



Corals of Rottneest Island

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MARINE RESEARCH

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Cover picture courtesy of H. Shortland Jones

** Several of the images in this publication are not from Rottnest and were sourced from corals.aims.gov.au courtesy of Dr JEN Veron*

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What are hard corals?

Hard corals belong to a group of marine animals that include soft corals, jellyfish and sea anemones. Their simple design consists of a calcium carbonate skeleton and a relatively thin outer layer of soft tissue that covers the coral skeleton. Most of the bulk of a coral is dead skeleton covered by a thin outer layer of live coral tissue.

The live coral polyp consists of tentacles surrounding a mouth that leads to a digestive area inside the animal. Each individual coral polyp occupies a calcareous skeletal 'cup' referred to as a corallite. A coral colony consists of multiple replicates of the basic coral polyp/corallite unit. Variation in the size, shape, and arrangement of the corallites are used to identify coral species. These features can be observed in living corals during daylight hours, when the tentacles are retracted and the underlying corallite structure is evident. At night the polyps extend their tentacles to capture small planktonic prey, giving the coral colony a shaggy appearance.

In considering what coral species are, it is helpful to liken corals with plants. Like most plants, corals have growth form characteristics that vary within a species according to the environment in which they occur. So the concept of a variable colony shape is important to keep in mind when looking at coral species as the driving force for coral growth is to orientate and produce growth forms that maximize exposure to sunlight. Other environmental factors that influence coral growth forms include exposure to wave action, levels of illumination, and sedimentation rates. In some cases, it may require keen observation to correctly identify a particular species of coral which is demonstrating a strong variation from normal in its colony shape due to the presence of an extreme environmental factor.

Hard corals have an essential symbiotic relationship with minute photosynthetic algae that live inside the coral tissue. The algae use waste products (nutrients and carbon dioxide) from the coral and are photosynthetic. The coral receives sugars, protein and oxygen from the algae, which enhances the coral's ability to grow rapidly and build the calcareous skeleton. Corals grow in such a way as to maximise their surface area so the algae can absorb sunlight. The colour of live coral is dominated by the symbiotic brownish algae along with pigments in the coral tissue. When under high temperature or low salinity stress levels, corals lose their colouration and become bleached or pale to white. If this condition persists for too long the coral can die.

Corals at Rottnest Island

Coral reefs stretch along much of the western Australian coastline being more numerous in the warmer northern parts of the state. In the north, reefs built by corals occur both on offshore islands and on the coast. Further south, corals do not form reefs but grow on existing structures and tend to occur offshore rather than onshore. Rottnest Island, 18 kilometres west of Fremantle, Western Australia is south of where corals commonly form reefs and the corals found here represent a small set of those found to the north, probably occurring here due to southward flowing currents like the Leeuwin Current.

Coral Identification

This book follows the standard scientific approach of a combination of genus and species names to give a unique identification for each coral. Many coral genera found at Rottnest Island are represented by only a single species, and many are quite rare and unusual to find. It is possible some of the species listed here from historical records are no longer present, or that additional species have established in recent times.

The key presented in this manual is designed to be used with live corals observed in the field.

Photos used to illustrate each species were taken by MScience at Rottnest Island during the years 2011 & 2012, or are from typical examples of species found elsewhere in Australia.

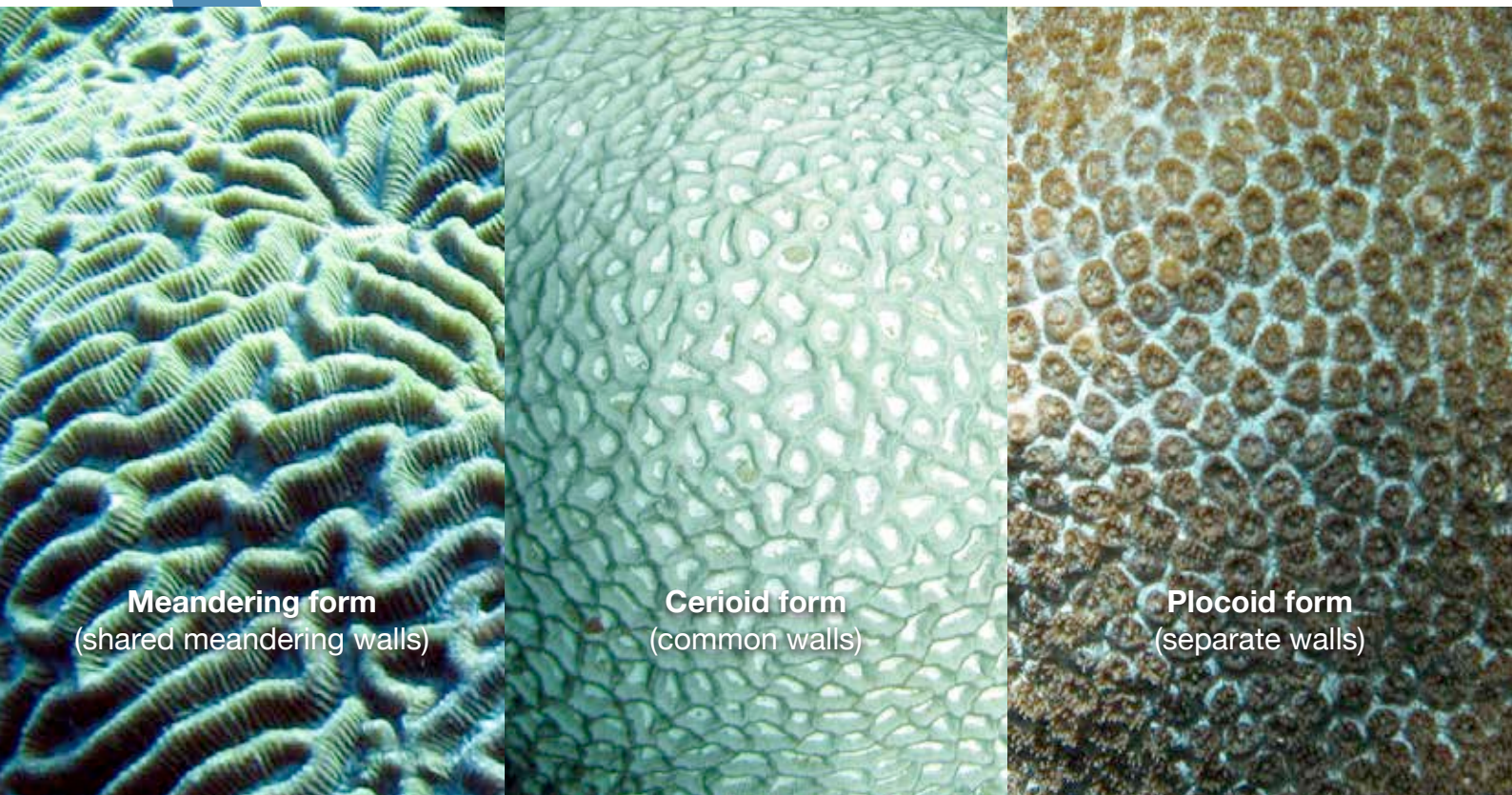
A simple key to follow for a positive identification is presented in at the back of the booklet. It begins with identifying growth or life forms typical of corals and then leads on to more specific features that help you to identify the genus of a coral, and if necessary, which species of coral, if there are more than one representative species from that genus.

