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Bryozoans of southern New Zealand: a field identification guide

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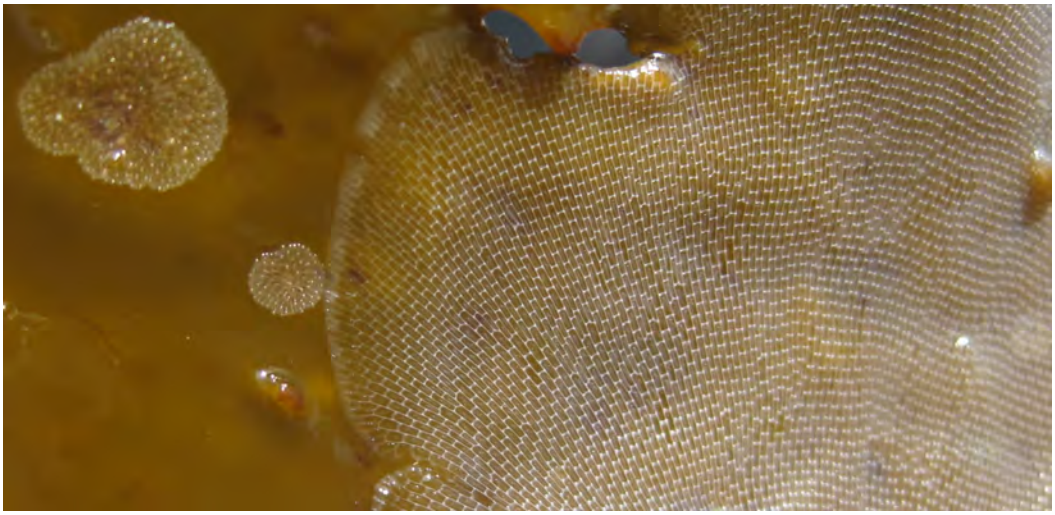
1. INTRODUCTION TO THE BRYOZOA

Bryozoans constitute one of 33 major branches (phyla) of the animal kingdom. In this context, *major* refers to body design, not necessarily numbers of species. Some phyla comprise fewer than five named species; on the other hand, the largest phylum, Arthropoda (insects, spiders, crustaceans, etc.), comprises nearly a million named species.

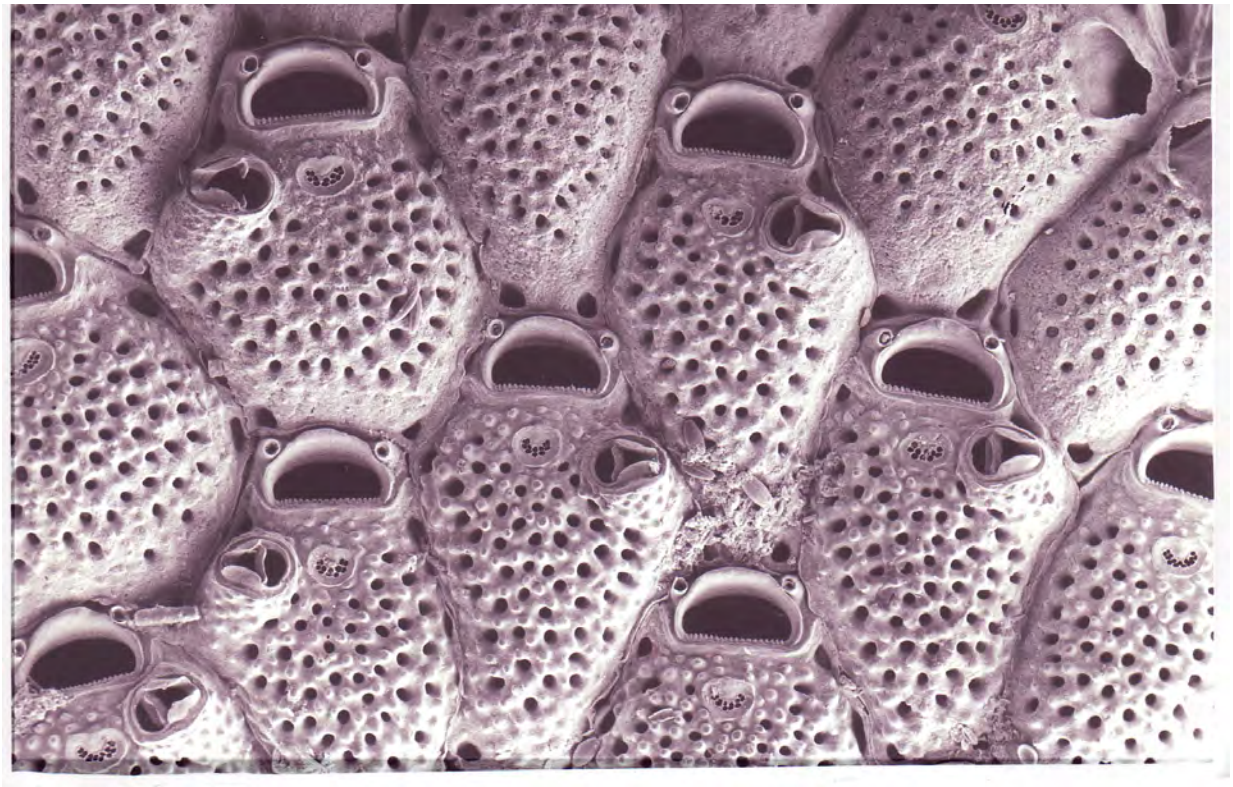
Bryozoans are referred to in overseas textbooks as moss animals (the literal meaning of Bryozoa from Greek, *bryon*, moss, *zoön*, animal), sea mats, or lace corals, but none of these common names is adequate for the whole group and "bryozoans" is probably the most useful overall name. Although neither the technical or common names are familiar to most people, bryozoans themselves will almost certainly have been encountered by any New Zealander fossicking under boulders on the seashore or by owners of pleasure craft or fishing boats who clean their hulls infrequently.

Bryozoans mostly form white or coloured crusts or tufts that superficially resemble other forms of marine life. Encrusting species form thin, flat, circular or irregular patches (hence the name sea mats) that are generally hard to the touch. If the patches produce upright folds they can look like small corals; if perforated, they are referred to as lace corals. Tufted or bushy species can resemble hydroids, small seaweeds, or even moss plants, hence the name moss animals.



The kelp-encrusting sheet bryozoan *Membranipora membranacea*.

The bryozoan body design is that of a colony of tiny individuals (zooids), each of which is somewhat box- or tube-shaped, with an opening at one end for feeding tentacles to emerge. Each zooid is generally about half a millimetre long but some may be smaller or very much larger. Most marine bryozoan zooids live inside a hard calcareous box, usually attached to other identical boxes to form a colony. Colony size ranges from microscopic to more than a metre in diameter.



Scanning electron micrograph of zooid skeletons of *Microporella discors*.

Because most bryozoans have a hard skeleton of calcium carbonate, the group has an excellent fossil record. It is known from the earliest Ordovician, 510–493 million years ago in the Paleozoic. Bryozoans are much less common in the Mesozoic in New Zealand but the Cenozoic record is very rich, such that the remains of their colonies can constitute 20–70% of New Zealand Tertiary limestones at Waitomo, Punakaiki, and Oamaru.

Some marine bryozoans are large and abundant enough to form a type of bottom habitat, called a thicket or a meadow, that is favoured by smaller organisms that settle on or between bryozoan colonies, as off Abel Tasman National Park (near Separation Point), Otago shelf (see Batson & Probert 2000), and Foveaux

Strait. Bryozoan thickets can provide substrate or habitat for many other organisms, including hydroids, ascidians, barnacles, worms, sponges, sea stars, crustaceans, and small fish (Batson & Probert 2000). Frame-building bryozoans appear to have a strong relationship with abundance of fish, including snapper, tarakihi, and cod. In Foveaux Strait, bryozoans are associated with Bluff oysters (Batson & Probert 2000).

Trawls, dredges, and anchors have considerable capacity to damage bryozoans. At Separation Point, bryozoan abundance was sufficient to constitute a large nursery ground for the juveniles of commercial fish, but the habitat was largely compromised by bottom trawling and is still recovering (Bradstock & Gordon 1983).

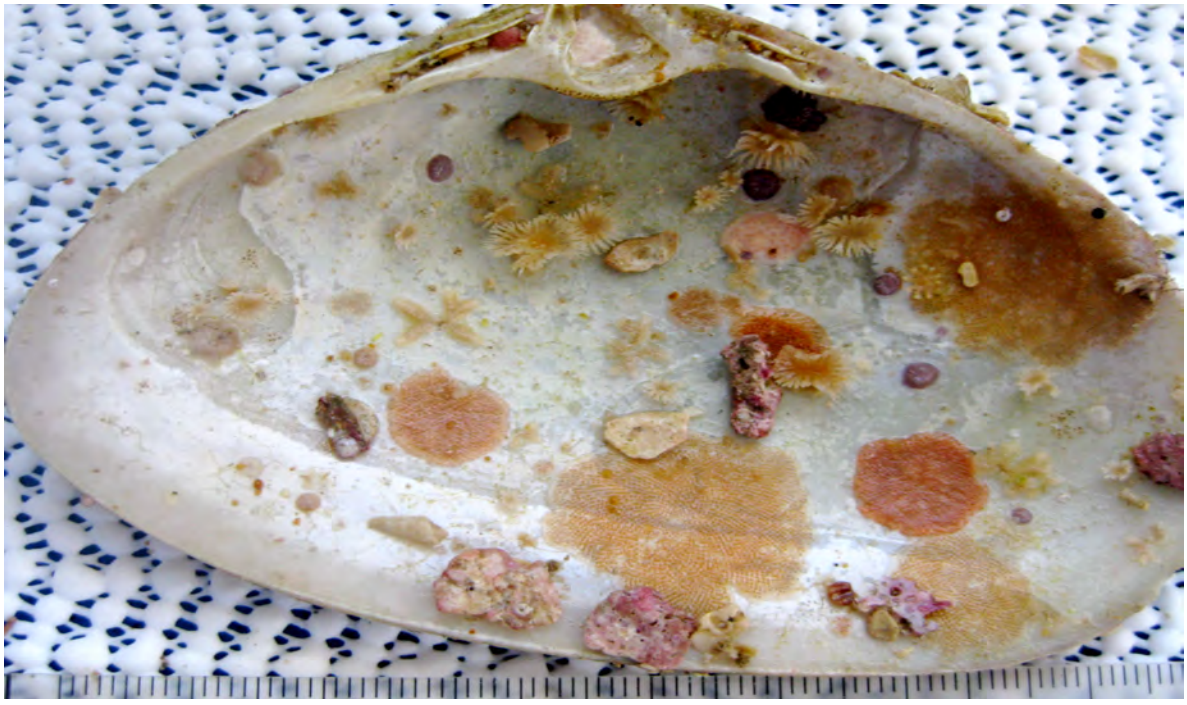
Some bryozoan species produce anticancer and antifouling compounds and the usefulness of these products is being explored in research in the United States and Japan, respectively.

