An observer's identification guide: New Zealand's protected corals

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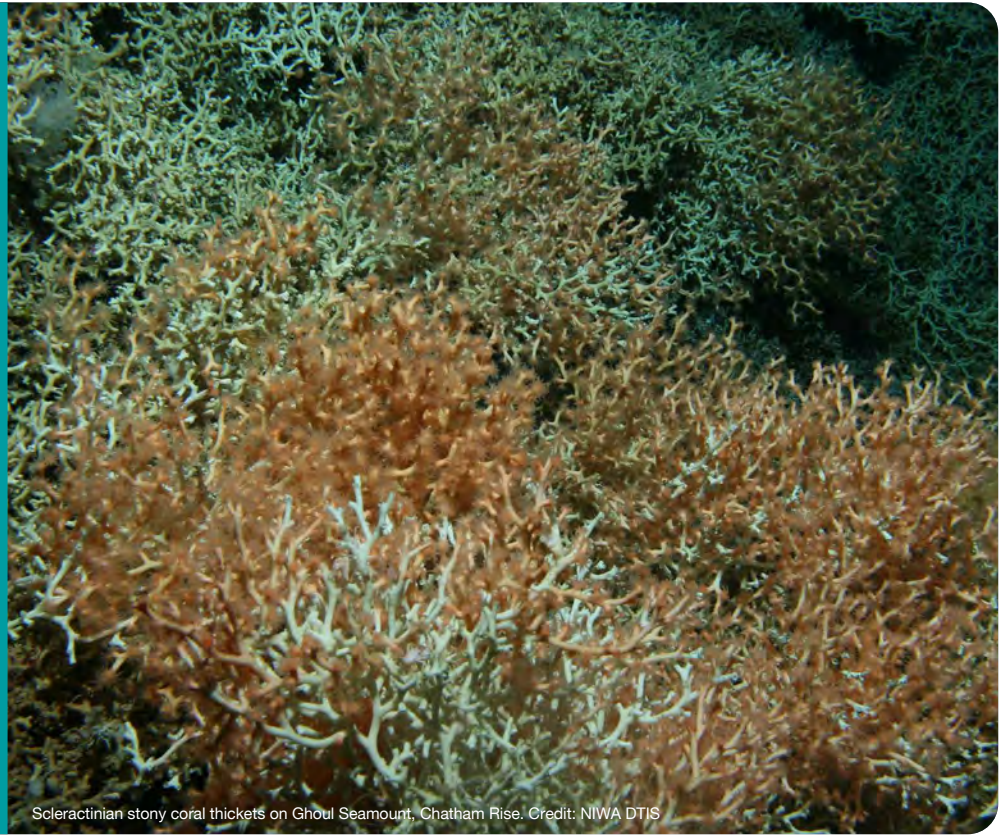
Aotearoa New Zealand's marine realm and its geologically varied seafloor supports abundant and diverse coral fauna.

Corals and their associated communities are vulnerable to several threats including fishing (bottom trawl and bottom longline), mineral exploration, and climate change.

Most corals in Aotearoa's waters are protected under the provisions of the Wildlife Act 1953. There are over 300 protected coral species.

This quick reference guide includes corals most at risk of being bycaught in fisheries.



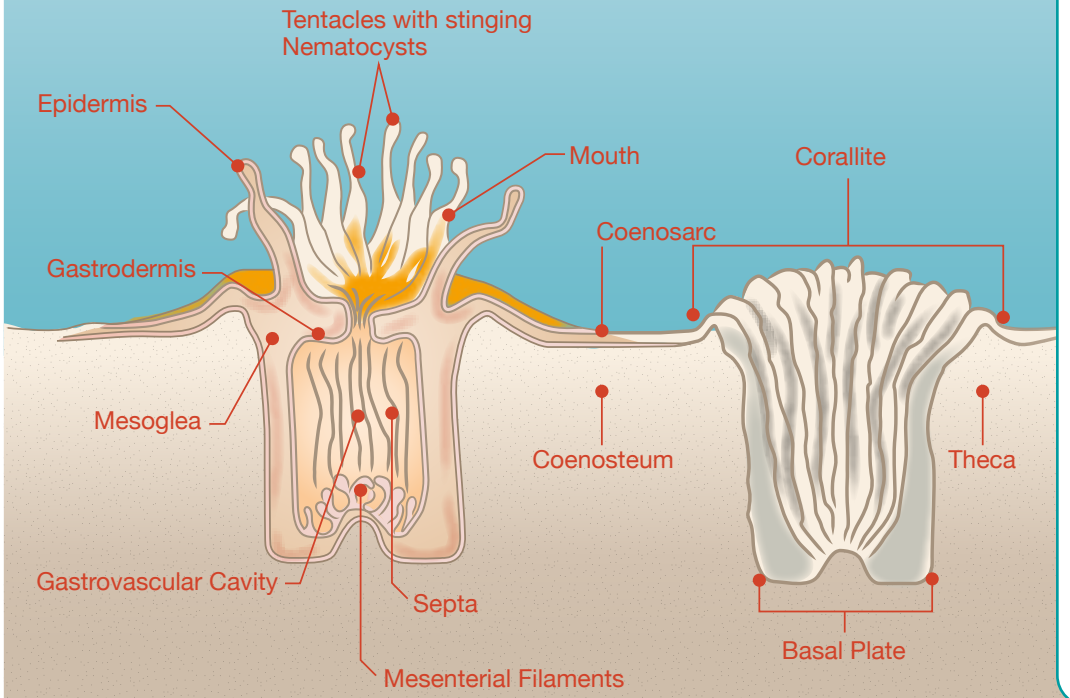
Scleractinian stony coral thickets on Ghoul Seamount, Chatham Rise. Credit: NIWA DTIS

Contents

This guide includes descriptions and images of key protected corals that fishers and fisheries observers may encounter at sea. The corals are organised into 4 main groups, and there are descriptions of other marine fauna that may be confused with each of the groups. Reporting codes and sampling instructions for observers are also included, as are resources where additional information can be found.

What is a coral?

"Coral" is a general term used to describe several different groups of animals in the Phylum Cnidaria. A coral consists of a skeleton base and living polyps with tentacles. The diagram below shows generalised coral morphology.



Some terminology in this guide:

Polyp – the tentacled living tissue part of a coral, multiple polyps make up a **colony**.

Calyx (pl. calyces) – cup that contains the polyp, in an octocoral.

Corallite – sketelal cup in stony corals; polyp is housed within it (and extends/contracts from it).

Corallum – a whole colony (or solitary cup).

Cup – easy terminology for where each individual coral polyp sits.

Septum (pl. septa) - radiating vertical plates lying within the corallite wall.