Hard corals found at Rottnest Island

(list from Veron & Marsh 1988)

FAMILY	GENUS	SPECIES	GROWTH FORMS	COMMON NAME
Acroporidae	<i>Acropora</i>	<i>A. selago</i>	Branching	Bushy Acropora
	<i>Montipora</i>	<i>M. mollis</i>	Encrusting	Velvet Coral
Pocilloporidae	<i>Pocillopora</i>	<i>P. damicornis</i>	Branching	Cauliflower Coral
Dendrophyllidae	<i>Turbinaria</i>	<i>T. mesenterina</i>	Foliose	Pagoda Coral
		<i>T. reniformis</i>	Foliose	Yellow Scroll Coral
		<i>T. frondens</i>	Foliose	Yellow Cup Coral
		<i>T. peltata</i>	Foliose	Brown Cup Coral
Faviidae	<i>Goniastrea</i>	<i>G. australensis</i>	Massive	Brain Coral
		<i>G. aspera</i>	Massive	Star Coral
		<i>G. palauensis</i>	Massive	Star Coral
	<i>Plesiastrea</i>	<i>P. versipora</i>	Massive / Encrusting	Small Knob Coral
	<i>Cyphastrea</i>	<i>C. serailia</i>	Massive / Encrusting	Lesser Knob Coral
	<i>Barabattoia</i>	<i>B. amicorum</i>	Massive	No common name
	<i>Favia</i>	<i>F. fava</i>	Massive	Head Coral
	<i>Favites</i>	<i>F. russelli</i>	Massive	Brain Coral
		<i>F. flexuosa</i>	Massive	Brain Coral
		<i>F. abdita</i>	Massive	Larger Star Coral
<i>F. complanata</i>		Massive	Moon / Pineapple / Star Coral	
Mussidae	<i>Symphyllia</i>	<i>S. wilsoni</i>	Massive	Brain Coral
	<i>Scolymia</i>	<i>S. australis</i>	Encrusting	Doughnut Coral
Poritidae	<i>Alveopora</i>	<i>A. fenestrata</i>	Massive / Encrusting	Flowerpot Coral
	<i>Goniopora</i>	<i>G. pendulus</i>	Massive / Lobate	Flowerpot Coral
	<i>Porites</i>	<i>P. lutea</i>	Massive	Mound Coral
Siderastreidae	<i>Coscinaraea</i>	<i>C. mcneilli</i>	Encrusting	No common name
		<i>C. marshae</i>	Encrusting	Wrinkle Coral

Faviidae



Meandering form
(shared meandering walls)

Cerioid form
(common walls)

Plocoid form
(separate walls)

Globally, the family Faviidae is represented by 24 genera of which six are found off Rottneest Island. The six genera identified off Rottneest include *Favites*, *Favia*, *Goniastrea*, *Plesiastrea*, *Cyphastrea* and *Barabattoia*.

Morphologically, faviids are typically referred to as massive or dome/ball shaped, although encrusting morphologies may occur. The identification of most faviids can generally be completed based on their polyp structure. Faviids typically have three polyp structures - meandering valleys and ridges with shared walls (meandroid), shared walls (cerioid) and separate walls (plocoid) as seen above.

Meandroid polyp structure describes a stylised ridge and valley cell wall arrangement. Cerioid polyp structure describes where neighbouring polyps share walls. Plocoid polyp structure describes where each corallite has its own wall, separate from its neighbour. At Rottneest, faviid genera include *Goniastrea* (meandering or cerioid), *Favites* (cerioid) and *Favia*, *Barabattoia*, *Cyphastrea*, *Plesiastrea* (plocoid).



Goniastrea australensis is a very common coral within the Rottnest Island Reserve. It is commonly called the “Brain coral”. *G. australensis* occurs commonly as a dome shaped massive or colonies can be mainly encrusting.



Goniastrea aspera is another common coral. Usually light brown and dome shaped, its corallites are 7-10mm in diameter.



Goniastrea palauensis is also dome shaped, although occasionally flattened, and pale brown or green. It has large corallites with very regular septae around them.

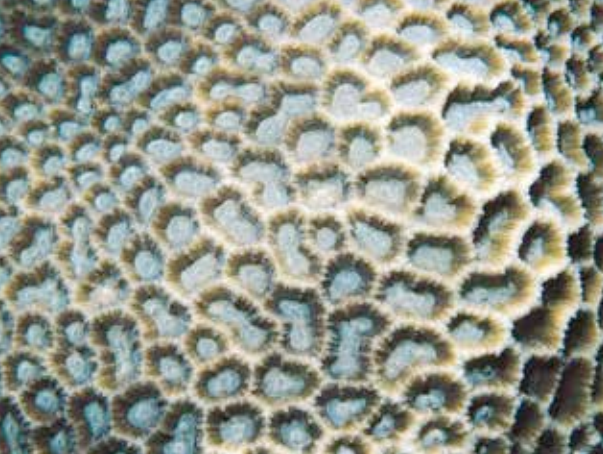
Favia fava can grow into large colonies which are usually domed, but may sometimes flatten. Corallites are very conical with irregular septae.

Plesiastrea versipora is a small, cryptic cushion shaped coral. They are seldom larger than 60mm in diameter. They are most frequently found in shady areas such as overhangs.

Cyphastrea serailia is uncommon on Rottneest Island. They occur with either a smooth or hillocky surface. Corallites are rounded and of equal size. Corallites are typically around 2mm in diameter.

Barabattoia amicornum is uncommon at Rottneest Island and is often small. Corallites have separate walls and are tubular with pale oral discs.

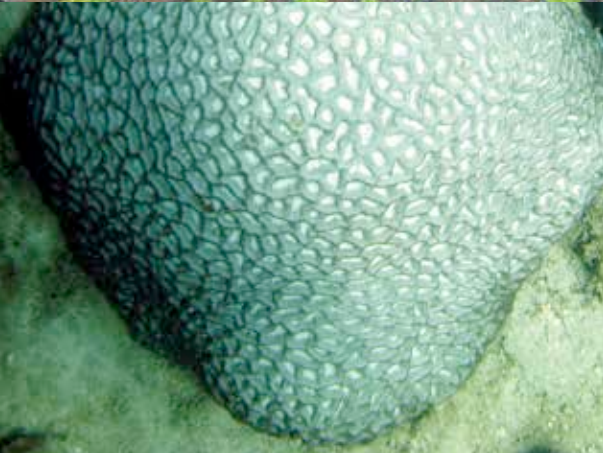




Favites russelli is found in both sub-massive and encrusting growth forms. They have shared walls with an irregular thickness, well developed inner lobes, and are green and brown with pale oral discs.



Favites complanata has thick, angular, rounded walls. Corallites have thick walls and slightly angular shape corallites. Inner lobes are weakly developed or absent.