A collection of bushy bryozoans (mostly atenicellids) from an underwater rock face.

1.1 Bryozoan growth forms

In New Zealand waters, bryozoan colonies range in size from microscopic to the size of footballs or cabbage heads. Seaweed-encrusters form extensive thin sheets on kelp fronds but are very fragile. Bryozoans on wharf-piles, vessel hulls, pontoons, small rocks, and shells form small to moderate-sized encrustations or bushy colonies. The largest bryozoans are found on stable rock faces where they can grow undisturbed for years to decades.

Because of their modular construction, bryozoans can, however, exhibit a very wide range of forms, and there has been considerable debate as to how to classify them. There is little taxonomic or evolutionary information in colonial growth form, but it does tend to be the first characteristic identified when a species is collected. For that reason, we have arranged our field guide by colony shape (Table 1), rather than by taxonomic grouping. We have, however, provided a taxonomic index (Section 3).



Several species of encrusting bryozoans attached to a bivalve shell.

1.2 Finding out more

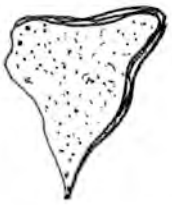
There are almost 1000 bryozoan species recorded in New Zealand (Gordon et al. 2009), which is a very large proportion of the roughly 6000 extant species. Bryozoans are the fifth most speciose marine animal phylum in New Zealand (Gordon et al. 2009) but there are only four identification guides available describing them (Gordon 1984, 1986, 1989; Gordon & Mawatari 1992), all of which are highly technical and mostly lack photos of living or recently collected material. It has been shown that the number of identification guides available on a group is strongly correlated with both species richness and state of knowledge (Costello et al. 2010) – we therefore hope that the addition of this guide will both fill a gap and stimulate further work on this important phylum.

The most recent comprehensive account of New Zealand's bryozoans is the chapter by Gordon et al. (2009) in volume 1 of the *New Zealand Inventory of Biodiversity*, published by Canterbury University Press. There are many other useful references given in section 5.

1.3 Where are Bryozoans found?

Worldwide, there are about 15 000 named fossil species and 6000 living species. The latter occur in all oceans, from the sea shore to deep ocean trenches, on seaweeds, rock, shell, and even on the hard parts of other creatures. There are also more than 80 freshwater species. These are not calcified. In New Zealand, 8 freshwater species and 953 marine species have been discovered but not all of them have been named yet (Gordon et al. 2009). There are still about 330 species yet to be described. Furthermore, new species continue to be discovered (and to arrive – we have at least 24 foreign bryozoans established in New Zealand waters now) and it is likely that New Zealand's EEZ has as many as 1200 bryozoan species.

Table 1: Bryozoan growth forms at a glance

Erect Flexible	Branching	Fluffy	
	Foliose	Leafy	
Erect Rigid	Branching	Tree-like	
	Foliose	Fan, sheet	
	Fenestrate	Net	
Encrusting	Unilaminar	Crust	
	Multilaminar	Glob, sphere, lump, loose spiral	
Free-living	Unattached	Disc, dome	

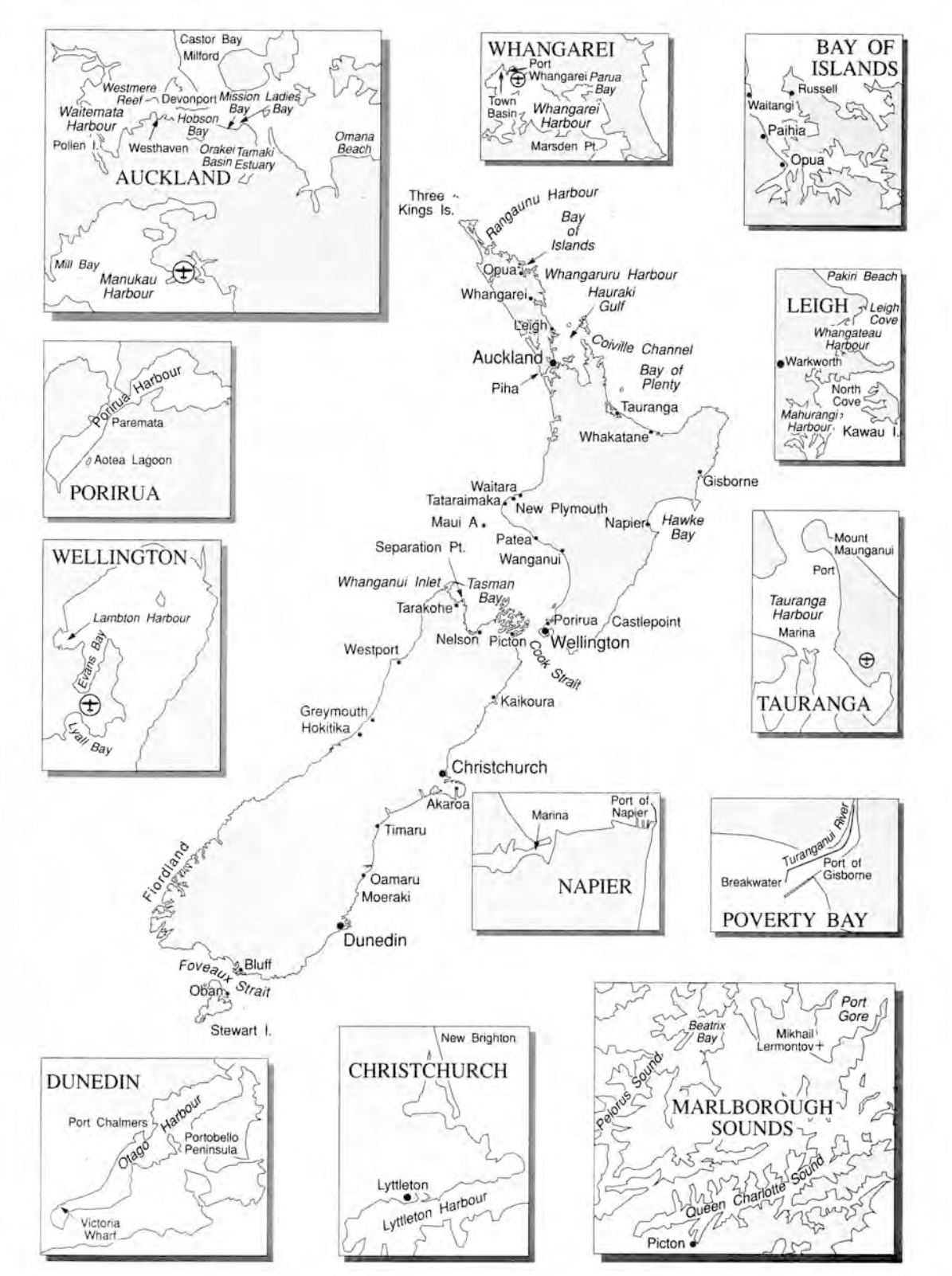


Figure 1: Localities in New Zealand. Insets are not at same scale (from Gordon & Mawatari 1992.)

2. SPECIES IDENTIFICATIONS

A typical assemblage of bryozoans attached to hard substrate on the seafloor.

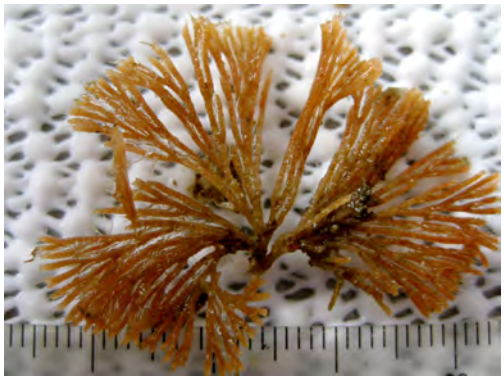
Growth form: **Erect Flexible Branching**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Candidae**

Caberea zelandica Gray, 1843



Description: Colony up to 3 cm tall, orange, with branches spread out in fan-like fashion, anchored to the substratum by short rootlets. Each branch is about 0.4–0.7 mm in diameter, composed of a double row of zooids and non-jointed. The back side of each branch has a series of microscopic narrow elongate chambers from each of which arises a long bristle. These lash backwards and forwards in unison when the colony is disturbed and this lashing can be seen with naked eye.

Habitat: Kelp holdfasts, pilings, and rock faces.

Abundance: Sporadic, but may be common where it occurs.

Depth range: Sublittoral fringe to 255 m.

Known distribution: Endemic. Recorded from east and west coasts from the Three Kings Islands to Fiordland, including Northland, Waitemata Harbour, Taranaki, Marlborough Sounds, Palliser Bay, Chatham Rise, Fiordland, Snares Platform, Puysegur Bank. There are about eight species of Caberea that occur at shallow-coastal to shelf depths. They all look very similar and are distinguished by microscopic characters.

Reference: Gordon 1986, p. 68; Wing 2008, p. 74 (as *Amastigia* sp.).

Growth Form: **Erect Flexible Branching**

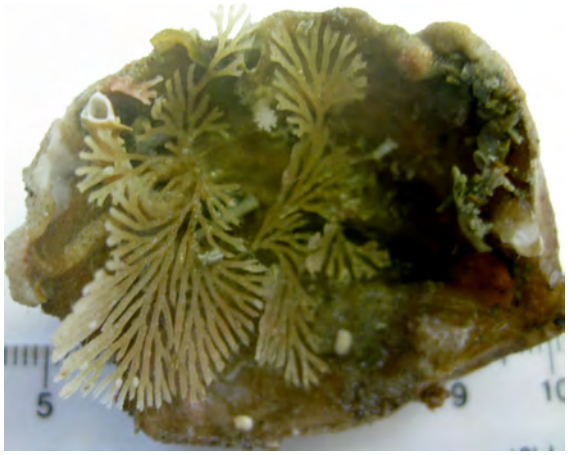
Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Candidae**

Caberea rostrata Busk, 1884

Caberea solida Gordon, 1986



Description: At the macro level, very similar to the preceding species but may be larger, up to 4 cm tall.

Distribution: *Caberea rostrata* – Three Kings Islands, Hauraki Gulf, Mahia, Snares Platform. Also Tristan de Cunha, South Atlantic. *Caberea solida* – Fiordland, Foveaux Strait, Puysegur Bank.

References: Gordon 1984, p. 52; Gordon 1986, p. 68.

