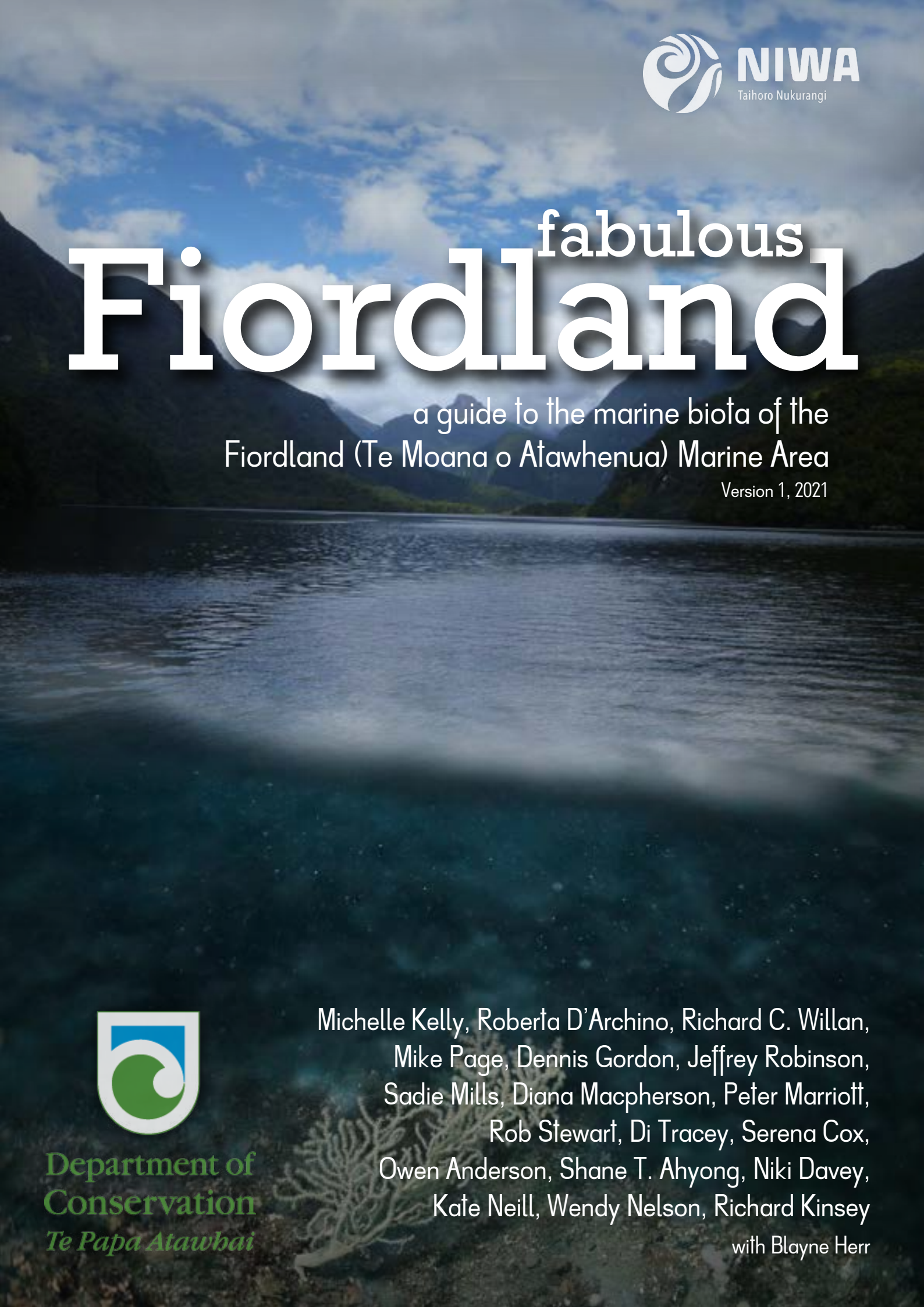

NIWA
Taihoro Nukurangi

fabulous Fiordland

a guide to the marine biota of the Fiordland (Te Moana o Atawhenua) Marine Area

Version 1, 2021

Michelle Kelly, Roberta D'Archino, Richard C. Willan, Mike Page, Dennis Gordon, Jeffrey Robinson, Sadie Mills, Diana Macpherson, Peter Marriott, Rob Stewart, Di Tracey, Serena Cox, Owen Anderson, Shane T. Ahyong, Niki Davey, Kate Neill, Wendy Nelson, Richard Kinsey

with Blayne Herr

Department of Conservation
Te Papa Atawhai

This guide is dedicated to Dr Ken Grange
in acknowledgement of a lifetime of
research and conservation in
Te Moana o Atawhenua

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INFO

about this guide

FABULOUS FIORDLAND is a fully illustrated e-guide to many of the commonly encountered shallow water biota in the Fiordland (Te Moana o Atawhenua) Marine Area of New Zealand, prepared in collaboration with the Department of Conservation and the Fiordland Marine Guardians. This guide compiles material from existing *Marvellous Marine Biota* e-guides (https://niwa.co.nz/coasts-and-oceans/marine-identification-guides-and-fact-sheets) with the addition of new taxa and species.

