SCLERACTINIAN REEF CORALS: IDENTIFICATION NOTES

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AUGUST 2004

DOI: 10.13140/RG.2.2.24656.51205
http://dx.doi.org/10.13140/RG.2.2.24656.51205

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INTRODUCTION

The purpose of this booklet is to highlight the characters that are most important for distinguishing species of scleractinian reef corals that I have needed to identify, compare, etc for various purposes. Information is taken from:

- The Australian Institute of Marine Science monograph series
- *Corals of the World* by Veron, 2000 and *New Species Described in Corals of the WorId* by Veron 2002 for species newly described or revised by Veron
- Staghorn Corals of the World by Wallace, 1999 for species of *Acropora*
- My notes and observations (1) of the Museum of Tropical Queensland collection for skeletal characters and (2) during field work
- Other references as listed under the References at the end of these notes

Families of Sc1eractinian corals are traditionally defined on the basis of ultrastructural characters, which are mostly visible only with a scanning electron microscope. The arrangement of genera within families is likely to change as new evidence, particularly genetic information, becomes available. Descriptions of families, genera and species highlight differences and similarities for species in these notes.

ABBREVIATIONS AND DEFINITIONS

Bifacial: corallites occur on both sides eg of a plate or frond
cf. Compare
Columella: axial structure in the centre of corallites e.g. lamellar, papillose, styliform, trabecular
Calice: the upper open end of the corallite
Coenosteum: skeleton uniting the corallites
Corallite wall/theca: encloses the polyp, unites the outer ends of the septa
Corallum: the skeleton of a coral
Costae: extensions of the septa on the outside of the corallite wall
Dentations: teeth which form along the upper margins of the septa
Dissepiments: partitions which cut off the lower part of the colony which the polyp no longer occupies (as the polyp grows upward)
Edge zone: zone between the cal ice or top of branch and the start of the epitheca, where live coral tissue comes down to meet the epitheca
Exsert corallite: corallite which protrudes above the level of the coenosteum
Exsert septa: septa which project above the corallite wall
Foliaceous: growth form in which colonies form thin sheets which may be inclined upwards and sometimes develop into branches
Immersed corallite: corallite which does not protrude above the level of the coenosteum
Lamellar columella: plate lying lengthwise along longer axes of calices e.g. *Leptoria phrygia*
Laminar: colony growth form in which colonies form flat horizontal plates, tending towards encrusting or massive growth forms
Monocentric: corallites have one columella centre per corallite
Paliform lobes: pillars on the inner edges of septa
Paliform crown: a circle of paliform lobes
Papillose columella: one or a few vertical pillars, usually granulated, develop from a trabecular columella although this is not usually evident
Septal margin: the upper/linner edge of the septa
Septa-costae: septa and costae which cannot be differentiated (e.g. if corallite walls are not developed), usually continuous between corallite centres
Stomadeum (pl. stomodaea): tube connecting mouth of polyp to the gastrovascular cavity
Styliform columella: solid vertical pillar-like structure
Synapticulae approximately horizontal rods connecting adjacent septa
Theca: corallite wall
Trabeculae: vertical microscopic rods in the septa
Trabecular columella:
common type of columella in favids
formed from the intermingling of **trabeculae**, **synapticulae** and **paliform lobes** from the inner septal margins of larger/lower cycle septa
may be (a) weakly developed and loose or (b) compact and spongy
Unifacial: corallites occur only on one side e.g. of a plate or frond

FAMILY ACROPORIDAE

Montipora

Growth form and the presence, appearance and arrangement of the tuberculae and papillae are used to identify species of *Montipora*. The tuberculae and papillae are homologous structures differing only in size. Tuberculae are the coenosteal elaborations larger than the corallites and papillae are smaller than the corallites. I use papillae/tuberculae if elaborations are about the same size, or just smaller or larger than the corallites. Thecal papillae are arranged around corallites while reticulum papillae are on the coenosteum (reticulum) between corallites.

Massive/thick plates/encrusting & tuberculae/papillae

Montipora monasteriata

GROWTH FORM

Colonies massive or form thick plates, plates bifacial or unifacial

Epitheca developed

CORALLITES AND COENOSTEUM

The coenosteum is **uniformly covered with papillae/tuberculae** (larger cf. *M. tuberculosa* papillae) Corallites only between (not in) papillae/tuberculae

Papillae/tuberculae may be absent or more scattered on concave surfaces

Papillae/tuberculae can fuse on flat surfaces into short ridges perpendicular to colony margin

Reticulum coarse, the papillae/tuberculae have elaborated spinules

COLOUR

Pale brown or blue/pink, with blue/pink or white margins

Massive/thick plates/encrusting & papillae

Montipora tuberculosa

GROWTH FORM

Submassive, encrusting, or laminar, surface usually raised into irregular mounds

CORALLITES AND COENOSTEUM

Corallites evenly distributed

Papillae/tuberculae all of a similar size, some papillae on reticulum may be smaller than thecal papillae

Thecal papillae surround some corallites, sometimes fusing as tubes

Spinules on all papillae and usually very elaborated, reticulum always spongy and coarse

COLOUR

May be bright colours e.g. blue in shallow water, but is usually dull brown or green

Montipora efflorescens

GROWTH FORM

Massive with irregular mounds fusing into **globular protuberances** to 15 mm high and 12 mm wide

CORALLITES AND COENOSTEUM

Corallites separated by 2 -4 calice diameters

Thecal and reticulum papillae may not be clearly differentiated (cf. *M. hispida* and *M. grisea*) **Reticulum** coarse, **usually obliterated by papillae**, all papillae covered with elaborated spinules sometimes forming a thick uniform cover over colony surface

COLOUR

Usually bright or dark green, sometimes cream, brown, blue/purple

Montipora nodosa

GROWTH FORM

Massive or thick unifacial plates, **epitheca well developed**

CORALLITES AND COENOSTEUM

Immersed and exsert corallites intergraded and intermixed

Corallites surrounded by fused thecal papillae forming a tube

Thecal and reticulum papillae similar, both covered with highly elaborated spinules

Reticulum is medium-coarse, spongy or covered with elongated spinules

COLOUR

Pale brown, green or blue/purple

Montipora grisea

GROWTH FORM

Massive, submassive or thick, unifacial, encrusting plates

CORALLITES AND COENOSTEUM

Papillae two sizes, with **thecal papillae much taller than the reticulum papillae**

Thecal papillae surround all corallites, may be partly fused or form fused cylinders

Reticulum is medium-fine, all papillae covered with slightly elaborated spinules

COLOUR

Usually dark brown or dark green or mixtures of both, or may be various pale colours, bright blue or pink in shallow water

Montipora crassituberculata

GROWTH FORM

Submassive or thick subencrusting plates

Epitheca is well developed, usually to 1 -3 cm from margin

CORALLITES AND COENOSTEUM

Corallites large (compare *M. aequituberculata*)

Papillae around and between corallites large, often fuse into tubes around corallites or short ridges, giving colony surface a crowded appearance

Papillae covered with elaborated spinules and the reticulum is coarse

COLOUR

Usually brown or blue, corallite centres may be brightly coloured

Montipora calcarea

Irregular thick plates with columnar upgrowths

Corallites crowded (more crowded cf. *M. cocosensis*) and immersed

Corallites on upgrowths – slight formation of a lower lip

Coenosteum coarse, light

Montipora effusa

NB these notes from Veron 2000

GROWTH FORM

Submassive or unifacial plates

CORALLITES AND COENOSTEUM

Elongate thecal papillae

COLOUR

Mostly brown with brightly coloured polyps

Massive/thick plates/encrusting & tuberculae

Montipora hoffmeisteri
GROWTH FORM
Thick, submassive plates
Epitheca developed
CORALLITES AND COENOSTEUM
Corallites unevenly distributed, mostly between tuberculae, single corallites may also be in the summits of tuberculae and one or more corallites may be in the sides of tuberculae
Tuberculae conical, 2 -4 mm diameter, irregularly fused
The reticulum is uniform, moderately coarse, covered with elaborated spinules
COLOUR
Cream or brown, sometimes brightly coloured

Montipora floweri
GROWTH FORM
Submassive
CORALLITES AND COENOSTEUM
Corallites very small Corallites distributed evenly and independently of tuberculae, (evenly spaced over colony surface, on and between tuberculae)
Tuberculae irregularly fused
Reticulum moderately coarse, spinules may be highly elaborated
COLOUR
Usually dark brown or green

Montipora millepora
Occurs in crevices and under ledges and overhangs
GROWTH FORM
Massive or encrusting
CORALLITES AND COENOSTEUM
Corallites very small
Corallites evenly distributed, between and sometimes on sides of tuberculae
Tuberculae low encrusting, cover colony surface Reticulum medium to fine, sometimes finer on tuberculae with elaborated spinules
COLOUR
Dark green or brown

Massive/thick plates/encrusting & NO tuberculae or papillae

Montipora foveolata
GROWTH FORM
Massive or thick plates
CORALLITES AND COENOSTEUM
Corallites foveolate
Tuberculae and papillae absent
Reticulum medium to fine, spinules have slightly elaborated tips giving a smooth but highly porous structure
COLOUR
Usually pale brown, blue/pink or cream, frequently bright blue or green polyps extended during the day

Montipora venosa
GROWTH FORM
Massive or submassive
CORALLITES AND COENOSTEUM
Corallites slightly foveolate, funnel only slightly wider than the calice diameter, development of funnels is variable (like a diminutive *M. foveolata*)
Tuberculae and papillae absent
COLOUR
Pale brown or blue

Montipora caliculata
GROWTH FORM
Massive or submassive
CORALLITES AND COENOSTEUM
Corallites an intergraded mixture of subfoveolate, tubular and immersed
Corallite perimeter is usually irregular i.e. discontinuous and/or uneven in height
Tuberculae and papillae absent
Reticulum uniform, moderately coarse
COLOUR
Brown or blue

Massive/thick plates/encrusting with columns/nodules & tuberculae

Montipora mollis
Mostly on subtidal mud flats and other inshore habitats
GROWTH FORM
Bifacial or encrusting plates with short irregularly dividing and fusing clumps of tapering columns, columns up to 50 mm long and 4.5 mm thick
CORALLITES AND COENOSTEUM
Colony surface is usually glabrous, low conical tuberculae may be developed on the reticulum of plating surfaces
Corallites not closely arranged
Reticulum moderately coarse, slightly finer on tuberculae, simple spinules
COLOUR
Usually uniform brown

Massive/thick plates/encrusting with columns/nodules & NO tuberculae or papillae

Montipora angulata
GROWTH FORM
Extensive encrusting bases with short branches
Branches form a compact clump, usually flattened in the plane of division, sometimes anastomose
CORALLITES AND COENOSTEUM
Corallites evenly distributed, of uniform diameter
Thin ridges between corallites give them a slightly foveolate appearance
Reticulum characteristically coarse with little or no tendency to form spinules
COLOUR
Pale brown

Massive/thick plates/encrusting with columns/nodules & papillae

Montipora australiensis
GROWTH FORM
Thick, horizontal bifacial plates with columns
Columns up to 2.5 cm diameter and fairly uniform in shape and size, rounded ends, frequently divide and anastomose forming a compact mass up to 25 cm high
CORALLITES AND COENOSTEUM
Exsert and immersed corallites
Exsert corallites surrounded by fused thecal papillae forming a tube
Fine reticulum ridges of coenosteum join corallites or tubes around corallites
Unfused papillae inconspicuous or absent Ridges and fused papillae have a finer reticulum cf. the much coarser basal reticulum
COLOUR
Pale brown

Montipora corbettensis
GROWTH FORM
Massive or thick plates, usually with variably shaped upward growths near centre
Plates unifacial or bifacial with widely spaced corallites, or epitheca is developed to the colony margin
CORALLITES AND COENOSTEUM
Papillae of a similar size, about the same diameter as the corallites**, no conspicuous thecal papillae**, closely arranged and not fused
Papillae look like little clubs
Reticulum coarse and is covered with spinules with few elaborations, spinules on papillae highly elaborated
COLOUR
Yellowish-brown and pale brown

Montipora informis
GROWTH FORM
Massive, plate-like or encrusting
CORALLITES AND COENOSTEUM
Corallites uniformly distributed
The reticulum is medium-fine and **uniformly covered with closely arranged, compact elongated papillae of uniform size (more than any other species of *Montipora*)**
Papillae never grouped around corallites, therefore **no conspicuous thecal papillae**
All papillae have elaborated ends, usually separated by a few threads of spongy coenosteum
COLOUR
Usually brown or mottled brown and white, papillae may have white or blue/purple tips, white polyps may be extended during the day

Plates with or without nodules or columns & papillae

Montipora turtlensis
Common in turbid environments
GROWTH FORM
Flat, explanate plates, usually with upward growths that may be widely separated or compacted to form subcolumnar nodules
Plates bifacial with a small epitheca and small widely spaced corallites on the undersurface
CORALLITES AND COENOSTEUM
Corallites closely compacted
Papillae less developed, **thecal and reticulum papillae not really differentiated** (cf. *M. peltiformis* and *M. hispida*)
Reticulum coarse, **spinules on and between papillae usually of a similar size and may be very elaborated**
COLOUR
Dark brown, green or blue, sometimes with cream tips to nodules

Montipora stellata
Most common in shallow, protected turbid water
GROWTH FORM
Contorted laminae which may form tiers or whorls and/or subarborescent with branches irregularly dividing and anastomosing and sometimes highly contorted
CORALLITES AND COENOSTEUM
Most corallites surrounded by several thecal papillae that are slightly larger than the reticulum papillae
Thecal or reticulum papillae may form short irregular ridges
At base of branches, reticulum is coarse and spongy becoming semi-solid, reticulum papillae irregular and small
Elsewhere the upper layer of reticulum is fine and spongy with very elaborated spinules giving a frosted appearance
COLOUR
Usually cream, blue/purple or brown, often with white ridges

Plates with or without nodules or columns & no tuberculae OR papillae

Montipora spongodes
Mostly high latitude reefs and rocky foreshores
GROWTH FORM
Encrusting or laminar bases with upward projecting ridges or columns, which may irregularly divide or anastomose
Bases may have rootlets
CORALLITES AND COENOSTEUM
Corallites **evenly and widely (2 -4 corallite diameters) distributed**
Coenosteum is always completely glabrous, although small projections may look like large tuberculae
Reticulum medium-fine, very uniform, **reticulum spinules have no elaborations**
COLOUR
Uniform pale cream to deep brown, grey or green

Montipora spumosa

GROWTH FORM

Encrusting or laminar, with or without irregular vertical columns

Columns can have flame-shaped ridges, be hollow with open or closed ends

Encrusting colonies may have rootlets

This species frequently overgrows other corals and assumes their shape

CORALLITES AND COENOSTEUM

Tuberculae of irregular shapes may be formed but **intergrade with larger mounds and ridges**

Corallites usually irregularly distributed and widely separated, may be aligned vertically between ridges on columns

The reticulum is very coarse (visible underwater) and **uniform, spinules always highly elaborated**

COLOUR

Mottled or uniform brown, cream or blue, may have pink margins

Montipora capricornis

Mostly found in lagoons

GROWTH FORM

Flat plates in tiers or whorls, columnar or both growth forms combined

Epitheca is well developed

CORALLITES AND COENOSTEUM

Corallites evenly spaced irrespective of colony surface contours

Large immersed calices

Glabrous, with a coarse and spongy coenosteum

COLOUR

Uniform purple, blue or brown

Plates with or without nodules or columns & tuberculae

Montipora undata

GROWTH FORM

Thick plates or encrusting base, usually with thick columns or branches

CORALLITES AND COENOSTEUM

Surface covered with tuberculae that fuse into ridges, ridges parallel on flat surfaces and perpendicular to colony margins, flame-shaped on columns