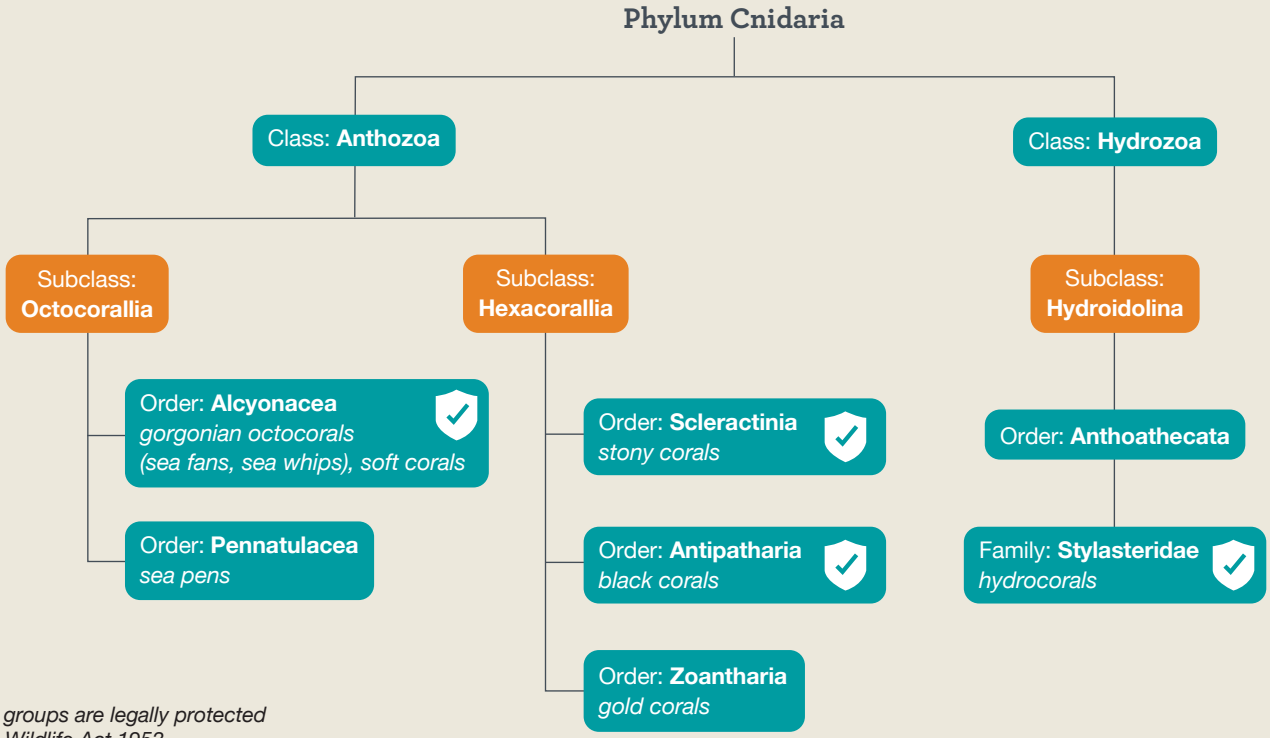
Stolon – tissue interconnecting individual polyps.

Pinnules – symmetrically arranged branches of nearly-equal length on black coral stem and branches.

For more information on corals, refer to resources on P34.

Taxonomy of major coral groups

This guide provides a summary of taxonomic features for the key coral groups we find in the New Zealand region, and covers primarily deep-sea species representative of each group likely to be encountered in trawl fisheries.



These groups are legally protected by the Wildlife Act 1953.

List of corals found in this guide

As there are very few common names for deep sea corals, many descriptions and corresponding reporting codes are at the genus level or species level. There are over 300 protected coral species in New Zealand waters; this guide covers the main deep sea species. Not all taxa have their own code (so should be reported at the next level up). This list includes the 3-letter reporting codes observers need to use when reporting coral bycatch.*

Stony Corals SIA

Branching thicket-forming corals CBR

Solenosmilia variabilis SVA
Madrepora oculata MOC
Enallopsammia rostrata ERO
Goniocorella dumosa GDU
Eguchipsammia japonica EJA
Dendrophyllia DDB
Oculina virgosa OVI
Culicia rubeola

Solitary or cup corals CUP

Flabellum COF
Flabellum apertum FAP
Fungiacyathus FUG
Desmophyllum dianthus DDI
Caryophyllia CAY
Caryophyllia ambrosia CMB
Stephanocyathus platypus STP
Stephanocyathus spiniger STP

Black corals COB

Whip black corals

Stichopathes STI
Cirripathes CIR
Stylopathes SLP

Bushy black corals

Antipathes ATP
Antipathella AHL
Triadopathes TDP
Tylopathes TYL
Leiopathes LEI
Trissopathes TPT

Sea fan-like black corals

Dendrobathypathes DEN
Dendropathes DDP
Lillipathes LIL
Parantipathes PTP
Bathypathes BTP
Telopathes TEO

Gorgonian corals GOC

Bamboo corals ISI

Keratoisididae
Keratoisis BOO
Isidella ISP
Acanella ACN
Jasonisis JAS
Mopseidae
Primnoisis
P. antarctica PAN
Minuisis MIN

Bubblegum corals (Paragorgiidae) PAB

Paragorgia PAB
P. arborea PAB

Precious corals (Corallidae) CLL

Hemicorallium
Corallium CLL

**Some coral genera do not have a 3-letter code, observers should use the family code or group code.*

Anthothelidae AND & Victorgorgiidae VIC corals
Iciligorgia ICI
Anthothela ANB
Victorgorgia VCT

Sea Fans GOC

Primnoidae PRI
Primnoella PML
Parastenella PLD
Thouarella THO
Metafannyella MEF
Tokoprymno TOK
Primnoa PMN
Callogorgia CLG

Calyptrophora CTP
Narella NAR

Plexauridae PLE
Muriceides MRI
Swiftia SWI
Paracis PRF
Bebryce PLE

Villogorgia VIL
Paramuricea PRG

Acanthogorgiidae ACD
Acanthogorgia ACC

Golden corals

Chrysogorgia CHR
Pseudochrysogorgia
Metallogorgia MTL
Iridigorgia IRI
Radicipes RAD

Hydrocorals COR

Errina ERR
Stylaster STL
Lepidotheca LPT
Calyptopora reticulata CRE
Conopora COO
*Crypt*helia CRY

Soft Corals SOC
Bathyalcyon robustum ARO
Clavularia SOC
Rhodelinda gardineri RGA
Telestula TLA
Heteropolypus SOC
Anthomastus SOC
Telesto TLO
Chironephthya SOC

Sea pens PTU

Funiculina FQU
Kophobelemnon KST
Distichoptilum DGR
Kophobelemnon KST
Umbellula UMB
Gyrophyllum sibogae GYS
Pennatula PNN
Balticina HWL

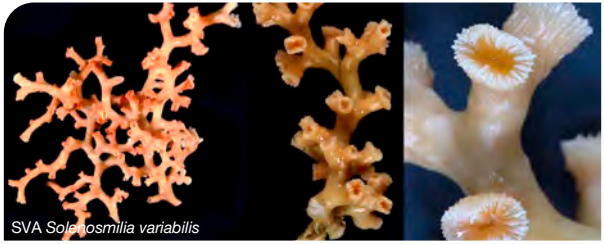
Zoanthids ZAH

Epizoanthus paguriphilus EPZ
Parazoanthus elongatus ZAH
Kulamanamana ZAH
Savalia ZAH

Class: Anthozoa
Subclass: Hexacorallia
Order: Scleractinia

Stony corals SIA

Solenosmilia variabilis, Madrepora oculata, Enallopsammia rostrata


SVA *Solenosmilia variabilis*


ERO *Enallopsammia rostrata*


MOC *Madrepora oculata*


ERO *Enallopsammia rostrata*

Please use the CBR code if you are unsure of the identification as these branching forms are difficult to distinguish to genus level.

Stony corals are hard, calcareous corals that form 3D matrix structures, dense clumps of individual colonies, OR occur as a solitary cup. This group is widespread and abundant in New Zealand waters. They have prominent polyp calices (the top opening of a **corallite**, or **cup**) in which the polyp is situated.

Branching stony corals CBR

Branching reef / thicket-forming colonies that produce large, fragile, habitat-forming 3D matrices of continuous and semi-continuous patches of live and dead coral. When live, these corals are pink, bright red to orange, yellow, brown, and purple.

They can be told apart by their branching pattern:

- ***Solenosmilia variabilis* SVA** the calice divides in two; branching in a ‘v’ shape:

Branching occurs below the calice:

- ***Madrepora oculata* MOC** Many small circular calices that can alternate on each side of thick branches in a flute-like, orientation, zig zag.
- ***Enallopsammia rostrata* ERO** Has main branches, then large calices on one side of the plane of the colony.