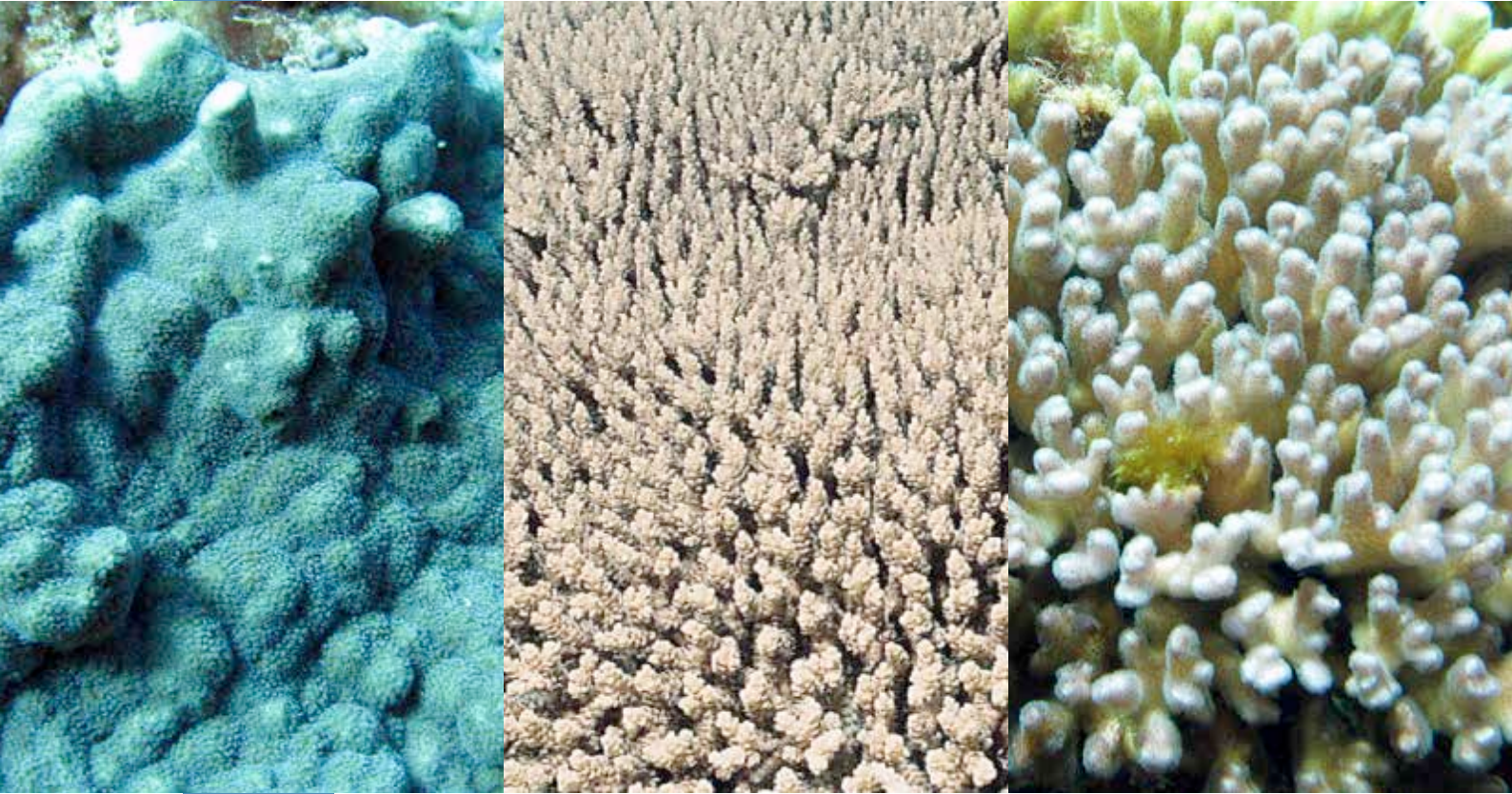


Favites flexuosa has angular and deep corallites, and weakly developed inner lobes. A wide range of colours occur, usually with contrasting walls and oral discs.



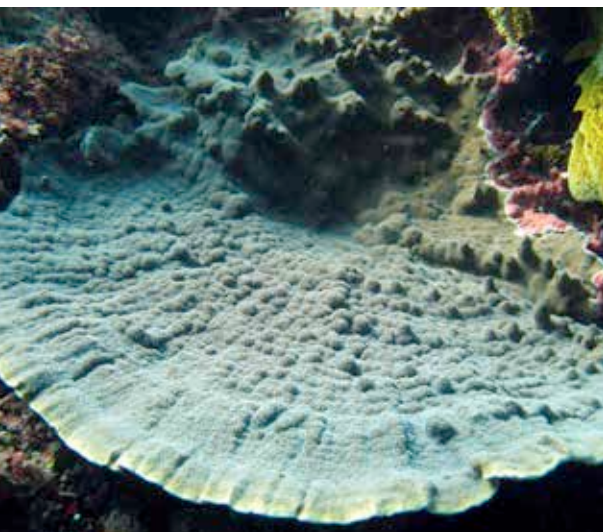
Favites abdita is rounded or hillocky and sometimes over a metre across. Corallites are rounded, with thick walls. Can be darker in turbid environments, otherwise pale brown with brown or green oral discs.

Acroporidae and Pocilloporidae



The family **Acroporidae** is extensive worldwide but represented by only two species at Rottnest Island. **Acropora selago** and **Montipora mollis** belong to the same family, but are of a different genus (Table 1). *A.selago* has multiple, short, vertical branches growing from thicker more horizontal branches and a corallite at the apex of all branches. **Acropora** species are hard to identify and in reality more than one may be present at Rottnest.

The **Pocilloporidae** are represented at Rottnest by a single species with a worldwide distribution. *P.damicornis* has mostly vertical branches with no apical corallite and lumps over all surfaces. Branches range from fine to coarse.



Montipora mollis is the only ***Montipora*** species found at Rottnest Island and are easily distinguishable. They commonly encrust rocks in a thin layer having a tight lumpy appearance, and very small pore like corallites. They commonly occur in blue, white/cream or pink colouration at Rottnest Island.



Acropora selago at Rottnest Island forms a branching, cushion shaped clump of coral. Its axial corallites are long and tubular, frequently showing tentacles during the day. They are relatively uncommon on the island.



Pocillopora damicornis has highly compact and sturdy branches in wave affected areas of Rottnest Island with thinner and less compact branch morphology in deeper or protected habitats. Colony size is variable with many measuring <250 mm across, although it can grow up to several metres in diameter. Colonies in the surrounding areas of Rottnest Island tend to be pink or light brown/cream in colour.

Dendrophyllidae



The family *Dendrophyllidae* is represented by four *Turbinaria* species at Rottneest Island. Two of which are relatively common - *Turbinaria mesenterina* and *Turbinaria reniformis*. *Turbinaria* are commonly referred to as plate corals. Most individuals at Rottneest Island will be either flat and laminated with overlapping sheets or stand-alone circular plates. We find flat morphologies of *Turbinaria* species in deeper water to maximise exposure to light, and contorted, fronded morphologies in shallower more turbid waters.



Turbinaria peltata colonies are usually flattened plates which often form tiers. They can sometimes form thick vertical branch like forms. Corallites are tubular and average 6 mm diameter. Usually grey or brown, likes protected environments.



Turbinaria frondens make small colonies that are usually cup shaped. They then usually develop irregularly contorted fronds. Corallites average 3.5 mm diameter, and become long and tubular towards the outer edge of the fronds. Usually a uniform dark or greenish brown, sometimes yellowish to grey.

