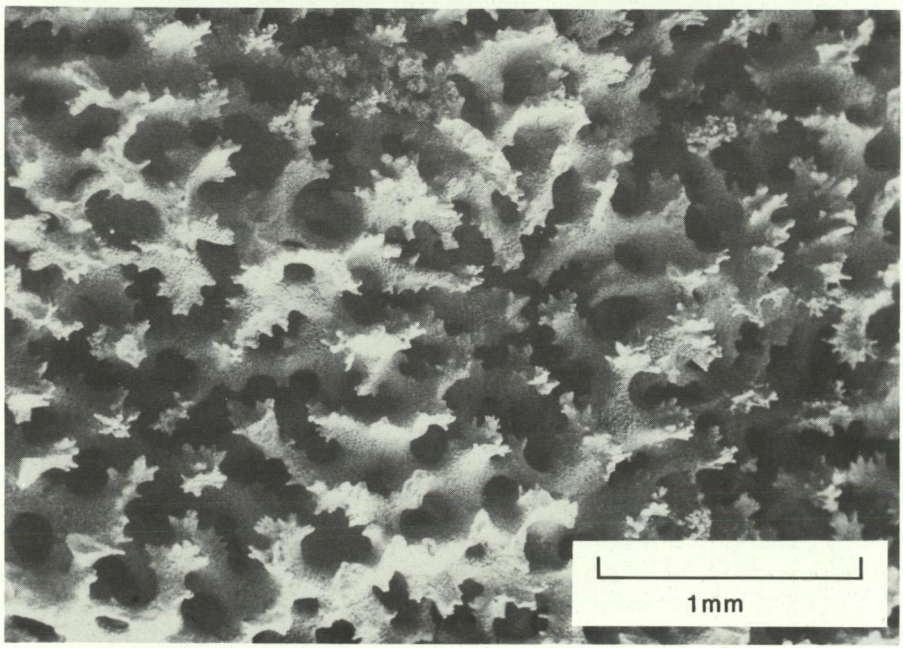


Figure 7 The holotype of *Porites heronensis.*





Figures 8,9 Electronmicrographs of the corallites of the holotype of *Porites heronensis*. The lack of a clear pattern in the septal configuration is characteristic of the species.

Distribution

Porites heronensis is very common in the southern Great Barrier Reef and also at Elizabeth and Middleton Reefs. It also occurs at Lord Howe and the Solitary Islands on the east coast and the Houtman Abrolhos Islands and Dampier Archipelago on the west coast.

Etymology

So named because this species is common in the Capricorn group of Islands (including Heron Island) of the Great Barrier Reef.

Additional material studied

In eastern Australia from Heron Island (1 specimen), Elizabeth Reef, Middleton Reef and the Solitary Islands (1 specimen each); in Western Australia Dampier Archipelago (2 specimens), Houtman Abrolhos Islands (1 specimen).

Porites (Porites) myrmidonensis sp. nov.

Figures 10 and 11

Porites (Porites) sp. 1 Veron and Pichon 1982.

Holotype

WAM 163-84 (Figures 87 and 89, Veron and Pichon 1982); an encrusting corallum 126 mm diameter; from Magdelaine Cay, Coral Sea, on a reef slope exposed to moderate wave action at 12 m depth; collected by J.E.N. Veron in 1978.

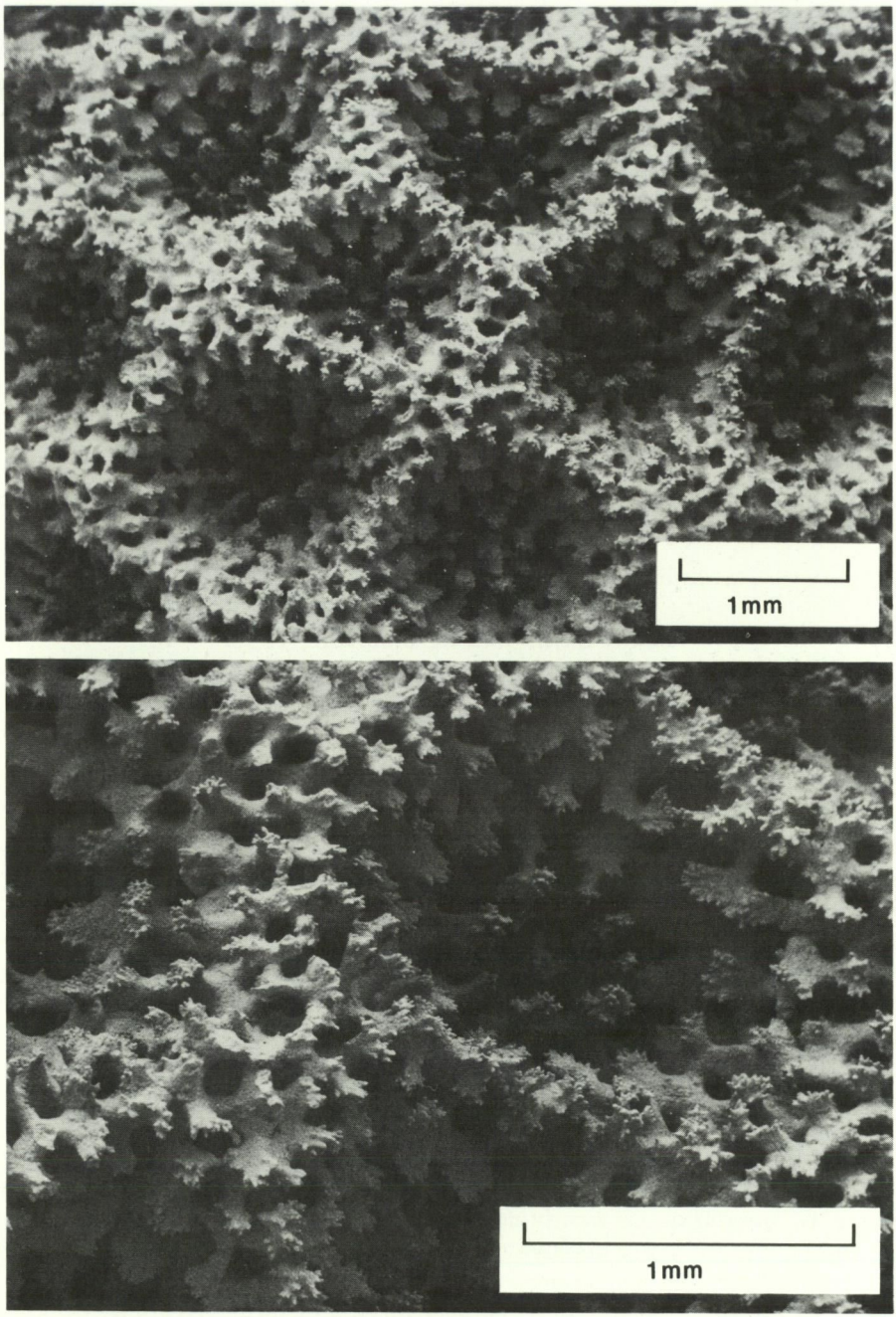
Diagnosis

'In general appearance this species is similar to *P. solida* (Forskål, 1975), although the smaller corallites and the presence of pali clearly distinguish it. Structurally it is most similar to *P. australiensis* Vaughan, 1918 but is readily separated from it by its deeper corallites, its tendency to form series by intratentacular budding and by its very clearly defined septal pattern' (Veron and Pichon 1982).

Description

'Coralla are massive with undulating or hillocky surfaces or are plate-like. Most massive coralla have a plate-like or encrusting periphery. Calices are deeply excavated and are 1.1-1.3 mm diameter. The walls are 0.2-0.5 mm thick. Corallites sometimes form a series through intratentacular budding, as described for *P. lichen* Dana, 1846. Septa have a very uniform pattern. The septa of the triplet have free margins and each has small pali. The lateral pairs and dorsal septum each have large pali, making a total of eight pali per corallite. Septa are long and usually thick and wedge-shaped. The paler synapticular ring is very well developed. A thick styliform columella is present in some corallites, absent in others' (Veron and Pichon 1982).

Living colonies are uniform or mottled greens and brown.



Figures 10,11 Electronmicrographs of the corallites of the holotype of *Porites myrmidonensis.*

Growth form

'Massive colonies of the present series closely resemble each other except for those where corallites form short series. Plate-like coralla usually have shallower corallites and thinner septa and pali. The columellae are also more conspicuous' (Veron and Pichon 1982).

Distribution

Known only from the Great Barrier Reef and the Coral Sea.

Etymology

Name alludes to Myrmidon Reef, central Great Barrier Reef, where the species is particularly common.

Additional material studied

Murray Islands (1 specimen), Triangle Reef (1 specimen), Great Detached Reef (3 specimens), Martha Ridgway (1 specimen), Tijou Reef (2 specimens), Yonge Reef (1 specimen), Lizard Island (1 specimen), Willis Island (14 specimens), Magdelaine Cay (9 specimens), Pompey Reef, Swain Reefs (1 specimen each).

Genus *Goniopora* de Blainville, 1830

Goniopora pendulus sp. nov.

Figures 12 and 13

Holotype

WAM 164-84; a 148 mm long piece of a massive corallum; from near Rat Island, Houtman Abrolhos Islands, Western Australia, on a sloping reef with unconsolidated substrate, protected from strong wave action at 8 m depth; collected by J.E.N. Veron in 1983.

Most corallites of this specimen have the well developed columellae usually found with this species.

Paratype

WAM 165-84; 132 mm long piece of a massive corallum from 'the maze' near Rat Island, Houtman Abrolhos Islands on a sloping reef with unconsolidated substrates and very protected, partly turbid water at 17 m depth; collected by J.E.N. Veron in 1983.

Corallite walls are relatively thin and columellae are deep-seated and reduced in size. These are the normal skeletal characteristics of coralla from relatively deep water.

Diagnosis

Of the east Australian species, *G. djiboutiensis* Vaughan, 1907, *G. stokesi* Edwards and Haine, 1860 and *G. lobata* Edwards and Haine, 1860 are most similar to *G. pendulus*. *G. pendulus* is distinguishable from *G. djiboutiensis in situ* by the former's usually massive rather than columnar growth form and by the latter's prominent pale oral cones. *G. stokesi* has larger corallites (up to 6 mm diameter) with thinner walls and deeper calices and more irregular, finely developed septa than *G. pendulus* and is usually found unattached on soft substrates.