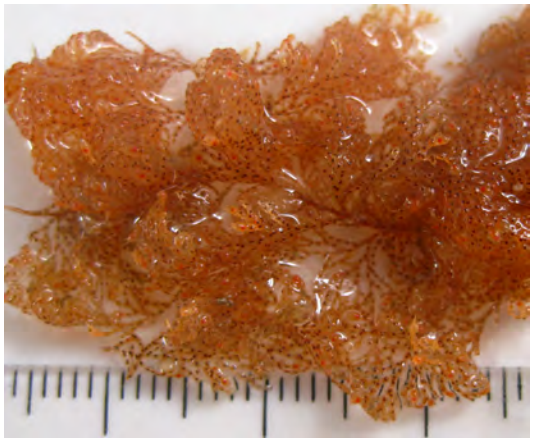
Growth Form: **Erect Flexible Branching**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Catenicellidae**

Pterocella scutella (Hutton, 1873)



Description: Colony bushy, with curled branches, up to 6 cm high, light pinkish orange in colour, attached to the substratum by short rootlets. Branches are composed of thin chains 0.5 mm wide of 1 or 2 zooids separated by flexible joints. The back side of each zooid segment is produced into a distinct keel. The fertile segment mostly comprises 3 zooids, with the larval incubation chamber (ovicell) pertaining to the most proximal zooid. Owing to the bright red of the developing larva, the ovicell chamber is visible to the naked eye in the breeding season.

Habitat: Usually associated with other bushy bryozoans or algal holdfasts.

Abundance: Locally common.

Depth range: 15–220 m.

Known distribution: Three Kings Islands to Foveaux Strait and Snares Platform. Also Victoria and Bass Strait, Australia. In the field it may be confused with other species from the same bryozoan family, including *Orthoscuticella fissurata*, *O. innominata* (yellow in life), and *O. ventricosa*.

Reference: Gordon 1989, p. 22.

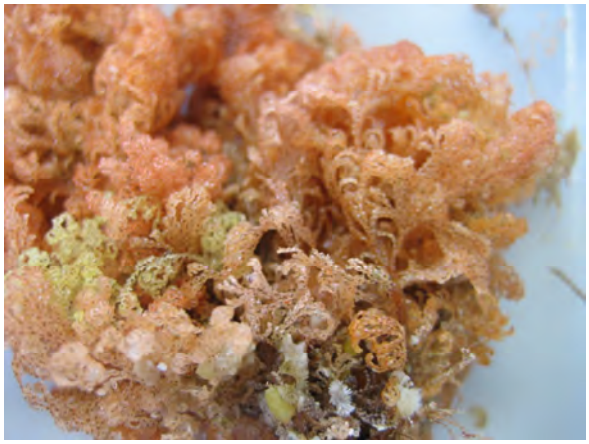
Growth Form: **Erect Flexible Branching**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Catenicellidae**

Costaticella bicuspis (Gray, 1843)



Description: Similar to the preceding species but with slightly thinner branches 0.3–0.4 mm wide, pale orange in colour. Branches are composed of chains of 1 or 2 zooids, with single zooids 0.49–0.64 mm long, 0.36–0.53 mm wide, and shield-shaped. The female segment occurs at the ends of branches and is visible to the naked eye in the breeding season owing to the bright-red larva within.

Habitat: Rock faces and overhangs, especially in current-swept areas.

Abundance: Locally common.

Depth range: Shallow subtidal to 220 m.

Distribution: Cook Strait, Fiordland, Stewart Island, Snares Platform, Puysegur Bank, Campbell Island. Also southeastern Australia, Bass Strait. *Costaticella solida* has a similar appearance and distribution and is distinguished by microscopic characters.

Reference: Gordon 1989, p. 18.

Growth Form: **Erect Flexible Branching**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Catenicellidae**

Cribricellina cribraria (Busk, 1852)

Description: Colony densely branching and attaining a larger size than the preceding species, up to 10 cm, the branches curling inwards, deep orange in life. Branches are composed of chains of 1 or 2 zooids, with single zooids 0.53–0.64 mm long and 0.38–0.45 mm wide, shield-shaped. The female segments have only a single zooid, located at the ends of branches, easily visible to the naked eye in the breeding season owing to the bright red larvae incubated within.

Habitat: Rock faces and overhangs, especially in current-swept areas.

Abundance: Locally abundant. A common component of drift bryozoans on beaches adjacent to rocky reefs.

Depth range: 15–250 m.

Known distribution: Three Kings Islands to Foveaux Strait, including Hauraki Gulf, Napier, Wellington, Cook Strait, Kaikoura, Otago, Fiorldand, Foveaux Strait, Snares Platform, Puysegur Bank, Campbell Island. Also South Australia to Queensland. Easily confused in the field with species of *Costaticella* and *Orthoscuticella*.

Reference: Gordon 1989, p. 22; Gordon 2003, p. 83

Growth Form: **Erect Flexible Branching**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Bugulidae**

Bugula flabellata (Thompson *in* Gray, 1848)

Photos: V. Christine Davis

Description: Colony buff-coloured, bushy and erect, up to about 4 cm high (floppy when out of water). Branches have zooids in 3–6 longitudinal series, hence are somewhat flattened in appearance and up to 1 mm wide. Embryos and larvae are yellow and just visible to the naked eye in breeding colonies.

Habitat: Only in ports and harbours, on pilings and a variety of shallow submerged substrata, including boat hulls.

Abundance: Locally very common.

Depth range: Mid-intertidal to shallow subtidal.

Known distribution: Recorded at most New Zealand ports from Opua to Bluff. Also widely distributed in warm and temperate waters of both hemispheres. In New Zealand, only one other species is likely to be confused with *B. flabellata*. This is *B. simplex* Hincks, 1886, a smaller fouling species with narrower branches that are thinner at the point of branching than in *B. flabellata*.

Reference: Gordon 1986, p. 45, pl. 15B.

Growth Form: **Erect Flexible Branching**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Candidae**

Menipea vectifera Harmer, 1923

Menipea vera Gordon, 1986

Description: *Menipea vectifera* has flattened and tree-like colonies, with the branches all or mostly in the same plane and beige (pale yellowish-brown). Branches are about 2 mm wide, with the zooids in 3–10 longitudinal series, opening on one side only. Rootlets descend along the lateral margins, collectively anchoring the colony to the substratum.

Menipea vera is similar but colonies can reach 6 cm high and the branches are narrower, being only 1 mm wide.

Habitat: Rock faces.

Abundance: Occasional, though may be locally common.

Depth range: 15–165 m.

Known distribution: Endemic. Three Kings Islands, Cook Strait, and Fiordland.

Distribution: Fiordland, Foveaux Strait, Snares Platform.

Reference: Gordon 1986, pp. 62–63, pl. 21 D-G, Pl. 22 A,B.

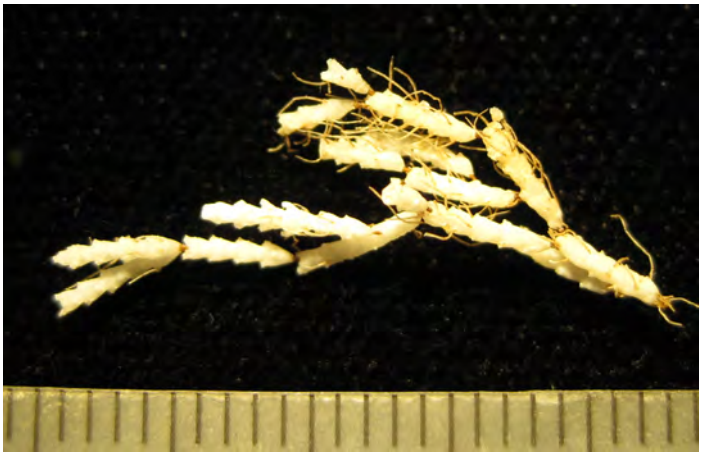
Growth Form: **Erect Flexible Branching**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Margarettidae**

Margaretta barbata (Lamarck, 1816)



Description: Colony orange, up to 9 cm high, bristly, the branches jointed. Each branch segment between joints is hard and cylindrical and not longer than 11 mm. Zooids are in alternating back-to-back pairs, with each zooid giving off a pair of bristles 4–5 mm long that give the colony a characteristically bristly appearance.

Habitat: Rock faces, especially in current-swept areas.

Abundance: May be locally common both subtidally and as beach drift after storms, especially around Cook Strait.

Depth range: 10–275 m.

Known distribution: East and west coasts from Cape Reinga to Foveaux Strait, including Makara, Wellington, Cook Strait, Kaikoura, Fiordland, Snares Platform (58–118 m), and Puysegur Bank (40–274 m). Also South Australia to New South Wales.

Reference: Gordon 1989, p. 64.

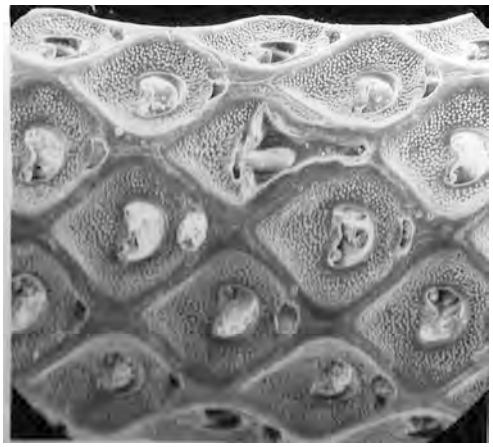
Growth Form: **Erect Flexible Branching**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Cellariidae**

Cellaria immersa (Tenison Woods, 1880)



Description: Colony obviously jointed, with forked branching and hard cylindrical stems between joints, white or with a pinkish cast when breeding. Up to 6 cm high, anchored to the substratum by rootlets. Branches are 0.57–1.32 mm thick and 10–15 mm long between joints.

Habitat: Rock faces, and on shell or rock gravel including on muddy bottoms.

Abundance: Locally common.

Depth range: 15–220 m.

Known distribution: Both coasts of the South Island from Cook Strait to Foveaux Strait and Campbell Plateau, including Tasman Bay, Kaikoura, Chatham Rise, Otago Shelf, Fiordland, Snares Platform, and Puysegur Bank. Also New South Wales, Australia.

Reference: Gordon 1986, pp. 74–76.

Growth Form: **Erect Flexible Branching**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Cellariidae**

Cellaria tenuirostris (Busk, 1852)

Description: Like *C. immersa*, but only to 4 cm height and the branches are more delicate and slender. Branch segments are up to 14 mm long, generally much less, and 0.25–0.53 mm thick.

Habitat: Rock faces and on shell or rock gravel.

Abundance: Locally common.

Depth range: 20–220 m.

Known distribution: Throughout the New Zealand region from Curtis Island (Kermadec Islands) to Foveaux Strait, including Hauraki Gulf, Cook Strait, Tasman Bay, Kaikoura, Chatham Rise, Otago Shelf, Fiordland, Snares Platform. Also southeastern Australia.

Reference: Gordon 1986, p. 74; Wing 2008, p. 73.