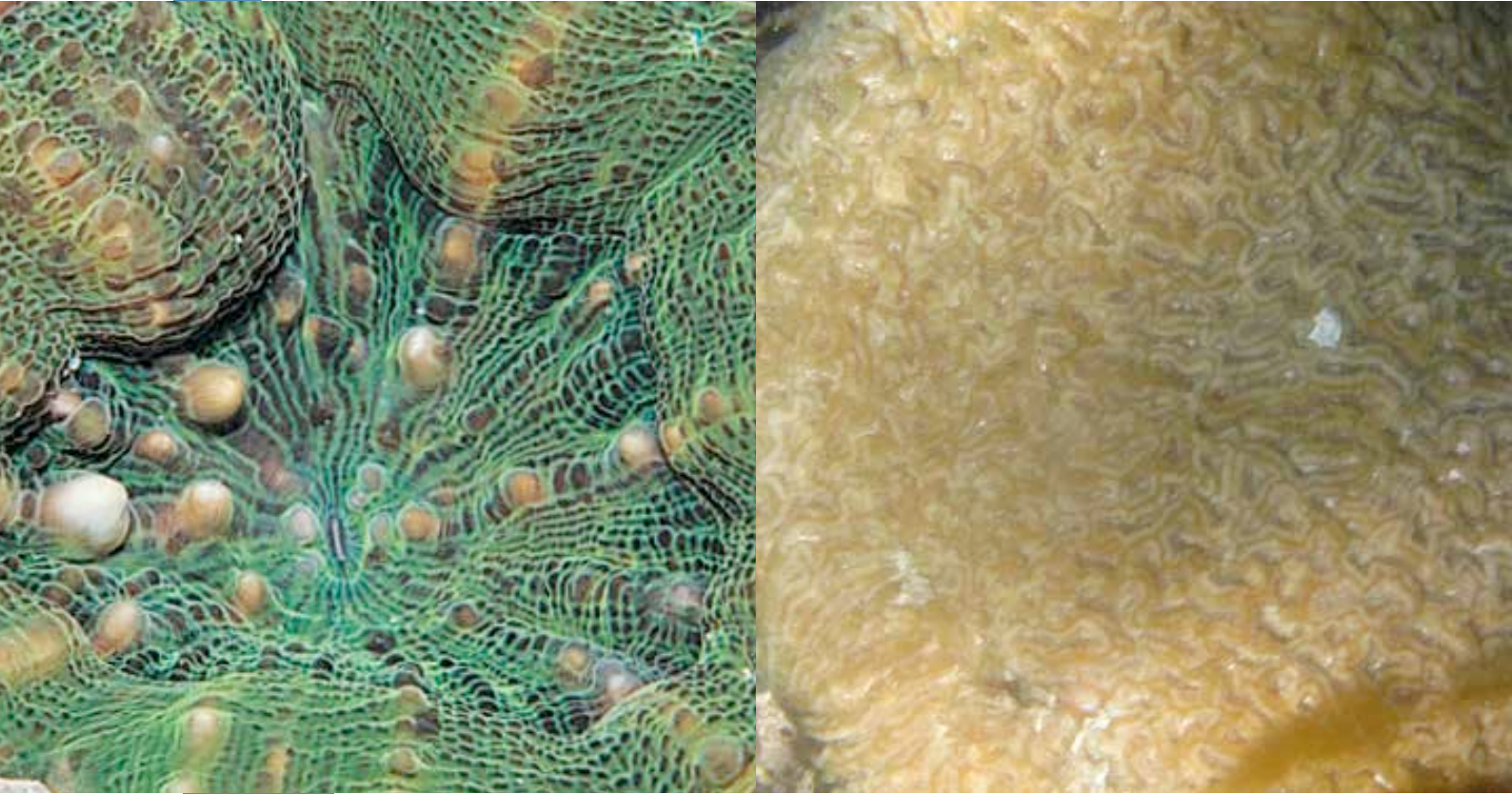


Turbinaria reniformis is also a common coral of Rottnest Island waters. The corallites average 2.5 mm diameter and are widely spaced compared to other *Turbinaria* species. Its common name is the yellow scroll coral and is easily distinguishable by its yellow contorted surface.



Turbinaria mesenterina has a pimply texture where corallites are relatively crowded on the colony surface and average about 2.5mm in diameter. The most common colours at Rottnest Island are grey/ green and brown/ yellow.

Mussidae



There are two genera of mussels at Rottneest: ***Symphyllia***, which has large polyps often forming massive colonies and the small ***Scolomyia***, where colonies are usually formed of a single polyp.