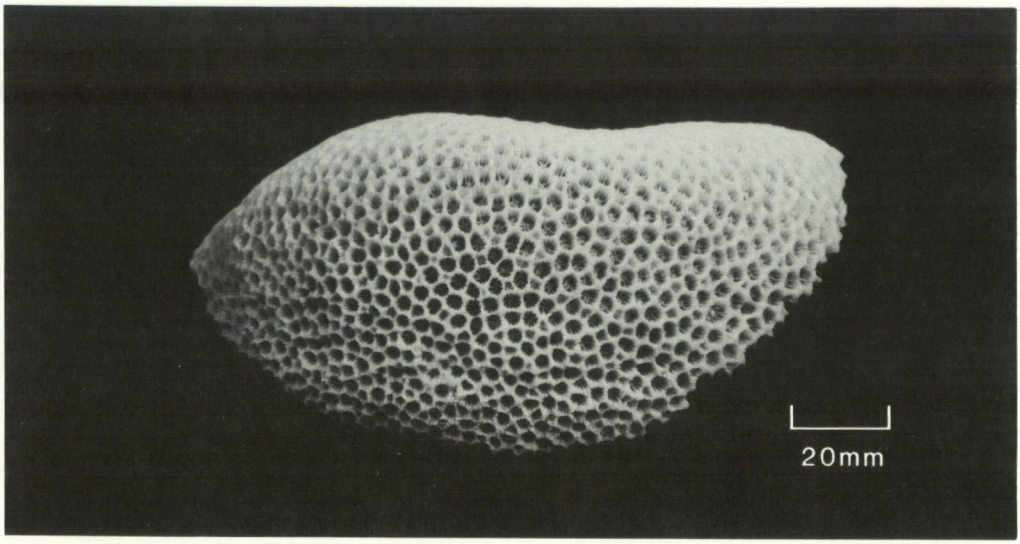


Figure 12 The holotype of *Goniopora pendulus*.

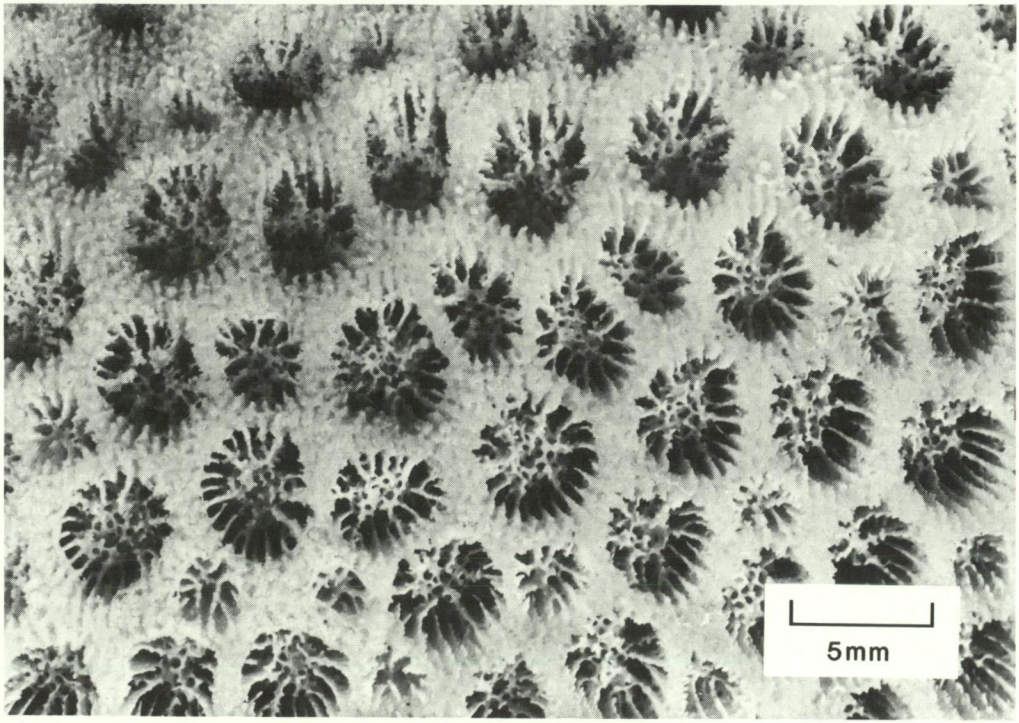


Figure 13 Corallites of the holotype of *Goniopora pendulus*.

G. lobata is readily distinguishable by its smaller columellae and longer septa, which are usually arranged in distinct orders or cycles.

Description

Colonies are massive, hemispherical or dome-shaped with an even surface. Mature corallites are sub-circular, with calices 3.4-3.6 mm diameter. Walls are 0.9-2.7 mm thick. Short, ridge-like septa extend vertically down the corallite wall to a depth of approximately 2 mm at which point they extend inward towards the columella. The gonioporoid pattern of fusion is sometimes developed, but usually the septa appear irregular. The largest corallites may have up to 24 septa but most have fewer than this. The columella is broad and diffuse in most coralla but can be poorly developed or spongy, and dome-shaped in others. Pali are not developed.

Living colonies have elongate greenish-brown polyps with pale oral discs and long thin tentacles that characteristically droop downwards or are wafted about with water movements. Polyps are extended day and night.

Habitat preference and growth form

Goniopora pendulus is common at the Houtman Abrolhos Islands where it occurs on protected upper reef slopes down to a depth of approximately 25 m. Coralla in shallow water have relatively large and well-calcified corallites. As with some other *Goniopora* species (notably *G. stokesi* Edwards and Haime, 1851) colonies with very large polyps and a fleshy appearance usually have relatively poorly calcified coralla. Such colonies are usually found where water movement is minimal.

Remarks

Veron and Pichon (1982: 65) note that of the 32 nominal species of *Goniopora* that are recognisable from type specimens or descriptions, 20 come close to, or fall within the range of east Australian species.

Of non-Australian *Goniopora* and nominal species not synonymised with Australian species by Veron and Pichon (1982), *G. pendulus* shows similarities only with *G. calicularis* (Lamarck, 1816). This, the first described *Goniopora,* has north-west Australia as its type locality. Lamarck's type specimen ('14' of the Museum National d'Historie Naturelle, Paris) is a fragment 36.5 x 25 mm, with corallites of the same size as *G. pendulus* but, in contrast, they have very prominent pali or paliform deltas which make up about ¾ the calice radius.

Distribution

Known only from the Dampier Archipelago and the Houtman Abrolhos Islands, Western Australia.

Etymology

So named because of the species' characteristically drooping polyps and tentacles.

Additional material studied

Houtman Abrolhos Islands (3 specimens).

Genus *Alveopora* de Blainville, 1830

Alveopora gigas sp. nov.

Figures 14 and 15

Holotype

WAM 166-84; a column end 150 mm long and 84 mm thick; from near Rat Island, Houtman Abrolhos Islands, Western Australia, on a very protected reef slope with unconsolidated substrate at 12 m depth; collected by J.E.N. Veron in 1982.

Diagnosis

A. gigas is most similar to *A. allingi,* but is distinguishable from it *in situ* by having larger polyps (the largest of all *Alveopora*), with white tips to the tentacles. Coralla of *A. allingi* are also typically branching and its corallites are smaller (3.5-4.5 mm diameter) and its septa relatively better developed. Only *A. allingi* coralla from deep water are difficult to distinguish from *A. gigas,* but polyps remain easily distinguished *in situ.*

Description

Colonies are commonly >1 m diameter. They consist of short irregularly shaped blunt-ended columns 40-90 mm thick usually with proximal parts covered with epitheca.

Corallites are polygonal 4.3-7.6 mm diameter, this variation commonly occurring in adjacent corallites. Walls are very thin and highly perforated and consist of a palisade of vertical trabeculae linked at irregular intervals by finer synapticulae. Septa are not divisible into orders. In some corallites they extend inward up to ½R, in others they consist of irregular spines that are scarcely distinguishable from the columella tangle, which is characteristically diffuse.

Living colonies have polyps which, when fully extended, are over 100 mm long. They have 12 tentacles which span up to 20 mm. Individual tentacles are club-shaped with white tips and bases forming two white concentric circles per polyp. The remaining parts of the polyp are brown or greenish-brown. This colour pattern is slightly variable among colonies but is usually readily recognised.

Habitat preference and growth form

Alveopora gigas is very abundant at the Houtman Abrolhos Islands, especially in protected lagoons, but may also occur on more exposed upper slopes as well as on the walls of channels >30 m deep.

Colonies in very still water, irrespective of depth, tend to have more elongate polyps and have corallites with the least calcified skeleton with poorly formed septa and a very diffuse columella tangle.

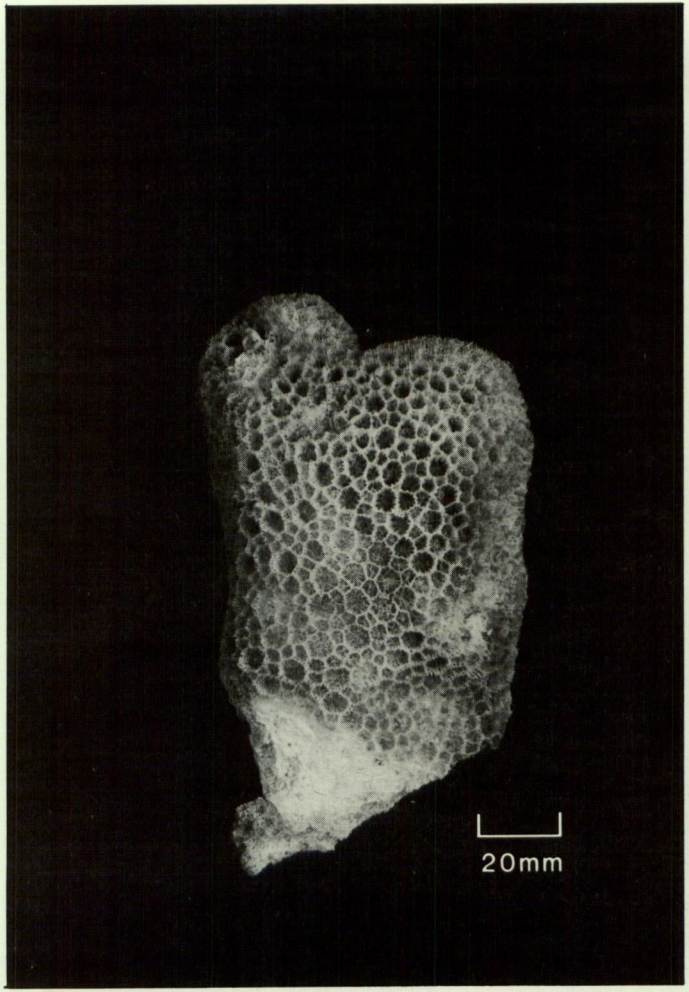


Figure 14 The holotype of *Alveopora gigas*.