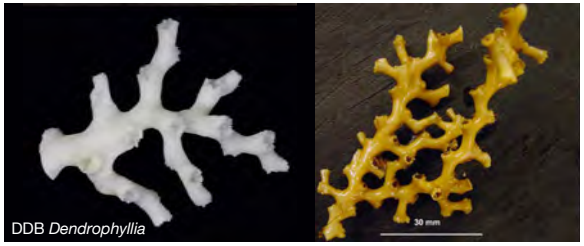
Class: Anthozoa
Subclass: Hexacorallia
Order: Scleractinia

Stony corals SIA

Goniocorella dumosa, Eguchipsammia japonic, Dendrophyllia, Oculina virgosa, Culicia rubeola


GDU *Goniocorella dumosa*


EJA *E. japonica*


DDB *Dendrophyllia*


OVI *Oculina virgosa*


Culicia rubeola

Please use the CBR code if you are unsure of the identification as these branching forms are difficult to distinguish to genus level.

Branching stony corals CBR *continued*

Branches extend away from the calices, at 90 degrees:

- ***Goniocorella dumosa* GDU** A 3D network of thin branches (note the bridges between branches); polyps branch at right angles
- ***Eguchipsammia japonica* EJA** only a few large calices develop as elongated branches. Also present as a clumping form
- ***Dendrophyllia* DDB** Colonies with zig-zag branching, corallites on alternating sides of the branches; corallites small and branches minutely porous; rough to the touch

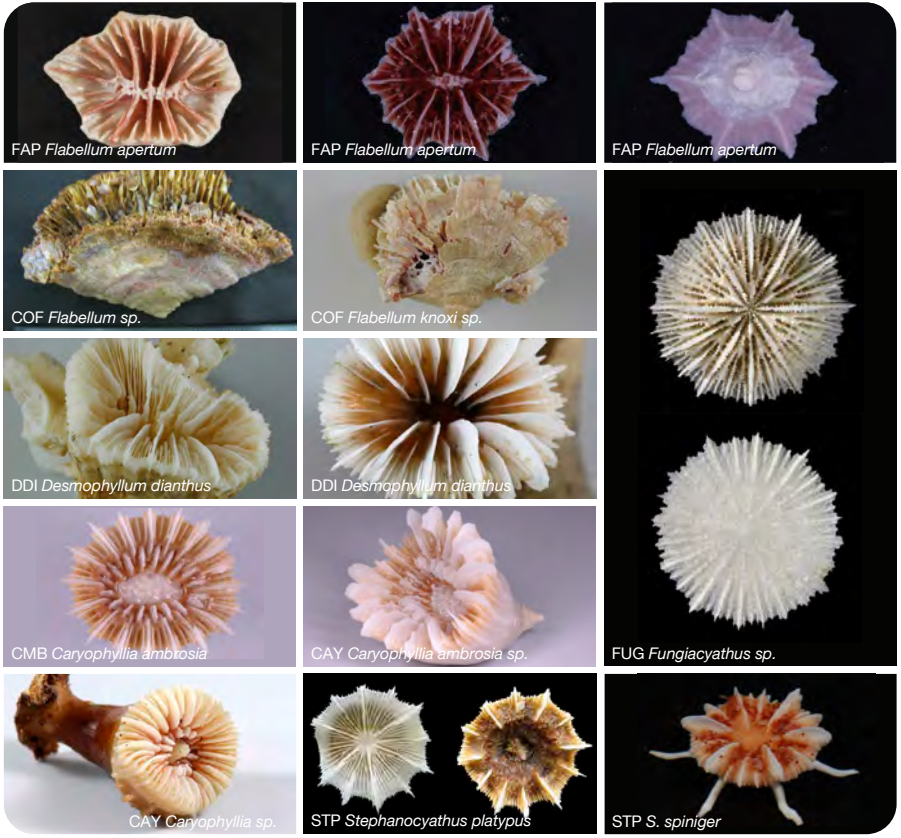
Irregularly branched:

- ***Oculina virgosa* OVI** sparsely and irregularly branched, thin branches; regularly arranged large circular cups with a diameter of 2.5 to 4.5 mm, pinkish red with white skeleton when alive; in shallow waters within diving depths, down to > 1000 m
- ***Culicia rubeola*** – cups aggregate to form clumps on hard substrates, including rock, mussel shell, and other corals; corallites are usually at different developmental stages; shallow water.

Class: Anthozoa
Subclass: Hexacorallia
Order: Scleractinia

Stony corals SIA

Flabellum, Flabellum apertum, Fungiacyathus, Desmophyllum dianthus, Caryophyllia, Caryophyllia ambrosia, Stephanocyathus platypus



Solitary or cup corals CUP

These stony corals occur as solitary individuals or can clump, are found attached to hard substrate or live in areas of soft sediment. They can be told apart by their shape:

Compressed, unattached:

- ***Flabellum* COF**, common genus comprising many species.
- ***Flabellum* (*Ulocyathus*) *apertum* FAP** distinguished by the frilled and pointed shape of the cup.

Flat bottomed, unattached base: ***Fungiacyathus* FUG** Cup-like (conical base):

- ***Desmophyllum dianthus* DDI** radial structures (septa) form from centre to edges.
- ***Caryophyllia* CAY**, common genus; displays several cycles of progressively smaller septa.
- ***Caryophyllia ambrosia* CMB** distinctive cup coral with curved horn shape pedicel (stem) that ends in a point.
- ***Stephanocyathus* STP**; ***S. platypus* STP** bowl-shaped; unattached (no conical base), ***S. spiniger* STP** has distinctive elongated 'costal spines' that keeps the cup coral off the seafloor and helps anchor it.

Groups that can be confused with stony branching corals


CLL *Corallium*


Cellaria


CEL *Cinctipora elegans*


TNE *Tetrocycloecia neozelanica*


TNE *Tetrocycloecia neozelanica*


HFO *Hornera*


CLC *Caulophacus*

Precious corals

- ***Corallidae* CLL *and Hemicorallium***
  have fleshy bump-like polyps and a white skeleton with tissue that can easily be scraped away.

Other corals

- **Stylasterids COR hydrocorals.** Hydrocoral main branches are obviously thicker than the side branches, their fragile side branches break easily, and they have pore-like apertures instead of calices, and no soft fleshy tissue on the surface.

Bryozoans

When broken or worn, the hollow core of bryozoan stems could be confused with some stony corals, such as the stony coral ***Culicia rubeola***. Other bryozoans have similar textures or branching forms to stony corals, such as ***Cellaria***, ***Hornera*** **HFO** and ***Cinctipora elegans*** **CEL**, or microscopic pores e.g., ***Tetrocycloecia neozelanica*** **TNE**.

Sponges

Some sponges can also be confused with stony corals, e.g., hard stalks of glass sponge ***Caulophacus*** **CLC**. These are often dead, brown in colour and missing most of its body when caught.

Class: Anthozoa
Subclass: Hexacorallia
Order: Antipatharia

Black corals COB

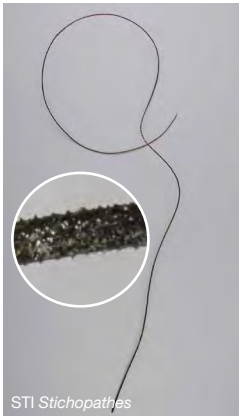
Key genera: Stichopathes, Cirrhipathes, Stylolathes

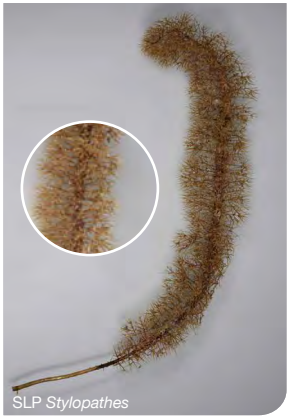

DEN *Dendrobathypathes*


DDP *Dendrobathypathes*


LIL *Lillipathes*


CIR *Cirrhipathes*


STI *Stichopathes*


SLP *Stylopathes*

Black corals – Antipatharia COB

Black corals have skeletons of protein and chitin that are flexible and covered with minute microscopic spines. These spines are barely visible but can be felt by touch – this is the easiest way to distinguish them from smooth-surfaced gorgonians. Black coral skeletons are typically black or dark brown, with living tissue being white, reddish or orange. They have diverse shapes - tree-like, fan-shaped, bushy, bottlebrush, unbranched or branched, and even a single stem or corkscrew shape. Black corals have pinnules – symmetrically arranged branches of nearly-equal length on their stem and branches. They are told apart primarily by branching patterns and pinnule arrangement.