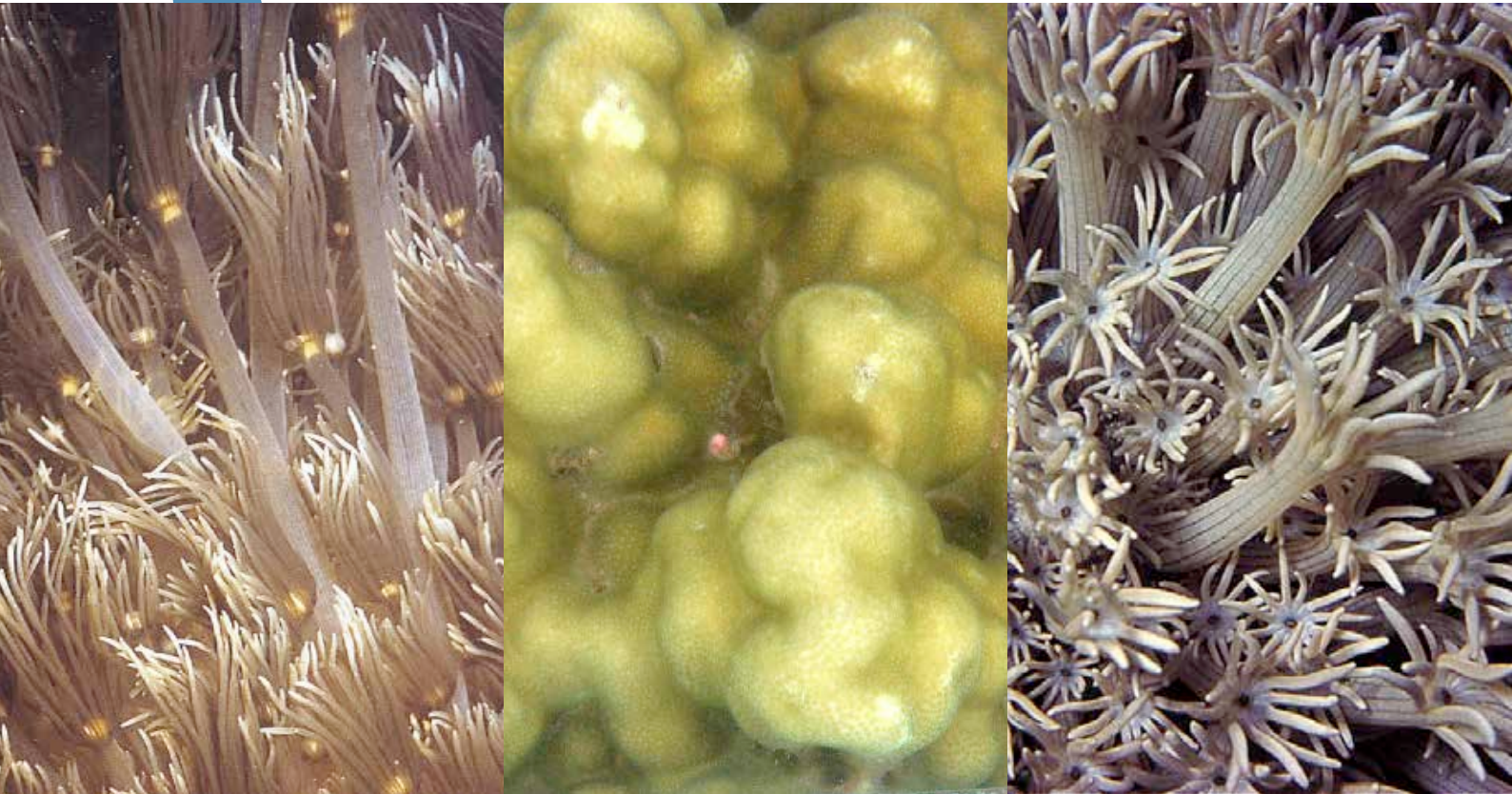


Scolymia australis is often referred to as the “doughnut coral”. It is very small <60 mm diameter and colourful. It is difficult to spot with a sparse distribution around Rottneest Island.



Symphyllia wilsonii has fleshy meandering polyps with a groove across the tops of valley walls. It is commonly white with golden yellow ridges or white with green ridges.

Poritidae

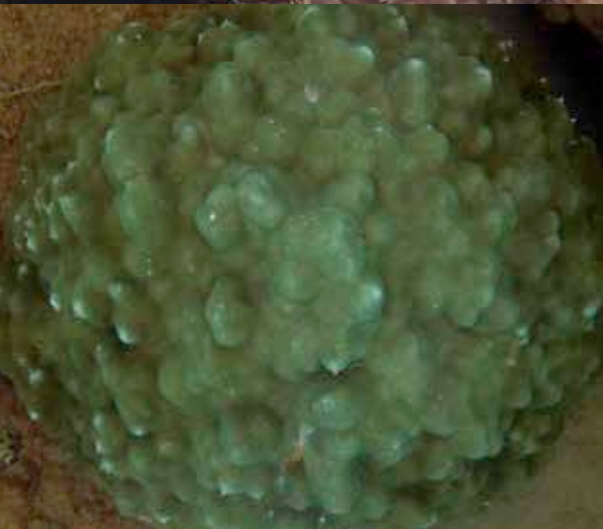


Poritidae at Rottneest Island include the species *Goniopora pendulus*, *Porites lutea* and *Alveopora fenestrata*. *G. pendulus* and *A. fenestrata* colonies usually extend their tentacles day and night whereas *P. lutea* extends tentacles only at night.

Species of *Porites* are the most difficult of all major genera to separate, partly because their corallites are both small and variable and partly because species with massive growth forms are difficult to recognize underwater. Colonies are spherical or hemispherical when small, and helmet or dome shaped when large. Corallites are small, immersed and filled with septa. Tentacles of most, but not all, species are extended only at night.



Goniopora pendulus sometimes known as the “golfball coral” as they look like the surface of a dimpled golf ball when polyps are retracted. Polyps are large, and often display 24 drooping golden tentacles during the day.



Porites lutea colonies are hemispherical or helmet shaped and can be very large. They can be identified by their yellow or cream smooth surface and very small polyps.

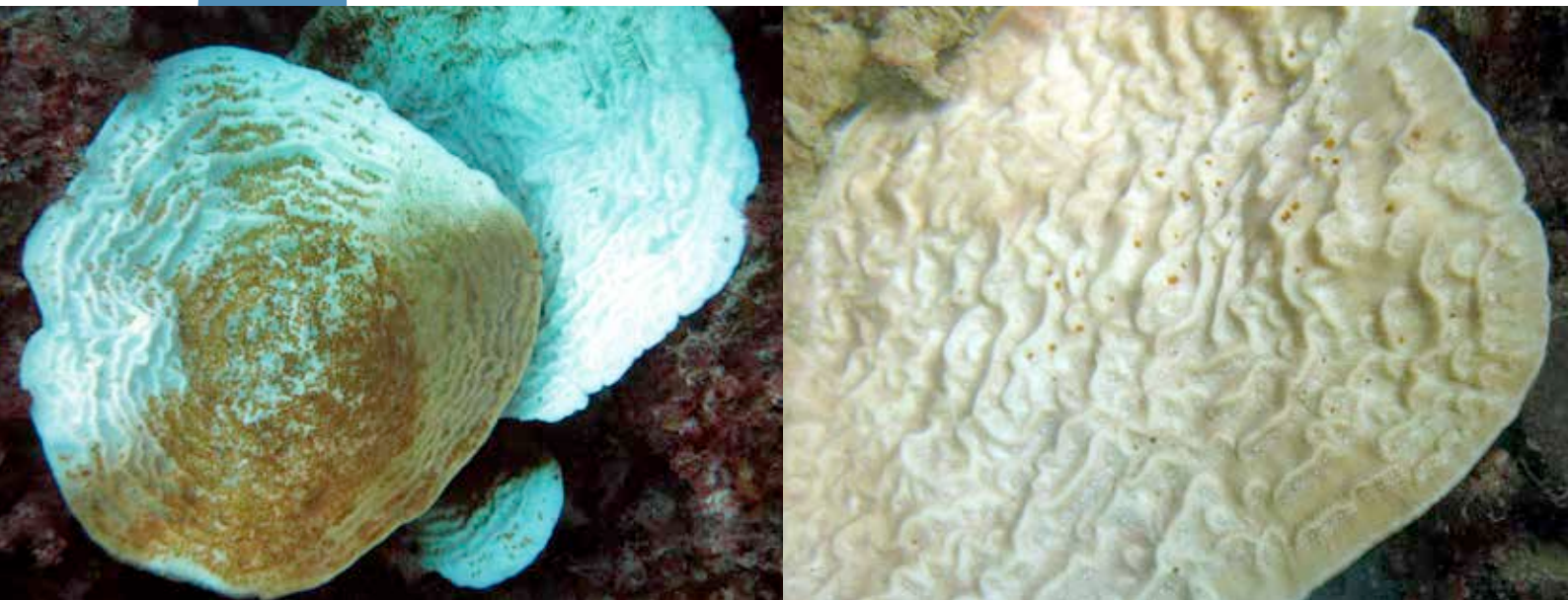


Alveopora fenestrata colonies are usually hemispherical with the surface divided into lobes. Polyps are long, with 12 long tentacles giving a ragged appearance.

Siderastreidae



Coscinaraea mcneilli



Coscinaraea marshae

Sometimes called the “wrinkle coral”, *Coscinaraea* is the only genus of this family found at Rottnest Island. They are one of the most common hard corals within the Rottnest Island marine reserve and are often seen in a bleached (white) state throughout the year. They also occur in brown/green and yellow colourations. *C.mcneilli* has short ridges roughly in lines parallel to the edge of the colony surface. *C.marshae* has long ridges parallel to the colony surface.