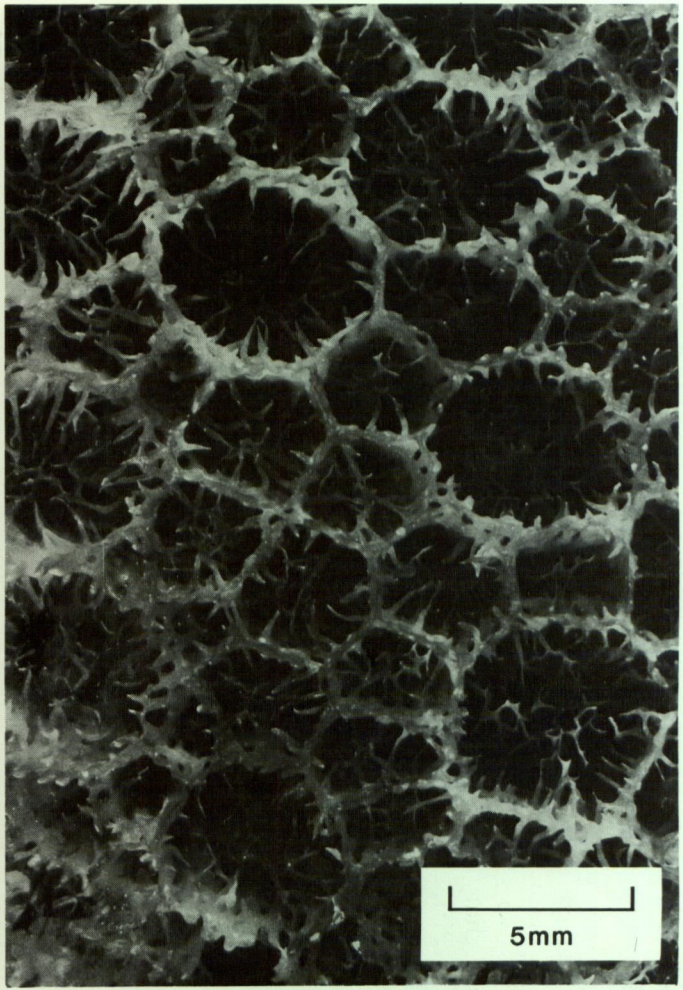


Figure 15 Corallites of the holotype of *Alveopora gigas*.

Remarks

The lack of conservative skeletal features makes some aspects of *Alveopora* taxonomy particularly difficult. In this case, coralla of *A. gigas* come close to a deep-water ecomorph of *A. allingi* Hoffmeister, 1925 and particularly the type specimen of *A. mortenseni* Crossland, 1952 from the Great Barrier Reef. The latter two species were synonymised by Veron and Pichon (1982) who (p. 114) noted that 'further work may show *(A. allingi)* to be two discrete species, occupying different habitats, the *mortenseni* form from deep or turbid water or biotopes exposed to currents'. Despite these doubts and the fact that *A. allingi* also occurs at the Houtman Abrolhos Islands, *A. gigas* is clearly a different species, firstly because *A. allingi* has the same range of variation at the Houtman Abrolhos Islands as it has on the Great Barrier Reef and also because polyps of *A. gigas* are very distinctive, both in size and colouration, and this species has never been observed anywhere along the east Australian coast.

Distribution

Known only from the Houtman Abrolhos Islands.

Etymology

So named because of the size of the species polyps and corallites.

Additional material studied

Houtman Abrolhos Islands (7 specimens including WAM 431-84, 432-84, 433-84).

Family Mussidae Ortmann, 1890

Genus *Lobophyllia* de Blainville, 1830

Lobophyllia diminuta sp. nov.

Figures 16 and 17

Holotype

WAM 167-84; a piece of branching corallum 154 mm maximum width; from northern Swain Reefs, Queensland, in a protected lagoonal area on a reef back margin at 2 m depth; collected by J.E.N. Veron in 1983.

Diagnosis

L. diminuata most closely resembles *L. hemprichii* (Ehrenberg, 1834) which is usually flabello-meandroid but which may be monocentric. In the latter case corallites are uniformly spaced and have a mean diameter of 35 mm, about twice that of *L. diminuta.* The latter also has taller septal dentations and thus coralla are more irregular and spiny than those of *L. hemprichii.*

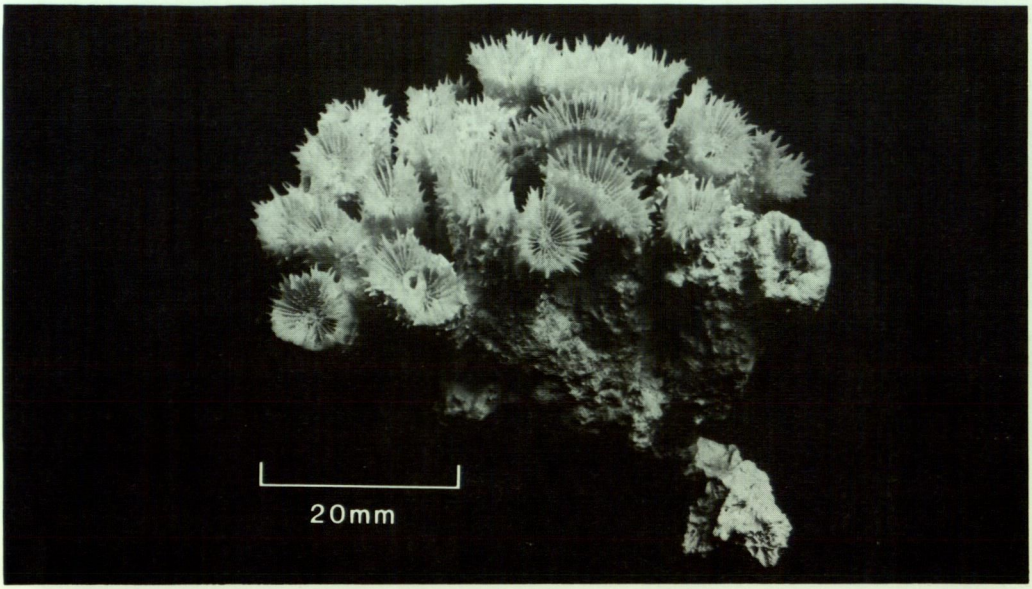


Figure 16 The holotype of *Lobophyllia diminuta.*

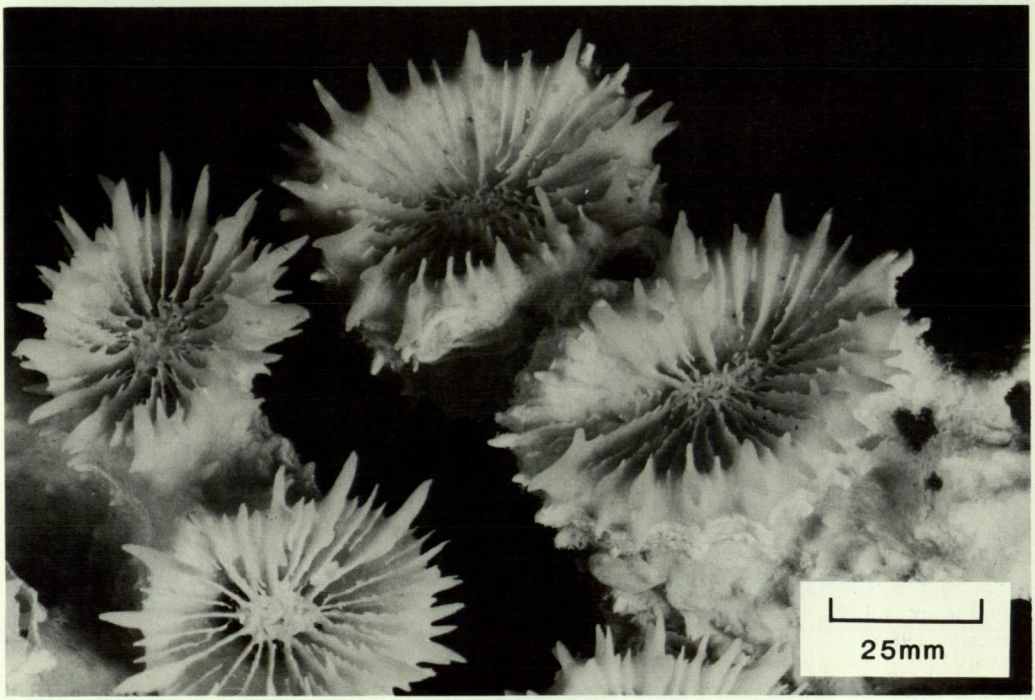


Figure 17 Corallites of the holotype of *Lobophyllia diminuta.*

Description

Colonies are irregular in shape with short, irregular branches. Corallites are mono- to tri-centric, but are never meandroid. They are circular to oval, up to 35 mm maximum dimension (mean 16 mm). Septa vary greatly in development but are seldom cyclically arranged. Primary septa are 1.5 mm thick and have two or three spine-like dentations projecting up to 5 mm above the wall and two to four short dentations within the calice. The remaining septa, which are not clearly arranged in orders are thinner and shorter with finer, more numerous dentations projecting towards the columella. All septa have finely granulated sides and finely serrated margins. Columellae are well developed, circular to oval, up to 8.5 mm maximum dimension. Costae are weakly developed except that primary costae have irregular elongate spines. The epitheca is well developed, the edge zone usually being <10 mm wide.

The only living colonies observed were mottled orange and grey in colour. Tentacles were retracted during the day.

Remarks

Lobophyllia diminuta has been observed only in one locality of the Swain Reefs. It is distinctive *in situ* and hence is considered a very rare species.

Distribution

Known only from the type locality and a single specimen from Phuket, western Thailand.

Etymology

The name alludes to the small size of the corallites of this species.

Additional material studied

Swain Reefs (2 specimens), Phuket, Thailand (1 specimen).

Genus *Symphyllia* Edwards and Haime, 1848

Symphyllia wilsoni sp. nov.

Figures 18, 19, 20, 21 and 22

Holotype

WAM 168-84; a sub-circular flattened whole corallum with a maximum dimension of 114 mm; from Rat Island, Houtman Abrolhos Islands, Western Australia, on a horizontal consolidated rock substrate exposed to moderate wave action, at 8 m depth; collected by J.E.N. Veron in 1983.