The e-guide is designed for New Zealanders and visitors who love our oceans, who dive and snorkel, explore our coasts, and for those who educate and are charged with kaitiakitanga, conservation and management of our marine realm. It is one in a series of e-guides on New Zealand biota (marine invertebrates and seaweeds) that NIWA's marine taxonomy group has developed.

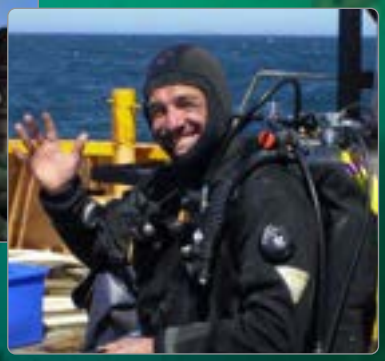
The e-guide starts with an information section that provides a brief introduction to Fiordland, its history, and the unique marine environment that makes the Fiordland moana region so special. Light penetration in the fiords is reduced by a layer of tannin-stained fresh water that can be over 10 m deep at times. These dark (but shallow) waters mimic deep-water habitats. Low light penetration supports an 'emergent' fauna that normally lives in the deep: black and red corals, sea pens, fan hydroids and glass sponges create the spectacular underwater scenery revered by divers the world over.

The Fiordland Marine Biota section that follows, looks at the biota by group, providing firstly a simple introduction to the groups featured, followed by a species list and then detailed individual species pages.

Each species page illustrates and describes features that should enable you to differentiate one species from another. Species are illustrated with high quality images of the organisms in life. As far as possible, we have used characters that can be seen by eye or magnifying glass, and language that is non-technical. Information is also provided in quick reference icons that convey information without words.

Finally, a guide to the icons and their meaning is provided at the end of the e-guide, followed by a glossary of unfamiliar terms, a list of further reading, and a celebration of our contributing authors and photographers.

As this is the first version of our e-guide to the marine biota of Fiordland, we acknowledge that most of the groups are limited in their scope (some severely so). In particular, the sections on brachiopods, cnidarians, molluscs, decapods and many of the seaweeds have glaring omissions, but we are committed to building the e-guide species inventory over time, to include more of the most commonly encountered organisms. We welcome your underwater photographs as these may assist with our ongoing mission to provide a more fabulous Fiordland e-guide!



We are grateful to Richard Kinsey, a senior ranger at the Department of Conservation, Te Anau, Southland, and Mike Page of NIWA Nelson, for their passion for conservation and protection of the Fiordland marine environment, and the drive to fund this e-guide and bring it to life.