Corallites only in valleys between ridges

The reticulum is medium to fine, similar on ridges and valleys, spinules simple

COLOUR

Uniform purple, green, blue, pink or brown, frequently with pale growing margins

Montipora confusa

GROWTH FORM

Encrusting or thick laminar base with irregular column-like branches

CORALLITES AND COENOSTEUM

Thick, fused coenosteum ridges over colony surface, ridges on branches form a distinctive **flame-shaped** pattern

COLOUR

Yellowish or greenish brown, usually with pale coenosteum ridges and plate margins

Plates with nodules or columns & papillae

Montipora foliosa
GROWTH FORM
Thin, horizontal laminae, may be tiered and form whorls
Laminae unifacial or bifacial but epitheca usually covers most of undersurface overgrowing the minute and widely spaced corallites
CORALLITES AND COENOSTEUM
Corallites strongly inclined towards perimeter, upper wall may be well developed and lower wall absent or partly developed
Papillae fuse to form radiating ridges perpendicular to colony margin
Reticulum is medium-coarse to coarse, spongy
COLOUR
Cream, pink or brown with pale margins

Montipora aequituberculata
One of the most abundant and widespread species of *Montipora* along eastern Australia
GROWTH FORM
Usually thin, flat to contorted laminae, often arranged in oblique overlapping whorls
Epitheca inconspicuous or absent, undersurface glabrous except for widely spaced tuberculae which may contain single minute corallites
CORALLITES AND COENOSTEUM
Thecal papillae surround corallites
Papillae frequently form hoods over peripheral corallites that are strongly outwardly inclined
Papillae fuse to form fine, discontinuous ridges perpendicular to colony margin, ridges often absent from thicker laminae
Spinules on the reticulum may be similar to those on papillae, all with highly elaborated spinules giving all coenosteal structures a uniform frosted appearance
COLOUR
Usually uniform brown, cream or purple with pale margins

Branching & no tuberculae or papillae

Montipora digitata
GROWTH FORM
Yellow spatulate morph (Stobart 2000)
Digitate or arborescent
Branches laterally flattened forming frond-like or spatulate tips, may anastomose
CORALLITES AND COENOSTEUM
Corallites small
Coenosteum is smooth and glabrous
COLOUR
Pale cream, brown or yellow

Montipora tortuosa
GROWTH FORM
Fat finger morph (Stobart 2000)
Digitate or arborescent
Branches rounded at tips, may anastomose
CORALLITES AND COENOSTEUM
Corallites twice as large as *M digitata*
Coenosteum is smooth and glabrous
Reticulum spongy to almost solid
COLOUR
Grey-brown with rounded branch tips

Range of growth forms: massive/plates, with or without nodules/columns & papillae

Montipora peltiformis
GROWTH FORM
Submassive or flat explanate plates with or without nodular upward growths, nodules usually irregular in size and shape but do not form columns
Bifacial with small widely spaced corallites or extensive epitheca to corallum margin
CORALLITES AND COENOSTEUM
Corallites crowded especially between nodules
Thecal and reticulum papillae slightly differentiated, especially on nodules where they **may form rims around corallites** (cf. *M. turtlensis* and *M. hispida*)
The reticulum is coarse, spinules very elaborated on papillae and may be slightly elaborated on the reticulum
COLOUR
Pale brown with blue/purple polyps

Montipora hispida
Mostly found in turbid water habitats
GROWTH FORM
Submassive, laminar, columnar, digitate or various combinations of these forms (usually submassive or columnar on reef slopes)
Plates bifacial, backed with small, widely spaced corallites that may be overgrown by epitheca
CORALLITES AND COENOSTEUM
Thecal papillae prominent, 4 -8 surround corallites and may be connected by synapticular connections
Reticulum papillae, smaller and more widely spaced
Reticulum very coarse, all papillae have spinules, especially at tips giving a very elaborate appearance
COLOUR
Pale brown sometimes with white branch tips and white tentacles

Range of growth forms: massive/plates, with or without nodules/columns & NO tuberculae or papillae

Montipora turgescens
GROWTH FORM
Massive, plate-like or columnar
May have **subcircular surface mounds 3 -12 mm diameter, mounds may be small enough to form the walls of single corallites**
CORALLITES AND COENOSTEUM
Corallites uniformly distributed on and between mounds
The reticulum is uniformly spongy with an outer covering of highly elaborated spinules
COLOUR
Uniform colour, usually brown, cream or purple

Range of growth forms: massive/plates, with or without nodules/columns & tuberculae

Montipora danae
GROWTH FORM
Columns or plates
CORALLITES AND COENOSTEUM
Corallites between verrucae
Verrucae cover colony surface, **dome-shaped, may fuse into ridges** perpendicular to the margins of plates, less uniform cf. *M verrucosa*
Reticulum fine, finer on verrucae than on valleys, spinules with elaborated tips
COLOUR
Usually pale brown with paler margins

Montipora verrucosa

GROWTH FORM

Submassive or laminar, colonies may form columns

Epitheca poorly developed in laminar colonies

CORALLITES AND COENOSTEUM

Corallites relatively large, open and deep

Corallites uniformly interspersed in reticulum, **between (never on) verrucae**

Verrucae cover colony surface, **uniform distribution, size (2 -3.5 mm diameter) and shape**

Reticulum spongy, fine on verrucae, verrucae covered with elaborated spinules

COLOUR

Blue or brown, uniformly coloured or mottled, polyps sometimes extended during day, usually bright blue/purple or green

Montipora incrassata

GROWTH FORM

Thick plates with or without **nodular columns**

Columns always irregular shapes with irregularly fused nodules and ridges

Plates backed with epitheca to colony perimeter or within 4 cm of edge

CORALLITES AND COENOSTEUM

Corallites irregularly distributed in and between surface contortions

Corallites in tuberculae cup-like, those on the sides of tuberculae have a nose-like appearance

Tuberculae may join to form low smooth ridges

The reticulum is spongy, finer on tuberculae, spinules slightly ornamented

COLOUR

Mottled or uniform purple or brown, usually with white polyps

Comparison of Montipora species

Species of Montipora	Thin plate	Thick plate	Submassive	Massive	Papillae	Papillae/ Tuberculae	Papillae differentiated	Tuberculae	ridges (tuberculae [illegible]	(papillae [illegible]	Corallites widely spaced	Corallites in tuberculae	Common	Glabrous	Columns / branches	Irregular surface mounds	papillae	Foveolate
M. aequituberculata	•												•					
M. angulata			*encrusting*												*short*			•
M. australiensis		•								*fused tubes*					•		•••	
M. caliculata			•	•	*no*			*no*										*subfoveolate - tubular - immersed*
M. capricornis	•													•				
M. confusa		•							•						•			
M. corbettensis		•		•			*clubs*									~		
M. crassituberculata		•	•				••										•	
M. danae		•						*domed*	*short*			*no*	•		•			
M. digitata													•	•	*arborescent spatulate*			
M. efflorescens				•	*obliterating reticulum*		•				•		•			•		
M. effusa		•	•		*thecal : elongate*													
M. floweri			•					•				•	•					
M. foliosa	•									•••			•					
M. foveolata		•		•	*no*			*no*										•••
M. grisea		•	•	•			•••						•				•	
M. hispida	•	•	•				•••								•			
M. hoffmeisteri		•	•					•				•						
M. incrassata									*short*			•			*nodular*			
M. informis		•		•			*uniformly elongate*						•					
M. millepora				•				•				•						
M. mollis		•						*low*						•	•			
M. monasteriata		•	•	•		•							•					

Species of Montipora	Thin plate	Thick plate	Submassive	Massive	Papillae	Papillae/ Tuberculae	Papillae differentiated	Tuberculae	ridges (tuberculae	(papillae	Corallites widely spaced	Corallites in tuberculae	Common	Glabrous	Columns / branches	Irregular surface mounds	papillae	Foveolate
M. nodosa		•		•			*no*										•	
M. peltiformis		•	•				••								•			
M. spongodes		*encrusting*									•			*projections*	•			
M. spumosa		*encrusting*						•			*coarse coenosteum*		•		•	*intergrade with tuberculae*		
M. stellata	•								••	*short*					•			
M. tortuosa													•	•	*arborescent finger-like*			
M. tuberculosa	~	•	•				•						•				•	
M. turgescens		•		•									•	•	•	*3-12 mm*		
M. turtlensis	•						•								•			
M. undata		•											•		•			
M. venosa			•	•	*no*			*no*										•
M. verrucosa		•	•					*verrucae*				*no*	~					

Anacropora

Coenosteum on branch tips, NO axial corallites, corallites often have projecting lower walls and no upper wall developed giving branches a spiny appearance.

Anacropora forbesi

Branches <10 mm diameter, only slightly tapered with rounded, blunt tips
Corallites small, immersed or have a slightly protuberant lower lip

Anacropora puertogalerae

Long, twisted branches forming compacted to open and sprawling colonies
Branches up to 13 mm diameter, taper to a point and irregularly anastomose
Corallites widely spaced, immersed or conical, with distinctively pointed spines on the lower wall

Anacropora reticulata

Branches up to 14 mm thick, tapering, divide equally and infrequently at acute angles
Corallites large and have a thick lower wall
Coenosteum between corallites is a fine reticulate network, visible underwater

Anacropora matthaii

Branches <5.5 mm diameter, terete, and form compact or open colonies
Corallites tubular, up to 1.5 mm exsert

Acropora

Type of branching, shape, size and arrangement of corallites and the structure of the coenosteum are used to identify species of *Acropora*.
Growth forms are illustrated in:

- Fig. 29 on Page 52 in Wallace 1999
- Fig. 2 on Page 179 in Veron 2000
- Fig. 15 on Page 128 in Veron 1986

Types of corallites are illustrated in:

- Fig. 33 on Page 55 in Wallace 1999

NB when I am referring to the coenosteum in *Acropora*, this is actually the wall of the axial corallite, between the radial corallites.
Characters for a species are as described for its species group, unless stated otherwise.

Subgenus Acropora

Colonies have 1 axial corallite per branch
Coenosteum of variable density ranging from costate to a dense arrangement of spinules

Acropora rudis group

Irregular, thick branching
Corallites rounded, tubular

Acropora austera

Untidy branching
Radial corallites large, thick walled and calices have a distinctive shape
Colony colour and radial corallite shape is similar to *A. verweyi*

Acropora humilis group
Sturdy heavy structured species, digitate to corymbose colonies with thick branches
Axial corallite large and forms much of the branch
Radial corallites short tubular and thick walled
Commonly found on shallow reefs

Acropora humilis
Branches terete
Radial corallites one size

Acropora gemmifera
Branches taper
Two sizes of radial corallites

Acropora monticulosa
Branches very conical
Radial corallites and opening of axial corallite similar in size, radial corallites tubular with rounded to nariform openings
Usually only on reef crests

Acropora samoensis
More branching than any of the other species in this species group
Radial corallites quite widely spaced, more tubular than other species of this species group
Usually found deeper, on slopes

Acropora digitifera
Branches thinner compared with other species in this species group
Inner wall of radial corallites is absent or barely developed, outer wall rounded and may form a flaring lip
Live colonies always cream or pale brown with or without blue tips, often with dark polyps
Usually only found on reef flats

Acropora retusa
Branches terete, sturdy
Radial corallites crowded, tubular appressed with elongate, nariform openings

Acropora multiacuta
Small colonies
Long axial corallites
Few radial corallites, pocket-shaped

Acropora fastigata
? *A. humilis* group
Small colonies with a few sturdy branches, incipient axials at base of branches
Few radials at branch tips

Acropora torresiana
? *A. humilis* group
Digitate with curved or straight long branches
Secondary branches only at base of main branches
Radial corallites of one size

Acropora wallaceae
? *A. humilis* group
Tall open branches with 3 or 4 branching cycles, higher branching cycles of decreasing size
Radial corallites tubular

Acropora nasuta group

Corymbose colonies, becoming sturdier in the following order: *A. kimbeensis*, *A. cerealis*, *A. nasuta*, *A. valida*, *A. secale*, *A. lutkeni*
Radial corallites nariform, appressed tubular or tubular with oval openings

Acropora cerealis

Caespito-corymbose colonies, with some anastomosis of branches
Radial corallites nariform with elongate openings, outer edge of radial corallites may curve upwards

Acropora kimbeensis

Caespito-corymbose colonies
Radial corallites long, tubular, with nariform openings at tips

Acropora nasuta

Radial corallites nariform with openings approximately perpendicular to branch, crowded and evenly arranged

Acropora valida

Corymbose colonies or large tables
Radial corallites tubular appressed with slightly oval openings

Acropora secale

Branches sturdy, like small Christmas trees at centre of colonies
Radial corallites thick walled, a mixture of long tubular corallites (often arranged in rows) with nariform corallites between them

Acropora lutkeni

Colonies irregularly corymbose Radial corallites thick walled, tubular appressed with round to oval openings, may be variable in shape and size with some long tubular corallites

Acropora divaricata group
Colonies form tables with anastomosing branches
Radial corallites large appressed tubular with nariform openings

Acropora divaricata
Colonies have a distinctive open pattern of caespito-corymbose branching with some branches anastomosing
Live colonies usually brown with blue branch tips

Acropora solitaryensis
This species is similar to *A. divaricata*, differing in that the basal branches of the colony anastomose, sometimes extensively
Live colonies may be brown, with or without blue branch tips, or green

Acropora clathrata
Tables with a distinctive pattern of branching: regularly anastomosing horizontal branching with little or no vertical branching
Radial corallites tubular, openings directed upwards

Acropora lovelli group
Various colony growth forms in this species group
Rare or absent on tropical parts of the Great Barrier Reef
Radial corallites large round openings, appressed tubular, equal shapes and sizes in colonies of the same species

Acropora bushyensis
Colonies form small corymbose clumps
Radial corallites short tubes with thin walls and large calices

Acropora lovelli
Caespitose to hispidose, long branches
Radial corallites short tubes to tubular appressed with thin walls and large, round calices

Acropora glauca
Highly fused tables with short, sturdy upright branches
Radial corallites one size, large round to oval openings

Acropora verweyi group

Acropora verweyi
Colonies form corymbose clumps with straight, terete branches
Axial and radial corallites about the same size
Radial corallites of the same size and shape, have a thickened outer wall
Colony colour and radial corallite shape is similar to *A. austera*

Acropora muricata group
Open arborescent branching or arborescent tables
Radial corallites tubular, with various openings, evenly sized or mixed sizes

Acropora muricata
Arborescent
Radial corallites crowded, tubular with small, round to oblique openings

Acropora grandis
Sprawling arborescent colonies
Radial corallites tubular, widely spaced, thin-walled, directed outwards, vary in size and have round openings

Acropora acuminata
Small arborescent tables with fairly compact branches
Occasionally longer radial corallites give branches a spiky appearance, large outer directive septum
Skeletons of this species often turn black

Acropora valenciennesi
Large open arborescent table with upwardly curving branches, like a candelabrum
Radial corallites, tubular, thin-walled with large openings, fairly widely spaced

Acropora robusta group
The radial corallites and coenosteum is very similar in all species in this group, the main difference between species is in growth form.
Radial corallites dimorphic: long tubular corallites with dimidiate openings interspersed with subimmersed corallites
Coenosteum structure dimorphic: costate on radials, reticulate between radials

Acropora robusta
Colonies form arborescent tables, with digitate central branches and upwardly curving peripheral branches

Acropora abrotanoides
Colonies have thick main branching units that proliferate distally

Acropora palmerae
Colonies encrusting, sometimes with occasional, irregular branches