Go and enjoy the environment:

- * Don't tread on or touch live corals: be careful with your fins**
- * Don't collect coral to take it home**
- * If you find something that's not in the book, take of photo of it to a RI ranger**

Coral Identification using a customised key

Description of Growth Forms

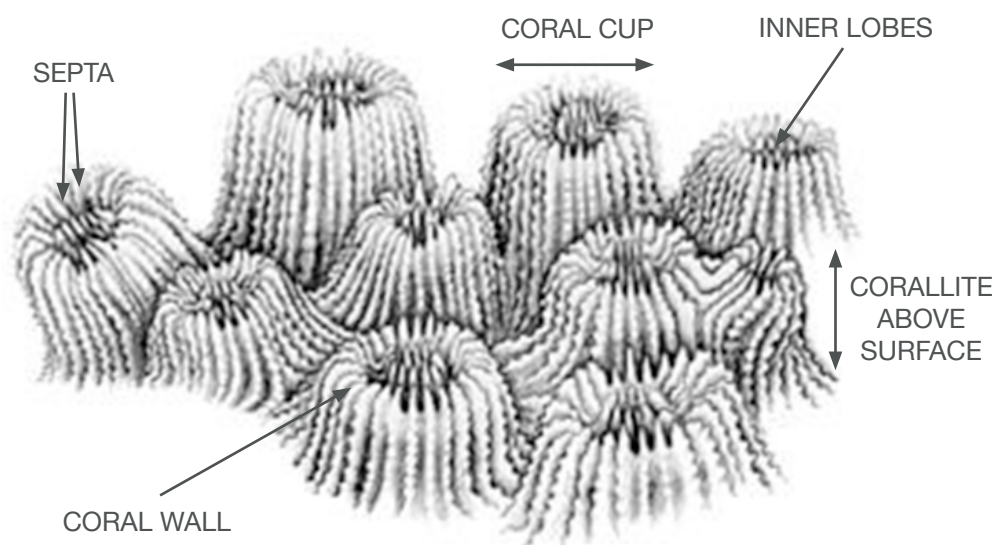
When corals are small and rapidly growing, they often show an encrusting growth form before their more typical adult form. Some branching corals also will encrust over the substrate before producing the typical branch like form. So in general, it is advisable to look for larger specimens of coral colonies where the adult form is likely to be demonstrated.

Branching – Similar to branches in a plant with or without a small base attachment to the substrate.

Massive / Encrusting – Dome shaped or rounded colonies which are firmly attached to the substrate over the widest section of the colony. Encrusting forms are more flattened than the typical massive dome shape.

Foliose / Plates – Colonies with plate like folds in either horizontal or vertical directions.

Parts of the Scleractinian (hard) corals



Adapted from Veron (2000)

Terms used in identification key

Corallite The skeleton of an individual polyp.

Corallite diameter – Distance across the center of the cup between the outer walls.

Corallite above surface – Cups rising above the surface of the colony (between the cups).

Corallite pore-like – Cups flush with the surface of the colony.

Corallite tubular – Cups shaped like tubes above the surface.

Corallite dome shape – Cups rounded shape above the surface.

Septa Thin vertical panels leading from the inner part of the cup wall towards the center of the cup.

Straight neat septa – Neatly arranged plates of equal length and distance apart.

Alternating short and long septa – Alternating between relatively shorter or longer plates.

Inner Lobes A series of lobe like vertical rods arranged around the mouth area in the base of the cup.

Well developed lobes – Highly conspicuous arrangement around mouth area.

Weakly developed lobes – Not obvious and irregularly present within cups.

Walls The skeleton outside individual cups which may be separate or shared between adjacent cups.

Rounded walls – Walls between cups that have a distinct smooth and rounded appearance.

Irregular (relatively thin or thick) walls – Walls vary in thickness around a colony.

Angular walls – Walls with obvious sharp angles defining individual cups.

Steep walls – Walls steeply descend into cups to inner mouth area.

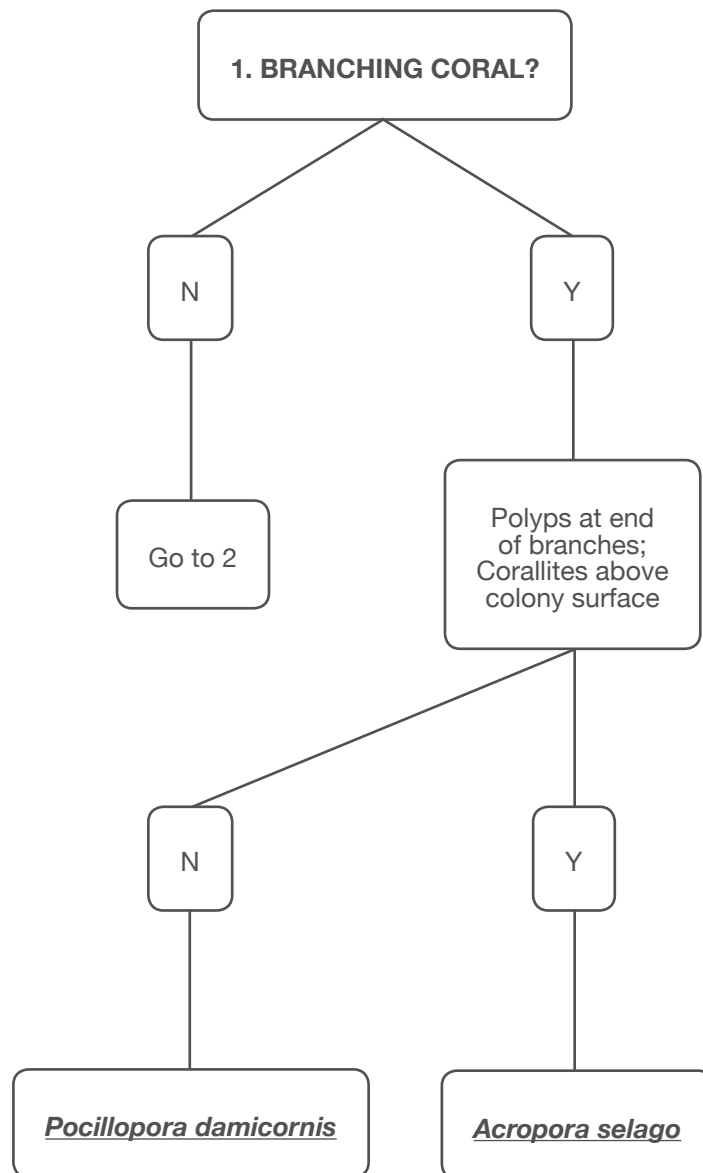
Wall grooves – Walls with a clear groove between adjacent cups.