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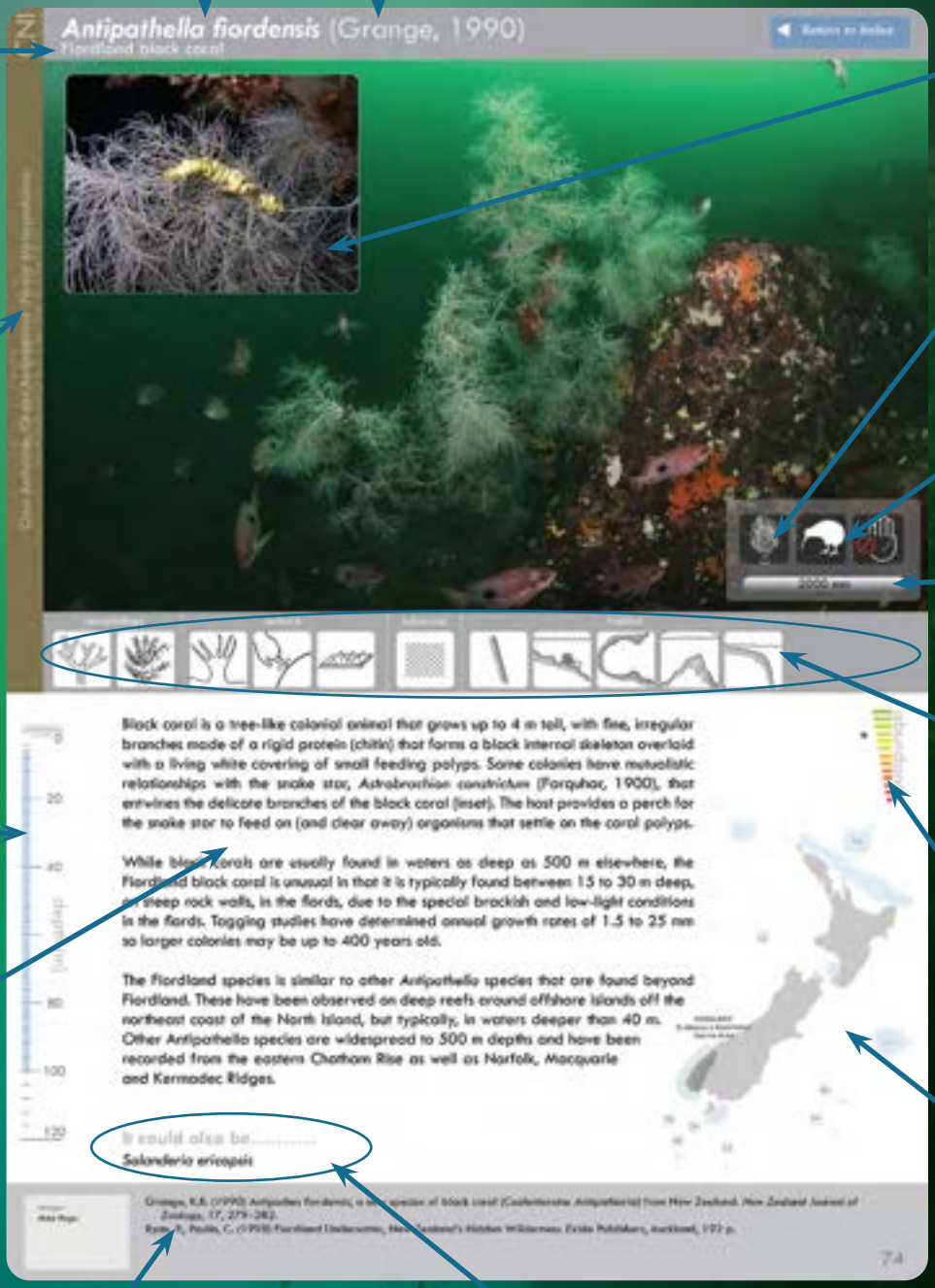
With thanks to

Department of Conservation
Te Papa Atawhai

a typical species page layout



taxonomic name of species

taxonomic authority
person(s) who first described this species

common name of species

species images
inset images show variations and/or closeup detail

body plan icon
highlighting the basic shape, or a special characteristic, that defines a group of these organisms

species classification
see species index for arrangement

life history icon
highlighting geographic distribution and other life characteristics

typical size bar
indicating typical size of the organism

quick id icons
highlighting morphology, surface, substrate and habitat

depth range
common depth range around New Zealand

scale of abundance
around New Zealand

information
details on external and internal characters and habitat

distribution
section of coastline where species is most commonly found

make notes of where you encountered this species and let us know if you find it at a new location

key taxonomic references

it could also be ...
some species are difficult to tell apart without more detailed information, so check the other species in the guide listed here to make sure that you have the correct species

about Fiordland (Te Moana o Atawhenua) Marine Area (FMA)

The Fiordland (Te Moana o Atawhenua) Marine Area comprises numerous rugged fiords, carved out by glaciers 20,000 years ago. Fifteen main fiords are located along 200 km of coastline. The Northern fiords are flooded steep 'U'-shaped valleys with narrow entrances to the open sea, dominated by dark inner fiord habitats. The Southern fiords are wider, more open to the sea and contain higher energy open coast habitats.

Drenched in an average seven metres of rain each year from Tasman Sea storms, the bush-stained water runs off steep mountains, through raging waterfalls to form a lens of freshwater that 'floats' on the seawater below. It is this rainwater and the steep fiord walls, extending hundreds of metres below the surface, that create the truly unique marine environment that is Fiordland.

DIVING

The abundance of marine life and variety of environments in Fiordland makes it one of the world's premiere dive locations. Many of the marine invertebrates in the fiords are fragile, slow-growing and long-lived. When diving in the Fiords, be careful, do not touch, and respect all underwater life!