Acropora intermedia
Arborescent with straight branches

Acropora polystoma
Corymbose with branches of similar length, up to 10 cm

Acropora listeri
Messy corymbose with tapering branches of uneven lengths

Acropora selago group

Radial corallites have variations of a cochleariform shape i.e. upper wall is short and weakly developed and the lower wall forms a rounded, flaring lip

Acropora selago

Caespito-corymbose colonies, some anastomosing of branches
Radial corallites appressed cochleariform

Acropora tenuis

Corymbose colonies
Well developed cochleariform corallites with rounded lips

Acropora striata

Hispidose growth form
Well developed cochleariform corallites with rounded lips

Acropora donei

Large arborescent tables
Radial corallites cochleariform with a reduced lip
Can be difficult to distinguish between *A. donei* and *A. yongei* in shallow water because arborescent table growth form is "lost"

Acropora yongei

Arborescent
Large, well developed cochleariform corallites
Can be difficult to distinguish between *A. donei* and *A. yongei* in shallow water because arborescent table growth form is "lost"

Acropora dendrum

"Phantom" species (Wallace, 1999)
Corymbose Corallites reduced cochleariform or appressed tubular with short walls

Acropora loisetteae

Arborescent with fine branches
Radial corallites cochleariform, widely spaced, thin walled

Acropora aspera group
All species have labellate radial corallites i.e. bottom/outer wall developed and upper wall absent or very reduced

Acropora aspera
Arborescent
Large rounded lipped radial corallites with smaller radial corallites between

Acropora pulchra
Arborescent Radial corallites have pointed (not rounded) lips and are a mixture of sizes

Acropora prostrata
Caespito-coryrnbose with thin elongate branches
Radial corallites all of a similar size, evenly arranged with large rounded lips giving branches a distinctive "scaly" appearance

Acropora millepora
Coryrnbose colonies with branches 3 -12 mm diameter
Radial corallites all of a similar size, evenly arranged with large rounded lips giving branches a distinctive "scaly" appearance

Acropora spathulata
Coryrnbose colonies with branches 12 -16 mm diameter
Radial corallites all of a similar size, evenly arranged with large rounded lips giving branches a distinctive "scaly" appearance

Acropora spicifera
Thin branches
Radial corallites all of a similar size, thin walled

Acropora papillare
Sturdy, sub arborescent branches Radial corallites crowded, rounded labellate with occasional small immersed corallites between

Acropora florida group
Sturdy hispidose branching
Radial corallites approach a labellate shape

Acropora florida
Colonies may be quite large, branches sturdy, hispidose with regularly spaced small branchlets
Axial corallites of a similar size to the radial corallites
Live colonies have a distinctive colouring: greenish brown, yellow or brown

Acropora sarmentosa
Colonies quite small with a small number of thick, sturdy branching units
Axial corallites may be larger than the radial corallites
Large rounded axial and radial corallites can be seen in live colonies
Live colonies have a distinctive colouring: pinkish or greenish brown

Acropora hyacinthus group
Colonies form tables or plates
Radial corallites labellate i.e. bottom/outer wall present and upper wall absent or very reduced

Acropora hyacinthus
Large tables with short branchlets
Radial corallites have neat rounded lips forming a "rosette" around the axial corallite

Acropora anthocercis
Coryrnbose colonies with sturdy branches
Axial and radial corallites have thick walls

Acropora cytherea
Large tables with short branchlets, branchlets in groups of 2 -3
Radial corallites have elongate vertical lips

Acropora microclados
Low corymbose colonies to longer branched tables
Radial corallites nariform to labellate
Not distinctive as live colonies

Acropora paniculata
Open, finely branching tables, often lightly calcified Radial corallites tubular with nariform openings or labellate

Acropora seriata
Similar to *A. spicifera* because of the short branches

Acropora latistella group
Corymbose colonies with slender branches
Radial corallites small, appressed tubular with round openings

Acropora latistella
Radial corallites fairly closely arranged

Acropora subulata
Large, lightly calcified tables
Usually only outer/lower wall of radial corallites developed
Polyps frequently extended during the day

Acropora nana
Colonies form small clumps with straight branches
Radial corallites appressed tubes

Acropora aculeus
Radial corallites fairly widely spaced
Living colonies often brightly coloured e.g. blue or yellow-green

Acropora azurea
Colonies form small clumps with straight branches
Radial corallites appressed with nariform openings

Acropora mirabilis
Corymbose
Axials prominent
Radials short, one size, less prominent cf. *A. latistella*

Acropora horrida group

Phenotypically plastic growth forms, ranging from open arborescent through hispidose to irregular caespitose
Radial corallites simple, tubular with round openings, evenly sized
Species in this group occur subtidally in sheltered habitats

Acropora horrida

Radial corallites tubular to subimmersed all with thin walls and round openings
Polyps usually extended during the day, live colonies blue/purple, grey or yellow

Acropora vaughani

Radial corallites widely spaced, round tubular, have thickened walls with small round openings, often directed outwards
Not a common species

Acropora abrolhosensis

Irregular arborescent to hispidose-arborescent
Radial corallites long, tubular with slightly swollen ends, not crowded

Acropora microphthalma

Branches slender, arborescent with frequent branching
Radial corallites tubular and very neatly arranged

Acropora kirstyae

Fine branches, caespito-arborescent
Radial corallites scattered and few in number
Coenosteum similar on and between radials, closely packed spinules with elaborated tips

Acropora tortuosa

Colonies are caespitose to hispidose
Radial corallites immersed to short appressed tubes with thin walls
Coenosteum can be highly fused giving a flaky appearance

Acropora exquisita

Thickets
Delicate upright branches, branches perpendicular
Axials very exsert
Radials mixed sizes, small radials are scale-like and large radials are tubular with flaring lips
Branches are less coarse and smaller cf. *A. microphthalma*

Acropora loripes group

Appressed tubular (pocket-like), evenly sized corallites with thick walls
There is a tendency for absence of radial corallites on parts of the colony
Coenosteum is a very dense arrangement of elaborated spines on and between radial corallites giving branches and walls of corallites a smooth appearance. The dense skeleton gives colonies a glowing appearance in live colonies.

Acropora loripes

Thick hispidose branches or corymbose
Radial corallites large, thick walled with rounded openings, upper sides of branches may be devoid of radial corallites

Acropora rosaria

Radials more crowded cf. *A. loripes*

Acropora chesterfieldensis

Corymbose
Radial corallites fairly crowded cf. other species in this group, thick walled with rounded nariform openings

Acropora willisae

Corymbose plates
Usually> 1 axial corallite per branchlet
Radial corallites appressed tubular with round to slightly nariform openings

Acropora granulosa

Small, thick plates with a large proportion of axial compared with radial corallites
Branchlets terete
Radial corallites simple appressed pockets

Acropora speciosa

Small, thick plates with a large proportion of axial compared with radial corallites
Branchlets tapering
Radial corallites simple appressed pockets

Acropora caroliniana

Small, thick plates, sturdy branchlets may approach a hispidose form like small Christmas trees at centre of colony
Branchlets composed of long tubular radial corallites / incipient axial corallites that often curve upwards, other radial corallites simple tubular appressed or appressed pockets

Acropora echinata group
All species have a hispidose or bottlebrush growth form.
Radial corallites few relative to axial corallites
All species have tubular or tubular appressed (pocket-like) radial corallites with round openings.
Dimension of branches and degree of calcification increases in the order the species are listed.

Acropora echinata
Can develop long sprawling branches
Axial corallites have round, open calices
Coenosteum on walls of corallites is costate
Live colonies usually white with purple or blue branch tips

Acropora subglabra
Axial corallites of branchlets have round and slightly contracted calices
Coenosteum forms lines of spinules on walls of corallites

Acropora carduus
Axial corallites of branchlets have round and slightly contracted calices
Coenosteum consists of a dense arrangement of elaborate spinules

Acropora elseyi
Colonies range from bushy to hispidose
Radial corallites tubular or appressed tubular
Coenosteum consists of a dense arrangement of elaborate spinules

Acropora longicyathus
Radial corallites crowded, large with fairly thick walls
Coenosteum is reticulate with elaborate spinules

Acropora turaki
Radial corallites and branch tips curve downwards
Coenosteum dense with elaborate spinules

Subgenus Isopora
Colonies can have more than 1 axial corallite per branch
Coenosteum very dense with very elaborate spinules

Acropora palifera
Branches and corallites have a swollen appearance
Radial corallites tubular appressed with dimidiate openings

Acropora cuneata
Branches and corallites have a deflated appearance
Radial corallites thin walled and conical

Acropora brueggemanni
Arborescent
Branches usually have one axial corallite
Radial corallites appressed

Astreopora

The corallites of this genus are distinctive, being conical with large calices giving them a crater-like appearance. Also distinctive are the coenosteal spines that are similar on and between the corallites.

Astreopora expansa

Plates not encrusting, form tiers or whorls in large colonies
Corallites inclined
Fine coenosteum spines

Astreopora moretonensis

Encrusting to laminar, sometimes forming irregular tubes or columns, may have rootlets
Corallites immersed or conical, conical corallites to 7 mm diameter at their base
This species is rare in the tropics

Astreopora incrustans

Encrusting, sometimes forming short columns and tubes
Coenosteum is coarse
This species is rare

Astreopora listeri

Massive or flattened colonies
Corallites small calices, immersed, sometimes crowded
Coenosteum covered with closely compacted spinules, giving a feathery appearance, spinules around corallites larger than those on the coenosteum

Astreopora scabra

Hemispherical colonies
Corallites conical, large
Coenosteum is coarse, spinules form ridges down walls of the corallites

Astreopora myriophthalma

This is the most common species of *Astreopora*
Massive, hemispherical or flattened, surface usually even
Corallites evenly spaced, slightly conical with smaller immersed corallites between
Coenosteum short spinules with elaborated tips

Astreopora gracilis

Submassive
Corallites of immersed, conical or tubular, some exsert corallites inclined
The irregular sizes and orientation of corallites give colonies a chaotic appearance
Coenosteum smooth, composed of compacted spinules

Astreopora cucullata

Thick, submassive to encrusting plates with a well developed epitheca and sometimes short rootlets
Corallites inclined on the corallum surface and have elliptical openings
Coenosteum elaborated spinules giving rims of calices a feathery appearance, spinules may form a hood over calices

Astreopora ocellata

Massive, usually dome shaped or flattened
Corallites large, with large calices (largest of the east Australian species)
Small corallites usually between the large corallites
Coenosteum coarse and spinules fine

Astreopora randalli
Flat, encrusting, usually plates
Corallites very small and are mostly immersed with round calices

Astreopora macrostoma
Distinctive because of large size of al skeletal characters
Colonies sub-massive or form thick irregular plates
Corallites are very large, to 12 mm thick at base and up to 12 mm exsert, conical to tubular, face different directions
Small corallites may occur between larger corallites
Coenosteum very coarse, large spinules with very elaborate tips

FAMILY ASTROCOENIIDAE

Species in this family all have a style-like columellae and solid septa

Stylocoeniella

Coenosteum is covered by fine spinules, with larger pointed styles about as numerous as the corallites

Stylocoeniella armata
Colonies encrusting
Corallites form excavations in the coenosteum, about 1.3 mm diameter
Septa in 2 equal or sub equal cycles
Coenosteum styles more prominent than in *S. guentheri*

Stylocoeniella guentheri
Colonies encrusting or knobby
Corallites flush with the coenosteum, about 0.8 mm diameter
Septa in 2 very unequal cycles – large septa are much larger cf. secondary septa, secondary septa tiny to absent
Coenosteum styles smaller than in *S. armata*

Madracis

Corallites in *Madracis kirbyi* are about twice the size and more closely arranged cf. those in *Stylocoeniella*

Madracis kirbyi
Most reef environments, especially turbid environments; rare
Laminar, encrusting, nodular or columnar
Corallites subcerioid
Usually 10 septa that are fused with the solid conical columellae

Palauastrea

Palauastrea ramosa
Restricted to turbid water and sandy substrates in Australia but found on upper reef slopes in equatorial countries
Branching growth form
Septa slightly exsert, giving branch surface a star-like appearance
Coenosteum covered with fine spines

FAMILY POCILLOPORIDAE

Corallites are small, and have a well developed columella. Septa are in 1 or 2 cycles. The coenosteum is covered with spinules.

Pocillopora

Colonies are covered with verrucae, with corallites in and between the verrucae.
The genus *Pocillopora* is well defined by the presence of verrucae, but species within this genus can be difficult to separate and form what appears to be a continuing series.

Pocillopora danae
Mostly prostrate branches that tend to form a 3D tangle
Verrucae widely spaced and irregular in size

Pocillopora damicornis
Common in many environments
Peripheral branches much thinner cf. other species in this genus
Lacks true verrucae, with verrucae, sub-branches and branches forming a continuum

Pocillopora verrucosa
Small colonies with uniform, upright branches
Branches divide to form new branches once they have approximately doubled in size: therefore, all branches of a similar diameter
Verrucae irregular in size (less irregular than *P. danae* and larger and more irregular than *P. meandrina*)

Pocillopora meandrina
Small colonies with uniform, upright branches
Branch ends expand in one plane without dividing therefore branches flattened or curved when viewed from above the colony
Branches evenly spaced
Verrucae neat and uniform

Pocillopora kelleheri
Wide plates with prostrate branches
Colonies usually side-attached
Verrucae uniform in size and not crowded

Pocillopora woodjonesi
Flattened branches that tend to sprawl over the substrate
Branches dwarfed and fan-shaped cf. *P. Eydouxi*
Coenosteum is finely granulated (not so in *P. eydouxi*)
Branches more irregularly spaced cf. *P. kelleheri*

Pocillopora eydouxi
Branching infrequent, branches flattened
Branches usually much larger than in other species
Verrucae uniform in shape and spacing

Seriatopora

Fine branching. Corallites arranged in neat rows along branches. Spines around corallites are larger than those between corallites, with those on the upper side of corallites usually longer.

Seriatopora hystrix

Branches taper strongly to fine points
Branches usually thinner than those of *S. caliendrum*: 1.5 -4.5 mm 1 cm below branch tip and 2.5-8 mm near colony base

Seriatopora caliendrum

Branches do not taper Branches usually thicker than those of *S. hystrix*: 3 -8 mm

Stylophora

Branches sturdy cf. *Seriatopora*, often with ends of branches thickened becoming globular. Spines around corallites are larger than those between corallites, with those on the upper side of corallites longer and forming hooded structures.

Stylophora pistillata

Branches thin

Stylophora mordax

Branches thick, blade-like

FAMILY EUPHYLLIDAE

Colonies are phaceloid, meandroid or flabello-meandroid. Septa or septo-costae large, solid, widely spaced with little or no ornamentation (dentation). Species of this family have large tentacles or bubble-like vesicles that obscure the skeleton and are important for identification.

Euphyllia

Tentacles are extended day and night and are important for identifying species. There are no columellae, at least in the species listed here.