Growth Form: **Erect Flexible Foliose**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Euthyroididae**

Euthyroides episcopalis (Busk, 1852)

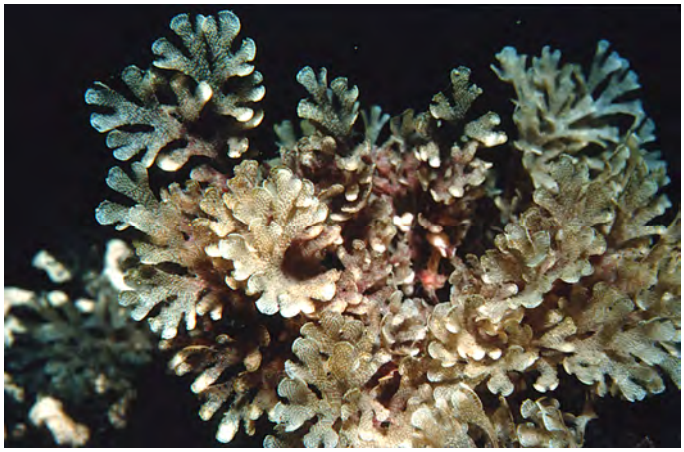


Photo by Karen Gowlett-Holmes

Description: Colony erect and branching, up to 10 cm high, with thin, flat, parchment-like fronds and short basal rootlets that attach it to the substratum. Not jointed. Branches 1.2–2.4 mm wide, dividing at intervals; light creamy brown in colour, tips of branches lighter.

Habitat: Rock faces, especially in current-swept areas.

Abundance: Can be locally common among drift bryozoans on beaches adjacent to rocky reefs.

Depth range: 15–135 m.

Known distribution: Kermadec Ridge and both coasts from the Three Kings Islands to Fiordland, Puysegur Bank, Stewart Island and Snares Platform, including Napier, Cook Strait and the Chatham Rise. Also southeastern Australia.

Reference: Gordon 1989, p. 16; Wing 2008, p. 73 (as *Beania* sp.).

Growth Form: **Erect Flexible Foliose**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Euthyroididae**

Euthyroides jellyae Levinsen, 1909

Description: Colony flexible, up to 3 cm tall, comprising a cluster of thin parchment-like fans arising from a common base; light brownish-orange.

Habitat: Rock faces, especially in current-swept areas.

Abundance: Sporadically distributed but may be reasonably common at some localities.

Depth range: 15–75 m.

Known distribution: Probably endemic. Three Kings Islands, Cook Strait, Chatham Rise, Snares Platform.

Reference: Gordon 1989, p. 16–17.

Growth Form: **Erect Flexible Foliose**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Beaniidae**

Beania bilaminata (Hincks, 1881)

Description: Colony erect, soft, felt-like, composed of flat, flexible, fawn fronds 3–8 cm long. Each frond is 2-layered with the zooids facing on both sides.

Habitat: Under rock overhangs, or attached to algae, stalks of the bryozoan *Steginoporella neozelanica*, or other organisms.

Abundance: Locally common, especially on some subtidal brown algae.

Depth range: Sublittoral fringe to 305 m.

Known distribution: Endemic. Kermadec Ridge and both mainland coasts from Cape Maria van Diemen to Foveaux Strait and the Snares Platform. In the North Cape region this species may be confused with *B. pulchella* Livingstone, 1929, which has a nearly identical colony form, but in which the zooids are visibly spiny.

Reference: Gordon 1984, p. 44.

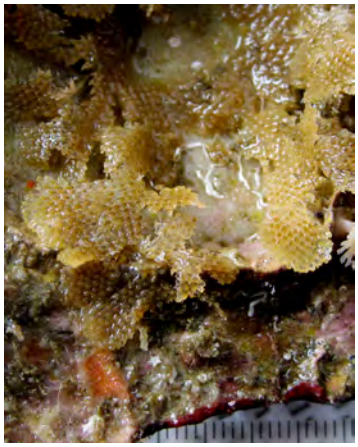
Growth Form: **Erect Flexible Foliose**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Beaniidae**

Beania magellanica



Description: Colony is pale brown to orange, soft and felt-like, composed of flat, flexible, fronds 3–8 cm long. Each frond is 2-layered with the zooids facing on both sides. Zooids are connected by short tubes to adjacent six zooids. Not well attached to the substrate.

Habitat: Under rock overhangs, or attached to algae or other organisms.

Abundance: Locally common.

Depth range: 0–220 m.

Known distribution: Three Kings, Hauraki Gulf, Cook Strait, Banks Peninsula, Bluff, Foveaux Strait, Stewart Island. Also found in Mediterranean, Cape Verde Islands, Japan, Mauritius, South Africa, southern Australia, southern South America, Kerguelen.

Reference: Gordon, 1984, p. 46.

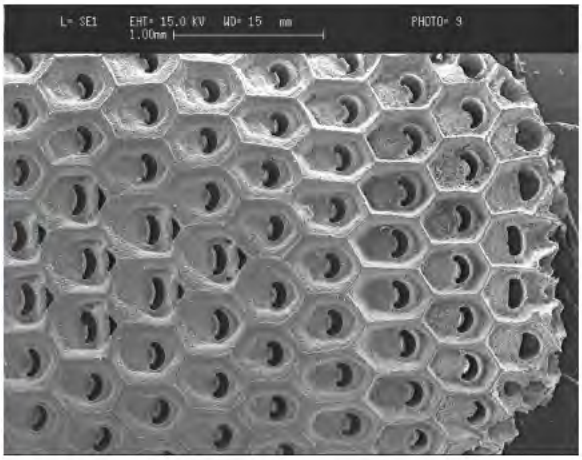
Growth Form: **Erect Rigid**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Cellariidae**

Melicerita chathamensis Uttley & Bullivant, 1972



Description: Sabre-shaped erect colony, pale pink when living. Blade is up to 3 mm wide and about 35 mm tall, sometimes showing periodic growth-checks, about 10 hexagonal zooids across, often many ovicells.

Habitat: Attached by small rootlets in sandy and gravelly shelf sediments.

Abundance: Locally common in depths around 150 m.

Depth range: 140–200 m

Known distribution: Three Kings Platform, off Ahipara, Cape Foulwind, Chatham Islands, Snares Platform.

Reference: Gordon 1986, pp. 76–77.

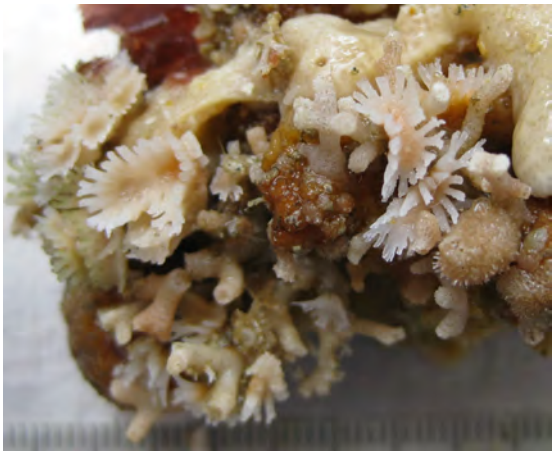
Growth Form: **Erect Rigid Branching**

Class: **Stenolaemata**

Order: **Cyclostomata**

Family: **Uncertain**

Telopora lobata (Tenison Woods, 1880)



Description: Colony like an inside-out umbrella, comprising a narrow conical stalk that expands rapidly into a stellate 'head' with outwardly flared, sometimes-forked lobes. The centre part of the head is a flat-surfaced brood chamber in mature colonies. The colony is white with the brood chamber ivory, becoming reddish as embryos mature. Individual colonies about 1 cm high and wide, but often forming larger, compound colony clusters.

Habitat: Rock faces, rock or shell gravel, and other bryozoans.

Abundance: Can be locally common, especially on large bryozoans like *Celleporaria agglutinans* (Tasman Bay coral) and *Hippomenella vellicata* (cornflakes coral).

Depth range: Extreme low intertidal to 220 m.

Known distribution: Widespread around New Zealand: Three Kings Plateau, Northland, Hauraki Gulf, Taranaki Bight, Otago Shelf, Stewart Island, Snares Platform, Puysegur Bank, subantarctic islands.

Note: Might be confused with *T. watersi*, also in the area.

Reference: None.

Growth Form: **Erect Rigid Branching**

Class: **Stenolaemata**

Order: **Cyclostomata**

Family: **Horneridae**

Hornera robusta MacGillivray, 1883

Description: Colony rigid and tree-like with somewhat pinnate (feather-like) branches that become progressively smaller from base to tip. White to pale orange. Branches radiate in different directions and sometimes fuse. The branch widths average about 0.5–3.0 mm across and the whole colony can attain 5.5 cm high. Zooid openings on only one side of colony.

Habitat: Rock faces.

Abundance: Widely distributed but tending to be sparse where it grows.

Depth range: 20–240 m.

Known distribution: Three Kings Platform, Northland, Bay of Plenty, Taranaki Bight, Cook Strait, Otago Shelf, Stewart Island, Snares Platform, subantarctic islands. Also south Australian shelf.

Reference: Smith et al. 2008.

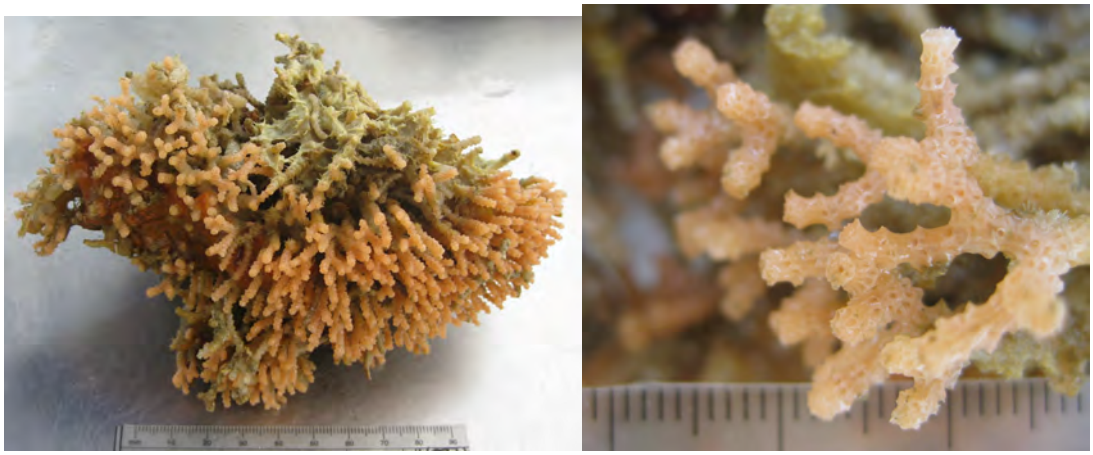
Growth Form: **Erect Rigid Branching**

Class: **Stenolaemata**

Order: **Cyclostomata**

Family: **Cinctiporidae**

Cinctipora elegans Hutton, 1873



Description: Colony erect and rigid with cylindrical branches 2 mm thick and forking in different directions. White, with the ends of the branches very pale pink to orange. Zooids are large, averaging 1.64 mm long and 0.33 mm wide, arranged in whorls or spirals of 9–13 around the branch circumference, just visible to the unaided eye. Old coral-like clumps may grow to 30 cm high, but clumps are generally shorter.