Whip-like black corals COB

Colonies usually have an unbranched, single stem or are sparsely branched.

- ***Stichopathes* STI** Thin unbranched; lower part straight, upper part may be coiled. Polyps in single row.
- ***Cirrhipathes* CIR** Unbranched; straight, irregularly coiled, or spiral. Polyps in multiple rows.
- ***Stylopathes* SLP** Simple bottlebrush colonies, usually one stem with very sparse branching. Pinnules extend out in all planes or in whorls of 3 or 4. Often with a 'worm run' which modifies pinnules to form a 'tunnel' along the main stem.

Class: Anthozoa
Subclass: Hexacorallia
Order: Antipatharia

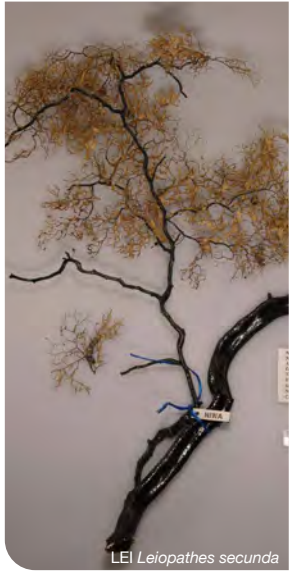
Black corals COB

Key genera: Antipathes, Antipathella, Triadopathes, Tylopathes, Leiopathes, Trissopathes


ATP *Antipathes*


AHL *Antipathella*


TDP *Triadopathes*


LEI *Leiopathes secunda*


TDP *Triadopathes*


TYL *Tylopathes*


TYL *Tylopathes*

Bushy black corals COB

Colonies are densely branched, without distinct pinnules, distinguished by their branching pattern.

- ***Antipathes*** **ATP** Colonies fan-shaped or bramble-like; numerous, irregular branches and typically elongated, but somewhat alternately arranged on opposite sides of larger branches.
- ***Antipathella*** **AHL** Bushy colonies; thin, straight or curved small branchlets arranged bilaterally or irregularly on both sides of branch; polyps often white; often host brittlestars.
- ***Triadopathes*** **TDP** Bushy, planar with upright (typically vertical) bottle-brush branches; stem and branches often fused together near base. Can be confused with ***Tylopathes*** but generally not as fan shaped.
- ***Tylopathes*** **TYL** Mostly planar fan-shaped colonies but some bushy with dense irregular bilateral short branching, with fusing in places. Branchlets brown with worm runs present on main stem. Can be confused with ***Triadopathes.***
- ***Leiopathes*** **LEI** Small to large colonies loosely spreading and tree-like with crooked smooth, shiny branches; smaller branches may be curved; usually has orange/red polyps.
- ***Trissopathes*** **TPT** Colonies have 4 rows of pinnules; 2 opposite rows of long, unbranched pinnules and 2 rows of shorter, branched pinnules; colonies often very slimy.

Class: Anthozoa
Subclass: Hexacorallia
Order: Antipatharia

Black corals – Antipatharia COB

Key genera: Dendrobathypathes, Dendropathes, Lillipathes, Parantipathes, Bathypathes, Telopathes


BTP *Bathypathes*


BTP *Bathypathes*


DEN *Dendrobathypathes*


DDP *Dendropathes*


LIL *Lillipathes*


PTP *Parantipathes*


TEO *Telopathes*


TEO *Telopathes*

Sea fan-like black corals COB

Colonies usually have sparse branching and have pinnules on the stem and branches.

- ***Dendrobathypathes* DEN** Colonies branched and alternately pinnulated in 2 rows; primary pinnules may have short sub-pinnules on just one side.
- ***Dendropathes* DDP** Branched and pinnulate colonies; stem and branches with short pinnules in 4 irregular rows in a bottlebrush pattern.
- ***Lillipathes* LIL** Sparsely arranged pinnules in 4 rows, 2 on each side in pairs; branches appear feather-like arranged in alternating semi spiral groups; up to several metres tall.
- ***Parantipathes* PTP** Distinct bottlebrush colony arrangement with 6 or more rows of unbranched pinnules in bilateral semi spiral groups; smaller colonies usually a long-stemmed single bottlebrush.
- ***Bathypathes* BTP** single stalk colonies with simple pinnules in 2 rows arranged in a symmetrical sub-opposite pattern around the stem; feather like appearance with prominent orange polyps. Larger colonies may be further branched and easily confused with *Telopathes.*
- ***Telopathes* TEO** Sparsely branched colony with simple branching in two regular sub-opposite rows. Can be confused with *Bathypathes*, which generally has no branching.

Groups that can be confused with black corals


HDF *Nemertesia*


HDF *Nemertesia*

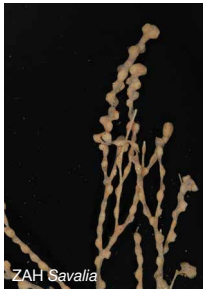

CRT *Cryptolaria*


HDF *Plumularia*


THO *Thouarella*, a gorgonian


ZAH *Savalia*


SEO *Perithalia capillaris*


ZAH *Savalia*


ZAH *Kulamanamana*

Hydroids HDF

These are less robust than black corals, with a 'woody' and flexible skeleton made of chitin, and very thin end branches. They don't have a hard axis, and have microscopic cups to house polyps.

- ***Cryptolaria* spp. CRT** branched, fan-shaped with a thick main stem; multiple stiff branches all in one plane; dark yellow, greenish-brown, brown.
- ***Nemertesia* spp.** and ***Plumularia* spp. HDF** stem, or stems, arise from a compact bundle of tubes that anchor it attach it to substrate; can be large, or single delicate and feathery; dark brown, yellowish brown, light yellow to white

Gorgonians GOC *(see next page)*

'Naked' gorgonian axes (no tissue) can be easily distinguished from black corals by the absence of skeletal spines on gorgonians. Tissue is generally much thicker and can be scraped off gorgonian axes.

Primnoid gorgonians can be easily distinguished from black corals by their metallic lustre or colour and armoured bud-like polyps ('e.g.Thouarella THO), (black coral polyps are always fleshy).

Algae SEO

Perithalia capillaris, an endemic, large, and robust brown algae with a horse-hair like texture; often hosts other small red epiphytic algae; easily confused with the black coral *Antipathes*.

Zoanthids ZAH *(the skeleton forming species)*

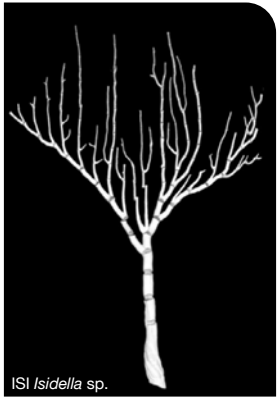
Kulamanamana and *Savalia* that produce their own skeleton made up of structural proteins. *Kulamanamana* produces a lustrous golden skeleton, however, *Savalia* usually produces a blackish skeleton. They have vibrant golden-yellow tissue and polyps.