Euphyllia cristata

Colonies phaceloid with compact branches/corallites, small solitary polyps common
Primary septa very exsert
Septa, particularly primary septa, more exsert than those in *E. glabrescens*, although this difference is less conspicuous in larger colonies
Polyps have large tubular tentacles with knob-like tips (usually white)

Euphyllia glabrescens

Colonies phaceloid with less compact branches/corallites than *E. cristata*
Septa not exsert
Polyps have large tubular tentacles with knob-like tips (usually white)
Tentacles similar to those of *Heliofungia actiniformis* but smaller

Euphyllia divisa

Colonies flabello-meandroid
Septa exsert
Polyps have large tubular tentacles with smaller tubular branches that may divide 1-20 times, each sub-branch has a knob-like tip
Skeleton is identical to that of *E. ancora*

Euphyllia ancora

Colonies flabello-meandroid
Septa exsert Polyps have large tubular tentacles with smaller tubular branches that may divide 1-20 times, each sub-branch has a knob-like tip
Skeleton is identical to that of *E. divisa*
Tentacles have few or no branchlets, usually only branching at their base
Tips of tentacles curved or crescentic in shape, maybe slightly or strongly curved forming kidney, anchor, hammer or T-shaped tips

Catalaphyllia

Monospecific genus

Catalaphyllia jardineri

Colonies flabello-meandroid, usually free-living and small
Valleys very long, often continuous, sinuous
Septa as described for this family, slightly and unevenly exsert
Distinguished from *Euphyllia* by appearance of polyps which have long tubular tentacles, well developed oral discs with large mouths; tentacles usually extended day and night

Plerogyra

Colonies are flabello-meandroid or phaceloid. Septa are large, solid, smooth edged, very exsert and widely spaced. Columellae are absent. The coenosteum (walls of valleys) are formed of blister-like layers. Colonies are covered with vesicles that retract only slowly when disturbed. Tentacles are only extended at night and extend between the vesicles.

Plerogyra sinuosa

Vesicles about the size and shape of grapes

Physogyra

Monospecific genus

Physogyra lichtensteini

Colonies massive or form thick plates
Meandroid valleys connected with a light blistered coenosteum
Septa large, smooth edged, exsert and widely spaced
Columellae absent
Colonies covered with vesicles that retract when disturbed, vesicles the size of small grapes
Tentacles only extended at night and extend between the vesicles

FAMILY OCULINIDAE

Colonies are formed of corallites as solid walled tubes linked together by coenosteum. Septa are very exsert.

Galaxea

Corallites are cylindrical, thin walled tubes separated by a blistered coenosteum. Septa are exsert and columellae are weak or absent.

Galaxea horrescens (Acrhelia discontinued by Veron 2000)
Colonies are branching
Corallites have flaring rims
Tentacles usually only extended at night

Galaxea fascicularis
Colonies massive, with or without columns
Corallites round or irregular in outline, mixed sizes up to 10 mm diameter
Tentacles usually extended during the day

Galaxea astreata
Colonies submassive or encrusting, with or without columns
Corallites round, usually 3-4.5 mm diameter
Tentacles not usually extended during the day

Galaxea acrhelia
Short, irregular lobe-like or truncated branches, skeleton very fragile
Corallites have flaring rims
Small corallites branch off larger corallites
Corallites to 3.5 mm diameter
Septa commonly irregular in length, tentacles usually only extended at night

Galaxea longisepta
Colonies small, encrusting
Small, inconspicuous branches may be formed
Corallites up to 4 mm diameter
Septa long, very irregular

FAMILY SIDERASTREIDAE

Walls are poorly defined, with septo-costae being connected between corallites. Septa are usually fused along their inner margins to form fan-like groups. Septa have granulated upper margins and are closely compacted.

Pseudosiderastrea

Monospecific genus

Pseudosiderastrea tayami
Colonies small (to 16 cm diameter), encrusting or dome shaped
Corallites cerioid, polygonal, 3 -16 mm diameter
Inner margins of septa fuse into fan-like groups
Colonies pale grey or brown with distinct white corallite walls

Psammocora

Corallites are small. Walls are indistinct. Septo-costae have finely granulated margins. Columellae consist of groups of pinnules.

Psammocora obtusangula
Colonies nodular or with small flattened branches
Corallites not in valleys, except at the tips of nodular growths
Septa thick, wedge shaped, serrated margins

Psammocora contigua
Colonies mixtures of flattened branches, columns and/or irregular nodules
Corallites shallow with fine structures, giving colonies a smooth surface

Psammocora profundacella
Colonies submassive, thick plates or laminar
Corallites in short valleys, corallite centres distinct
Walls rounded, sometimes with a central ridge
Septo-costae petaloid
Live colonies may have dark corallite centres

Psammocora superficialis
Colonies thick plates or encrusting, irregular ridges
Corallites irregularly distributed
Primary septo-costae petaloid

Psammocora haimeana
Colonies submassive
Corallites in bottom of depressions or short non-meandering valleys
Walls acute
Primary septo-costae petaloid

Psammocora nierstraszi
Colonies massive
Highly meandering valleys, often with steep walls and well defined ridges
Corallites largely independent of valleys
Primary septa petaloid, exsert giving colony surface a rough appearance

Psammocora digitata
Colonies form thick plates and / or columns
Primary septa petaloid and slightly exsert

Psammocora explanulata
Colonies form thin plates or encrusting with a flat surface
Corallites large cf. other species of *Psammocora*
Primary septo-costae very distinctive, exsert, petaloid or meandering
Colonies have smaller corallites and petaloid septo-costae cf. *Coscinaraea wellsi*

Coscinaraea

Corallites are larger than those in Psammocora. Walls are indistinct. Septo-costae have finely serrated to heavily granulated margins. Columellae consist of groups of pinnules.

Coscinaraea columna
Encrusting, massive, sometimes hillocky, NOT columnar
Septo-costae not heavily granulated
Columella pinnules deeper than septo-costae

Coscinaraea marshae
Concentric rows of well-developed, high, narrow collines or ridges

Coscinaraea exesa
Columnar (cf. *Psammocora digitata* petaloid septa are less conspicuous in *C. exesa*, corallites are much finer in *P. digitata*)
Corallites in shallow valleys
Corallites larger and shallower (cf. *C. columna*)
Septo-costae more granulated, conspicuous granule near valley wall
Columella pinnules at the height of inner septal margins

Coscinaraea crassa
Large unifacial plates, heavily calcified (cf. *Podabacia crustacea* can feel costal spines on undersurface of colony)
Large compact corallites
Septo-costae long and short alternate slightly, finely elaborated
Columellae single fused septal margin deep in corallite

Coscinaraea wellsi
Encrusting to explanate lamellae with thin lobed margins, often overlapping plates
Corallites irregularly distributed, superficial or slightly protuberant
Septo-costae heavily granulated
• cf. *Leptoseris scabra*, *C. wellsi* has petaloid septo-costae that fuse at inner margins
• cf. *Psammocora explanulata* corallites larger and septo-costae less petaloid

FAMILY AGARICIIDAE

Corallites are immersed with poorly defined walls. Where present, walls are formed by thickening of the septo-costae. Septa seldom fuse, are continuous between adjacent corallite centres, have smooth or finely serrated margins and are loosely packed.

Pavona

Colonies are massive, columnar, frond-like or laminar. Corallites have poorly defined walls and are small shallow depressions, usually with columellae, sometimes separated by ridges. Corallites are interconnected by exsert septo-costae. *Pavona* is similar to *Leptoseris* but has finer septo-costae and other skeletal structures.

Pavona cactus
Thin, contorted, bifacial, upright fronds with or without thickened branching bases
Corallites very small (cf. *P. decussata*), fine, shallow, aligned in irregular rows parallel to frond margins

Pavona explanulata
Generic affinity uncertain because also *Leptoseris*-like (corallites are large cf. other species of *Pavona*)
Encrusting or thin unifacial laminae, sometimes massive or columnar
Corallites circular
Septo-costae smooth, alternating
Smaller corallites cf. *Leptoseris explanata*

Pavona varians
Submassive, laminar or encrusting, or combinations of these growth forms
Corallites in short, irregular valleys, aligned between ridges or irregularly distributed on flat surfaces
Septo-costae in two alternating orders
Columellae more developed (cf. *P. venosa*)

Pavona venosa
Massive to encrusting
Corallites in short valleys with acute walls
Septo-costae in 3 orders, widely spaced and less even in height (cf. *P. varians*)
Columellae poorly developed or absent

Pavona divaricata
Leafy species
Subramose /foliaceous branches
Approximately half way between *P. cactus* and *P. venosa*
Collines on shaded parts of colonies reduced or absent
Valleys about 2 mm wide, usually with < 5 distinct centres

Pavona maldivensis
Columnar and / or thin horizontal encrusting plates
Corallites circular, plocoid with distinct walls

Pavona decussata
Thick, interconnecting bifacial upright plates, or submassive with or without lobed horizontal margins and upright plates
Corallites deep seated, sometimes aligned parallel to margins or to radiating ridges

Pavona minuta
Submassive or encrusting with thin margins, smooth surface
Corallites small, superficial
Corallites widely spaced
Septo-costae in two alternating orders
Corallites smaller, less exsert septo-costae cf. *P. duerdeni*

Pavona clavus
Colonies have club shaped columns to 10 cm thick and / or are laminar, columns divide but do not fuse
Corallites have thick walls, 2.5-3.5 mm diameter
Septo-costae two very distinct orders
Columellae rudimentary or absent

Pavona duerdeni
Distinct growth form, massive and divided into parallel or irregular ridges or hillocks
Corallites small giving colonies a smooth appearance, calices 2 - 3 mm diameter
Septo-costae strongly alternating
Walls thick (because of wedge shaped septa)
Columellae developed

Leptoseris

Colonies are unifacial laminae or encrusting. Corallites have poorly defined walls and are small shallow depressions, usually with columellae, sometimes separated by ridges. Corallites are usually separated by ridges and are interconnected by septo-costae. Septo-costae and other skeletal structures are larger than those in species of *Pavona*.

Leptoseris gardineri
Horizontal, subdividing fronds Corallites outwardly inclined

Leptoseris papyracea
Very small, delicate, contorted fronds

Leptoseris explanata
Laminar plates, with lobed or entire margins
Corallites widely spaced, outwardly inclined, <6 mm max dimension
Long and short septo-costae alternate strongly forming fine but conspicuous striations
Cf. *L. gardineri*, corallites larger and more prominent, wider branches, more septa and markedly unequal septo-costae

Leptoseris scabra
Encrusting or laminar plates, may be highly contorted forming hollow columns, tubes, or fronds
Corallites large, irregular, sometimes indistinct in highly contorted colonies, usually outwardly inclined
Septo-costae two alternating orders, heavily granulated
cf. *Coscinaraea wellsi*

Leptoseris solida
Encrusting, surface may be folded, sometimes forms tubes
Corallites inclined towards colony margins, distributed irregularly, small openings
Septo-costae granulated, alternate
Corallite mounds commonly occur between corallites

Leptoseris mycetoseroides
Encrusting or laminar plates, plates have small, irregular folds
Corallites crowded between folds (carinae) forming short irregular series, except at colony periphery where they align in rows parallel to the colony margin
Outwardly inclined
Septo-costae fine, even

Leptoseris hawaiiensis
Encrusting laminae
Corallites deep, rounded
Irregularly distributed, mostly outward facing
Septo-costae even giving colonies a smooth appearance
Corallites smaller, less protuberant, deep round calices cf. *L. scabra*

Leptoseris incrustans
Primarily encrusting, may develop broad explanate laminae, laminae often have radiating ridges
Numerous hydnophoroid projections over colony surface
Corallites small, closely compacted, superficial
Septo-costae thin and equal giving colonies a smooth surface

Leptoseris foliosa
Laminar, either encrusting or in whorls or tiers, with or without radiating folds
Corallites in irregular rows parallel to the margins, outwardly inclined, small and shallow with little or no development of walls
Septo-costae fine, equal or alternate slightly, closely spaced and heavily granulated giving colonies a smooth appearance, usually straight
Lack alternating septo-costae cf. *L. explanata*
Septo-costae very similar to *L. mycetoseroides* which differs in having relatively prominent carinae, more deeply seated calices, and colonies more encrusting

Leptoseris yabei
Laminar, in whorls, tiers or vase-shaped
Corallites enclosed in rectangular pockets formed between radiating ridges and low walls parallel to frond margins (concentric rows and radiating ridges of carinae)
Calices frequently inclined to colony margin
Septo-costae in two alternating orders

Coeloseris

Monospecific genus

Coeloseris mayeri

Colonies massive, rounded or hillocky but always distinctive smooth surface
Corallites cerioid
Septa neatly arranged, joined at the top of walls of adjacent corallites
Columellae absent

Gardineroseris

Monospecific genus

Gardineroseris planulata

Colonies massive to encrusting, sometimes with laminar margins
Corallites or groups of corallites separated by acute ridges, with the centre of corallites at the bottom of the excavations
Septo-costae fine and even

Pachyseris

The surface of colonies is a series of concentric ridges and valleys parallel to the colony margin. Corallite centre are not evident. Septo-costae are fine, even and tightly compacted. Columellae are wall-like or absent.

Pachyseris rugosa

Colonies upright, irregular, usually contorted, anastomosing bifacial plates
Columellae always well developed, wall-like continuous or discontinuous plates

Pachyseris speciosa

Colonies unifacial laminae, usually horizontal
Columella absent or rudimentary

FAMILY FUNGIDAE

This family includes the free living "mushroom" corals, which have single or multiple mouths, as well as three genera (*Cantharellus*, *Lithophyllon* and *Podabacia* that remain permanently attached. All free living species are attached to the substrate by a stalk as juveniles, then detach as they become heavy and become free adults. Septo-costae radiate from the mouth on the upper surface, as septa, and from the centre of the undersurface, as costae.

Characters used to identify species within this family are attached or free living, colony shape, number and arrangement of mouths, arrangement of septa and costae, septal and costal dentations, and the presence or absence of perforations between costae in undersurface of corals.

Cantharellus

Corals of this genus are permanently attached to the substrate. Septa and costae have simple ornamentations, usually only fine granules. The undersurface is imperforate. Polyps have one or several centres.

Cantharellus noumeae

Corals small, up to 65 mm diameter, cup-shaped with wavy margins
Septa thin, densely packed, margins finely dentate appearing smooth
Costae distinct from attachment point to corallum margin

Heliofungia

Monospecific genus

Heliofungia actiniformis

Solitary, circular to slightly oval with a central mouth, flat to slightly arched around mouth, free-living
Skeletons usually imperforate (some pits may be seen at the margins)
Septa solid, septal teeth large (compared with Fungia) and rounded to triangular lobes
Costae numerous, all of similar thickness, virtually continuous from the centre to the corallum margin, not elaborate
Polyps large, long tentacles always extended
Tentacles similar to those of *Euphyllia glabrescens* but larger

Fungia

Corals are free-living and usually solitary as adults.
They are circular or elongate in outline, with a central mouth. Septa have large or small, rounded to pointed teeth. Costae usually consist of rows of spines. Septal teeth and costal spines are important characters for identification of species. The undersurface of the skeleton may have pits between the costae. The presence or absence of pits is also used for identification of species. The genus Fungia is divided into 5 subgenera to aid in classification and identification. The subgenera and characters of each are listed below and are listed as groups 1-5 in Veron 2000.