Habitat: Rock faces and shell gravel.

Abundance: Can dominate the seafloor, as off Otago, where colonies are scattered over many square kilometres, creating habitat for many other organisms. Also in Foveaux Strait on rock faces and on oyster-shell bottoms.

Depth range: Recorded from 12 to 250 m.

Known distribution: Endemic. Southern half of New Zealand from Cook Strait, Chatham Rise, Otago Shelf, Fiordland, and Foveaux Strait to south of Campbell Island.

Reference: Boardman et al. 1992, p. 56; Gordon 2003, p. 82; Taylor et al. 2004, fig. 2C,D; Wing 2008, pp. 70, 72.

Growth Form: **Erect Rigid Branching**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Celleporidae**

Celleporina grandis Gordon, 1989

Description: Colony erect, forming short and solid, sparsely branching, coral-like growths with branches not exceeding the thickness of a little finger (c. 13 mm). Off-white with orange tips when living.

WARNING: this species sometimes forms a symbiotic relationship with hydroids that can cause acute dermatitis – handle with care.

Habitat: Rock faces, and rock or shell gravel.

Abundance: Of sporadic occurrence, locally common off Otago Peninsula in about 80 m water depth.

Depth range: 15–220 m.

Known distribution: Endemic. New Zealand-wide, from the Three Kings Islands to Foveaux Strait and Snares Platform, but more generally encountered in southern waters.

Reference: Gordon 1989, p. 70.

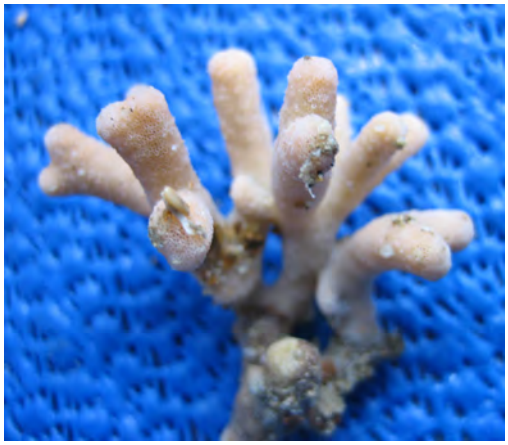
Growth Form: **Erect Rigid Branching**

Class: **Stenolaemata**

Order: **Cyclostomata**

Family: **Cerioporidae**

Tetrocycloecia spp.



Description: Colony is formed of erect cylindrical lobe-like stems from a common base, the lobes are about 5 mm diameter, up to 3 cm high, and yellow-orange.

It is not at all clear how many species occur in New Zealand, or how to tell them apart. At least some are undescribed; much work remains to be done on these. *Heteropora* is a similar Cretaceous genus.

Habitat: On shell gravel.

Abundance: Occasional.

Depth range: Not known with certainty, c. 40–100 m.

Known distribution: Endemic. Otago Shelf, Foveaux Strait, Snares Platform, Campbell Islands.

Reference: None.

Growth Form: **Erect Rigid Branching**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Foveolariidae**

Odontionella cyclops (Busk, 1854)

Description: Colony may be encrusting, foliose, or erect with flattened bilaminar branches – it has even been described in fenestrate form. Quite heavily calcified in all forms. Surface is characteristically "spotty" with large squarish zooid openings. Crusts may reach 3–4 cm across and erect lobes may be up to 4 cm.

Habitat: Rocks, kelp holdfasts, rock faces and shell gravel.

Abundance: May be locally common.

Depth range: Low intertidal to 220 m.

Known distribution: New Zealand from Whangarei to Foveaux Strait, Snares Platform, Puysegur Bank. Also southern South America and possibly Victoria, Australia.

Reference: Gordon 1986, p. 36 (as *Foveolaria cyclops*).

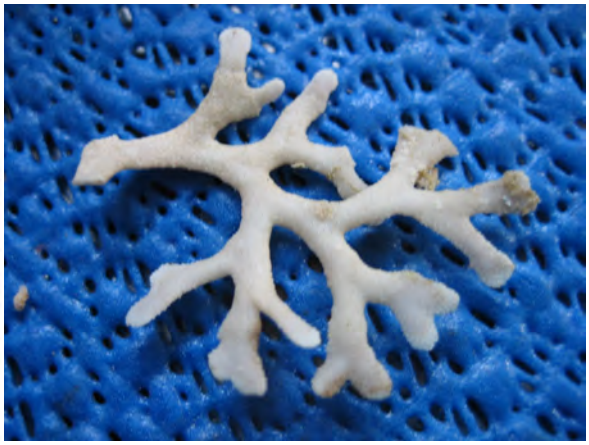
Growth Form: **Erect Rigid Branching**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Adeonidae**

Adeonellopsis sp.



Description: Colony small to large, comprising an intricate coral-like mass of flattened staghorn-like branches repeatedly forking in all directions; rigid and brittle, and sometimes very large, the size of a football or more. Coloured purplish or purplish brown and cream, with the branches 2.5–5.0 mm wide. Once thought to be *A. yarraensis* (Waters, 1881) but now considered several undescribed species.

Habitat: Rock faces and very coarse gravel, generally in current-swept areas.

Abundance: May be locally abundant.

Depth range: 30–240 m.

Known distribution: Uncertain because of taxonomic problems; there appear to be at least three species in the region, two of them with similar-sized branches. Ranges in the broad sense from the Kermadec Ridge to Foveaux Strait, including at least Three Kings Islands, Otago Shelf, Fiordland, Snares Platform, Puysegur Bank.

Reference: Gordon 1984, p. 73.

Growth Form: **Erect Rigid Branching**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Celleporidae**

Galeopsis polyporus (Brown, 1952)

Galeopsis porcellanicus (Hutton, 1873)

Description: Colony upright and rigid from a small encrusting base, with unjointed stems and forked branching resembling a miniature staghorn coral, up to about 5 cm tall. *Galeopsis porcellanicus* is whitish cream, with a pale pinkish cast at breeding time. Branches attain 1.45 mm diameter between branching points. A similar endemic species, *G. polyporus* (Brown, 1952), may be less commonly encountered, though widespread. The branches are thinner and it is very pale yellowish-brown.

Habitat: Rock faces and shell gravel, also among kelp holdfasts.

Abundance: May be locally common subtidally.

Depth range: 0–300 m.

Known distribution: Endemic. Both coasts, from the Three Kings Islands to Foveaux Strait, Fiordland, Puysegur Bank and the Antipodes Islands.

Reference: Gordon 1989, pp. 67–68.

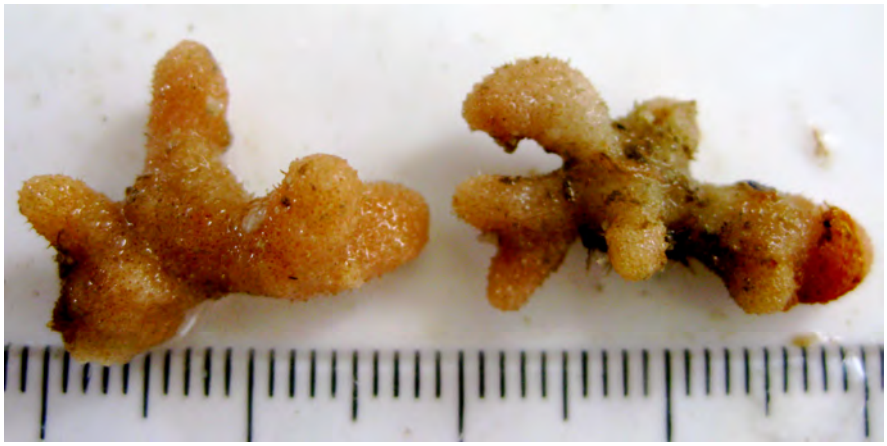
Growth Form: **Erect Rigid Branching**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Celleporidae**

Osthimosia avicularis Gordon, 1989



Description: Colony small and branching, thick stubby branches grow up from an encrusting base.

Usually orange when living.

Depth range: around 150 m.

Known distribution: Fiordland, Puysegur Bank.

Reference: Gordon, 1989, p. 73.

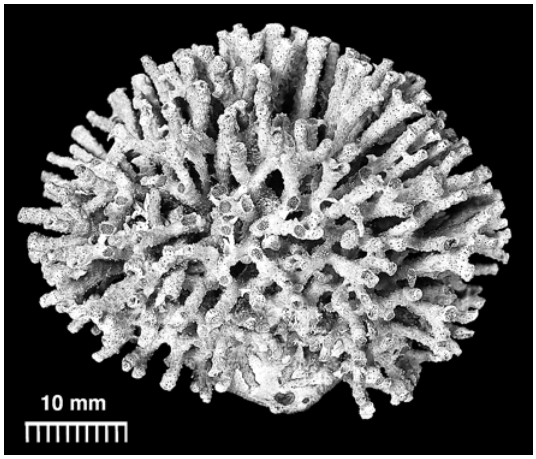
Growth Form: **Erect Rigid Branching**

Class: **Stenolaemata**

Order: **Cyclostomata**

Family: **Diaperoeciidae**

Diaperoecia purpurascens (Hutton, 1873)



Description: Colony erect and irregular in shape or rounded like a ball, the branches hard, 1.0–1.8 mm in diameter, cylindrical and intricately forked. Cream-coloured, with a brownish-purple cast, up to 4 cm high and 7 cm across.

Previously known as *Mecynoecia purpurascens*.

Habitat: Rock faces, also among kelp holdfasts.

Abundance: Can be locally common.

Depth range: 15–220 m.

Known distribution: Endemic. New Zealand-wide, from the Three Kings Shelf to Cook Strait, Chatham Islands, Otago Shelf, Foveaux Strait, Bounty and Antipodes Islands, and Campbell Plateau.

References: Taylor et al. 2004, p. 59, fig. 2A,B.

Growth Form: **Erect Rigid Foliose**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Hippopodinidae**

Hippomenella vellicata (Hutton, 1873)

"Cornflake Coral"

Description: Colony initially encrusting but then growing large and erect in brittle, bilaminar, foliose colonies, pale orange on growing surfaces, often heavily encrusted in dead parts. Fronds may intersect with each other to form an open network up to 15 cm tall and 18 cm across. Large zooids are easy to see, many with round white ovicells, arranged in rows.

Habitat: Rock faces and shelly substrata. In some locations, as at Separation Point, large colonies may provide habitat for numerous associated species of bryozoans, other invertebrates and fish. Also common on Otago Shelf shell gravel.

Abundance: Locally abundant at mid-shelf depths off Otago.