Class: Anthozoa
Subclass: Octocorallia
Order: Alcyonacea

Gorgonian corals GOC

Key families: Keratoisididae, Mopseidae


BOO *Keratoisis* sp.


ISI *Isidella* sp.


BOO *Keratoisis* sp.


ACN *Acanella* sp.


JAP *Jasonisis* sp.


LLE *Lepidisis* sp.

Gorgonian corals GOC

In addition to the fleshy soft corals, the order Alcyonacea also contains gorgonians, an abundant, diverse and colorful group whose tiny eight-tentacled polyps form bushy, bottlebrush, tree-like, sea fan, or sea whip colonies, which can be large and flexible.

Bamboo corals ISI

Bamboo corals have an articulated skeleton composed of calcareous segments alternating with short proteinaceous segments, giving them their bamboo-like appearance.

Family Keratoisididae

Medium to large with thick branches and large brownish / black nodes; colonies are unbranched ("whip-like") or branched, with branches originating at the nodes, or from the internodes; some colonies have an unusual candelabra form.

Branching bamboo corals can be distinguished by where the branches come from:

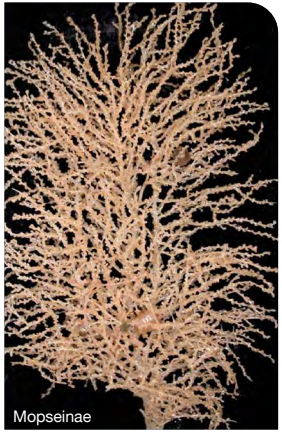
- ***Keratoisis* BOO** - unbranched or branching from the white calcareous internodes, often just above the node.

Class: Anthozoa
Subclass: Octocorallia
Order: Alcyonacea

Gorgonian corals GOC

Key families: Keratoisididae, Mopseidae


ISI (bamboo coral)


Mopseinae


MIN *Minuisis* sp.


Mopseinae sp.


PAN *P. antarctica*

Family Keratoisididae *continued*

- ***Isidella* ISP** - branched from the proteinaceous nodes, the white internodes are noticeably long with wide tube in younger ones.
- ***Acanella* ACN** - branched from the brown/orange nodes with several branches in a whorl at each branching point.

Several other genera are uncommon in New Zealand e.g., ***Jasonisis* JAS** has curved branches that are shaped like a lyre (lyrate), and are covered in thick tissue with erect, elongate polyps.

Family Mopseidae

Small, bushy, with fine delicate branches and short nodes of various colours (visible if you look closely). These are distinguished by their branching shape:

- ***Primnoisis* (*P. antarctica* PAN)** - bottle-brush shape, white.
- ***Minuisis* MIN** – irregular branching, usually with some flat or tubular branches, white.
- Other Mopseidae - mostly planar, colony and axis white/brown/orange.

Class: Anthozoa
Subclass: Octocorallia
Order: Alcyonacea

Gorgonian corals GOC

Key genera: *Paragorgia, Corallium, Hemicorallium*

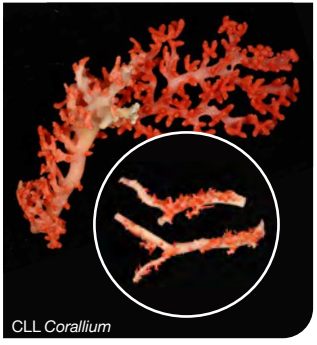

PAB *Paragorgia arborea*


PAB *P. arborea*


CLL *Corallium*


PAB *P. arborea*


CLL *Hemicorallium*


CLL *Corallium*

Bubblegum corals PAB and Precious Corals CLL

Large, thick branches with a lumpy surface that, together with pink or orange colour, gives them their 'bubblegum' appearance. Branches are somewhat flexible but lack a protein (gorgonin) axis, being composed of clay-like sclerites instead. Bubblegum corals can reach enormous sizes (> 2m in height).

Family Paragorgiidae - Bubblegum corals

Large iconic gorgonian. Central axis is soft and easily crushed. Colonies are orange to pink (rarely white) with thick, lumpy branches.

- ***Paragorgia, P. arborea* PAB** axis is pink and red.

Precious corals Family Corallidae CLL

Central axis is solid and extremely hard (not wire like): similar to the hydrocoral *Errina* but Corallidae lack pores on their skeleton, do not have small side branches, and surface tissue can be scraped off.

- ***Hemicorallium*** - has erect, elongate polyps.
- ***Corallium* CLL** - has flat or bump-like polyps.

Class: Anthozoa
Subclass: Octocorallia
Order: Alcyonacea

Gorgonian corals GOC

Key genera: *Iciligorgia, Anthothela, Victorgorgia*


ANB *Anthothela*


ICI *Iciligorgia*


ANB *Anthothela*


VCT *Victorgorgia*

Anthothelid AND **and Victogorgiid** VIC **gorgonians**

These gorgonians have a soft and friable central axis, and branches that fuse together and are mesh-like. The easiest way to tell them apart is by colour:

- ***Iciligorgia* ICI** - dark brown or black (fan-like).
- ***Anthothela* ANB** – pale beige to white.
- ***Victorgorgia* VCT** - purple or violet.


VCT *Victorgorgia*

Class: Anthozoa
Subclass: Octocorallia
Order: Alcyonacea

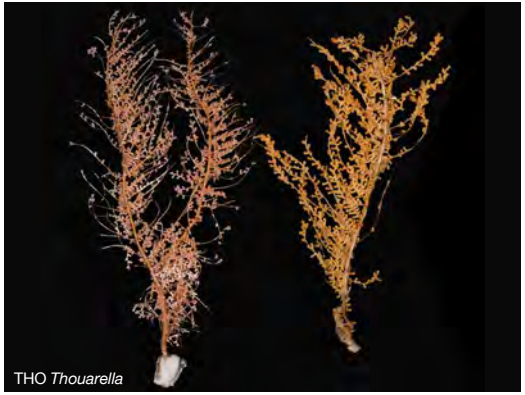
Gorgonian corals GOC

Family Primnoidae PRI Key genera: *Primnoella, Thouarella*


PLD *Parastenella*


PML *Primnoella*


THO *Thouarella*


THO *Thouarella*

Primnoids are similar in form, which makes the descriptions difficult to follow at sea. Use the higher-level code PRI when in doubt.

Family Primnoidae PRI

This diverse family of gorgonians has a central wire-like often brittle axis, black or brown, bronze to golden skeleton, often with orange, white, yellow, pink large and small polyps. Often polyps are hard. A layer of semi-soft tissue (coenenchyme) covers the tissue.

Primnoid sea fans, sea whips

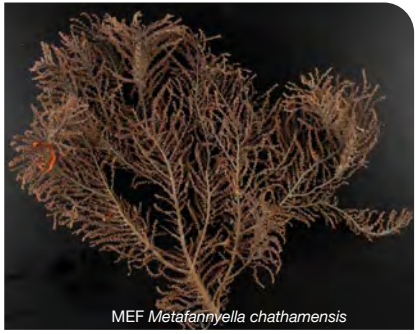
- ***Primnoella* PML** colonies usually unbranched and whip-like; slightly curved never coiled; polyps in whorls.
- ***Thouarella* THO** common abundantly branched bottlebrush coral, but can also be uni-planar pinnate, or dichotomous branching (the branching pattern is repeating), and numerous. Often branchlets are arranged close to the main stem. Polyps are isolated and arranged randomly. A common species is *T. variabilis,* where large colonies have commensal marine worms that form tubes on main branches.