Danafungia – Group 1 (Veron 2000)

Corals circular or nearly circular
Septal teeth large, triangular, lobulate
Costal spines club-shaped, finely spinulose, occur only on larger costae

Fungia scruposa

Corals mostly flat, skeleton thick and heavy
Septa often wavy, tentacular lobes may be developed
Costae very unequal, simple spines
Perforations extensive

Fungia corona

Corals convex upper surface, skeleton thin and light
Septal teeth large and pointed, tentacular lobes weakly developed
Costae widely spaced, larger costae with simple spines
Perforations between costae

Fungia danai

Corals strongly arched around mouth, skeleton not heavily calcified
Septal teeth large with prominent tentacular lobes
Costae compact with large branching spines
Pits present between costae but few deep perforations

Fungia horrida

Corals strongly arched around mouth, skeleton thick and heavy
Septal teeth large, irregular, tentacular lobes weakly developed
Costae unequal, very long spines
Perforations not present

Fungia klunzingeri

Corals flat with a central dome
Septal dentations very large, regular, tentacular lobes not usually developed

Fungia – Group 2 (Veron 2000)

Monospecific subgenus

Fungia fungites

Corals circular
Septal dentations variable size but usually fairly small, triangular, nearly smooth, tentacular lobes may be present
Costal spines tall, nearly smooth, conical
Perforations range from common or absent

Verillofungia – Group 3 (Veron 2000)
Corals circular, flat or centrally arched
Septal dentations subtriangular, rounded and moderately sized
Costal spines beaded, commonly with tiny branches

Fungia concinna
Corals flat
Septal teeth and costal spines small, giving septa and costae a smooth appearance, tentacular lobes not formed or minute
Perforations usually absent

Fungia repanda
Corals flat or strongly arched
Septa of different cycles almost equal at perimeter
Septal teeth fine but clearly visible, no tentacular lobes
Perforations present
Costal spines granular
Septal dentations fine cf. *F. fungites*

Fungia scabra
Corals flat or arched
Septa thin
Septal teeth fine and conical or granular, small tentacular lobes may be present
Costae fine
Perforations absent
cf. *F. concinna*, which has thinner corals, has thicker septa with coarser septal and costal ornamentations

Fungia granulosa
Corals flat or with a central arch
Septa thick and wavy, tentacular lobes large causing the wavy septa, finely granulated margins
Costae fine
Perforation present

Pleuractis – Group 4 (Veron 2000)

Corallum elongate i.e. distinctly non-circular corals
Septal dentations rounded, most fine and evenly spaced
Costal spines small, beaded or spinose

Fungia scutaria

Corals thick and heavy, up to 170 mm long
Septa variable lengths, extending only partway between mouth and coral periphery
Tentacular lobes tall and obvious
Costae well developed, equal or subequal

Fungia paumotensis

Corals thick and heavy, elongate, usually have a strong central arch, sides almost parallel, up to 250 mm long
Most primary septa extend from mouth to coral perimeter
Costae fine and straight

Fungia moluccensis

Corals usually attached, sometimes encrusting, shape similar to *F. paumotensis* or contorted, usually have a strong central arch
Primary septa extend form mouth to perimeter if corals not contorted, secondary mouths sometimes formed
Costae equal or subequal
cf. *F. paumotensis*, which is heavier, less irregular and has thicker septa and costae which are straight and uniform

Ctenactis

Corals are free living and elongate (more elongate compared with species of the subgenus *Pleuractis*) with round ends. They have a prominent central furrow which extends much of the axial length of the coral. The central furrow may contain one to several mouths. Mouths are not developed outside the central furrow. Septal teeth are large, triangular, coarse and evenly spaced. Costal spines tall and spinose.

Ctenactis echinata

Only a single mouth present in central furrow
Septal teeth and costal spines well developed
Colour usually brown

Ctenactis albitentaculata

One, sometimes two mouths in central furrow
Septal teeth well developed, long and tapered, costal spines well developed
Brown with distinctive and conspicuous white tentacles, tentacles usually extended during the day

Ctenactis crassa

Several mouths present along central furrow
Septal teeth larger and more angular cf. *C. echinata*

Herpolitha

Corals are free living and elongate with a central axial furrow. Several mouths are present along the central furrow and smaller (lateral) mouths are also present amongst the septa. Septa are discontinuous, being interrupted where the lateral mouths are developed. Septal and costal elaborations are as described for the subgenus *Pleuractis*.

Herpolitha weberi

Corals usually have pointed ends
Few lateral mouths developed, with most primary septa extending from the central furrow to the periphery

Herpolitha limax

Corals usually have rounded ends
Lateral mouths numerous, with few primary septa extending from the central furrow to the periphery

Polyphyllia

Corals are free living, elongate or elliptical with a high arch. Mouths distributed densely and evenly over the surface of the coral. Primary septa are short, thick and petaloid in shape. The primary septa alternate with short thin and less obvious secondary septa. The central axial furrow is usually indistinct, except in small colonies. Costae are distinct at the edge of corallum. Septal and costal elaborations as described for the subgenus *Pleuractis*.

Polyphyllia talpina

Secondary septa usually fuse around primary septa, forming a background matrix
Tentacles usually extended during the day, long and numerous

Sandalolitha

Corals are free-living, circular to elongate and heavily calcified (compared with *Halomitra*). Mouths are closely arranged and more numerous cf. *Halomitra*, and corallites are exsert and outward facing. An axial furrow is not present. Septal and costal elaborations as described for the subgenus *Verillofungia*.

Sandolitha robusta

Corals circular to oval, dome-shaped
Corallites compact
Septa vary little in height

Halomitra

Corals are free-living, subcircular, thin and delicate. Mouths are mostly fairly widely spaced over the colony surface. An axial furrow is not present. Septal and costal elaborations as described for the subgenus *Fungites*.

Halomitra pileus

Corals flat, dome or bell-shaped and circular
Corallites widely spaced, increase in size as colony grows

Lithophyllon

Colonies remain attached in the adult stage. They are encrusting or explanate with one or many centres. Septa and costae are thin (compared with *Podabacia*). The skeleton does not have perforations. Septal and costal elaborations as described for the genus *Cycloseris* or *Diaseris*.

Lithophyllon mokai

Colonies small, up to 80 mm across, encrusting
Central corallite usually distinguishable in small colonies
Septo-costae as described for *Diaseris*

Podabacia

Colonies remain attached in the adult stage, and form explanate plates. Corallites are usually inclined towards the plate margins. Septa are compact and mouths closely arranged (cf. *Lithophyllon*). Costae are not distinct although for short segments they are continuous. The skeleton is perforated between the costae.

Podabacia crustacea

Peripheral corallites exsert, inclined towards plate margins
Septo-costae similar to those of *Sandolitha*

Podabacia motuporensis

Peripheral corallites small, not strongly inclined towards plate margins
Septo-costae similar to those of *Halomitra*

FAMILY PECTINIIDAE

Colonies mostly have very thin skeletal structures. They are basically laminar and are composed of thin plates. Corallites usually lack definite walls. Septa are irregularly dentate. Columellae are usually weakly developed. Septo-costae or costae are always well developed. The coenosteum characteristically lacks ornamentation.

Echinophyllia

Colonies are encrusting or laminar. Calices are immersed to tubular and not strongly inclined on the colony surface. Columellae are usually well developed. The coenosteum is pitted at the commencement of new septo-costae. Septo-costae have large spines that are often ornamented.

Echinophyllia echinoporoides

Encrusting laminae, usually thin, sometimes with nodules at colony centre
Corallites small, mostly immersed, some subplocoid protruding up to 2.5 mm, slightly inclined towards colony margins
Lack or only have a few pits (cf. *Oxypora lacera*)

Echinophyllia aspera

Partly or completely encrusting laminae, central parts may be submassive and edges may have free margins
Corallites usually inclined, usually towards colony periphery, variable in level of protrusion
Septa clearly define corallites despite lack of poorly developed walls, 1 -3 large dentations
Costae thick, even, pronounced dentations as pointed spines
Pits only common in small colonies
Columellae well developed
Paliform lobes not developed

Echinophyllia orpheensis

Submassive, laminar at colony periphery
Corallites plocoid, exsert to very protruding
Walls developed
Paliform lobes well developed
Costae well developed, thick, beaded dentations

Echinophyllia echinata

Thin, flat to vase-shaped laminae
Central corallite conspicuous
Corallites widely spaced
Septo-costae obvious, ornamentation variable from almost none to tall spines
Pits at commencement of new costae
Corallites slightly protuberant and inclined, cf. *Oxypora lacera* which has shallow, elliptical corallites

Oxypora

Colonies composed of thin laminae. Corallites are shallow, not strongly inclined and do not have walls developed. Septo-costae are few but obvious on the colony surface. Columellae are poorly developed. The coenosteum is pitted at the commencement of new septo-costae.

Oxypora lacera

Thin, delicate plates, thickened in high energy environments
Costae always have spines developed, spines have ornamented tips

Oxypora glabra

Thin, delicate plates, commonly with ragged margins
Costae have few or no spines
Columellae reduced to the fusion of inner septal margins

Mycedium

Colonies are laminar. Corallites are exsert and inclined towards the colony periphery, so that the lower wall is not or barely developed, giving corallites a nose-like appearance. The coenosteum is NOT pitted at the commencement of new septo-costae. Septo-costae are well developed and finely ornamented.

Mycedium robokaki

Septal and costal margins very ornamented
Corallite smaller and more ornamented cf. *M. elephantotus*

Mycedium mancaoi

Colonies form tiers of contorted, dissected, unifacial laminae with wavy margins
Corallites 6 -10 mm diameter

Mycedium elephantotus

Colonies laminar or encrusting
Corallites up to 15 mm diameter
Costae form thickened radiating ribs on corallite walls

Pectinia

Colonies are laminar to branching, and covered with high, thin, acute, irregular walls which form wide valleys. Walls are variably continuous, being long, short or discontinuous and form tall branching spires. Corallites are usually at the bottom of the valleys. Septo-costae are widely spaced, well developed and finely dentate. There is little or no formation of columellae.

Pectinia lactuca

Colonies submassive or form thick plates
Valleys elongate, some can be traced from colony centre to periphery
Walls of relatively uniform height, continuous, plate-like

Pectinia paeonia

Colonies never have extended valleys
Valleys irregular clusters of fluted thin laminae forming spires and short walls

Pectinia alcicornis

Irregular clusters of fluted, flat laminae forming spires or very short walls
Spires more heavily calcified with thicker and coarser skeletal structures cf. *P. Paeonia*
Columellae large

FAMILY MERULINIDAE

A common and distinctive feature of the genera of this family is the coarse but evenly dentate septa that fuse with those across walls of adjacent valleys or corallites. Valley walls are long and continuous at one extreme and modified to form distinctive conical hydnophores. Paliform lobes are not developed. Other characters are as described for each genus.

Hydnophora

Colonies are massive, encrusting or branching. This genus is characterised by the presence of hydnophores formed where sections of common walls between corallites intersect and develop into conical mounds. Septa converge at the top of hydnophores rising from the columella centres between hydnophores. Hydnophores are present over the entire surface of colonies. They may fuse on flattened surfaces of *H. pilosa* and *H. exesa*, forming *Merulina*-like walls. Tentacles may obscure the hydnophores when fully extended.

Hydnophora pilosa
Laminar or submassive bases with short columns or fused branches
Branches sometimes flattened towards their tips, 10-25 mm thick
Hydnophores smaller cf. *H. exesa*

Hydnophora rigida
Branching without a massive or encrusting base
Branches have flattened sides, 7 -12 mm thick
Hydnophores usually fused into ridges down branches

Hydnophora grandis
Branching with little tendency to form a flattened base
Branches mostly circular in section, 10 -15 mm thick
Hydnophores little fusion

Hydnophora exesa
Submassive, encrusting, laminar or subarborescent (thicker bases, columns, branches and larger hydnophores cf. *H. pilosa*)
Branches 4-7.5 cm thick and to 20 cm in height
Hydnophores 5 -8 nun diameter

Hydnophora microconos
Massive
Hydnophores small, 2-3 mm diameter

Paraclavarina

Monospecific genus

Paraclavarina triangularis
Colonies form a network of anastomosing branches, without a plating or encrusting base
Branches triangular in cross-section
No clearly defined corallites, instead they form valley-like series
Three series of valley, one on each side of the branches, centres of valleys run down flat sides of branches and angles are the common walls between the series
Valleys usually divide when branch divides, short and shallow
Septa align across valley walls
Columellae thick, fused with septa

Merulina

Colonies are laminar with or without subarborescent branches. Valleys are short and straight, spreading and dividing in fan-like patterns. Flat surfaces often have concentric growth lines.

Merulina scabricula
Skeletal structures thin and fine

Merulina ampliata
Skeletal structures thick and coarse

Scapophyllia

Monospecific genus

Scapophyllia cylindrica
Thick laminar bases and blunt columns
Valleys meandroid, sinuous, parallel (cf. spreading in *Merulina*)

FAMILY DENDROPHYLLIIDAE

Turbinaria

Most species of this genus form laminar colonies. Corallites are round, and immersed to tubular. A distinctive feature is the porous surface of colonies, having the same structure on the corallite walls and the coenosteum between corallites. Septa are short and neat. Columellae are broad and compact. Predominantly found in turbid environments.

Turbinaria patula
Unifacial, upright fronds
Corallites long, tubular, conical, strongly inclined towards colony margin, 4-6 mm diameter at rim, 3.5 mm maximum diameter and protrude to 1.8 cm

Turbinaria peltata
Flat, thickened, unifacial laminae, often overlapping tiers, sometimes ridges with budding margins as bifacial fronds or cylindrical columns
Corallites circular openings, immersed to tubular protruding up to 2.5 cm, 6 mm average diameter, crowded or widely spaced, mostly directed upwards
Polyps large, often out in the day
• Corallites larger diameter and less tubular cf. *T. patula*

Turbinaria frondens
Horizontal or inclined fronds
Corallites immersed to tubular, regularly spaced and inclined, tubular corallites strongly inclined towards colony margins, 3.5 mm average diameter

Turbinaria mesenterina
Unifacial laminae, range from highly contorted folds and tubes in subtidal habitats to less convoluted or flat in deeper water
Corallite crowded, slightly exsert, 2.5 -3.5 mm diameter
• Thinner more tubular corallites cf. *T. reniformis*

Turbinaria reniformis
Unifacial laminae, sometimes tiered
Corallites usually widely spaced, thick walled and small calices, immersed to conical, 2.5 mm average diameter
Colour distinctive, usually yellow-green, especially around colony margins, yellow polyps
• Laminae not usually as convoluted and corallites more immersed giving colonies a smoother appearance cf. *T. mesenterina*

Turbinaria radicalis
Usually subtropical, rare on the GBR
Encrusting laminae with rootlets growing down into substrate
Corallites low cones or immersed, never strongly inclined, 2.5-3.5 mm diameter

Turbinaria stellulata
Colonies encrusting or massive, formed by repeated overgrowths of plates
Corallites conical, protrude up to 2 cm, 3-4 mm diameter, calices quite large to approx. 2mm giving corallites an open appearance
• Corallites more protuberant cf. *T. radicalis*
Seldom found in turbid habitats

Turbinaria bifrons
Flat laminae and upright bifacial fronds
Corallites conical, tubular, regularly spaced, uniform appearance, < 2 mm diameter, strongly inclined on fronds, 2 -6 mm exsert, being more exsert where fronds are widely spaced
Fronds thicker, corallites larger and more conical with large calices cf. *T. conspicua*
• cf. other species of *Turbinaria*, fronds always bifacial with equal corallite development on each side, fronds do not show substantial secondary thickening except near bases
• Differs from other species of *Turbinaria* which fold because they fold irregularly and then folds subsequently separate
• Corallites slightly smaller and more regular cf. *T. frondens*
• Fronds thicker, corallites slightly larger and more conical with larger calices than *T. conspicua*

Turbinaria conspicua
Thin, upright, bifacial fronds
Corallites small, 2 nun diameter, immersed, widely separated, small calices

Turbinaria heronensis
Subtropical
Irregularly dividing fronds
Corallites elongate, tubular, projecting beyond the margins of the fronds sometimes forming small branches, 3-4 mm diameter and up to 10 cm long, calices very deep

Duncanopsammia
Monospecific genus

Duncanopsammia axifuga
Lateral or sub-horizontal branching
Corallites are large, exsert, open tubes facing upwards
Septa in five cycles, develop to Pourtales Plan, slope steeply giving corallites a deep appearance
Paliform lobes and costae absent
Columellae large
Coenosteum dense

Heteropsammia

Heteropsammia cochlea
Solitary or colonial with up to 7 calices
Free-living
Base of colony encloses tube of a commensal sipunculid
Septa develop to Pourtales Plan
Columellae well developed
Wall thick and spongy as for family
cf. *Heterocyathus aequicostatus*

FAMILY CARYOPHYLLIIDAE

Heterocyathus

Heterocyathus aequicostatus
Solitary
Free-living
Walls have well developed costae
cf. *Heteropsammia cochlea*

FAMILY MUSSIDAE

Corallites and valleys are large. Septa have large teeth or lobes. Columellae and walls are thick and well developed. Polyps are fleshy, and when retracted they form concentric rings of tissue. Species are usually brightly coloured, often with contrasting colours.