The holotype shows the characters of coralla from habitats exposed to moderate wave action. Septa are thick, laminar linkages between centres are well developed and some monticule-like wall structures are developed.

Paratypes

WAM 169-84; part of a massive colony. Maximum dimension 139 mm; from Port Denison, Western Australia, in a rock crevice, protected from a strong wave action at 9 m depth; collected by J.E.N. Veron in 1982.

This specimen is characteristic of coralla from moderately shaded or calm-water habitats. Valleys are relatively sinuous, centres tend to be indistinct and have trabecular as well as laminar linkages, septa are relatively thin.

WAM 170-84; part of a massive colony. Maximum dimension 142 mm; from Port Denison, Western Australia, under a rock overhang, protected from wave action, at 12 m depth; collected by J.E.N. Veron in 1982.

This specimen is an ecomorph of *S. wilsoni* from shaded, calm-water habitats. Valleys are highly sinuous, centres are indistinct and have trabecular linkages, septa are thin.

Diagnosis

Within the *Symphyllia, S. wilsoni* resembles only *S. erythraea* Klunzinger, 1879 from the Red Sea and *S. simplex* Crossland, 1948 from South Africa. The former is primarily characterised by its short valleys resembling *Symphyllia* cf. *recta* ecomorph *hemispherica* (Veron and Pichon, 1980: 280); the latter is monocentric (possibly an *Acanthastrea*) with calices up to 40 mm diameter.

Description

Colonies are massive or submassive and flattened, with entire margins, usually <0.5 m diameter.

Valleys are very irregular in length and shape and may be monocentric to irregularly meandroid, this variation sometimes occurring in the one corallum. Valleys seldom exceed 13 mm diameter. Walls are uneven, irregular in shape and may form monticule-like structures. Columellae are well developed, 1.1-4.1 mm diameter, compact and spongy and are connected by laminar or trabecular linkages. In some coralla the columella is sub-continuous and linkages may be partly fused. Septa are equal or sub-equal, irregularly exsert, sometimes with a weakly developed ambulacral groove. Septal dentations are similar in appearance to those of *Acanthastrea.* There are 10-13 septa per centimetre. In most coralla, enlarged septa occur at irregular intervals and these are usually fused with thickened laminar linkages. The epitheca is usually well developed.

Living colonies have fleshy polyps with deep ambulacral grooves. They have a wide range of mottled colours, green, grey, purple and brown being the most common. Polyps are extended only at night.

Habitat preference and growth form

Symphyllia wilsoni commonly occurs in shallow coastal localities, south to Geographe Bay, which are characterised by rock substrate covered with kelp and exposed to wave swell. Colonies are usually found in crevices or hollows and have well calcified skeletons with relatively thick septa, some of which are greatly thickened and fused with thickened columella laminar linkages. These coralla usually have well developed monticule-like wall structures. *Symphyllia*

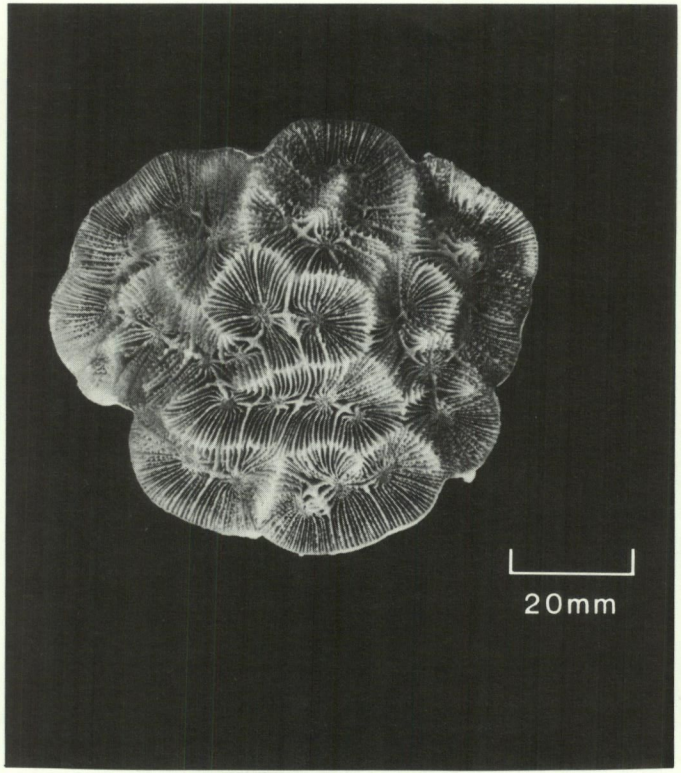


Figure 18 The holotype of *Symphyllia wilsoni.*

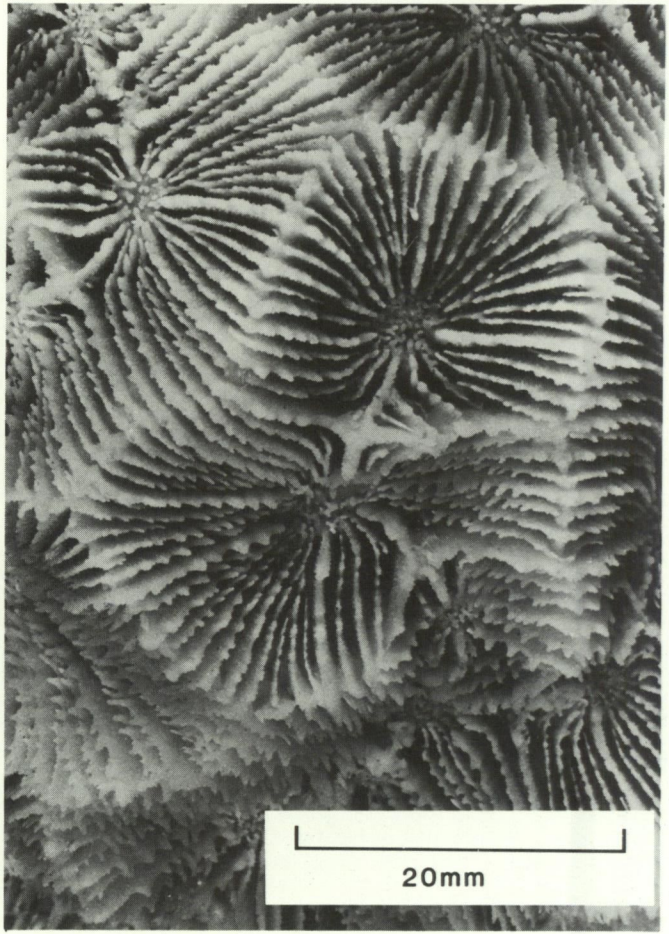
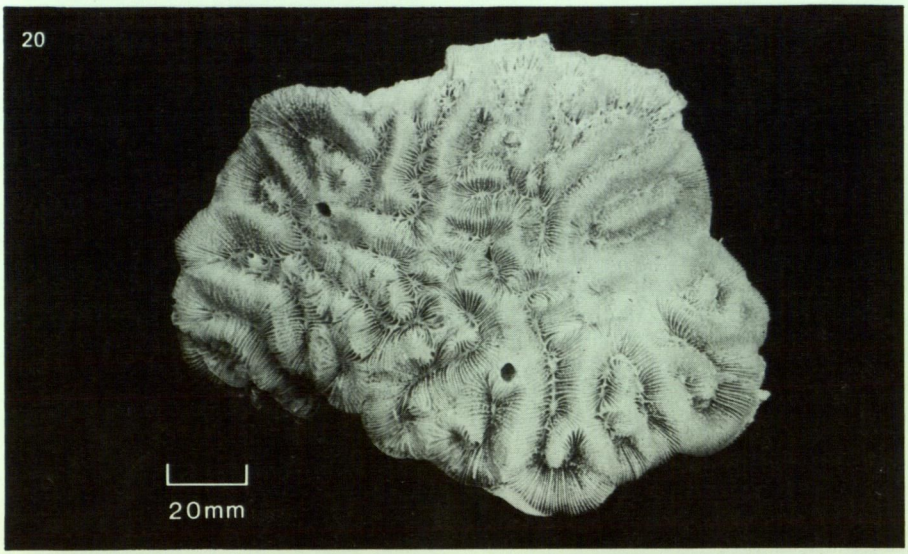
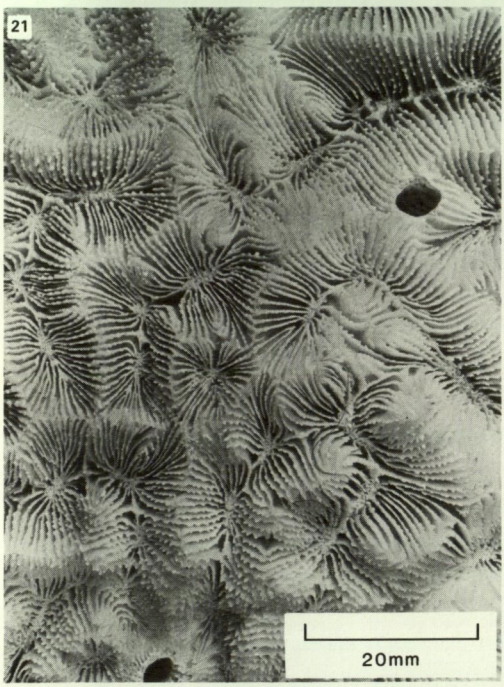


Figure 19 Valleys of the holotype of *Symphyllia wilsoni* showing *Acanthastrea*-like septal dentations and thick laminar linkages between centres.





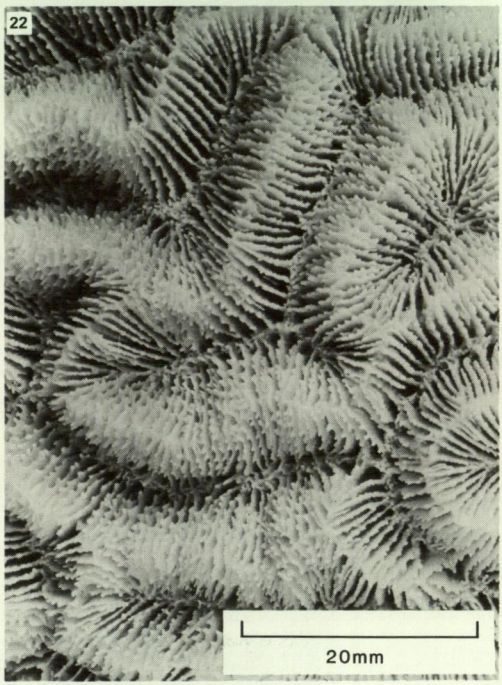


Figure 20 Paratype WAM 169-84 of *Symphyllia wilsoni.*

Figure 21 Valleys of paratype WAM 169-84 of *Symphyllia wilsoni.*

Figure 22 Valleys of paratype WAM 170-84 of *Symphyllia wilsoni* showing extreme development of trabecular linkages and near obliteration of columella centres.

wilsoni has also been reported from Geographe Bay, 15-20 m depth, where algae are small and sparce.