Depth range: 25–350 m.

Known distribution: Endemic. Kermadec Ridge and both mainland coasts from the Three Kings Islands to Foveaux Strait, Chatham Rise, Fiordland, Puysegur Bank.

Reference: Gordon 1984, p. 77.

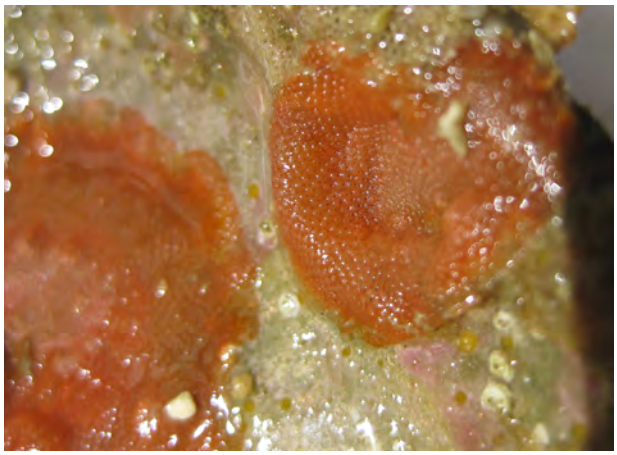
Growth Form: **Erect Rigid Foliose**

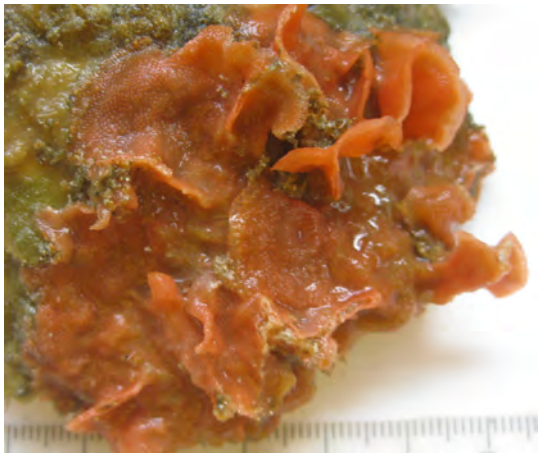
Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Smittinidae**

Smittoidea maunganuiensis (Waters, 1906)





Description: Colony initially encrusting, then producing erect curled or wavy brittle lobes, that intersect and merge, the result being a compact, deep-orange colony up to 3–4 cm high and 5–6 cm across.

Habitat: Rock faces, shell gravel and brown algal stems.

Abundance: Locally common.

Depth range: Low intertidal to 220 m.

Known distribution: Hauraki Gulf, Waitemata Harbour, Cook Strait, Tasman Bay, Chatham Rise, Akaroa Harbour, Fiordland, Puysegur Bank, Stewart Island. Also Victoria, Australia.

Reference: Gordon 1989, pp. 55–56.

Growth Form: **Erect Rigid Fenestrate**

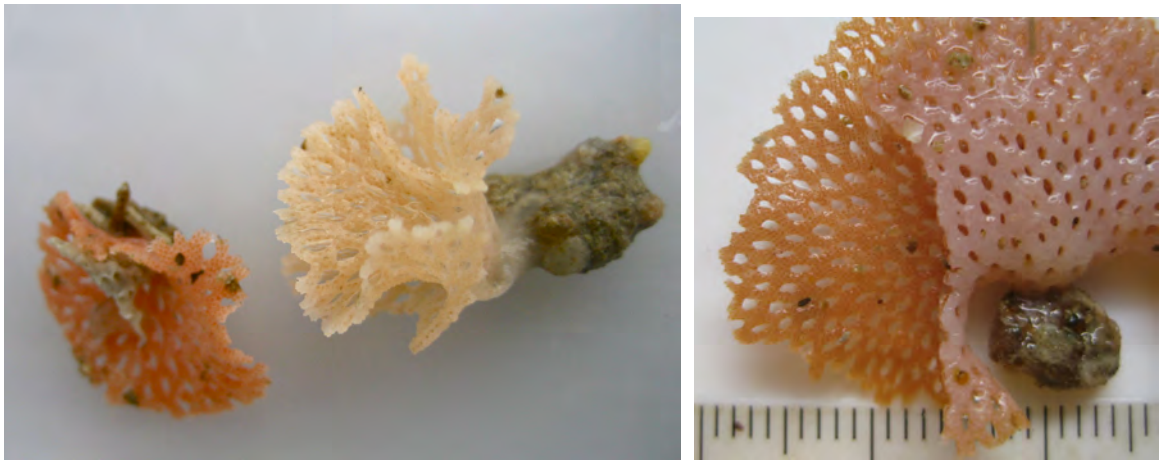
Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Phidoloporidae**

Hippellozoon novaezelandiae (Waters, 1895)

Orange lace coral



Description: Colony hard and lacy, bright orange with numerous small oval perforations in the colony structure, which forms ruffled fronds up to 10 cm high and 12 cm across. Zooid openings are on only one side of colony. More robust than similar *Hornera foliacea*.

A less-robust orange lace coral with thinner branches, *Reteporella aurantium* Gordon, 2009, is known to occur in Cook Strait, but it is likely to have a wider distribution and could be confused with *H. novaezelandiae*.

Habitat: Rock faces, reefs and overhangs in high-flow areas.

Abundance: May be locally common subtidally.

Depth range: 30–120 m.

Known distribution: Endemic. Three Kings Islands to Cook Strait and Otago Shelf, also Snares Platform.

Reference: Gordon 1989, p. 75.

Growth Form: **Erect Rigid Fenestrate**

Class: **Stenolaemata**

Order: **Cyclostomata**

Family: **Horneridae**

Hornera foliacea MacGillivray, 1868

Description:. Colony erect and rigid, with convoluted fronds resembling a meshwork of stiff, orange-to-cream-coloured lace up to 7 cm high. Parts of the colony may have a greyish (older areas) or pale orange (fresh growth) cast. Branches are nearly parallel, with cross-connections between branches. Zooid openings on only one side of colony. Bright orange larval sacs sometimes on reverse side.

Habitat: Rock faces.

Abundance: Widely distributed but tending to be sparse where it grows.

Depth range: 20–240 m.

Known distribution: Not known with certainty owing to possible confusion of similar-looking species, but probably from Three Kings Shelf to Snares Platform and subantarctic Islands. Also Victoria, Australia.

Reference: Smith et al. 2008; Wing 2008, p. 71.

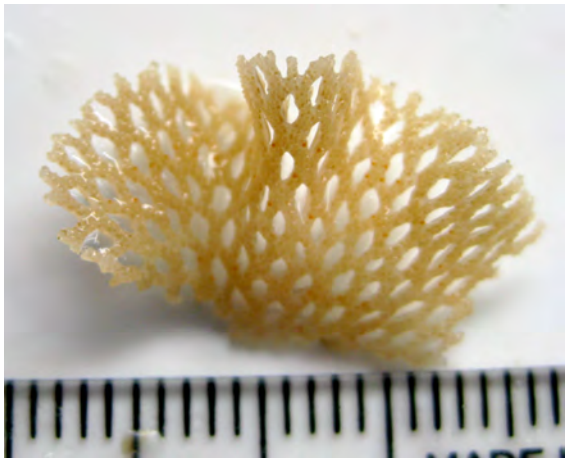
Growth Form: **Erect Rigid Fenestrate**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Phidoloporidae**

Reteporella ligulata Gordon, 1989



Description: Colony is erect and reticulate, pale orange to pink, with a generally “coarse” arrangement, that is, thick branches relative to the fenestrae.

Depth range: 164–549 m

Known distribution: Puysegur Bank.

Reference: Gordon 1989, p 76.

Growth Form: **Encrusting Unilaminar**

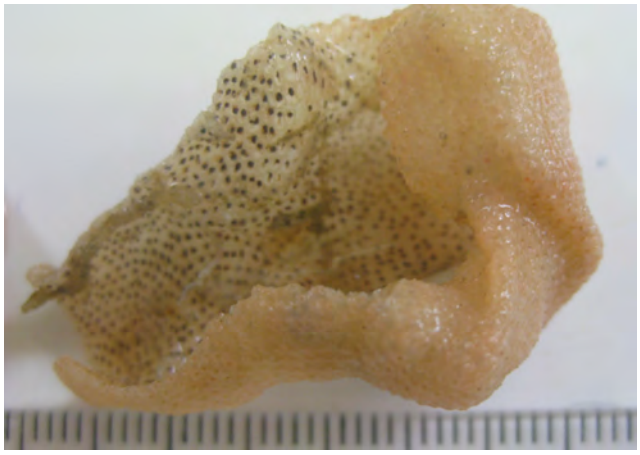
Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Exochellidae**

Escharoides excavata (MacGillivray, 1860)

Escharoides angela (Hutton, 1873)



Description: Colony is usually hard and encrusting, orange in life, sometimes with black spots inside. Commonly found intertidally around New Zealand. Similar to related *E. angela*, though you need a microscope to tell them apart.

Habitat: Under boulders, on kelp holdfasts, rock and shell gravel, and pilings.

Abundance: Can be quite common on the lower shore.

Depth range: Intertidal to 90 m.

Known distribution: Endemic**.** Kermadec Ridge, Three Kings Islands, most of New Zealand, Foveaux Strait, Snares Platform, Puysegur Bank. Also Queensland, NSW, Victoria, Japan, Gulf of California, Galapagos. Fossil: Tertiary of NZ, Australia.

Reference: Gordon 1984, p. 72.

Growth Form: **Encrusting Unilaminar**

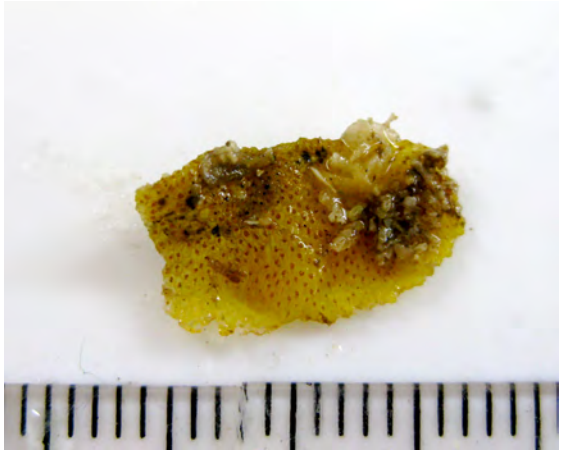
Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Bitectiporidae**

Bitectipora rostrata (MacGillivray, 1887)

Bitectipora mucronifera (Powell, 1967)



Description: Colony is bright yellow and thin, either flat or in a cylinder around a stem or filament, sometimes with erect, flattened lobes.

Habitat: Rock faces, and rock and shell gravel.

Abundance: Locally common.

Depth range: 10–205 m.

Known distribution: Endemic. Three Kings and Poor Knights Islands, Cook Strait, Milford Sound, Snares Platform, Puysegur Bank.