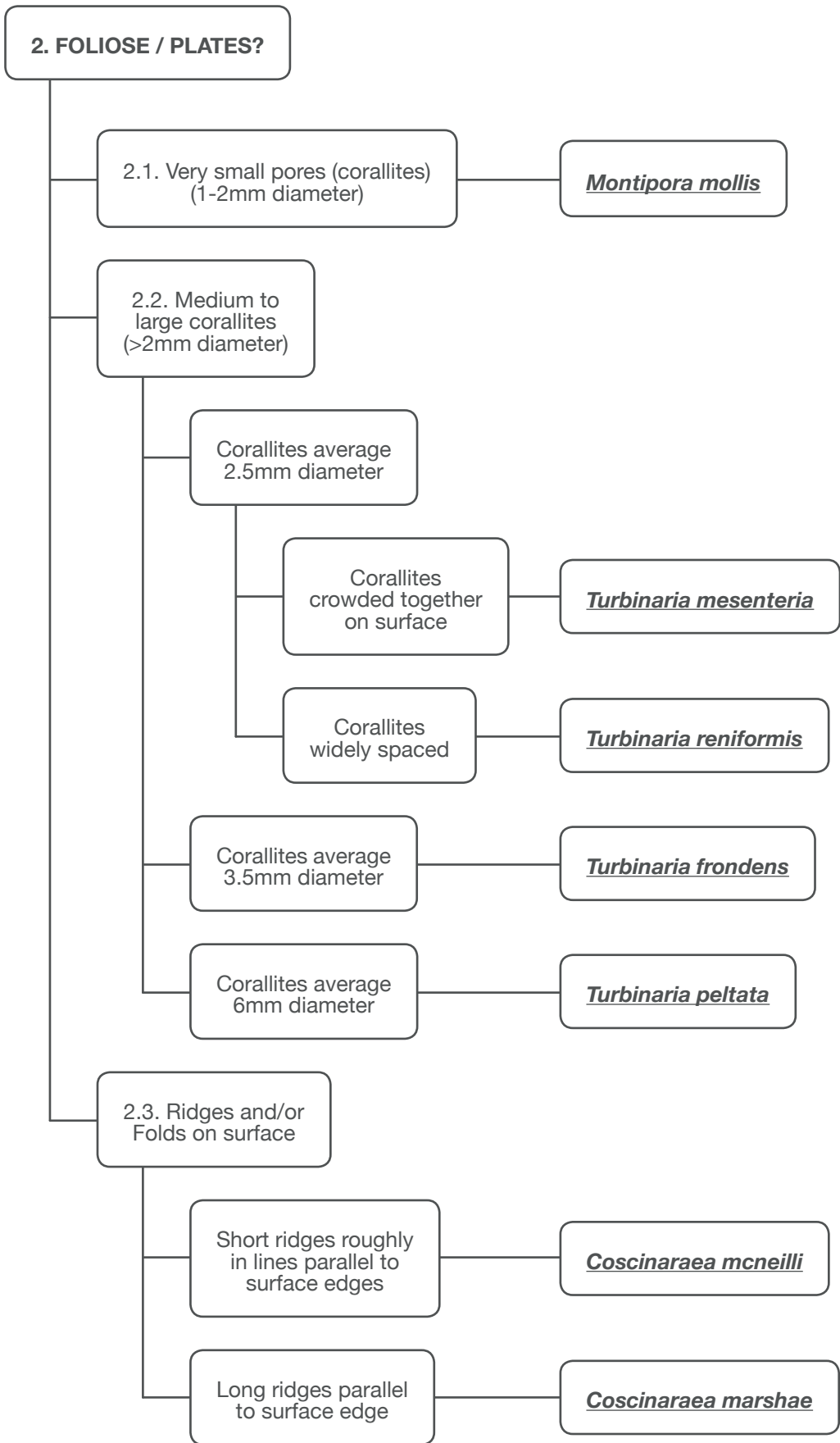
Ridges Raised parts of the skeleton surface in more or less parallel lines, that may include cups or polyps.

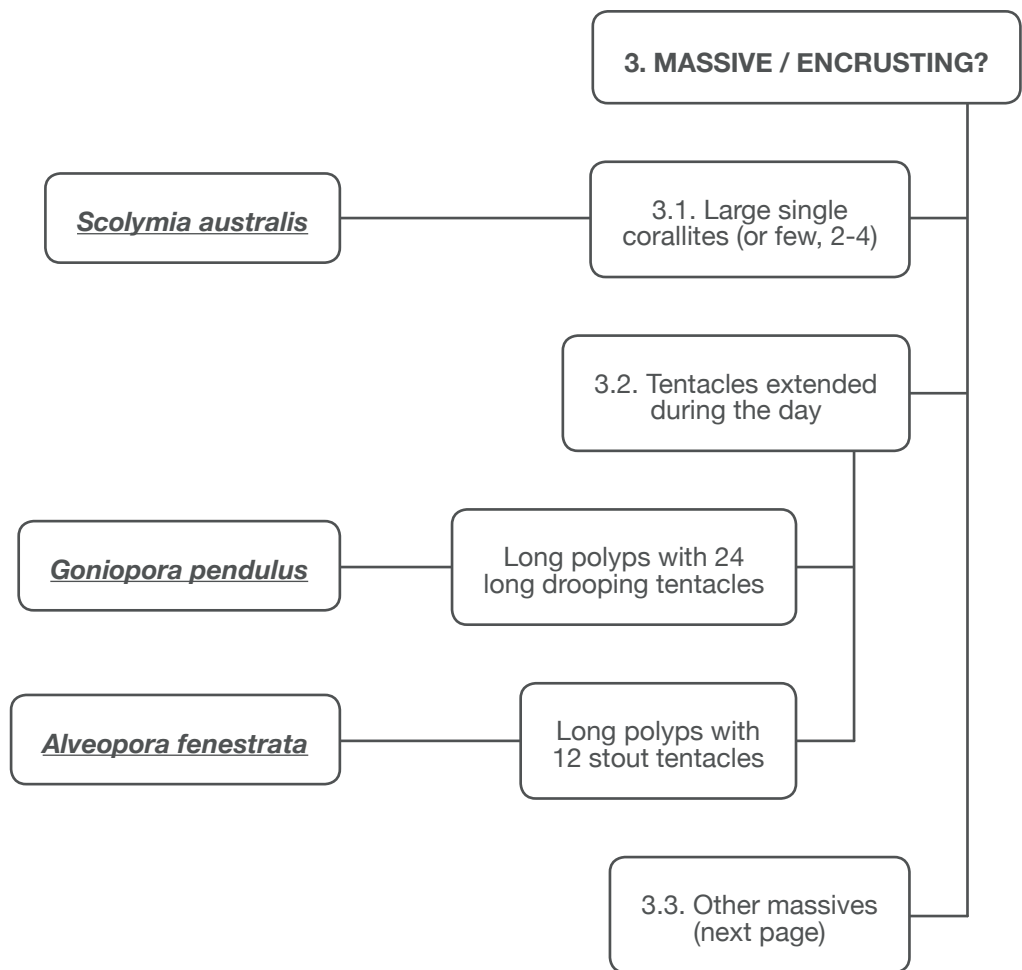
Short ridges – Raised parts of the skeleton that are not continuous.