The species is also common in reefal habitats of the Houtman Abrolhos Islands which are not exposed to strong wave swell and where corals are generally dominant over kelp. Living colonies are similar in appearance to those from coastal localities but usually have less calcified coralla.

Coralla from protected environments (Figures 21 and 22) have relatively thin septa, laminar linkages between centres and in extreme conditions have indistinct columella centres.

Remarks

Coralla of this species superficially appear to be more faviid-like than mussid-like, with closest affinities to *Platygyra* or *Oulophyllia.* Septal dentations, however, are mussid and its inclusion in the Mussidae is strongly supported by the thick, fleshy appearance of the living polyps. This situation is similar to that of *Acanthastrea echinata* (Dana, 1846) which also has faviid-like coralla except for its mussid septal dentations. *Acanthastrea echinata,* likewise, has fleshy mussid-like polyps.

Distribution

Known only from Houtman Abrolhos and Rottnest Islands and coastal localities between Shark Bay and Geographe Bay.

Etymology

Named after Dr Barry Wilson, formerly of the Western Australian Museum who originally collected this species.

Additional material studied

Off Ludlow, Geographe Bay (WAM 57-59), Eagle Bay, Cape Naturaliste (WAM 51-59), Port Denison (2 specimens), Port Gregory (2 specimens including WAM 515-84), Houtman Abrolhos Islands (3 specimens WAM 179-78, 516-84 and 521-84), Shark Bay (WAM 393-81, 396-81).

Genus *Australomussa* gen. nov.

Type Species

Australomussa rowleyensis (this study). This genus is monospecific. Its characters are therefore those of *A. rowleyensis.*

Austalomussa rowleyensis sp. nov.

Figures 23, 24 and 25

Holotype

WAM 171-84; a distorted, oval-shaped, flattened whole corallum with a maximum dimension of 256 mm; from Legendre Island, Dampier Archipelago, Western Australia, at the base of a fringing reef with a nearly vertical slope, at 17 m depth; collected by J.E.N. Veron in 1983.

This corallum has the characteristic features of the genus well developed. Valleys are short and septo-costae well developed.

Paratypes

WAM 172-84; part of a flat corallum. Maximum dimension 240 mm; from Mermaid Reef, Rowley Shoals, Western Australia, in a protected, clear, reef lagoon with an undulating sand and rubble substrate at 9 m depth; collected by J.E.N. Veron in 1982.

This specimen is an ecomorph associated with a lagoonal environment. It has *Scolymia vitiensis*-like septo-costae up to 2.4 mm thick. Corallites are shallow.

WAM 183-84; a flattened whole corallum with a maximum dimension of 167 mm; from Phuket Peninsula, western Thailand on a substrate of steeply sloping rock with soft sediment and turbid water at 18 m depth; collected by J.E.N. Veron in 1984.

This corallum has a large central corallite encircled by secondary centres produced by extratentacular budding. The flattened corallum perimeter with shallow peripheral corallites is characteristic of colonies from deep or turbid-water environments.

Diagnosis

Australomussa shows little resemblances to any other genus. Its closest affinities appear to be with *Symphyllia* and *Scolymia*. It primarily differs from *Symphyllia* in having an initial central corallite which buds daughter corallites extratentacularly, in lacking meandering valleys (which some *Symphyllia* ecomorphs also lack) and in having widely separated series of centres without a true common wall between them.

Description

Colonies are flattened or helmet- or dome-shaped.

Centres are grouped in short, usually concentric series forming irregular shallow valleys in the corallum surface. Valleys are 8-20 mm wide and are separated by very thick walls. Columellae are well developed, spongy, and 0.3-1.1 mm diameter. Those in a series are joined by laminar or trabecular linkages which may become highly fused and up to 3 mm thick.

Septo-costae either radiate from corallite centres or are nearly parallel when running perpendicular to concentric series of centres. The former case is seen in juvenile colonies which have central corallites or a group of plocoid corallites each resembling a central corallite. Septo-costae are arranged in up to four indistinct orders, all of which become equal over the corallite wall. The latter case is seen in most large coralla (except for the central corallite which often remains distinguishable). In both cases septo-costae between corallites are 0.7-3.0 mm thick, and taper towards the columella centres. Thin septo-costae have tall triangular or pointed dentations and these get shorter and bead-like as septo-costae get thicker. Septo-costae are separated by blistery exothecal dissepiments. The epitheca is well developed only in coralla with thick septo-costae.

Juvenile coralla usually consist of a central corallite surrounded by one or more concentric rows of extratentacularly budded daughter corallites. These colonies seldom resemble adult ones, in general appearance.

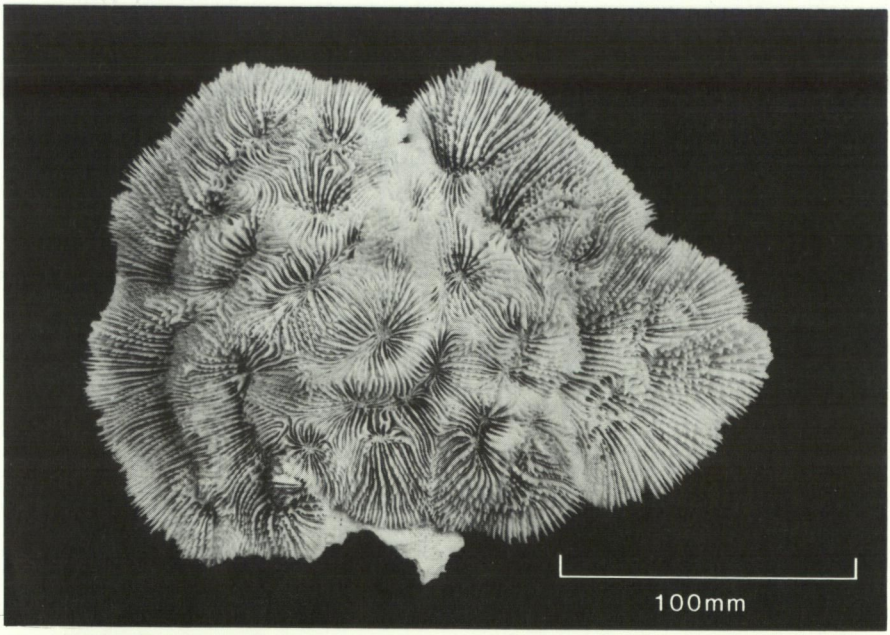


Figure 23 Holotype of *Australomussa rowleyensis.*

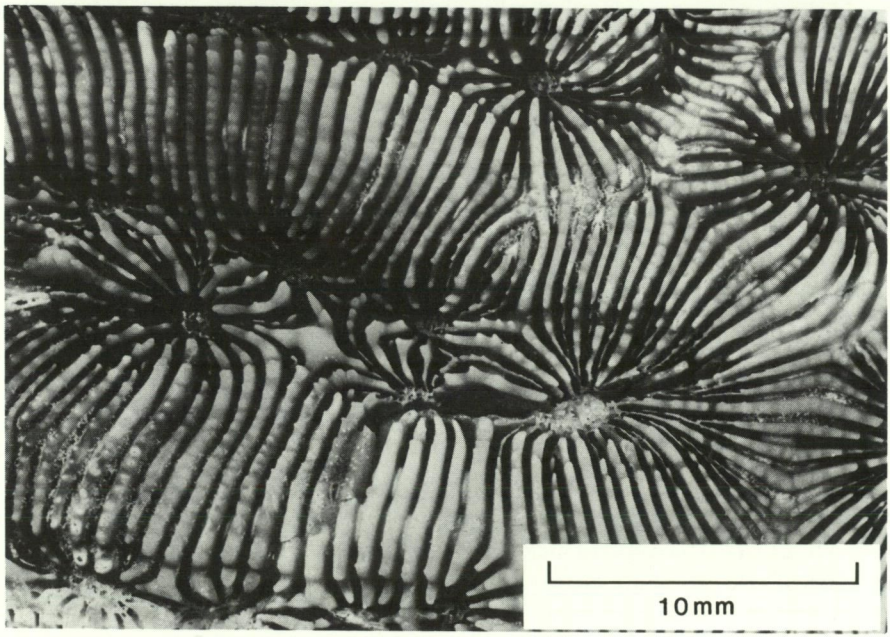


Figure 24 Paratype WAM 172-84 of *Australomussa rowleyensis* from the Rowley Shoals showing shallow valleys with thick septo-costae.

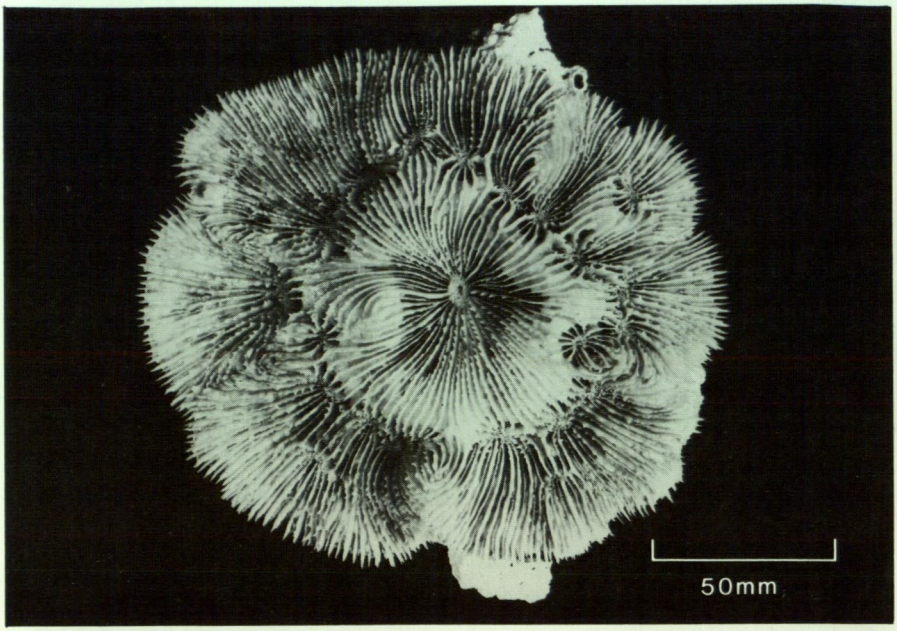


Figure 25 Paratype WAM 173-84 of *Australomussa rowleyensis* from Phuket, Thailand showing a large central corallite and secondary centres produced by extra-tentacular budding.