References: Gordon 1989, p. 39, plate 19E, Gordon 1994, pp. 286–289, fig. 3a–b.

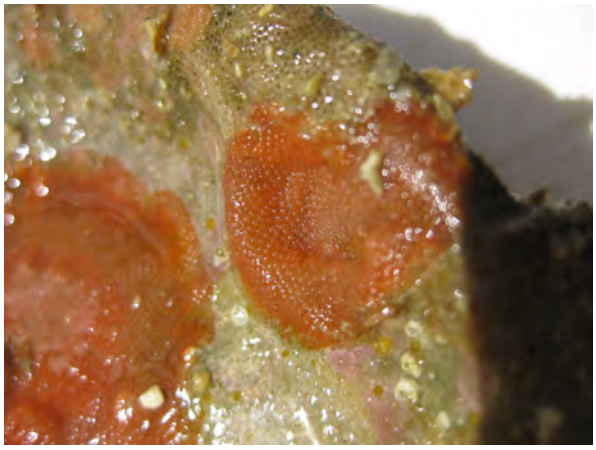
Growth Form: **Encrusting Unilaminar**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Eurystomellidae**

Eurystomella biperforata Gordon, Mawatari & Kajihara, 2002 and *E. foraminigera* (Hincks, 1883)



Description: Colony is pink-to-red and encrusting, usually flat and in one layer on a rock or shell. In the field *E. biperforata* is indistinguishable from *E. foraminigera*.

Habitat: Under boulders and overhangs, and on shell gravel.

Abundance: Locally common.

Depth range: Mid-intertidal to 205 m.

Known distribution: NZ from Kermadecs to Foveaux Strait, including Spirits Bay, Chatham Islands, Campbell Islands.

Reference: Gordon et al. 2002, p. 203.

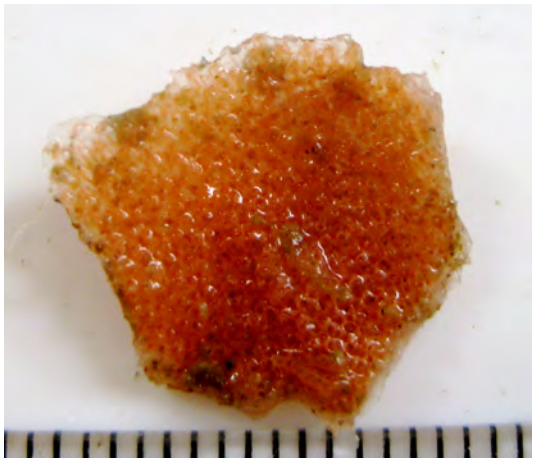
Growth Form: **Encrusting Unilaminar**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Escharinidae**

Escharina waiparaensis Brown, 1952



Description: Colony is red-to-orange, encrusting, usually flat on a shell or rock, though sometimes delicate branches can arise from the encrusting part.

Habitat: Under boulders and overhangs, and on shell gravel.

Abundance: Locally common.

Depth range: 44–350 m.

Known distribution: Originally described as a fossil from Miocene of Southland, also Pliocene of Hawke's Bay. Living material found at Kermadecs, Three Kings Islands, Chatham Rise, Fiordland, Puysegur Bank, Campbell Islands. Also South Africa.

Reference: Gordon 1994, 1989.

Growth Form: **Erect Rigid Branching**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Watersiporidae**

Watersipora subtorquata (d'Orbigny, 1852)

Description: Colonies initially encrusting but in quiet environments with plenty of water flow, as on wharf pilings they can grow to the size of a cabbage head, comprising an intricate mass of wavy brittle fronds; Dark grey to nearly black with dark orange growing edges.

Habitat: Found on wharf pilings, marina pontoons, algae, glass, wood, steel, and concrete. In intertidal areas it frequently occurs under rocks and ledges.

Abundance: Common in ports and harbours.

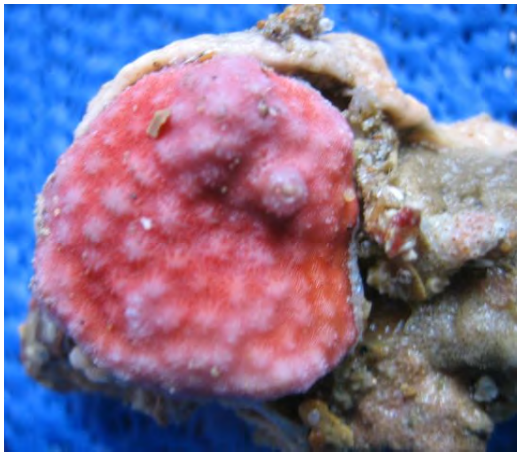
Known distribution: Naturalised alien. Known in New Zealand since 1977, having been introduced by shipping. Found from Bay of Islands to Bluff and is widespread around the world in warm to temperate waters.

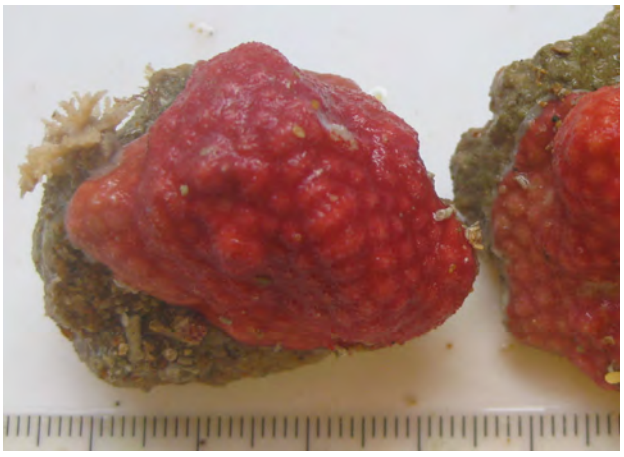
References: Gordon 1989, p. 41, plate 20I,J; Gordon & Mawatari 1992, pp. 29–30, plate 8D.

Growth Form:	**Encrusting Unilaminar**
Class:	**Stenolaemata**
Order:	**Cyclostomata**
Family:	**Densiporidae**

Favosipora rosea Gordon & Taylor, 2001

Strawberry bryozoan





Description: Bright pink to red, roundish thick encrusting colonies. Surface of the colony is marked with regular pale pustules, while the edge is often raised and paler.

Habitat: On shells and gravel.

Abundance: Can be locally common.

Depth range: 40–80 m.

Known distribution: Endemic. Occasional off Otago Peninsula and Foveaux Strait, extending to Snares Platform.

References: Gordon & Taylor 2001, p. 255, figs 16–18.

Growth Form: **Encrusting Unilaminar**

Class: **Stenolaemata**

Order: **Cyclostomata**

Family: **Lichenoporidae**

Doliocoitis cyanea Gordon & Taylor, 2001

Description: Colonies are dark purplish blue, round and thick encrusting. Surface of the colony is marked with regular pale pustules, while the edge is often raised and paler.

Habitat: On shells and gravel.

Abundance: Can be locally common.

Depth range: 40–85 m.

Known distribution: Endemic. Occasional off Otago Peninsula and Foveaux Strait, extending to Snares Platform.

References: Gordon & Taylor 2001, pp. 280–283, figs 52–58.

Growth Form: **Encrusting Unilaminar**

Class: **Stenolaemata**

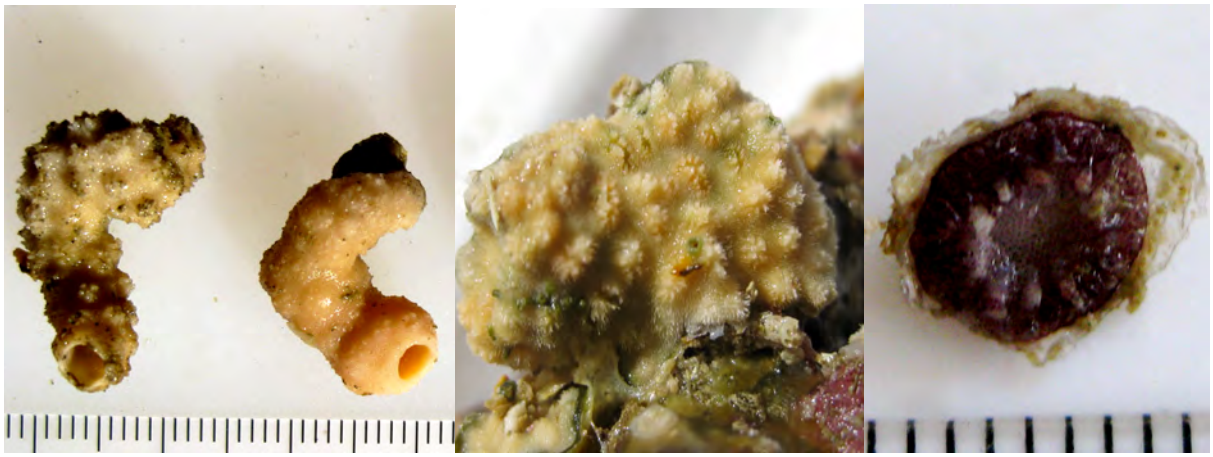
Order: **Cyclostomata**

Family: **Lichenoporidae**

Disporella novaehollandiae

Disporella pristis (MacGillivray, 1884)

Disporella spp.



Description: Purple, yellow, or orange round encrusting colony, often circular. Surface marked with radial spiky ridges, edge is thin and pale. Up to 4–5 cm across and 0.5 cm high.

Note: *D. pristis* used to be called *D. gordoni*.

Habitat: Rocks or dead gastropod shells occupied by hermit crabs.

Abundance: May be reasonably common locally.

Depth range: Low intertidal to 305 m.

Known distribution: Endemic. New Zealand-wide, also Australia and parts of the Indo-Pacific.

References: Taylor et al. 1989, pp. 1071–1073, fig. 3B–D, 6A–F; Gordon & Taylor 2001, 260–266, figs 22–30.

Growth Form:	**Encrusting Multilaminar**
Class:	**Gymnolaemata**
Order:	**Cheilostomata**
Family:	**Celleporidae**

Osthimosia socialis Taylor, Schembri & Cook, 1989

Description: Colony is multilaminar encrusting, forming rounded globs on the distal end of serpulid worm tubes, with a round hole for hermit crab, pale orange in life. This species can occur on mollusks occupied by hermit crabs as well.

Habitat: Rocks or dead shells or worm tubes occupied by hermit crabs.

Abundance: May be reasonably common locally.

Depth range: Moderate shelf depths.

Known distribution: Otago Shelf, Snares Platform.

References: Taylor et al. 1989, pp. 1077.

Growth Form:	**Encrusting Multilaminar**
Class:	**Gymnolaemata**
Order:	**Cheilostomata**
Family:	**Antroporidae**

Akatopora circumsaepta (Uttley, 1951)

Description: Colony is multilaminar encrusting, forming a more or less coiled tube, with a round hole for hermit crab; dark grape purple colour persists after drying.