Class: Anthozoa
Subclass: Octocorallia
Order: Alcyonacea

Gorgonian corals GOC

Family Primnoidae PRI Key genera: *Parastenella, Tokoprymno, Metafannyella*


MEF *Metafannyella ventilabrum*


MEF *Metafannyella chathamensis*


MEF *Metafannyella moseleyi*


TOK *Tokoprymno*

Primnoid sea fans, sea whips *continued*

- ***Parastenella* PLD** (*image on page19*) Colonies uni-planar to slightly bushy. Polyps stand perpendicular to branch, arranged independently or in pairs. Not common.
- ***Metafannyella* MEF** branching sea fan coral colony, mostly uniplanar, some can lyrate or bottlebush (e.g., *M. chathamensis*, the species that has commensal worms); polyps facing upwards arranged in whorls or in random order.
- ***Tokoprymno* TOK** branching bushy coral. Small sea fan often with fat pregnant polyps. Calyces arranged in two rows or series (biserially), projecting perpendicularly from opposite edges of each branch.


TOK *Tokoprymno*

Class: Anthozoa
Subclass: Octocorallia
Order: Alcyonacea

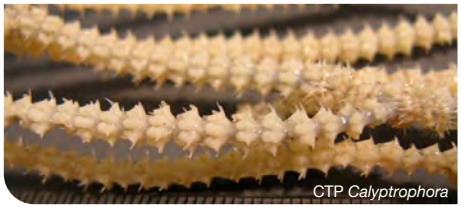
Gorgonian corals GOC

Family Primnoidae PRI Key genera: *Callogorgia, Calyptrophora, Narella, Primnoa*


PMN *Primnoa*


CLG *Callogorgia*


CTP *Calyptrophora*


CTP *Calyptrophora*


NAR *Narella*

Primnoid sea fans, sea whips *continued*

- ***Primnoa*** **PMN** Large bushy to fan-like with robust branches and scales or plates on the knobbly orange polyps. *P. notialis* common in the region.
- ***Callogorgia*** **CLG** branching sea fan coral colony, uni-planar OR pinnately (opposite or alternate) branched; polyps face upwards.
- ***Calyptrophora*** **CTP** uniplanar to slightly bushy colonies – many forms, including lyrate and un-branched colonies.
- ***Narella*** **NAR** Can be unbranched or branched; polyp arrangement in whorls, ‘dreadlock-like’. Some specimens with a robust calcified base.


NAR *Narella vulgaris*

Class: Anthozoa
Subclass: Octocorallia
Order: Alcyonacea

Gorgonian corals GOC

Family Plexauriidae PLE

Key genera: *Muriceides, Swiftia, Paracis*


MRI *Muriceides*


SWI *Swiftia*


SWI *Swiftia*


PRF *Paracis***

Plexaurids are morphologically similar, which makes them difficult to describe at sea. Use the higher-level code PLE when in doubt.

Family Plexauridae PLE

Branching gorgonians that are woody, flexible, and usually beige to dark brown. The surface tissue is red, pink, purple, tan or brown with surface polyp bumps on the branch surface.

- ***Muriceides*** **MRI** straggly colonies with thicker branches arising at right-angles and alternating on each side of stem. Branches have interspersed conical mounds arranged on opposite edges of branches but sometimes on all sides, from which the polyps protrude.
- ***Swiftia*** **SWI** thin/wiry colonies, polyps on opposite sides of branches, branch tips wedge-shaped with 2 mounds at each tip. May be coloured red/ crimson. Branch surface not rough/spiny. Polyp mounds often pyramid-shaped/tall cones.
- ***Paracis*** **PRF** highly branched colonies with surface covered by rice-grain-like scales. Polyp mounds usually obvious but variable in shape from porous to short cylinders to small cones, but often with a jagged edge.

Class: Anthozoa
Subclass: Octocorallia
Order: Alcyonacea

Gorgonian corals GOC

Family Plexauriidae PLE, Key genera: *Bebryce, Villogorgia, Paramuricea*
Family Acanthogorgiidae ACD, Key genera: *Acanthogorgia*


PLE *Bebryce*


PRG *Paramuricea*


VIL *Villogorgia*


ACC *Acanthogorgia*

Family Plexauriidae *continued*

- ***Bebryce* PLE** thin, irregular branches giving straggly appearance; grey/dull brown with wart-like polyp mounds that are taller than thickness of branch; mounds may be on sides of branches in places but found on all sides in others.
- ***Villogorgia* VIL** highly branched in single plane ('sea-fans'), often reddish-pink in life (also tan), with thin branches, polyps opposite on sides of branches, polyp mounds conical to tubular, with pale 'cap'.
- ***Paramuricea* PRG** Highly branched in single plane. Pale orange to white. Polyp mounds tall and crater-like with a serrated margin. Polyps may protrude from mounds as a 'cap'. Mounds closely spaced and on all sides of branches but more concentrated on opposite edges.

Family Acathogorgiidae

***F. Acanthogorgiidae* ACD** Like the plexaurids, acanthogorgiids appear as highly branched 'sea-fans' but are often smaller (<20cm high) and can be recognized by their tubular polyps with a spiky margin, whereas plexaurids have mounds/warts.

- ***Acanthogorgia* ACC** small, highly branched sea fans immediately recognisable by the long, protruding polyps whose surface is continuous with the branch surface (no distinct polyp mound). Polyps often look like match-sticks and cannot retract, colonies are sometimes multicoloured.

Class: Anthozoa
Subclass: Octocorallia
Order: Alcyonacea

Gorgonian corals GOC

Key genera: Chrysogorgia, Pseudochrysogorgia, Metallogorgia, Iridogorgia, Radicipes


CHR *Chrysogorgi*


MTL *Metallogorgia*


Pseudochrysogorgia

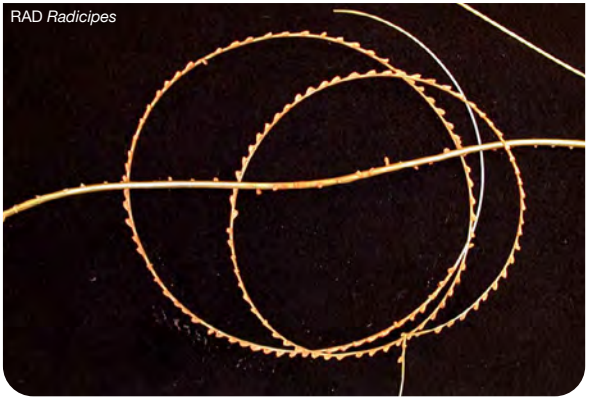

IRI *Iridigogria*


IRI *Iridigorgia*

Golden corals Family Chrysogorgiidae

Stems of golden corals have a distinctive metallic lustre, they can appear as black/green as well as golden. These can be separated based upon their shape:

- ***Chrysogorgia* CHR** and ***Pseudochrysogorgia*** - delicate bottle-brush.
- ***Metallogorgia* MTL** - long stalk ending in a network of branches.
- ***Iridigorgia* IRI** – twisted / spiral.
- ***Radicipes* RAD** - whip-like with polyps arranged on one side only of the stem.


RAD *Radicipes*

Groups that can be confused with gorgonian corals

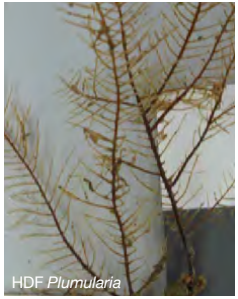

ZAH *Kulamanamana*


ZAH *Kulamanamana*


ZAH *Savalia*


CRT *Cryptolaria*


HDF *Nemertesia pinnatifida*


HDF *Plumularia*


Dendrilla rosea


NEE *Hydrozoa Nemertesia elongata*

Other corals

Black corals COB can be morphologically similar to many octocorals, but black corals have tiny spines on their stems and feel rougher to the touch. Black coral skeletons are also darker, and have thinner, less obvious, transparent tissue.

Zoanthids ZAH (the skeleton forming species)

Kulamanamana and ***Savalia*** that produce their own skeleton made up of structural proteins. ***Kulamanamana*** produces a lustrous golden skeleton, *Savalia* usually produces a blackish skeleton. They have vibrant golden-yellow tissue and polyps.