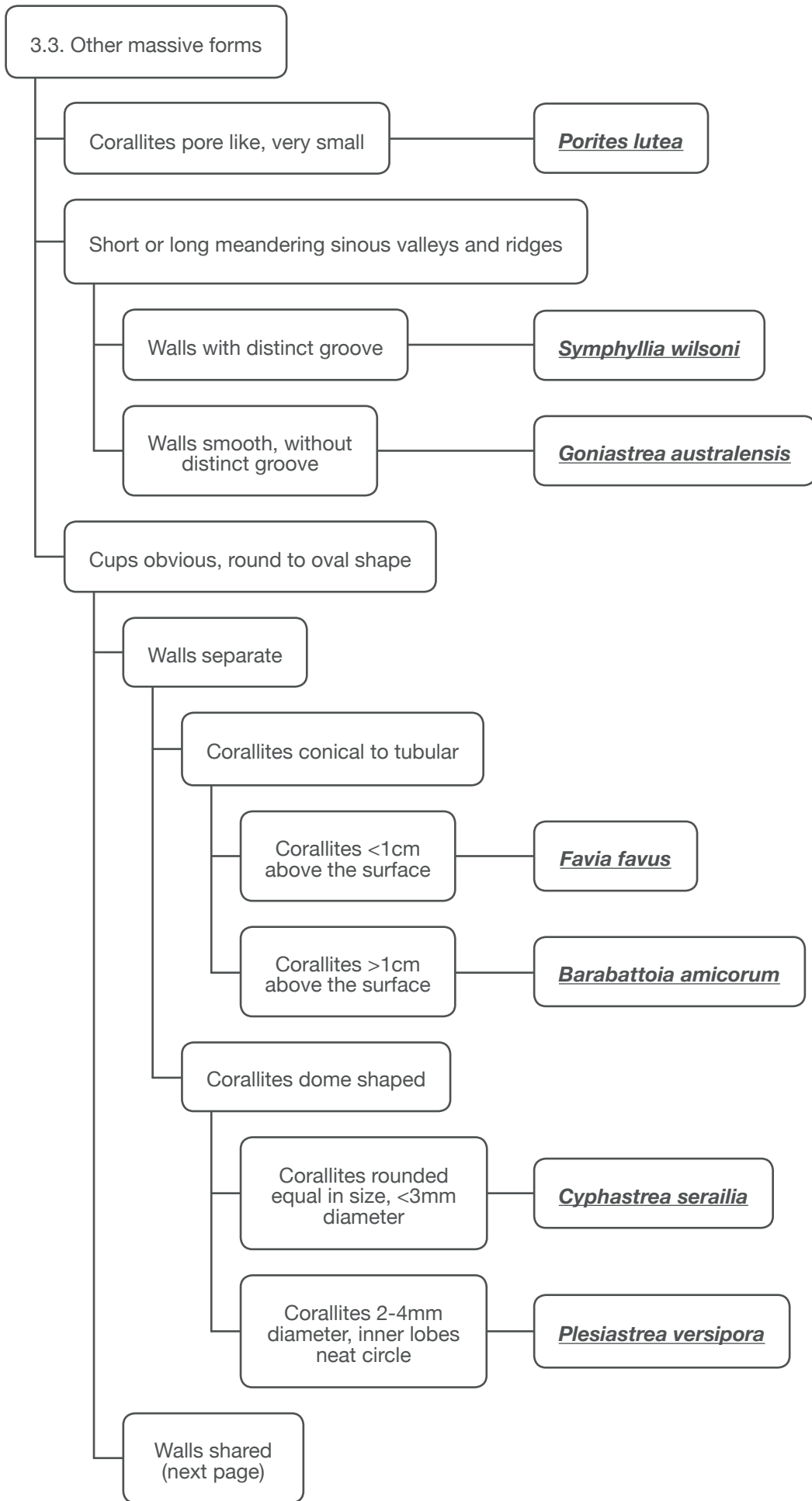
Long ridges – Rows of raised parts of the skeleton that are more or less continuous.

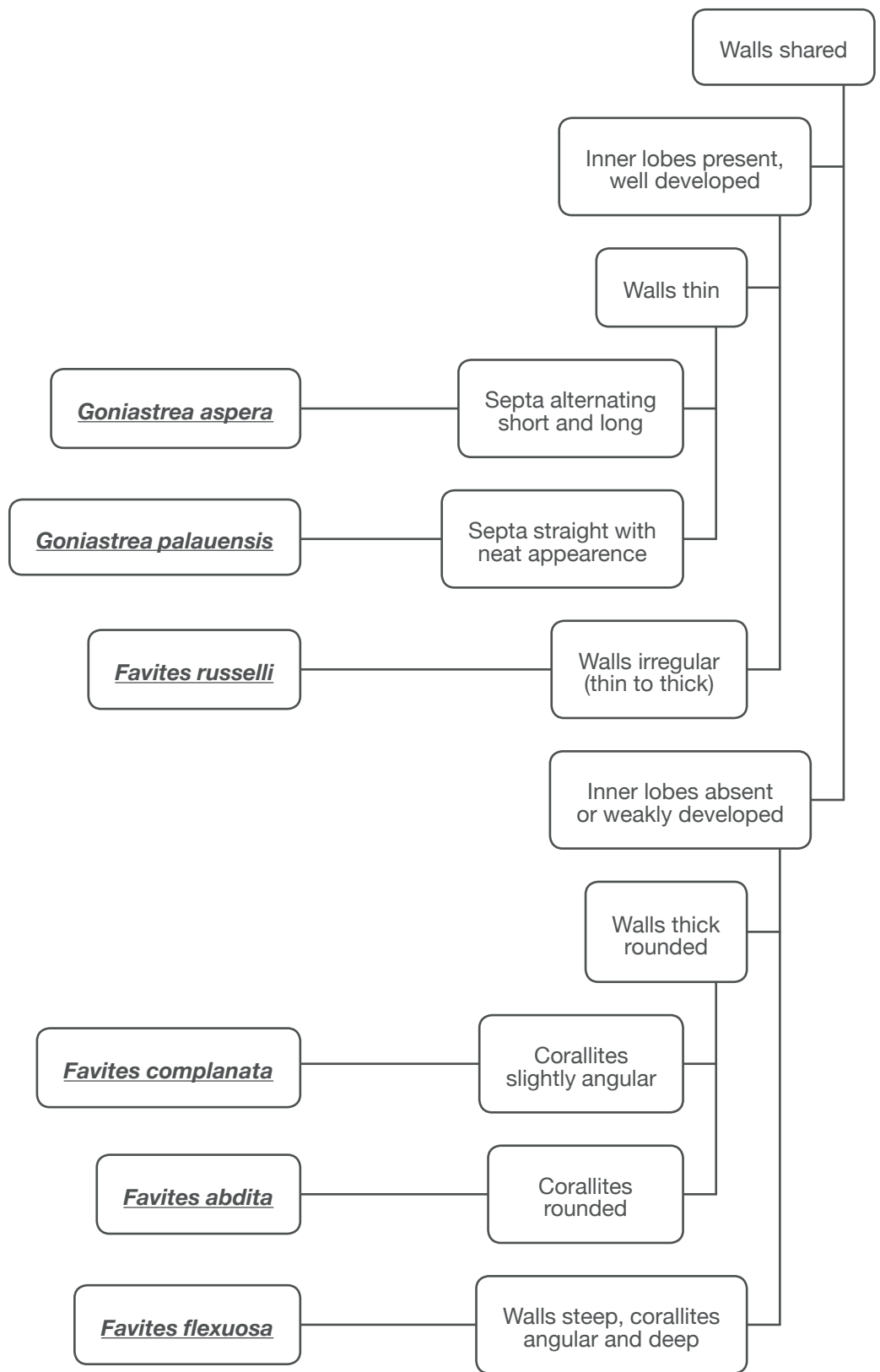
Customised coral identification key











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