Living colonies from Australia are blue-grey or brown except for those from the Rowley Shoals which were green with dark grey centres. The same species from western Thailand is usually very colourful, red, blue and green colonies being the most common.

Skeletal variation

The main skeletal variation in the species (both mature and juvenile coralla) is in the degree of thickening of the septo-costae. The greatest degree of thickening found in the present series is in coralla from lagoonal environments, especially those from the Rowley Shoals. In this respect *Australomussa* has a similar response to environmental conditions as *Scolymia vitiensis* Brüggemann, 1877.

Remarks

Superficially *Australomussa* bears less resemblance to *Scolymia* than *Symphyllia* but its closest affinities are probably with the former. Both genera exhibit intra- and extra-tentacular budding, especially *S. vitiensis* (see Veron and Pichon, 1980: 240), they have similar septo-costae that exhibit similar environmentally induced variation, and they have a similar lack of clearly defined valley walls.

Distribution

Known only from Western Australia (Rowley Shoals, Dampier Archipelago and the Houtman Abrolhos Islands) and western Thailand including the Mergui Archipelago, Thailand, where it may be very abundant.

Etymology

The genus is so named because it was first recognised in Australian waters. The species is named after the Rowley Shoals where it was first recognised.

Additional material studied

Houtman Abrolhos Islands (1 specimen), Dampier Archipelago (7 specimens including WAM 513-84, 514-84), Rowley Shoals (4 specimens including WAM 512-84), Phuket, Thailand (4 specimens).

Family Merulinidae Verrill, 1866

Genus *Hydnophora* Fischer de Waldheim, 1807

Although *Hydnophora* is a readily recognised genus primarily characterised by the presence of conical collines (referred to as monticules or hydnae) it has had a history of confusion with *Merulina* and *Clavarina* of the Merulinidae. Thus, for example, *Merulina laxa* Dana, 1846, *Merulina prolifera* Quelch, 1886 and *Clavarina composita* Rehberg, 1892 are all synonyms of *Merulina (= Hydnophora) rigida* Dana, 1846 (Veron *et al.* 1977: 124).

Despite this confusion, *Hydnophora* has been placed, by the authors of this century, in the Faviidae while *Merulina* and *Clavarina* have been placed in the Merulinidae (except perhaps by Matthai [1924, 1928] who placed these genera together but did not group genera into families). This situation has been revised in the present study in the light of the structural characteristics and growth form variation of *Hydnophora pilosa.*

Hydnophora is placed in the Merulinidae for the following reasons:

1. Both *Merulina ampliata* (Ellis and Solander, 1786) and *Hydnophora pilosa* have, basically, the same growth forms and range of growth form variation, consisting of thin explanate plates in some combination with irregular upright branches.
2. The extended polyps of *Scapophyllia cylindrica* (Edwards and Haime, 1848) and *H. pilosa* are very similar.
3. Thin explanate plates of *M. ampliata, S. cylindrica, H. pilosa* and *H. exesa* (Pallas, 1766) have similar skeletal structures and differ primarily in the degree to which valleys diverge.

4. Branches of *Hydnophora* species, notably *H. rigida* and *H. pilosa,* have fine monticules that are frequently aligned down their sides forming ridges which are similar to the ridges of finely-branched *M. ampliata.*

5. 'The general appearance of *H. rigida* is similar to that of *Paraclavarina triangularis* (Veron and Pichon, 1980) (see page 000) and there is close similarity between the star-shaped centres at the base of *C. triangularis* branches and the flattened monticules at the base of *H. rigida* branches. The branch ends of both species, likewise, show similar septal and columella structures' (Veron *et al.* 1977).

Wells (1956) gives 'septa formed by one fan system of simple trabeculae, commonly with small inner fan system' as a diagnostic character of Subfamily Faviinae of Family Faviidae (the subfamily which has traditionally included *Hydnophora),* and 'septa of one fan system of compound trabeculae . . .' as a diagnostic character of Family Merulinidae. The significance of this difference for *Hydnophora* has not been examined in the present study, but could be raised as an objection to including *Hydnophora* in the Merulinidae.

Hydnophora pilosa **sp. nov.**

Figures 26, 27 and 28

Holotype

WAM 174-84; a complete colony with an encrusting base and a cluster of short branches. Maximum dimension 198 mm; from Elizabeth Reef, eastern Australia on a flat consolidated substrate exposed to moderate wave action at 6 m depth; collected by J.E.N. Veron in 1982.

This corallum shows laminar and subarborescent growth forms.

Paratypes

WAM 175-84; a flat laminary plate 139 mm maximum dimension; from Beacon Island, Houtman Abrolhos Islands, Western Australia, on a lower reef slope with a substrate of unconsolidated rubble at 28 m depth; collected by J.E.N. Veron in 1982.

This corallum is a flat explanate plate. In general appearance it is *Merulina*-like but valleys do not converge.

WAM 176-84; an arborescent corallum 129 mm high; from Legendre Island, Dampier Archipelago, Western Australia, on horizontal solid substrate, clear water and at 12 m depth; collected by J.E.N. Veron in 1983.

This corallum is an arborescent part of a colony that had been arborescent and laminar components.

Diagnosis

Within *Hydnophora, H. pilosa* most closely resembles *H. rigida* and *H. exesa. In situ* it is usually distinguished from both these species by having polyps extended during the day. Coralla of *H. rigida* are readily distinguished by always being fully arborescent. Individual branches of both species are, however, indistinguishable. Coralla of *H. exesa* have thicker bases, columns or branches, and have larger monticules which are seldom arranged in rows. All skeletal characters

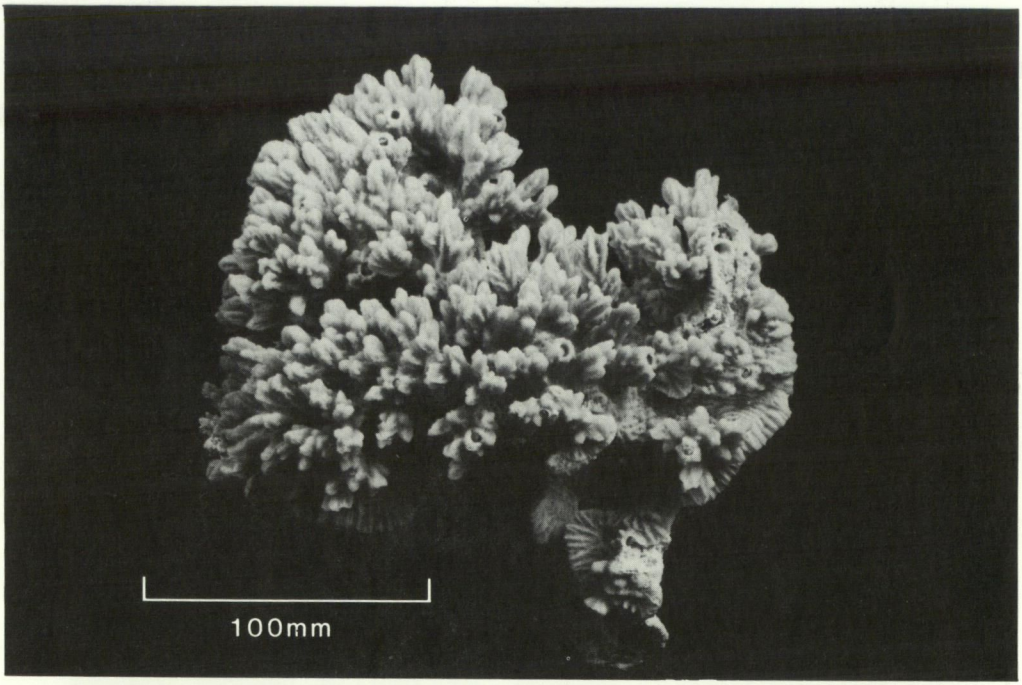


Figure 26 Holotype of *Hydnophora pilosa* from Elizabeth Reef.

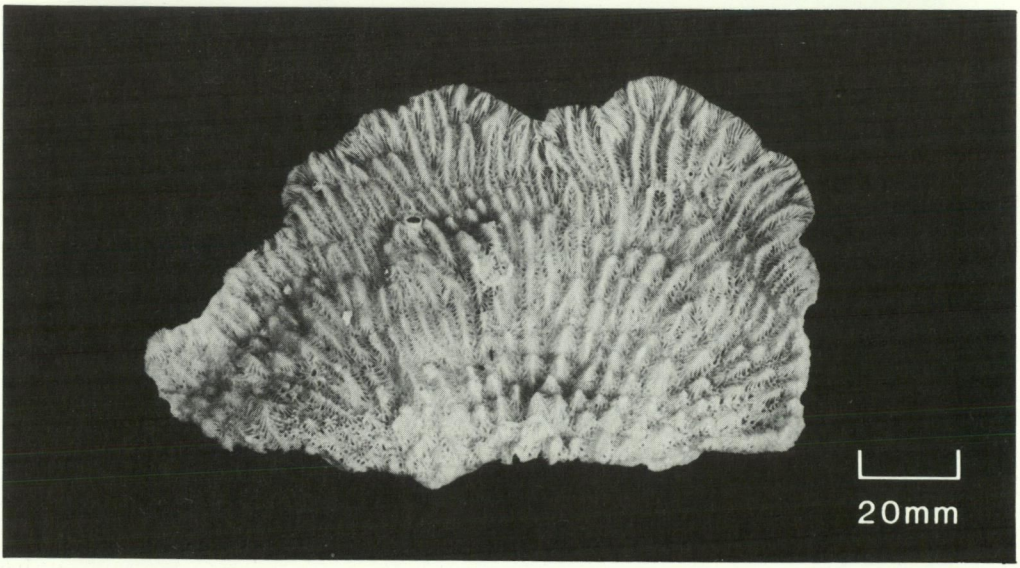


Figure 27 Paratype WAM 175-84 of *Hydnophora pilosa.* The corallum, from the Houtman Abrolhos Islands, is a flat explanate plate.