Hydroids HDF

***Hydroids* HDF** have very thin end branches and they never have a hard axis, instead they have a chitinous axis that is less robust. Check gorgonians to ensure they also have a layer of semi-soft tissue covering the skeleton, otherwise they can be hydroids;

- ***Cryptolaria spp.* CRT** branched, fan-shaped hydroids. Thick, polysiphonic (several bundled stems) main stem, stiff branches regularly and pinnately arranged, subopposite, and all in one plane. Dark yellow, greenish-brown, light to dark brown in colour.
- ***Plumulariidae; Nemertesia* spp.** and ***Plumularia* spp.** HDF hydroids with an erect stem, or stems, arising from a compact bundle of tubes used to anchor it in sediment or attach it to firm substrate. Can be large, or single delicate and feathery. Dark brown, yellowish brown, light yellow to white in colour.

Sponges ONG

Some sponges could also be confused with certain gorgonian corals, e.g., the demosponge ***Dendrilla rosea***, which is brightly coloured and branched.

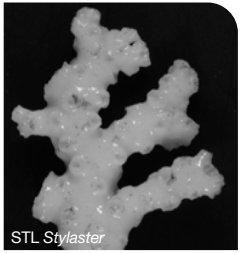
Class: Hydrozoa
Subclass: Hydroidolina
Order: Anthoathecata

Hydrocorals COR

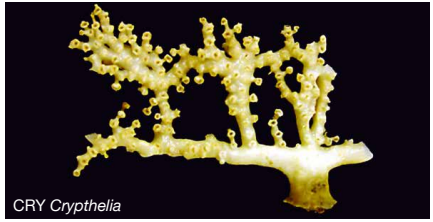
Hydrocorals (lace corals) Family: *Stylasteridae* COR

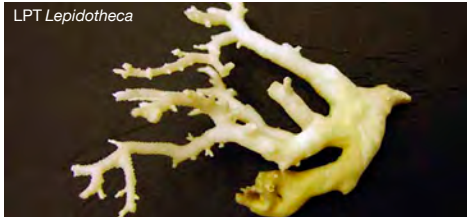

ERR *Errina*


ERR *Errina*


STL *Stylaster*


COO *Conopora*


CRY *Crypthelia*


LPT *Lepidotheca*


CRE *Calyptopora reticulata*

Most stylasterids other than some Errina ERR species form similar colonies and require a microscope to reliably tell them apart. If unsure, use the generic code COR. Note: some non-Errina species are also pink / orange.

Hydrocorals COR

Hydrocorals can be recognised by their main branches usually being obviously thicker than the side branches, having side branches that break easily, and pore-like apertures. The surface of branches is hard and calcareous, without a layer of soft fleshy tissue.

- ***Errina*** **ERR** White or pink to red, short spines, thick branches. The surface of *Errina* species are covered in spines.
- ***Stylaster*** **STL** White, has cyclosystems on the surface (a circular arrangement of gastric structures).
- ***Lepidotheca*** **LPT** White, colony surface has a series of long spines.
- ***Calyptopora reticulata*** **CRE** White, thin intricate side branches, lacy. Very similar to some Stylaster species.
- ***Conopora*** **COO** White, some species have quite distinctive branching forms with cyclosystems (feeding pores) only on branch edges, not on front or rear face of the colony e.g., *C. candelabrum.*
- ***Crypthelia*** **CRY** White, species of this genus usually exhibit large cyclosystems (feeding pores) with a lid extending over them.

Groups that can be confused with hydrocorals


HDF *Hydroids*


CLL *Corallium*


SIA Dendrophyllia


Oculina virgosa


COZ

Other corals

Precious red corals

- ***Hemicorallium*** and ***Corallium*** **CLL**
  Large white colonies of the precious coral *Corallium* can be confused with stylasterids but *Corallium* lacks pores of any kind on its skeleton, and does not have the small side branches of *C. reticulata*. Surface tissue can be scraped off precious corals.

Stony corals SIA

e.g., *Dendrophyllia* which can appear similar to white hydrocorals, but should have a thin veneer of soft tissue on the branch surfaces and tentacles in the polyps.

Hydroids HDF

These are less robust than hydrocorals, with a 'woody' and flexible skeleton made of chitin, and very thin end branches. They never have a hard skeleton and have microscopic cups to house polyps.

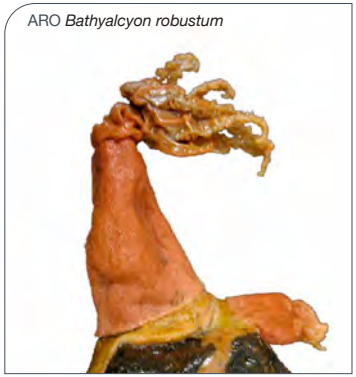
Bryozoans COZ

Some branching bryozoans can have similar shapes but are somewhat crystalline, have thinner branches, and are without robust main branches. The branches when broken appear to comprise a matrix of calcareous walled canals.

Class: Anthozoa
Subclass: Octocorallia
Order: Alcyonacea

Soft corals SOC

Key families: Alcyoniidae & Clavulariidae


ARO *Bathyalcyon robustum*


RGA *Rhodelinda gardineri*


SOC *Clavularia*


TLA *Telestula*

Soft corals SOC

Soft corals do not produce stony skeletons and are fleshy, soft and flexible. They may be brightly coloured, often red, orange, pink or purple.

Soft corals SOC

Soft corals do not produce stony skeletons and are fleshy, soft and flexible. They may be brightly coloured, often red, orange, pink or purple.

How many polyps do they have?

If they have one or a few polyps, connected by stolons (tissue that connects polyps), unbranched:

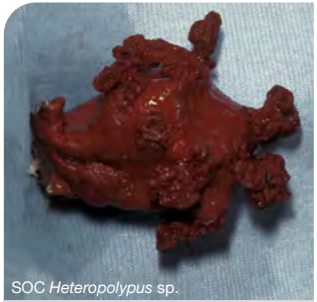
- ***Bathyalcyon robustum* ARO**: Gigantic polyp.
- ***Clavularia* SOC**: Single cream or greyish- orange polyp tubes joined by runners.
- ***Rhodelinda gardineri* RGA**: Single long, red or white tubes joined by runners. Rhodelinda tubes can be easily snapped, and resemble an inverted cone.
- ***Telestula* TLA**: Very tall and thin white polyp tubes joined by runners.

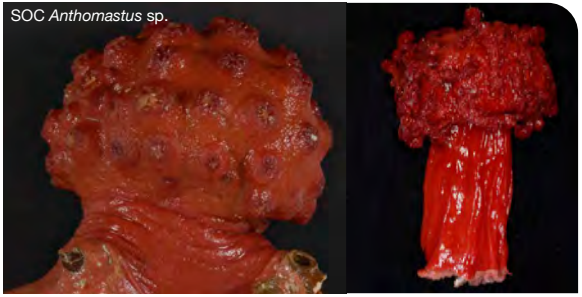
This group of corals are not protected.

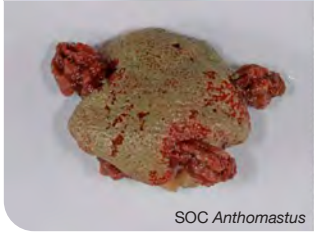
Class: Anthozoa
Subclass: Octocorallia
Order: Alcyonacea

Soft corals SOC

Key families: Alcyoniidae, Clavulariidae, Nidaliidae


SOC *Heteropolypus* sp.


SOC *Anthomastus* sp.


SOC *Anthomastus*


TLO *Telesto spp.*


SOC *Chironephthya* spp.

Soft corals SOC

What is the colony shape?