Habitat: Dead mollusc shells occupied by hermit crabs.

Abundance: May be reasonably common locally.

Depth range: 20–205 m.

Known distribution: Hauraki Gulf, Marlborough Sounds, Tasman Bay, Otago Shelf, Fiordland, western Foveaux Strait, Snares Platform, Puysegur Bank, Campbell Islands.

References: Gordon 1986, p. 35; Taylor et al. 1989, p 1078.

Growth Form: **Encrusting Multilaminar**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Celleporidae**

Celleporina proximalis (Audouin, 1826)

Description: Spherical colony usually attached to anything fibrous, light orange to white in life. A spiky ball in appearance, generally about 2–3 mm across.

Habitat: Algae, hydroids, or any thin substrate including fishing line.

Abundance: May be reasonably common locally.

Depth range: Intertidal to shelf depths, to 220 m.

Known distribution: Kermadecs, Cook Strait, Tasman Bay, Otago Shelf, Snares Platform, Puysegur Bank, also Red Sea, Sri Lanka, Timor, Indonesia, Easter Island, Tasmania.

References: Gordon 1989, p. 71.

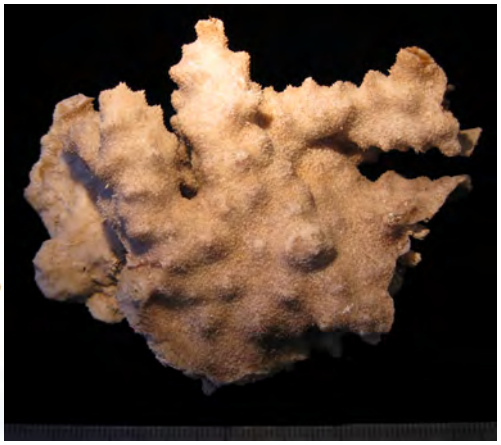
Growth Form: **Encrusting Multilaminar**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Lepraliellidae**

Celleporaria agglutinans (Hutton, 1873) “Pumice bryozoan”, “Tasman Bay coral”



Description: Heavily calcified massive colony, dark orange or pink, with a bumpy surface texture, often forming chimneys. This is one of the two largest New Zealand bryozoans, with colonies reaching to more than 30 cm in height and more than 50 cm in width.

Habitat: Shelf gravels, where it is a structure-forming ecosystem engineer. Under *Ecklonia radiata* kelp, on rock faces, or even attached to shell on sandy mud substrata, and generally in current-swept areas. Around Tasman Bay (especially at Separation Point, where the bryozoan habitat is legally protected from trawling), extensive coral-like growths provide a substratum for epifauna and nursery environment for juveniles of commercial fish. Ecologically, it may be the most important bryozoan in New Zealand waters.

Abundance: Abundant on shelf gravels.

Depth range: 5–220 m

Known distribution: Endemic. Both coasts from about the Poor Knights Islands to Stewart Island, including: Hauraki Gulf, Cook Strait, Marlborough Sounds, Tasman Bay, Chatham Rise, Fiordland, Otago, Puysegur Bank.

References: Gordon 1989, p 33.

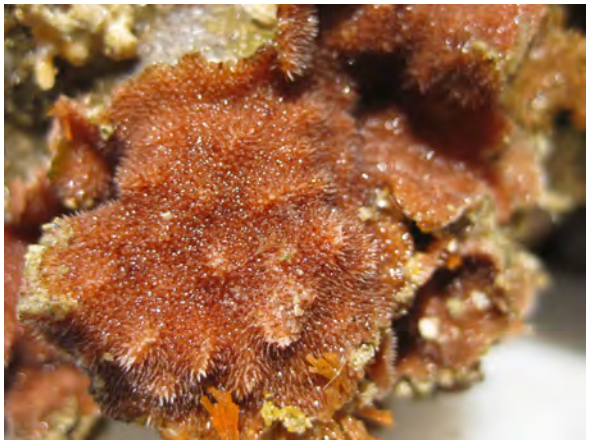
Growth Form: **Encrusting Multilaminar**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Arachnopusiidae**

Arachnopusia unicornis (Hutton, 1873)



Description: Colony is heavily calcified, highly spiky, dark red to dark purple to brown, forming encrusting multilaminar colonies or sometimes erect rigid foliose colonies.

Habitat: Shelf gravels and rocks.

Abundance: Widespread. May be locally common.

Depth range: Low intertidal to 550 m.

Known distribution: Kermadec Ridge, and both coasts of New Zealand from the Three Kings Islands to Foveaux Strait. Also found off southern Australia.

References: Gordon 1984, p. 69, plate 23B; Gordon 1989, p. 28, plate 12A–C; Gordon & Mawatari 1992, p. 27, 29, plate 7f.

Growth Form: **Free-Living**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Lepraliellidae**

Celleporaria emancipata Gordon, 1989

Description: Colony forms a large dome, 1 to 4 cm in diameter and up to 15 mm tall, with zooids opening on the convex side; the other side is flat or slightly concave with concentric growth rings. Pale orange in life. Subcolonies can form on top of the parent colony making a stack of two to five.

Habitat: On fine sandy-gravelly sediment at shelf depths.

Abundance: May be locally abundant.

Depth range: 75–549 m.

Known distribution: Endemic. Mernoo Bank, Foveaux Strait, Puysegur Bank, Campbell Plateau, Snares Platform.

References: Gordon 1989, p. 33, plate 16G,H; Taylor et al. 2004, Fig. 2J.

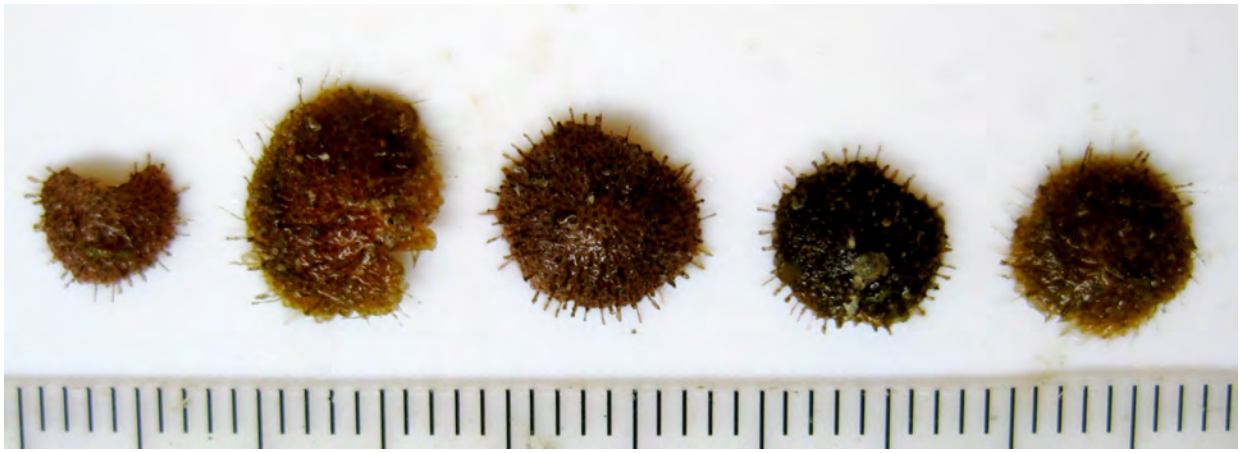
Growth Form: **Encrusting Multilaminar**

Class: **Gymnolaemata**

Order: **Cheilostomata**

Family: **Otionellidae**

Otionellina spp.



Description: Colony is a small dome, 3–8 mm in diameter and about 1 mm tall, with whiskery zooids opening only on the convex side; the other side is flat. Often the sand grain or piece of shell on which the colony settled is visible in the apex of the dome. There are four species in the area, impossible to tell apart without a microscope.

Habitat: Sandy or gravelly substrates.

Abundance: May be reasonably common locally.

Depth range: Moderate shelf depths.

Known distribution: Otago Shelf, Foveaux Strait, Snares Platform.

References: Steger & Smith 2005

3. Taxonomic list of species included here

ORDER Cyclostomata

Family Cerioporidae

Tetrocycloecia sp.

Family Cinctiporidae

Cinctipora elegans

Family Densiporidae

Favosipora rosea

Family Diaperoeciidae

Diaperoecia purpurascens

Family Horneridae

Hornera robusta

Hornera foliacea

Family Theonoidae

Telopora lobata

Family Lichenoporidae

Doliocoitis cyanea

Disporella novaehollandiae

Disporella pristis

Disporella sp.

ORDER Cheilostomata

Suborder Neocheilostomina

Infraorder Flustrina

Superfamily Calloporoidea

Family Antroporidae

Akatopora circumsaepta

Family Foveolariidae

Odontionella cyclops

Superfamily Buguloidea

Family Beaniidae

Beania bilaminata

Beania magellanica

Family Bugulidae

Bugula flabellata

Family Candidae

Caberea zelandica

Caberea rostrata

Caberea solida

Menipea vectifera

Menipea vera

Superfamily Microporoidea

Family Otionellidae

Otionellina spp.

Superfamily Cellarioidea

Family Cellariidae

Cellaria immersa

Cellaria tenuirostris

Melicerita chathamensis

Infraorder Ascophora

“Grade” Acanthostega

Superfamily Cribrilinoidea

Family Euthyroididae

Euthyroides episcopalis

Euthyroides jellyae

Superfamily Catenicelloidea

Family Catenicellidae

Costaticella bicuspis

Costaticella solida

Cribricellina cribraria

*Pterocella scutell*a

Family Eurystomellidae

Eurystomella biperforata

Eurystomella foraminigera

“Grade” Umbonulomorpha

Superfamily Arachnopusioidea

Family Arachnopusiidae

Arachnopusia unicornis

Superfamily Adeonoidea

Family Adeonidae

Adeonellopsis spp.

Superfamily Lepralielloidea

Family Lepraliellidae

Celleporaria agglutinans

Celleporaria emancipata

Family Exochellidae

Escharoides excavata

Escharoides angela

“Grade” Lepraliomorpha

Superfamily Smittinoidea

Family Smittinidae

Smittoidea maunganuiensis

Family Bitectiporidae

Bitectipora rostrata

Bitectipora mucronifera

Family Watersiporidae

Watersipora subtorquata

Superfamily Schizoporelloidea

Family Margarettidae

Margaretta barbata

Family Hippopodinidae

Hippomenella vellicata

Family Escharinidae

Escharina waiparaensis

Superfamily Celleporoidea

Family Celleporidae

Celleporina proximalis

Celleporina grandis

Galeopsis polyporus

Galeopsis porcellanicus

Osthimosia avicularis

Osthimosia socialis

Family Phidoloporidae

Hippellozoon novaezelandiae

Reteporella ligulata

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