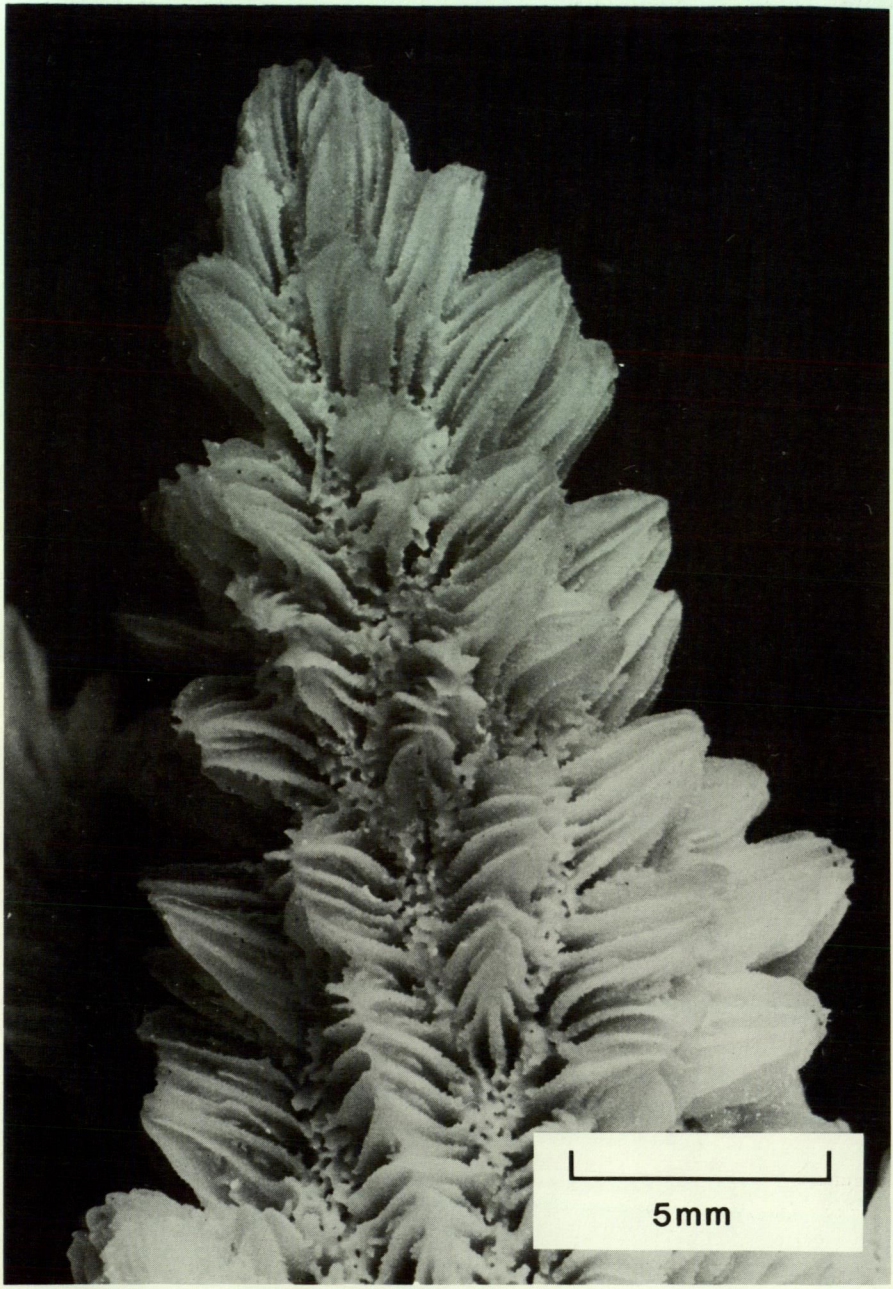


Figure 28 Paratype WAM 176-84 of *Hydnophora pilosa*. The corallum, from Dampier Archipelago, is arborescent.

including the septa are coarser in *H. exesa*. This difference is readily seen in coralla taken from the same habitat but may not be clear in coralla from different habitats.

Description

Colonies have encrusting laminar or sub-massive bases with short columns or branches. Some colonies are almost devoid of branches while others have frequently dividing branches, 10-25 mm diameter, of a wide range of shapes and sizes. These branches may be flattened along their whole length and are always flattened towards their tips.

Monticules, septa and columella have structures identical to those of *H. rigida* (see Veron *et al.* 1977: 127). Monticules are fine and are usually aligned forming ridges down branches and across encrusting bases in a *Merulina*-like manner. Only on sturdy branches are conical monticules developed and these are separated by spongy columellae which may be continuous between monticules.

Living colonies are very distinctive, as polyps have elongate tentacles extended day and night. The tentacles are terete, of uniform length and are arranged in neat rows. They are dark brown or blue-grey and have white tips. (They are very similar to those of *Scapopyllia cylindrica*).

Distribution

Off eastern Australia, occurs only on Elizabeth and Middleton Reefs. Known to occur along the west coast from the Houtman Abrolhos Islands north to Dampier Archipelago including Shark Bay, and the Ningaloo Reef Tract.

Etymology

Name alludes to the hairy appearance of the living colony with tentacles extended during the day.

Additional material studied

Elizabeth reef (WAM 518-84, 519-84), Middleton Reef (WAM 520-84), Ningaloo Reef Tract, North West Cape (WAM 336-77), Dampier Archipelago (2 specimens including WAM 517-84).

Paraclavarina gen. nov.

Type Species

Clavarina triangularis Veron and Pichon, 1980.

Diagnosis

Paraclavarina is like *Merulina* except that it is ramose without any development of laminae. It is the only fully ramose genus in the Merulinidae.

Description

The description of *Clavarina triangularis* by Veron and Pichon (1980) is repeated below.

'Colonies, which frequently exceed 1 m diameter, resemble those of *Hydnophora rigida* in consisting entirely of a network pf anastomosing branches without any plate-like or foliaceous basal attachment (Figs. 765, 766). Some colonies have lax, open branching, while others are compact and bushy. Old branches may be up to 1.5 cm thick; most average 1 cm except towards the tips where they taper. All branches are basically triangular in section and have three series of centres, one on each side, with the angles being the common walls. On most branches the series of centres are straight and divide only when the branch divides. Thicker branches may have more irregular series with frequent divisions not associated with sub-branches and branch sections may be more circular than triangular. Branch tips (Figs. 381, 382) are three-pointed star-shaped in section, with the centres lying along the valleys and the walls forming the points. Septa are in two alternating orders. First order septa are slightly exsert, either adjoined over the wall or, more usually, separated by a groove. They increase in thickness towards the 'valley' axes and most curve towards the nearest centre. Their inner margins, which are mostly vertical, may have large dentations. However, most skeletal structures at the centres and along the valley axes are fused together so that the centres are star-shaped, consisting of 5-10 thick, radiating septa with fused inner margins and deep inter-septal loculi (Fig. 383). Second order septa are short and usually thinner than those of the first order. All septa are dentate, those of the first order usually more so than those of the second. Centres are linked by a single, sometimes very thick, laminar plate, which itself is fused to adjacent septa. There are no clearly defined calices and valleys are often very superficial. Columellae may be trabecular or spongy, but are only distinguishable as such near branch tips.

Individual centres and the perimeter of oral discs are clearly defined in living coralla. When polyps are expanded at night, fine, elongate tentacles usually occupy most of the space between the branches. Colonies are pale yellow or cream.

Skeletal variation

Large colonies usually have compact, frequently anastomosing branches giving the colony a bushy appearance. Such colonies are readily broken by wave action and daughter colonies, growing from scattered fragments, frequently have irregular shapes. However, most of the species variation in skeletal structure can frequently be found in the one corallum or branch. Older parts of branches are usually heavily calcified with valleys indistinguishable and centres distinguished only as star-like radiating septa as described above. Valleys become more apparent towards the branch tips where septal dentations become tracecular and the elements of spongy collumellae discernible.'

Remarks

Merulina scabricula Dana, 1846 is the type species of *Clavarina* Verrill, 1964, the genus to which *C. triangularis* was assigned by Veron and Pichon (1980). Two species were included by them in *Clavarina: C. scabricula* and *C. triangularis* with the suggestion that *Merulina togianensis* Umbgrove, 1940 was a probable synonym of *scabricula.*

Umbgrove (1940) and Chevalier (1975) discussed the relationships between *C. scabricula* and *Merulina ampliata* (Ellis and Solander, 1786) and both concluded that these species belonged to the same genus, *Merulina.* However, the name *Clavarina* was revived by Veron and Pichon, 1980 for *triangularis* which appeared to have close affinities with Dana's holotype of *scabricula,* but could not be included in *Merulina,* mainly because it is entirely ramose, lacking the encrusting base of *Merulina* species. 'Without the present species *(C. triangularis),* there would appear little reason for maintaining *Clavarina* separate from *Merulina,* and most authors have not done so. However, as *C. triangularis* can hardly be placed in *Merulina* and as it does have clear affinities with *C. scabricula,* the authors propose to revive the genus *Clavarina* rather than create a new genus for *triangularis'* (Veron and Pichon 1980: 227).

Since that time, two species of *Merulina* have been studied by the author at Phuket and the Mergui Archipelago, Thailand and at Scott Reef, north-western Australia, where both are common and occur together. These species are clearly *M. ampliata* and *M. scabricula,* skeletal details of the latter being virtually identical to Dana's holotype (USNM 165). These studies support the original conclusion of Umbgrove (1940) and Chevalier (1975) that these are similar, but distinct, species of *Merulina,* neither of which is close to *triangularis.*

Clavarina triangularis is therefore transferred to the new genus *Paraclavarina.* As far as is known, this genus is monospecific.

Additional material studied

Elizabeth Reef (1 specimen), Middleton Reef (2 specimens), Ningaloo Reef Tract, North West Cape (1 specimen), Dampier Archipelago (2 specimens).

Acknowledgements

The author gratefully acknowledges the continuing assistance of Ms Loisette Marsh in all aspects of this study. Hospitality and field assistance was also provided by other staff of the Western Australian Museum, especially Mr Clay Bryce, Ms Shirley Slack-Smith, Dr Ric How and Dr Paddy Berry. The author also thanks Dr Graham Chittleborough and Mr Chris Simpson of the Western Australian Department of Conservation and Environment, Dr Bruce Hatcher of the CSIRO, and also the Australian Institute of Marine Science for providing funding and field support.

Type specimens were loaned to the author by Dr Paul Cornelius of the British Museum (Natural History) and Dr Frederick Bayer of the United States National Museum.

Photographs were taken by Mr Les Brady and electron-micrographs by Mr Ed Lovell, both of the Australian Institute of Marine Science.

References

Bernard, H.M. (1897). *Montipora.* The genus *Anacropora. Cat. Madreporarian Corals. Br. Mus. (Nat. Hist.)* 3: 1-192.