Colonies are mushroom-shaped:

- ***Heteropolypus* SOC** thick stalk with a low domed shape head, large polyps around rim of head.
- ***Anthomastus* SOC** thick stalk with a rounded rounded 'hemispherical head' with polyps distributed all over head.

Branching

- ***Telesto* TLO**: thin tubular branches that are generally red.
- ***Chironephthya* SOC**: hard with prickly branches at the top, hollow stem.

This group of corals are not protected.

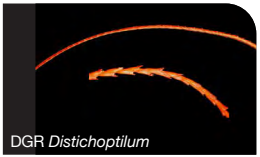
Class: Anthozoa
Subclass: Octocorallia
Order: Pennatulacea

Sea pens PTU

Key genera: Funiculina, Distichoptilum, Kophobelemnon, Umbellula, Gyrophyllum sibogae, Pennatula, Balticina

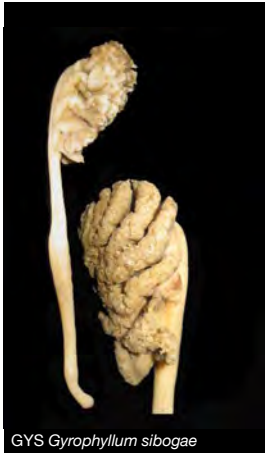

FQU *Funiculina*


KST *Kophobelemnon*


DGR *Distichoptilum*


UMB *Umbellula*


HWL *Balticina*


GYS *Gyrophyllum sibogae*


PNN *Pennatula*


PNN *Pennatula*

Sea pens PTU

Sea pens are colonial animals that resemble quill pens (hence the name). They have a central stalk that has a lower part, the peduncle, which anchors the colony in mud or sand, and an upper part, the rachis, which bears polyps or branches bearing several polyps. Sea pens are usually only found on soft, muddy bottoms, except for 'rockpens' that attach to deep-sea rocky outcrops.

Whip-like (small polyps)

What type of axis does it have?

- ***Funiculina* FQU**: square in section.
- ***Kophobelemnon* KST** and ***Distichoptilum* DGR**: cylindrical.

Fleshy

- ***Kophobelemnon* KST**: flower-like polyps arranged along stem.
- ***Umbellula* UMB**: long stalk with a terminal bump of large flower-like polyps.
- ***Gyrophyllum sibogae* GYS**: short with large fleshy 'leaves'.

Pen-like

- ***Pennatula* PNN**: purple and looking like a soaked feather.
- ***Balticina*** the polyps appear in oblique rows and each have a calyx that has two conspicuous, broad teeth.

This group of corals are not protected.

Class: Anthozoa
Subclass: Pennatulacea
Order: Zoantharia

Zoanthids ZAH Gold corals


EPZ *Epizoanthus paguriphilus*


EPZ *Epizoanthus paguriphilus*


EPZ *Epizoanthus paguriphilus*


ZAH Bullagummizoanthus


ZAH *Parazoanthus elongatus*


ZAH *Parazoanthus elongatus*


ZAH *Savalia*


ZAH *Kulamanamana*


ZAH *Kulamanamana*

Zoanthids ZAH

Zoanthids are colonial "sea anemones" with squarish shaped polyps with two rows of tentacles. Often associated with and growing on other benthic organisms such as hermit crabs, sponges, gastropods, and corals like primnoids, bubblegum corals, bamboo corals and black corals. Polyps are usually incrusted with mineral particles. Usually no skeleton, however some do produce their own skeleton – these species can be confused with black corals and some gorgonian corals.

- ***Epizoanthus paguriphilus*** **EPZ** lives in a symbiotic relationship with a hermit crab.
- ***Parazoanthus elongatus*** can be often found growing over sponges or coralline algae.
- ***Kulamanamana*** and ***Savalia*** can secrete a scleroproteic skeleton (uniquely they produce their own skeleton made up of structural proteins). *Kulamanamana* produces a lustrous golden skeleton, *Savalia* usually produces a blackish skeleton. Most commonly they colonise dead octocorals e.g., bamboo corals.

This group of corals are not protected.

Instructions for observers

Sort - record - label - photograph - subsample

Use this guide to identify as best you can all coral bycatch per event to species, genus, or family level, and include the correct code on photograph and specimen labels, and in your reporting. This guide should be used in conjunction with the most recent MPI Fisheries Observer Manual and Observer Briefing Notes, where reporting instructions are included.

It is a legal requirement to report protected coral bycatch.

Photographing

Make sure to include a legible photo label in each image with trip and station number.

1. Photographs should be taken of all coral bycatch.
2. Separate the corals into groups /species, and photograph each type.
3. Make sure to include the benthic photo label (opposite) and make sure it is legible. You MUST include at least trip number, tow/set number, and the 3 letter species code, and sample number, so that the specimen and photo can be matched later.
4. Take one image of the whole specimen, and capture close-ups of part of the specimen to provide more detail.
5. If it's a particularly large coral, take several photos to show the whole colony and zoom into the label.
6. Capture things in good light, use a plain grey background if possible and ensure a size scale is included. Check images are in focus.
7. Record all images in the photo log.

Use the benthic photo card

1. Write down the information required **MUST include tow and trip number**.
2. Put this card next to the specimen.
3. Take photos with both the specimen and this card in the same frame.

Sub-sampling corals

1. For expert ID and research back on land, take a small clipping (5-10 cm) of each type of coral. Try to ensure it has tissue (not just skeleton).
2. If multiple individuals of the same species occur in the same fishing event, it isn't necessary to sample all of them (but DO record their total weight AND sample weights and count individuals if applicable).
3. Retain whole large, rare or intact colonies at your discretion and with permission of the crew.
4. Dead coral and coral rubble sub-samples can also be retained to confirm identification.
5. Place the sample or the sub-sample in a plastic bag with a waterproof label facing outwards, **filled out in pencil** (2B preferred) to include:

Observer: *(your name)*	**AREA:** (e.g., stat area, FMA)
TRIP:	**Tow/Set:**
Observer Benthic Materials Form: **FNZ Sample ID:**	**FNZ Species Code:** *(the lowest taxonomic level you are confident with - using this guide)*
COMMENTS: ***(****useful context, including if this is a subsample / whole specimen, and estimated* ***total*** *weight)*	

6. Freeze immediately. If delicate place in a bag of sea-water and freeze.

Resources and Further Reading

Further information

This guide is a revision of the 2014 DOC Coral Identification Guide (Tracey et al. 2014 and is designed for fisheries observers in the New Zealand region, and complements:

- Antipatharia Black Corals for the New Zealand Region (Opresko et al. 2014, New Zealand Aquatic Environment and Biodiversity Report No. 131)
- Pennatulacea (Sea Pens) Descriptions for the New Zealand Region. (Williams et al. 2014, New Zealand Aquatic Environment and Biodiversity Report No. 132)
- Guide to Common Deepsea Invertebrates in New Zealand Waters (Tracey et al. 2011, New Zealand Aquatic Environment and Biodiversity Report No. 86)

Further information on New Zealand corals can be found in: Tracey, DM & F. Hjorvarsdottir (eds, comps) (2019). The state of knowledge of deep-sea corals in the New Zealand region. NIWA Science and Technology Series Number 84. 140 pp.

This and other identification guides published by DOC can be found at: https://www.doc.govt.nz/our-work/conservation-services-programme/csp-resources-for-fishers/protected-species-identification-guides/

This version has been updated by and undergone technical review by Di Tracey, Diana Macpherson, Rob Stewart, Jaret Bilewitch, and Peter Marriott, (NIWA Taihoro Nukurangi), Stephen Cairns and Dennis Opresko, (Smithsonian Institution, Washington, USA), Phil Alderslade (CSIRO, Hobart, Australia), Frederik Sinniger (Ryukyus university) and Marcelo Kitahara (University of São Paulo, Brazil).

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