Blastomussa

Colonies are phaceloid to subplocoid. Septa slope gently to corallite centre and have lobed teeth. Columellae are weakly developed. Corallite walls often joined by epitheca. The growth form is apparent only when polyps retract, because the large fleshy mantles of adjacent polyps fit compactly together so that colony appears to be massive when polyps expanded. Polyps are similar in both species.

Blastomussa merleti
Phaceloid to plocoid
Corallites < 7 mm diameter
Septa 2 cycles, only the first reaches the columella, slightly serrated, primaries may be exsert

Blastomussa wellsi
Phaceloid, rarely subplocoid
Corallites 9 -14 mm diameter
Septa not arranged in cycles, numerous, small blunt teeth, most regularly exsert and extend from thecae to columellae

Cynarina

Cynarina lacrymalis
Monospecific and distinctive genus
Solitary, may be attached or free living
Septa large and thick
Septal dentations very large, lobate and few in number
Paliform lobes usually well developed, large, thickened
Columella large and compact
Costae are variably developed sometimes with large dentations
Polyps very distinctive

Scolymia

Colonies are usually monocentric, sometimes polycentric. Septa are numerous with five or six cycles developed. Septa have large and regular with blunt dentations. Columellae are large. Polyps are as described for this species, but do not form concentric rings. In contrast to Cynarina, there are no costae.

Scolymia australis
Septa and dentations covered with fine granulations

Scolymia cf. vitiensis
Sturdy with large blunt teeth

Australomussa

Monospecific genus

Australomussa rowleyensis

Colonies massive with a flattened or dome-shaped surface
Corallites form narrow valleys (8-20 mm wide)
Valleys are poorly defined or short with thick walls
One or more central plocoid corallites are evident in juvenile corals
Polyps are as described for the family

Micromussa

Colonies are submassive or encrusting, usually flat. Corallites are small (up to 8 mm diameter), cerioid or subplocoid, circular or angular. Septa are thickened at the corallite wall and have conspicuous teeth.

Micromussa amakusensis

Massive
Corallites cerioid, neat angular, up to 8 mm diameter, 1 -3 large teeth
Thick fleshy mantle usually covered with fine papillae

Acanthastrea

Colonies are massive or encrusting and are usually flat. Corallites are cerioid or subplocoid, monocentric, and circular or angular. Septa are thickened at the corallite wall, and have tall teeth. Colonies have thick fleshy tissue over the skeleton.

Acanthastrea lordhowensis

Massive
Corallites cerioid, laterally compressed of uneven height and acute walls, up to 2 cm diameter
Septa short, thick, teeth large
Columellae barely developed
Corallite walls thin, vertical
Thick fleshy mantle covered by fine papillae

Acanthastrea regularis

Massive
Corallites subplocoid, mostly separated by a deep fissure
Septa uniformly spaced, wedge shaped being thick at wall and tapering towards columellae centre, all similarly sized, 8 -10 evenly spaced rounded teeth
Tissue over skeleton NOT thick

Acanthastrea echinata

Encrusting to massive
Corallites cerioid or subplocoid, circular, thick walls
Septal dentations long, pointed
Thick fleshy tissue over skeleton forms concentric folds

Acanthastrea rotundoflora

This species has an Echinophyllia-like appearance
Encrusting, sometimes submassive
Small colonies have a conspicuous central corallite
Corallites plocoid, widely spaced at colony periphery
Septal dentations long, pointed
Fleshy tissue over the skeleton

Acanthastrea hemprichii
Encrusting to massive
Corallites cerioid
Septal dentations exsert
Fleshy tissue over skeleton, but not thick enough to mask the underlying skeletal structures
cf. *A. echinata* which has more widely spaced, fleshy, less cerioid corallites

Acanthastrea bowerbanki
Mainly subtropical
Colonies encrusting, usually small
Corallites cerioid, irregular angular shapes, central corallite usually conspicuous, thin walls
Septa compact, thinner and more numerous (cf. *A. hillae*)
Columellae small
Colonies not fleshy

Acanthastrea hillae
Common only in high latitudes
Massive, usually small
Corallites cerioid, irregular shapes sometimes forming short valleys with several centres
Moderately fleshy tissue

Lobophyllia
Colonies are phaceloid to flabello-meandroid. Corallites and / or valleys are large. Septa are large with long teeth. Columellae centres are broad and compact.

Lobophyllia diminuta
Colonies small
Corallites phaceloid, usually monocentric but may have up to 3 centres, average 16 mm diameter (about half diameter of *L. hemprichii* at 35 mm mean diameter, hence species name)
Septal teeth few in number, long and conspicuous making corallites more irregular and spiny cf. *L. hemprichii*
Columellae well developed
• *L. hemprichii* has more uniformly spaced corallites

Lobophyllia pachysepta
Colonies never large (seldom> 0.5 m)
Branches / corallites phaceloid or partly flabello-meandroid, short and widely spaced, 40 -50 mm diameter
Primary septa thick, 3 -5 long, lobed dentations
Costae poorly developed
Colour distinct, uniformly dark green or grey with yellowish primary septa

Lobophyllia corymbosa
Appearance of this species not very variable
Colonies mostly phaceloid and monocentric, can have up to 3 centres per branch (cf. *L. hemprichii* which is phaceloid to flabello-meandroid)
Corallites smaller (cf. *L. hemprichii*), calices deep
Septa relatively regular, thick near walls and thin within the calice
Septal dentations tall, blunt, decrease in size towards the columella
Costae fairly well developed

Lobophyllia hemprichii
Colonies may be very large (e.g. > 5 m)
Phaceloid to flabello-meandroid
Septa taper from the wall to the columella
Septal dentations small, sharp

Lobophyllia hattai
Flabello-meandroid at colony periphery and me android at centre of colony
Valleys shallow, wide, flat floors (large corallites cf. other species of *Lobophyllia*)
Columellae may be in two rows
Small colonies can be confused with *L. hemprichii*
• cf. *S. agaricia* (both species can have two rows of columellae) which has coarser septa, septal ornamentation, much deeper valleys

Lobophyllia flabelliformis
Colonies large
Flabello-meandroid
Valleys closely compacted, elongate
Large fleshy mantle so live colonies are *Symphyllia*-like
Mantle has elongate papillae that may resemble tentacles

Lobophyllia robusta
Colonies usually a few corallites, but may be larger
Corallites large, phaceloid, mostly mono centric
Septal dentations tall, sharp
• Corallites larger and polyps more fleshy cf. *L. hemprichii*

Symphyllia

Colonies are massive and meandroid. Valleys are large and wide, usually with a groove along the top of the valley walls in live colonies. Septa are large with long teeth. Columellae are broad and compact.

Symphyllia wilsoni
Valleys 13 mm wide, irregular length ranging from monocentric to irregularly meandroid
Septa equal or subequal

Symphyllia recta
Valleys 12 -15 mm wide, highly sinuous
Septal dentations finer cf. other species of *Symphyllia*

Symphyllia radians
Valleys 20 -25 mm wide, fairly straight especially on flat surfaces, otherwise irregularly sinuous
Valleys in a radiating pattern from centre of colony (not in *S. cf. recta*)
Septal dentations intermediate between *S. recta* and *S. agaricia*

Symphyllia agaricia
Valleys 35 mm average width, sinuous or straight
Septa thick
Septal dentations large
Columellae usually in two rows

Symphyllia valenciennesii
Colonies usually flat, little formation of valleys at colony centre
Valleys radiate from flat centre, steep sides, flat floors
Septa thick
Septal dentations large

FAMILY FAVIIDAE

There are more genera in this family than in any of the other families of sc1eractinian corals. We will examine 15 families. All genera have a moderate or small number of species. Growth form, type of corallites, septal dentation, presence of paliform lobes and structure of the columellae are important characters for identifying genera and species of favids.

Caulastrea

Colonies are phaceloid. Septal dentations are fine, columellae well developed and paliform lobes usually absent.

Caulastrea echinulata
This species is rare
Branches compact, 6-8 mm apart
Corallites mostly monocentric, oval, 10-12 mm, sometimes laterally compressed
Septa markedly exsert to 2 mm
Corallite walls thin

Caulastrea furcata
Branches more compact cf. *C. Curvata*
Corallites < 10 mm diameter, mostly monocentric, circular or oval
Septa very exsert i.e. the largest septa 2-3 mm exsert
Columella well developed
Costae strongly developed in upper edge zone
Brown with bright green centres

Caulastrea tumida
Colonies phaceloid to plocoid
Branches / corallites short, thick, 10-15 mm diameter
Costae poorly developed

Caulastrea curvata
Branches usually sprawl irregularly, curving at colony periphery (branches less compact and thinner cf. *C. furcata* and *C. echinulata*)
Corallites < 8 mm diameter
Septa less exsert cf. *C. furcata*
Columella not well developed
Costae well marked over whole length of edge zone and covered with minute, acute spines
Less septa and costae uniformly developed but less prominent cf. *C. furcata*
Colonies pale brown, sometimes with green oral discs, usually less brightly coloured

Favia

Colonies are massive or encrusting, usually with rounded or flattened surfaces. Corallites are mostly monocentric, plocoid and divide equally by intratentacular budding.

Favia stelligera

Colonies massive, columnar, hillocky or flat
Corallites plocoid, low, conical with thick walls and small calices, very small (2.5-3.5 mm diameter)
Costae well developed
Paliform lobes large
Budding is predominantly extratentacular

Favia laxa

Corallites plocoid, low round and conical, uniform in shape, 3 -6 mm diameter
Paliform lobes well developed, forming a neat crown
Septa and costae fine
Costae usually elongate, separated from those of adjacent corallites by a fine line
Uniform colour usually pale brown or pinkish-brown
Budding is mostly intratentacular, although also extratentacular budding
Not common in most reef biotopes

Favia matthai

Colonies massive and rounded, occasionally flat or encrusting, usually small
Corallites plocoid, crowded, circular, 9 -15 mm diameter, shallow open calices
Exsert septa, very prominent paliform crown or series of crowns in concentric circles
Costae beaded, seen especially in living colonies when polyps retracted as concentric rings, costae not usually joined with costae of adjacent corallites
Budding entirely intratentacular
Usually brown or grey or mottled, walls and calices may be contrasting colours
• Shallower, more open calices with more exsert septa and a more prominent paliform crown or series of crowns, concentric circles of elongated septo-costal dentations readily recognisable underwater, different colours of the oral disc and coenosarc cf. *F. pallida*
• Larger, more protruding corallites and very different calicular structures cf. *F. favus*

Favia speciosa

Massive
Corallites circular, crowded (in colonies from shallow water)
• Corallites conical, septa thinner, more numerous, less even, have longer dentations and better developed paliform lobes (less numerous costae cf. *F. pallida*
• cf. *F. pallida* which has circular or elliptical calices, and less crowded and shallower corallites

Favia helianthoides

Colonies submassive
Corallites plocoid, conical, small to 4 mm diameter and project 1-2 mm
Septa fine, closely compacted, large septa alternate with short septa
Paliform lobes well developed, forming a neat crown
Costae correspond to septa, are equal in size, adjoin with those of adjacent corallites
Extra and intratentacular budding
Brown, tan or blue-grey with cream oral discs
• cf. *F. laxa* which has smaller, more widely spaced corallites

Favia truncatus
Massive, flat or hemispherical
Corallites 6-9 mm diameter, inclined, facing down and out from centre of colony
Corallites appear hooded, with lower wall immersed
Septa widely spaced, irregular in size
Paliform crowns well developed
Uniform yellowish green or brown

Favia pallida
Colonies massive and rounded
Corallites plocoid or ploco-cerioid, 6-10 mm diameter, usually less than or equal to 2 mm exsert, calices circular, irregularly squashed together or elliptical (not conical as in *F. speciosa*), thin walls
Septa widely spaced, characteristically irregular, descend abruptly
Paliform lobes usually poorly developed
Septa regularly dentate and dentations short (cf. *F. favus*)
Colonies pale yellow cream, green with dark brown or green oral discs
Very abundant and variable

Favia favus
Colonies massive and rounded, sometimes flattened
Corallites plocoid, 12 -20 mm diameter, up to 5 mm exsert with broad bases (i.e. conical corallites which are quite protruding), usually circular but may be irregular in shape, endotheca (inner corallite wall) almost always cylindrical, calices deep or shallow
Septa usually regularly exsert
Paliform lobes poorly developed
Costae equal, frequently aligned between adjacent corallites
Wide variety of colours including a uniform dull brown, grey, green or mottled brown and light grey, pale centres or sometimes oral disc more brightly coloured
Very abundant and variable

Favia rosaria
Submassive to encrusting
Corallites crowded, up to 20 mm diameter, low walls
Extratentacular budding is common
Septo-costae uniform, not exsert
Paliform lobes inconspicuous
Distinctive pinkish-brown with darker corallite inner walls and pale oral discs

Favia lizardensis
Colonies massive usually with a rounded surface
Corallites plocoid, circular, 10 -13 mm diameter, usually regularly spaced
Corallite walls thick but with fine rims
Septa thin, widely spaced, evenly exsert
Paliform lobes not developed
Costae well developed, even, conspicuous
Endothecae near vertical
Budding is intratentacular, mono-to tristomodaeal
Colour pinkish brown with cream or green oral discs
• More regular, shallower compact corallites with thinner septa and usually much thinner walls cf. *F. favus*
• cf. *F. pallida* both species can have thin walls, *F. lizardensis* has larger corallites and septa which are more exsert and which have more elongated dentations

Favia rotumana
Colonies massive
Corallites subplocoid to cerioid, irregular shape sometimes short valleys with up to 3 centres, crowded, corallites fairly large
Septa thin, irregular, irregularly exsert, descend steeply
Paliform lobes poorly developed or absent
Septal dentations prominent and irregular giving a ragged appearance
Colour variable, walls and oral discs usually contrasting colours

Favia danae
Massive, usually small
Corallites conical, thick walls
Septo-costae irregular, thick
Costae strongly beaded
Paliform lobes weakly developed
Uniform or mottled brown, green, yellow-green or grey
• cf. *F. favus* which has more uniform septo-costae and costae which are less beaded

Favia marshae
Massive, dome-shaped or flat
Corallites shallow, circular, neatly arranged, 15-20 mm diameter
Corallites at margin frequently in concentric rows
Septa fine
Paliform lobes weak to absent
Pale grey with contrasting walls and centres
• cf. *F. rotundata* which has larger more fleshy polyps

Favia rotundata
Massive, flat or dome-shaped
Corallites subplocoid to cerioid, very large, 19-22 mm diameter, calices also large
Larger septa that reach the columella develop paliform lobes
Septa and costae have regular dentations, equally exsert
Budding intratentacular and extratentacular, monostomodaeal intratentacular budding is predominant
Colour dark grey, green, brown, uniform within individual colonies
Polyps distinctly fleshy

Favia maxima
Colonies massive with rounded or flattened surfaces, usually small
Corallites plocoid, deep with well defined walls, distorted circular or oval
Very large calices 20 -30 mm diameter, close together or to 9 mm apart
Large paliform lobes forming a conspicuous crown
Budding is entirely intratentacular
Dull brown or yellow-brown, oral discs usually dull green or white

Favia veroni
Colonies massive
Corallites subplocoid, very large to 30 mm, closely compacted often with an irregular outline
Calices deep to 10 mm, very open with septa remaining close to endothecae
Paliform lobes absent
Budding is intratentacular, mono-or tristomodaeal
Brown or red with cream oral discs

Favia maritima
Colonies massive, usually hemispherical
Corallites plocoid, round, oval or irregular in shape, large to 20 mm diameter
Septa numerous and fine, evenly exsert, descend abruptly
Paliform lobes if present are inconspicuous
Thecae very exsert and gradually slope out towards the coenosteum
Budding is equal, usually mono-to tristomodaeal
Dark brown or greenish, sometimes with pale oral discs
• *F. maritima* like a large *F. favus*

Barabattoia

This is a genus of convenience, including two species that are similar to each other and distinct from species of *Favia*.
Corallites are tubular and fuse irregularly, budding is primarily extratentacular.