Blainville, H.M. de (1830). Zoophytes. *In 'Dictionnaire des Sciences naturelles'.* Paris. 60: 295-364.

Brüggemann, F. (1877). Notes on the stony corals in the British Museum. *Ann. Mag. Nat. Hist.* 19 (4): 415-421.

Chevalier, J.P. (1975). Les scleractiniaires de la melanesie francaise (Nouvelle-Caledonie, Iles Chesterfield, Iles Loyaute, Nouvelles-Hebrides). Leme Partie. *Exped. Recifs Coralliens Nouvelle-Caledonie,* Fond. Singer-Polignac, Paris. 7: 5-407, pl. 1-42.

Crossland, C. (1948). Reef corals of the South African Coast. *Ann. Natal. Mus.* 11 (2): 169-205.

Crossland, C. (1952). Madreporaria, Hydrocorallinae, *Heliopora* and *Tubipora. Sci. Rep. Great Barrier Reef Exped. 1928-29. Br. Mus. (Nat. Hist.)* 6 (3): 85-257.

Dana, J.D. (1846-1849). Zoophytes. *U.S. Exploring Exped. 1838-1842.* 7: 1-740.

Edwards, H. Milne and Haime, J. (1848). Note sur la classification de la deuxieme tribu de la famille des Astreides. *C.R. Hebd. Seances Acad. Sci.* 27 (20): 490-497).

Edwards, H. Milne and Haime, J. (1851). Recherches sue les polypiers. Mem. 7, Monographie des Poritides. *Ann. Sci. Nat. Zool.* 3e Ser. 16: 21-70.

Edwards, H. Milne and Haime, J. (1860). Histoire naturelle des Coralliaires. Paris. 1-560.

Ehrenberg, C.G. (1934). Beitrage zue physiologischen Kenntniss der Corallenthiere im Allgemeinen und besanders des Rothen Meeres. *Abh. Akad. Wiss: D.D.R.* 1832: 250-380.

Ellis, J. and Solander, D. (1786). The natural history of many curious and uncommon zoophytes. London. 1: 1-208.

Fischer, Waldheim de (1807). Description du Museum Demidoff. Moscow. 3: 295-296.

Fôrskal, P. (1775). Descriptions Animalium, Avium, Amphibiorum, Piscium, Insectorum, Vermium que in intinere orientali observavit Petrus Forskal. IV Corallia. Hauniae. 131-139.

Gray, J.E. (1842). Pocilloporidae in 'Synopsis Br. Mus.' (44th ed.).

Hoffmeister, J.E. (1925). Some corals from American Samoa and the Fiji Islands. *Pap. Dep. Mar. Biol. Carnegie Inst. Wash.* (Publ. 343) 22: 1-90.

Klunzinger, C.B. (1879). Die Korallenthiere des Rothen Meeres. Gutmann, Berlin. 2: 1-88, 3: 1-100.

Lamarck, J.B.P. de (1816). Histoire naturelle des animaux sans vertebres. Paris. 2: 1-568.

Lamberts, A.E. (1980). Two new species of *Astreopora* (Cnidaria, Anthozoa, Scleractinia) from the Mid-Pacific. *Pacific Sci.* 34 (3): 261-267.

Lamberts, A.E. (1982). The reef coral *Astreopora* (Anthozoa, Scleractinia, Astrocoeniidae): a revision of the taxonomy and description of a new species. *Pacific Sci.* 39 (1): 83-105.

Link, H.T. (1807). Beischreibung der Naturalien-Sammlungen der Universitat zu Rostock. 3: 161-165.

Matthai, G. (1924). Report of the Madreporarian corals in the collection of the Indian Museum, Calcutta. *Mem. Indian Mus.* 8: 1-59.

Matthai, G. (1928). A monograph of the recent meandroid Astraeidae. *Cat. Madreporarian Corals. Br. Mus. (Nat. Hist.).* 7: 1-288.

Oken, L. (1815). Lehrbuch der Naturgeschichte. III Zoologie. Schmid, Leipzig, Jena. 1: 59-74.

Ortmann, A. (1890). Die Morphologie des Skeletts dere Steinkorallen in Beziehung zue Koloniebildung. *Z. Wiss. Zool.* 50: 278-316.

Pallas, P.S. (1766). Elenchus Zoophytorum. Den Haag. 1-451.

Quelch, J.J. (1886). Report on the reef-corals collected by H.M.S. *Challenger* during the years 1873-76. *Rep. Sci. Results Voyage H.M.S. Challenger Zool.* 16 (3): 1-203.

Rehberg, H. (1892). Neue und wenig bekannte Korallen. *Abh. Naturwiss. Ver. Hamburg.* 12: 1-50.

Umbgrove, J.H.F. (1940). Madreporaria from the Togian reefs (Gulf of Tomini, North-Celebes). *Zool. Meded. Rijksmus. Nat. Hist. Leiden.* 22: 265-310, pl. 21.35.

Vaughan, T.W. (1907). Some madreporarian corals from French Somaliland, East Africa, collected by Dr Charles Gravier. *Proc. U.S. Natl. Mus.* 32 (1526): 249-265.

Vaughan, T.W. (1918). Some shoal-water corals from Murray Islands, Cocos-Keeling Islands and Fanning Island. *Pap. Dep. Mar. Biol. Carnegie Inst. Wash.* 9 (Publ. 213): 51-234.

Veron, J.E.N. and Pichon, M. (1976). Scleractinia of eastern Australia. I Families Thamnasteriidae, Astrocoeniidae, Pocilloporidae. *Aust. Inst. Mar. Sci. Monogr. Ser.* 1: 1-86.

Veron, J.E.N. and Pichon, M. (1980). Scleractinia of eastern Australia. III Families Agariciidae, Siderastreidae, Fungiidae, Oculinidae, Merulinidae, Mussidae, Pectiniidae, Caryophyllidae, Dendrophyllidae. *Aust. Inst. Mar. Sci. Monogr. Ser.* 4: 1-422.

Veron, J.E.N. and Pichon, M. (1982). Scleractinia of eastern Australia. IV Family Poritidae. *Aust. Inst. Mar. Sci. Monogr. Ser.* 5: 1-159.

Veron, J.E.N., Pichon, M. and Wijsman-Best, M. (1977). Scleractinia of eastern Australia. II Families Faviidae, Trachyphylliidae. *Aust. Inst. Mar. Sci. Monogr. Ser.* 3: 1-233.

Veron, J.E.N. and Wallace, C. (1984). Scleractinia of eastern Australia. V Family Acroporidae. *Aust. Inst. Mar. Sci. Monogr. Ser.* 6 (in press).

Verrill, A.E. (1866). Synopsis of the polyps and corals of the North Pacific Exploring Expedition, 1853-1856, with descriptions of some additional species from the West Coast of North America. III Madreporaria. *Comm. Essex Inst. Salem.* 5, 6.

Verrill, A.E. (1902). Notes on corals of the genus *Acropora* (*Madrepora* Lam.) with new descriptions and figures of types, and of several new species. *Trans. Connecticut Acad. Arts Sci.* 11: 207-266.

Wells, J.W. (1956). Scleractinia. *In* Moore, R.C. 'Treatise on Invertebrate Palaeontology. Coelenterata'. *Univ. Kansas Press,* F., F328-F440.

Received 28 March 1984 Accepted 9 May 1984 Published 2 April 1985

Guide to Authors

Subject Matter

Reviews, observations and results of research into all branches of natural science and human studies will be considered for publication. However, emphasis is placed on studies pertaining to Western Australia. Full length papers should not normally exceed 30 typed pages. Short communications should not normally exceed three typed pages and this category of paper is intended to accommodate observations, results or new records *of significance*, that otherwise might not get into the literature, or for which there is a particular urgency for publication. All material must be original and not have been published elsewhere.

Presentation

Authors are advised to follow the layout and style in the most recent issue of the *Rec. West. Aust. Mus.* including headings, tables, illustrations and references.

The title should be concise, informative and contain key words necessary for retrieval by modern searching techniques. Names of new taxa must not be included. An abridged title (not exceeding 50 letter spaces) should be included for use as a running head.

An abstract must be given in full length papers but not short communications, summarizing the scope of the work and principal findings. It should normally not exceed 2% of the paper and should be suitable for reprinting in reference periodicals. Contrary to Recommendation 23 of the International Code of Zoological Nomenclature it may include names of new taxa.

Footnotes are to be avoided, except in papers dealing with historical subjects.

The International System of units should be used.

Numbers should be spelled out from one to nine in descriptive text; figures used for 10 or more. For associated groups, figures should be used consistently, e.g. 5 to 10, not five to 10.

Spelling should follow the *Concise Oxford Dictionary*.

Systematic papers must conform with the International Codes of Botanical and Zoological Nomenclature and, as far as possible, with their recommendations.

Synonymies should be given in the short form (taxon, author, date, page) and the full reference cited at the end of the paper.

Manuscripts

The original and two copies of manuscripts and figures should be submitted to the Editorial Committee, c/- Publications Department, Western Australian Museum, Francis Street, Perth, Western Australia 6000. They must be in double-spaced typescript on A4 sheets. All margins should be at least 30 mm wide. Tables plus headings and legends to illustrations should be typed on separate pages. The desired positions for insertion of tables and illustrations in the text should be indicated in pencil. Tables should be numbered consecutively, have headings which make them understandable without reference to the text, and be referred to in the text.

High quality illustrations are required to size (13.5 cm x 18 cm) or no larger than 32 cm x 40 cm with sans serif lettering suitable for reduction to size. Photographs must be good quality black and white prints, 13 cm x 18 cm (5 inches x 7 inches). If scale line and lettering are required on photographs *do not* place directly on to print. They should be positioned on a clear paper or film overlay. Scale must be indicated on illustrations. All maps, line drawings, photographs and graphs, should be numbered in sequence and referred to as Figure/s in the text and captions. Each must have a brief, fully explanatory caption.

In papers dealing with historical subjects references may be cited as footnotes. In all other papers references must be cited in the text by author and date and all must be listed alphabetically at the end of the paper. The names of journals are abbreviated according to *World List of Scientific Periodicals*. The use of 'unpublished data' or 'personal communication' is discouraged.

Processing

Papers and short communications are reviewed by at least two referees and acceptance or rejection is then decided by an editorial committee.

The senior author is sent two sets of galley proofs (one to be retained) and one set of page proofs which must be returned promptly.

The senior author will receive fifty free offprints of the paper. Additional offprints can be ordered at page proof stage.

CONTENTS

museum