Barabattoia laddi
Corallites bifurcated at approximately 10 mm intervals, join frequently
Costae in 2 alternating orders

Barabattoia amicorum
Corallites plocoid to tubular
Costae equal

Favites

Colonies are usually massive, usually with dome-shaped or flat surfaces. Corallites are monocentric, cerioid or occasionally subplocoid. Septal dentations usually larger compared with species of *Favia* or *Goniastrea*. Paliform lobes are rarely well developed, ranging from enlarged septal dentations (may not be conspicuous) to a prominent crown. Corallites divide unequally by intratentacular budding, producing daughter corallites of different sizes.
NB Some specimens of every species of *Favites* in the Museum of Tropical Queensland monograph collection show some tendency towards a plocoid growth form.

Favites stylifera
Encrusting to submassive
Corallites irregular shape, 3-6 mm diameter
Septa few and highly contorted, irregular teeth
Paliform crown weakly developed
Pale brown sometimes with green oral discs
• Like a small *F. russelli*

Favites pentagona
Submassive to encrusting, sometimes hillocky or irregular columns
Corallites cerioid, angular, usually always less than 6 mm
Septa reaching columella have well developed paliform lobes forming a distinctive crown
Colour most commonly brown or red, often with green oral discs

Favites chinensis
Colonies massive, rounded
Corallites, cerioid to subplocoid, 10 -13 mm diameter
Septa straight, spaced irregularly and widely, aligned with septa of adjacent corallites
Characteristically elongated septal dentations
Walls thin and angular
Uncommon on GBR
• Smaller corallites, usually angular, fewer septa and (less reliably) fewer but more elongated dentations cf. *F. abdita*

Favites halicora
Massive, submassive or encrusting with rounded to hillocky surfaces (same growth forms as *F. abdita*)
Corallites very thick walls, cerioid becoming subplocoid, calices approx 1 cm diameter
Septal dentations larger at calice centre sometimes forming paliform lobes
Uniform pale yellowish or greenish brown
• More rounded corallites, thicker thecae, paliform crown cf. *F. abdita*

Favites abdita
Massive, submassive or encrusting with rounded to hillocky surfaces (same growth forms as *F. halicora*)
Corallites cerioid, rounded rather than angular becoming more angular when walls are thin / calices are larger, 7 -12 mm
Paliform lobes not developed
Walls variable within a single colony: thin, irregular on hillocky parts, and broad on flat sides where calices are shallow
Pale brown often with brown or green oral discs
Most widespread species of *Favites*, found in all biotopes of hermatypic corals

Favites russelli
Submassive to encrusting
Combined appearance of corallites and septa give colonies a messy look
Cerioid or subplocoid, corallites irregular in outline
Primary septa often highly exsert and thick near walls
Prominent paliform lobes
Usually very brightly coloured, very often bright green or with the coenosarc and oral disc different colours

Favites complanata
Massive
Corallites cerioid or slightly subplocoid, approximately 12 mm diameter
Walls thick and rounded
Septa two alternating cycles, 4 or 5 prominent dentations (forming 3 pointed stars)
Paliform lobes developed
Columellae large and compact
Brown, sometimes with green or grey centres

Favites flexuosa
Massive with flat or hemispherical surface (NOT hillocky)
Corallites always cerioid, usually angular, deep, 1.5 -2 cm diameter
Septa prominent with large conspicuous teeth
Paliform lobes weakly developed
Wide range of colours, usually with contrasting walls and oral discs

Favites paraflexuosa
Colonies hemispherical or flat
Corallites angular and deep
Septa even with fine teeth
Paliform lobes weakly developed
Brown with pale oral discs
Corallite shape identical to *F. flexuosa* but *F. flexuosa* has conspicuous septal teeth (even underwater)

Goniastrea

Corallites are cerioid, submeandroid or meandroid. They have a regular, neat appearance with deep calices plunging septa and fine regular septal dentations. Paliform lobes are very obvious and form conspicuous crowns. Columella centres are small but obvious, even in submeandroid and meandroid species being surrounded by paliform crowns.

Goniastrea edwardsi
Colonies usually massive tending towards spherical or columnar
Corallites cerioid, 2.5 -7 mm diameter
Thick rounded walls

Goniastrea retiformis
Colonies usually massive tending towards spherical or columnar
Corallites cerioid, straight-sided with 4 -6 sides, uniform in size (3 -5 mm diameter)
Long and short septa alternate

Goniastrea palauensis
Massive or encrusting, usually flattened or hillocky
Corallites cerioid, deep and large calices (6 -15 mm diameter)
Extremely prominent paliform crown, paliform lobes always have vertical inner margins descending to a compact, deep seated columellae
Thickness of the thecae is the most variable character of this species, from 2 -8 mm in cerioid colonies

Goniastrea aspera
Colonies massive or encrusting
Corallites cerioid, deep, angular with straight sided walls, 7 -10 mm diameter
Walls fairly thin

Goniastrea australensis
Submassive or encrusting
Meandroid
Walls of variable thickness in different colonies
Colour usually green or brown with walls and valley floors of contrasting colours

Goniastrea favulus
Colonies mostly massive
Corallites submeandroid, sometimes cerioid
Walls usually thin
Corallites larger than *G. retiformis* if cerioid, about same scale as *G. aspera* but tending to be meandroid

Goniastrea pectinata
Colonies submassive or encrusting
Corallites cerioid to submeandroid usually with <4 centres
Walls thick
Usually uniform pale brown, pale violet or pink

Platygyra

Corallites are meandroid or rarely cerioid. Paliform lobes are absent or poorly developed. Columellae are loosely trabecular, forming a continuous tangle along valley floors and do not form well defined centres. Valley walls are usually fairly thin and have a ragged appearance due to unevenly developed septa and septal dentations (cf. species of *Goniastrea*).

Platygyra pini

Massive or encrusting
Corallites monocentric or form short valleys with one or two centres
Walls usually fairly thick, rounded edges
Septa usually thin but may be very thick if walls also very thick
Paliform lobes developed
• Greater development of the columella cf. *P. sinensis*

Platygyra verweyi

Colonies massive
Corallites cerioid to submeandroid with thin acute walls
Septa neat and uniformly spaced (cf. other species of *Platygyra*)
Columellae weakly developed or absent
• cf. *P. sinensis* which is more meandroid and shallower calices

Platygyra ryukyuensis

Colonies massive
Valleys short, sometimes monocentric, narrow (3 -4.5 mm wide)
Walls thin
Septa thin and widely spaced
Columella lamellar and indistinct
• cf. *P. sinensis* which is more meandroid and has larger valleys
• More/longer valleys, some development of a lamellar columella, more ragged septal dentations cf. *P. verweyi*

Platygyra sinensis

Massive
Meandroid with short to long valleys
Walls thin
Septa thin, slightly exsert, evenly spaced
Columella narrow, no centres
Wide variety of colours, often bright

Platygyra daedalea

Polymorphic and common species
Massive or encrusting
Meandroid or submeandroid
Walls thick (cf. *P. sinensis*), often perforations in skeleton
Septa characteristically messy, being very exsert, usually with pointed or ragged tips and frequently adjoined by fine trabecular linkages above the wall
Columellae of various widths but usually conspicuous, centres indistinct

Platygyra lamellina

Massive and rounded, sometimes flattened surface
Meandroid, characteristically thick walls (1 -1.5 times the valley width), valleys usually elongate
Septa continuous across walls, only slightly exsert, evenly spaced, dentations fine and neat (cf. *P. daedalea* and *P. sinensis*)
Columellae of various widths, centres indistinct

Australogyra

Monospecific genus

Australogyra zelli

Branching
Corallites monocentric or form short valleys
Walls thick, rounded and smooth (2-4 mm)
Valleys shallow
Columella absent although elongated, recurved septal dentations occasionally found and occasionally form a distinct columella

Oulophyllia

Colonies are massive. Corallites are monocentric to meandroid. Valleys are wide and deep with acute thin walls. Septa are widely spaced, thin, and ragged. Corallite centres are usually distinct arid loosely connected. Paliform lobes may be developed.

Oulophyllia crispa

Colonies massive and hemispherical or thick plates
Valleys fairly short, sometimes monocentric, 9 -20 mm wide, V-shaped with sharp upper margins (the acute angle of valley walls is emphasised by slope of septa)
Septa usually thin, continuous between valleys
Paliform lobes may be developed
Columellae centres weakly developed
Walls variable in width
• More meandroid cf. *O. bennettae*

Oulophyllia bennettae

Massive
Corallites cerioid, angular, large (average diameter 10 mm)
Some corallites elongated occasionally with 2 or 3 columellae
Septa widely spaced, usually very exsert, strongly dentate with large rounded teeth
Paliform lobes developed
Septa of adjacent corallites adjoined over the walls
Walls usually thick

Leptoria

Colonies are massive or encrusting. Corallites are meandroid with sinuous valleys of uniform width. Septa are neatly arranged. There are no paliform lobes.

Leptoria irregularis

Submassive or laminar
Valleys 3 -4 mm wide, usually perpendicular to colony margins and more sinuous towards colony centre
Septa irregular with sturdy teeth
Columellae do not form centres, not laminar

Leptoria phrygia

Massive, submassive or ridged with an even surface and dense skeleton
Corallites meandroid, sinuous, valleys of indefinite length, valleys have a very neat appearance being of constant width, thecae always thick
Septa all even in size and spacing and regularly adjoined with those of the adjacent valley
Columellae a series of vertical plates, do not form centres

Montastrea

Colonies are massive, and either flat or dome-shaped. Corallites are monocentric and plocoid. Daughter colonies are predominantly formed by extratentacular budding. Septa have fine regular dentations. Paliform lobes may be developed. Columellae are small. Retracted polyps are separated from each other by deep grooves in the coenosarc.

Three species have 'groove and tubercule formations'. These are formations interspersed between most calices that consist of very thin walled tubes up to 0.5 mm diameter, which have circular or elongated openings at irregular intervals on their upper surfaces. They have calcareous walls identical to, and continuous with the epitheca (a fine skeletal layer), which is normally visible as a fine lamina at the periphery of most colonies. Polychaetes live within the tubes.

Montastrea curta

Colonies massive with spherical or flattened surfaces, or columnar
Corallites circular, calices 2.5 -7.5 mm diameter with corallites within a colony being of similar size
Septa descend vertically just inside theca then curve inwards deep within the calice, long and short septa alternate
Small paliform lobes usually developed
Costae not adjoined with those of adjacent corallites

Montastrea salebrosa

Colonies massive and mostly spherical
Corallites circular, compact, small (3 -4 mm diameter), exsert, very thick walls
Corallites may face different directions
Septa evenly spaced, alternate strongly
Paliform crowns well developed

Montastrea colemani

Colonies submassive to encrusting
Corallites compact, 5 -8 mm diameter
Groove and tubercule formations well developed
Septa alternate in two cycles
Paliform crown well developed

Montastrea annuligera

Colonies irregular to encrusting
Corallites round, 3 -5 mm diameter
Septa descend vertically just inside theca then curve inwards deep within the calice
Paliform crown well developed, conspicuous
Costae separated by shallow grooves between adjacent corallites, beaded
Some corallites separated by groove and tubercule formations (never as well developed cf. *M valenciennesi*)

Montastrea valenciennesi

Colonies submassive to encrusting
Corallites distinctly polygonal, usually hexagonal, 8 -15 mm diameter
Groove and tubercule formations well developed
Long and short septa alternate strongly
Paliform lobes form a distinct crown
Costae prominently beaded

Montastrea magnistellata
Colonies massive with hemispherical or flattened surfaces
Corallites usually only slightly exsert and shallow, circular, 6 -13 mm diameter
Septa tightly compacted
Paliform lobes usually developed
Columellae large
Costae usually unequal, not adjoined with those of adjacent corallites and may be separated by a small ridge

Plesiastrea
Corallites are plocoid, round and small. True pali are developed. Budding is extratentacular.

Plesiastrea versipora
Colonies flat, may have lobes developed
Corallites 2-4 rum diameter
Pali form a defined paliform crown varying from thick wedges to fine pinnacles
Columella small, usually consisting only of a few pinnacles
First order costae always present and those of other orders may be equal or absent
Coenosteum smooth, blistered or ornamented with granules
Living colonies usually pale yellow, cream or brown, may be brightly coloured
Polyps fleshy giving corallites and colony surface a crowded appearance

Oulastrea
Monospecific genus

Oulastrea crispata
Live colonies are black with white upper septal margins

Diploastrea
Monospecific genus

Diploastrea heliopora
Genus / species distinctive
Colonies dome-shaped, large to very large, very uniform surface
Corallites plocoid, form low cones, thick walls
Septa thick at the corallite wall and thin where they join the columellae
Columella large and well developed
Budding is extratentacular

Leptastrea

Colonies are massive to encrusting or irregular. Corallites are crowded, and subcerioid to plocoid. Septa are minutely dentate. Costae are greatly reduced or absent. The coenosteum dense, giving the walls of the corallites a glowing white appearance that is distinctive for the species of this genus. Budding is extratentacular. Colony colour is useful for identification of the last three species listed below.

Leptastrea bewickensis

Colonies massive, flat or hillocky
Corallites appear deep and quite empty
Septa plunge sharply
Columellae small, simple fused ridges

Leptastrea inequalis

Massive
Corallites plocoid, barrel shaped, most small (3 mm diameter) with occasional "giant" corallites to 5 mm diameter
Corallites separated by deep grooves, with groove and tubercle formations (as described for Montastrea) well developed but without epitheca
Corallite walls thick, frequently higher on one side of calices, or a row of calices than on the other
Corallite walls and coenosteum usually smooth or finely granulated
Costae usually absent

Leptastrea purpurea

Colonies encrusting or massive with flat surfaces
Corallites subcerioid, polygonal and characteristically variable in size within a colony (2 -11 mm diameter), smaller calices in depressions or around worm or gastropod holes, etc
Septa tightly compact, approximately similar in size, slope gently and uniformly to the corallite centre
Costae poorly developed
Coenosteum between adjacent corallites a narrow, smooth strip
Thickness of walls very variable
Colour usually pale yellow, greenish or cream on the upper surface
• cf. *L. transversa* which has more uniformly sized corallites, less compact septa, characteristically deeply plunging inner margins of septa

Leptastrea pruinosa

Skeletons of this species very similar to L. purpurea differing in that the sides and margins of septa are granulated in *L. Pruinosa*
In live colonies:
Polyps frequently expanded during the day (cf. *L. purpurea* polyps usually nocturnal)
Usually contrasting colours, chocolate brown or pink, normally with a green oral disc which varies from pale green, almost white, sometimes very bright (cf. *L. purpurea* usually creamy-yellow)
Occasionally the stomadaeum is a different colour from the surrounding oral disc

Leptastrea transversa

Massive or encrusting with flat surfaces
Corallites cerioid, calices polygonal, 2 -9 mm diameter, less size variation cf. *L. purpurea*
Septa not tightly compact, characteristically deeply plunging, usually extending inwards approx 2/3 of the calice radius before descending vertically or near vertically
Intercalicular groove may be absent in some colonies or parts of colonies, in such cases septa adjoined or alternate
Colour usually pale grey, green

Cyphastrea

Colonies are massive to encrusting, except *C. decadia*, which is branching. Corallites are plocoid, small and round. Costae are well developed, and usually restricted to the corallite wall. The coenosteum is granulated. Budding is extratentacular.

Cyphastrea chalcidicum

Encrusting or massive, tendency to form columns
Corallites widely spaced, conical, exsert
Septa in two cycles of 12 with the second markedly smaller than the first
Costae very unequal i.e. large primaries and abortive secondaries, in contrast with *C. serailia*

Cyphastrea serailia

The most abundant species in this genus -therefore the greatest diversity of growth forms and range of calicular structures
Massive to columnar, smooth or hillocky surface
Corallites round, variably exsert from subcerioid to ~ 3mm
Septa 2 very unequal cycles of 12 septa each, second cycle is usually less than half the calice radius
Costae equal or subequal (do NOT alternate strongly), frequently poorly developed
Corallite walls vary in height and thickness

Cyphastrea ocellina

Massive or encrusting, surface undulating
Corallites < 3 mm diameter, tightly compacted
Septa in 2 unequal orders of 12

Cyphastrea microphthalma

Massive to encrusting
Corallites plocoid, tall, conical
Calices 1 -2 mm diameter
2 orders of septa, primarily characterised by 10 (sometimes 11) first order septa, first order septa exsert, second order septa less exsert and never reach the columellae
Costae usually equal and support elongated

Cyphastrea agassizi

Colonies massive
Surface often deeply grooved
Corallites widely spaced
Septa in 3 unequal orders, first order septa exsert
Coenosteum between corallites usually smooth
Irregular groove and tubercle formation (as described for *Montastrea*) may be present

Cyphastrea decadia

Branching with axial and lateral corallites
Calices 1 -2.5 mm diameter
Primary septa vary from 10 -12
Costae weakly developed
Coenosteum very granulated

Echinopora

Colonies are massive, laminar, branching or combinations of these growth forms. Corallites are plocoid, with calices up to 10 mm diameter. Septa are exsert. Columellae are usually prominent. Costae are usually restricted to the corallite wall. Septal dentations and the coenosteum have elaborate spines (except *E. mammiformis*).

Echinopora pacificus

Unifacial plates with laminar margins and encrusting centres
Corallites large (up to 9.8 mm diameter)
Septo-costae in two orders
Columellae small
Septal teeth exsert
Paliform lobes not exsert
Costae finely beaded
Coenosteum tall spinules giving a velvet appearance
• cf. *E. lamellosa*, which has smaller corallites

Echinopora lamellosa

Thin laminae, in whorls or tiers, rarely forming tubes
Corallites small (2.5 -4 mm diameter), thin
Septa of the first and sometimes second cycle exsert
Paliform lobes well developed and maybe as tall as the septal spines
Columellae small and compact
Spines on and between corallites uniformly distributed and close together, giving a characteristic "furry" rather than spiky appearance

Echinopora ashmorensis

Irregularly contorted tubes with hollow centres or rarely solid branches
Corallites 3-5 mm diameter, usually conical
Septa in three cycles, first two cycles reach columellae
Columellae weakly developed
Paliform lobes prominent
Uniform brown or dark blue-grey
Coenosteum similar to *E. lamellosa*

Echinopora gemmacea

Laminar and bifacial, rarely thick or encrusting, sometimes with solid (not hollow), irregular proliferations (never the characteristic dendroid growth form of *E. horrida*)
Corallites up to 3.5-4.5 mm diameter, circular or slightly elongated, cylindrical and superficial or conical and protruding
Primary septa thick, always exsert, have prominent upper lobe or spines near corallite wall giving colonies a spiky appearance
Paliform lobes not well developed (cf. *E. lamellosa*)
Columellae large
Costae on and between corallites well developed and bear well developed, irregularly spaced spines
Septal and costal spines give colonies a spiky appearance

Echinopora hirsutissima
Colonies submassive or encrusting
Corallites 4 -7 mm diameter, thick walled, sometimes inclined
Septa very exsert, have 2 -3 very prominent lobes, outer septal lobe often flattened or divided sometimes appearing to replace the first costal spine
Costae well developed and strongly beaded, having numerous tall spines, ornamented with abundant granulations and echinulations
Coenosteum densely covered with thick, finely elaborated spinules

Echinopora mammiformis
Lack of prominent dentations on septa and costae distinguish this species
Laminar or branching, sometimes submassive
Corallites low cones, 4 -10 mm diameter
Upper and inner margins of septa smooth
Paliform dentations present but not obvious
Costae well developed extending over the whole exotheca and sometimes partitioning the surface of the colony into polygonal areas the centre of which is occupied by a cone shaped corallite
Coenosteum is smooth

Echinopora horrida
Contorted branches, varying in extent of anastomosis, sometimes with laminar base, branches up to 40 mm diameter
Corallites to 4 -6 mm diameter, circular, cylindrical or with the shape of a truncated cone, superficial or protuberant, thick walled
Primary septa exsert, thick at the periphery of the calice with tall prominent spines
Paliform dentations present
Costae increase in size towards the base of the corallites, costae on and between corallites bear well developed, irregularly spaced spines, spines often have an inflated base
Septal and costal spines give colonies a spiky appearance

Moseleya

Monospecific genus

Moseleya latistellata

Usually in turbid environments with muddy substrates
Small colonies to a maximum size of approximately 25 cm
Corallites angular and cerioid, large central corallite often evident
Budding extratentacular at colony perimeter
Septa numerous, multiple cycles are evident
Small dentations along length of septa
Paliform lobes developed
Pale to deep brown or green, polyps are not fleshy (at least when retracted)

Trachyphyllia

Trachyphyllia geoffroyi

Usually free-living
Flabello-meandroid forming short valleys
Septa descend abruptly into valleys, finely dentate
Paliform lobes well developed
Columella trabecular and well developed, loosely connected along valleys
Valley walls are thin
Costae are well developed to level of the epitheca

FAMILY PORITIDAE

Colonies are massive, laminar, encrusting or branching. Large massive colonies are typically helmet-shaped i.e. edges of colonies are raised off the substrate by a constricted base and edges of colonies form a thick ledge which curves under towards the base of the colony. The surfaces of massive colonies often have a distinctive lumpy appearance. Corallites are very small. Calices are crowded with skeletal structures, including septa and pali. Corallite walls and other skeletal structures have denticles along their surface, contributing to the crowded appearance.

Species can be grouped into the following morphological categories (taken from Veron 2000). To identify species within these categories, it is necessary to examine the skeletal structures within the corallites.

Porites

Large massive colonies, hemispherical or helmet-shaped with the characteristic lumpy colony surface

Porites solida
Largest corallites in this group of species
Pali weakly developed or absent, triplet has free margins
Thin walls
Columellae
cf. *P. lobata* which also has weakly developed pali

Porites lobata
Septa – lateral pairs and dorsal are well developed
Triplet always has free margins
Pali – 8, weakly developed
Columellae
cf. *P. australiensis* which has taller lateral pairs of pali

Porites australiensis
Septa – lateral pairs smaller cf. directive
Triplet usually has free margins
Pali – 8, lateral pairs largest, outer pair of triplet smallest
Columellae
cf. *P. lutea* which has fused triplets

Porites lutea
Triplet fused at inner margins
Pali – 5, well developed to same height at corallite walls
Columellae

Porites myrmidonensis
Thick wall
8 pali
Triplet has free margins

Porites mayeri
Walls thick
Septa short, thin and irregular (normal *Porites* pattern might not be evident)
Triplet not fused
Pali – usually 5, tall and prominent
Columellae small or absent

Small massive colonies, hemispherical or spherical, colony surface lumpy or smooth

Porites murrayensis
Corallites have empty appearance
Pali – only 4, weakly developed
Columellae small or absent

Porites stephensoni
Septa short
Triplet has free margins
Columellae small or absent

Porites densa
Largest corallites in this group of species
Thick walls
Septa short and thick
Triplet – free margins
Pali – only 4 laterals
Columellae absent

Columns, laminae, irregular branches, variable calicular structures

Porites lichen
Flat laminae or thick plates, or fused nodules and columns
Corallites shallow giving colonies a smooth surface

Porites heronensis
Massive, encrusting or columnar
Irregular septa and triplet

Porites vaughani
Encrusting, laminar or columns
Corallites widely spaced, separated by ridges

Porites annae
Growth form distinctive so can be recognised in situ
Nodular anastomosing branches or columns< 20 cm long, usually with encrusting or laminar base
Corallites more excavated cf. a more even colony surface in *P. lichen*

Porites rus
Submassive, laminar or contorted anastomosing branches and columns (tends to form branches cf. *P. monticulosa* tends to be massive or form plates)
Corallites tiny, superficial and widely separated by an extensive, fine coenosteum
Coenosteum commonly raised into ridges

Porites monticulosa
Massive, columnar, laminar, branching or encrusting (tends to be massive or form plates cf. *P. rus* tends to form branches)
Corallites tiny, superficial and widely separated by an extensive, fine coenosteum
Coenosteum commonly raised into ridges

Porites deformis
Thin basal laminae and nodular branches that fuse into clumps
Corallites superficial, branch surface smooth

Porites eridani
Encrusting plates, short simple branches/columns
Walls thick
Septa short and thick
5 pali
Calice deep
Columella absent

<u>Branching, sometimes with an encrusting base</u>

Porites cylindrica
Branches thicker cf. *P. nigrescens*
Corallites superficial, branch surface smooth

Porites nigrescens
Branches thinner cf. *P. cylindrica*
Concave calices give branch surfaces a pitted appearance

Goniopora

Colonies have thick but porous walls and calices are filled with compacted septa and columellae cf. the more lightly calcified skeletons of *Alveopora*. Polyps are long, fleshy and extended day and night. Polyps have 24 tentacles.

Massive with corallites (> 5 mm diameter)

Goniopora pendulus
Usually massive with an even surface
Septa short
Pali absent
Columellae broad and diffuse
Walls thick
Polyps have pale oral discs and long, thin tentacles which characteristically droop downwards and waft with water movements

Goniopora djiboutiensis
Submassive or short thick columns
Corallites shallow (cf. *G. stokesi* and *G. lobata*)
Septa shorter and columella larger (cf. *G. lobata*)
Polyps have large pale oral cones

Goniopora stokesi
Large corallites (6 mm diameter) with deep calices
Septa fine and irregular cf. *G. pendulus*
Walls thin

Branching or columnar with corallites (> 5 mm diameter)

Goniopora lobata
Short, thick columns
Septa long, usually arranged in distinct cycles
Small columellae

Goniopora columna
Short columns
Septa short and columellae well developed

Encrusting

Goniopora somaliensis
Thin and encrusting or large thick plates
Shallow corallites (> 3 mm) giving colonies a smooth surface
Polyps short

Massive with medium corallites (3-5 mm diameter)

Goniopora norfolkensis
Septa long, regular, steeply plunging
Paliform lobes absent
Columellae small or absent
Polyps short, form a thick, uniform carpet
Tentacle tips blunt
Usually greenish brown with distinctively coloured oral discs and pale tips to tentacles

Goniopora tenuidens
Primary septa extend to and may fuse with columellae
Prominent paliform lobes
Polyps closely compacted, polyps and tentacles uniform length
Tentacle tips blunt
Uniform blue/pink, green or brown, sometimes with white tips to tentacles

Goniopora minor
Corallites have thick walls
Thick pali forming a crown
All septal structures heavily granulated
Brown or green, usually with distinctively coloured oral discs and pale tentacle tips

Branching or columnar with medium corallites (3-5 mm diameter)

Goniopora eclipsensis
Small, branching, cylindrical columns (< 3 cm diameter)
Thick corallite walls and septa
Paliform lobes prominent, forming a crown
Columellae usually a fused tangle of inner septal margins and pali
Tentacle tips pointed
Uniform brown, with or without paler tentacle tips
cf. *G. fruticosa* which is primarily encrusting or with small branches
cf. *G. palmensis* which is digitate with thing and more frequently dividing branches

Goniopora pandoraensis
Short, branched columns
Pali – 6, large, very prominent
Columns and corallite size is intermediate between *G. eclipsensis* and *G. columna*

Goniopora palmensis
Submassive or digitate branching
Corallites uniform, thick walled
Pali – usually 6, fused with synapticular ring
Walls are thin forming an *Alveopora*-like lattice
Polyps have a large oral cone and short pointed tentacles (cf. *G. fruticose*)
Brown, green or cream, often with white tentacle tips

Small corallites (<3 mm diameter)

Goniopora stutchburyi
Submassive to encrusting
Corallites small (< 3mm), shallow giving colonies a smooth surface
Septa tightly compacted, thick granulations on sides and margins
Polyps short, tapered tentacles
NB could be confused with *Porites*, but polyps are larger

Goniopora fruticosa
Growth form distinctive as encrusting or branching with highly fused branches
Inner septal margins, pali and columella often fused, forming a tangle
Columellae broad and conspicuous
Walls are thin forming an *Alveopora*-like lattice
Polyps fine tapered tentacles
Dark brown with white oral discs

Alveopora

Colonies have a light skeletal structure, consisting of thin porous lattice-like walls of interconnecting rods and spines. Septa mostly composed of fine spines that may connect to form a columella tangle. Polyps have 12 tentacles and swollen knob-like tips.

Large corallites and long polyps

Alveopora catalai
Branching distinctive character
Large corallites (3.5 -4.5 mm diameter)
Polyps to 10 cm long, tentacles short

Alveopora allingi
Encrusting, short lobes or columnar
Large corallites (3.5 -4.5 mm diameter)
Septa long, spine-like
Columellae usually present, sometimes well developed
Polyps tightly compacted, long to 10 cm

Alveopora gigas
Colonies often > 1 metre diameter with short, blunt ended columns
Corallites 4.5 – 7.5 mm diameter
Largest polyps of all species of *Alveopora*

Medium corallites

Alveopora marionensis
Short, irregular lobes
Medium corallites (2.8-3.2 mm diameter)
Septa tapered spines, only connect deep in calice
Columellae not or poorly developed
Short straight tentacles

Alveopora fenestrata
Hemispherical with surface divided into irregular lobes
Medium corallites (2.1 -3.0 mm diameter)
Septa tapered spines, only connect deep in calice
Columellae not or poorly developed
Polyps and tentacles long and thin, ragged appearance
• Growth form and size of corallites intermediate between *A. marionensis* and *A. verrilliana*
• Corallites only slightly larger and slightly longer septa in *A. marionensis*, but polyps of *A. marionensis* and *A. fenestrata* are very different

Alveopora verrilliana
Distinctive short irregularly dividing knob-like branches
Small corallites (1. 7 -2.0 mm diameter)
Septal spines short, blunt
No columellae
Walls extend as vertical spines
Polyps long

Small corallites and short polyps

Alveopora spongiosa
Encrusting or submassive plates with smooth, undulating surfaces or columnar
Well developed epitheca
Small corallites (1.9 -2.6 mm diameter)
Septal spines long or short, fine, seldom connect
No columellae
Polyps short to 3 mm long

Alveopora tizardi
Flat or undulating plates
Small corallites (1.2 -1.7 mm diameter)
Regularly tapered septal spines
No columellae
Short polyps (smaller cf. *A. spongiosa*)
• Corallites smaller with thicker walls cf. *A. spongiosa*

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