PROTECTED

All corals (except soft corals, zoantharians, sea pens) are protected under Schedule 7A of the Wildlife Act 1953 and a later (2010) amendment to the Act.

It is illegal to deliberately collect or damage these species and all protected corals accidentally brought to the surface (e.g., on or in fishing gear or fouled by anchors) must be immediately returned to the sea.

Fiordland history

For Ngāi Tahu, the fiords of Te Rua o Te Moko represent the raised-up sides of Te Waka o Aoraki. The waka foundered on a submerged rock and its occupants, Aoraki and his brothers were turned to stone. They stand now as the highest peaks of Ka Tiritiri o te Moana (The Southern Alps). The fiords at the southern end of the alps were hacked out of the raised side of the wrecked waka by Tū Te Rakiwhānoa, in an effort to make it habitable for humans. The deep gouges and long waterways that make up the fiords were intended to provide safe havens on the rugged coastline, and were stocked with fish, forest, and birds to sustain travellers.

The fiords were first explored and used for seasonal harvest of mahinga kai (food) and pounamu (greenstone) by the Waitaha tribe between AD 1300 and AD 1500. They were succeeded by Ngāti Mamoe and in-turn by Ngāi Tahu. The three southern iwi merged through conflict and intermarriage to become the present day Ngāi Tahu Whānui iwi.

The Fiordland coast is dotted with Māori history. Scared urupā, cave dwellings (nohoanga) and place names after tupuna (ancestors) show a rich history spanning over 500 years. European influence began with Cook's exploration of Dusky Sound in 1773, where he had friendly interactions with Māori families. Occupation came later in the early 1800s with fur sealing and whaling. By the turn of the 20th century, fishing for blue cod and hapuku replaced whaling and sealing. The Fiordland region continues to support lobster and pāua fisheries that are now managed under the Quota Management System.

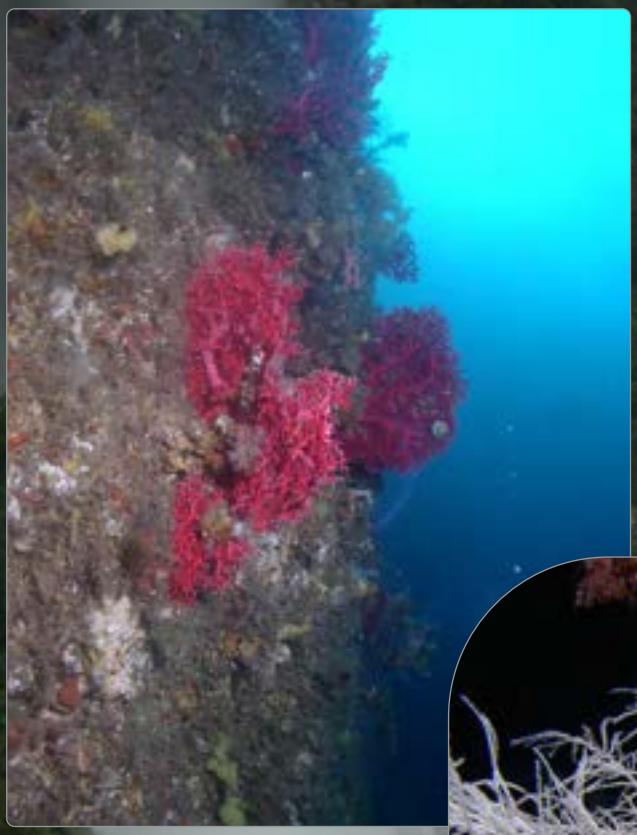
William Hodges family in Dusky Bay 1777, Alexander Turnbull Library

Fiordland marine habitats

Fiordland is a special marine area because of the presence of an 'emergent' deep-water fauna living at diveable depths. Cold waters and reduced light from a surface layer of tannin-stained freshwater (a few centimeters to 10 m deep at times), creates habitats in relatively shallow water that mimic cold, light-reduced deep-water environments. Stunning black coral trees, red corals, sea pens, lamp shells and fragile glass sponges are abundant here on fiord walls and submerged trees that have fallen hundreds of metres from vertical valley sides. Sea pens can be found in vast fields on shallow sills at the entrance of the fiords.

Gradients in light, current, and wave exposure occur along narrow fiords to create a diverse environment, supporting communities of filter feeders and a mobile fauna of starfish, sea urchins, molluscs, fishes and mammals. Most species diversity seems to occur in a band above about 40 m deep, where glaciers have carved vertical walls.

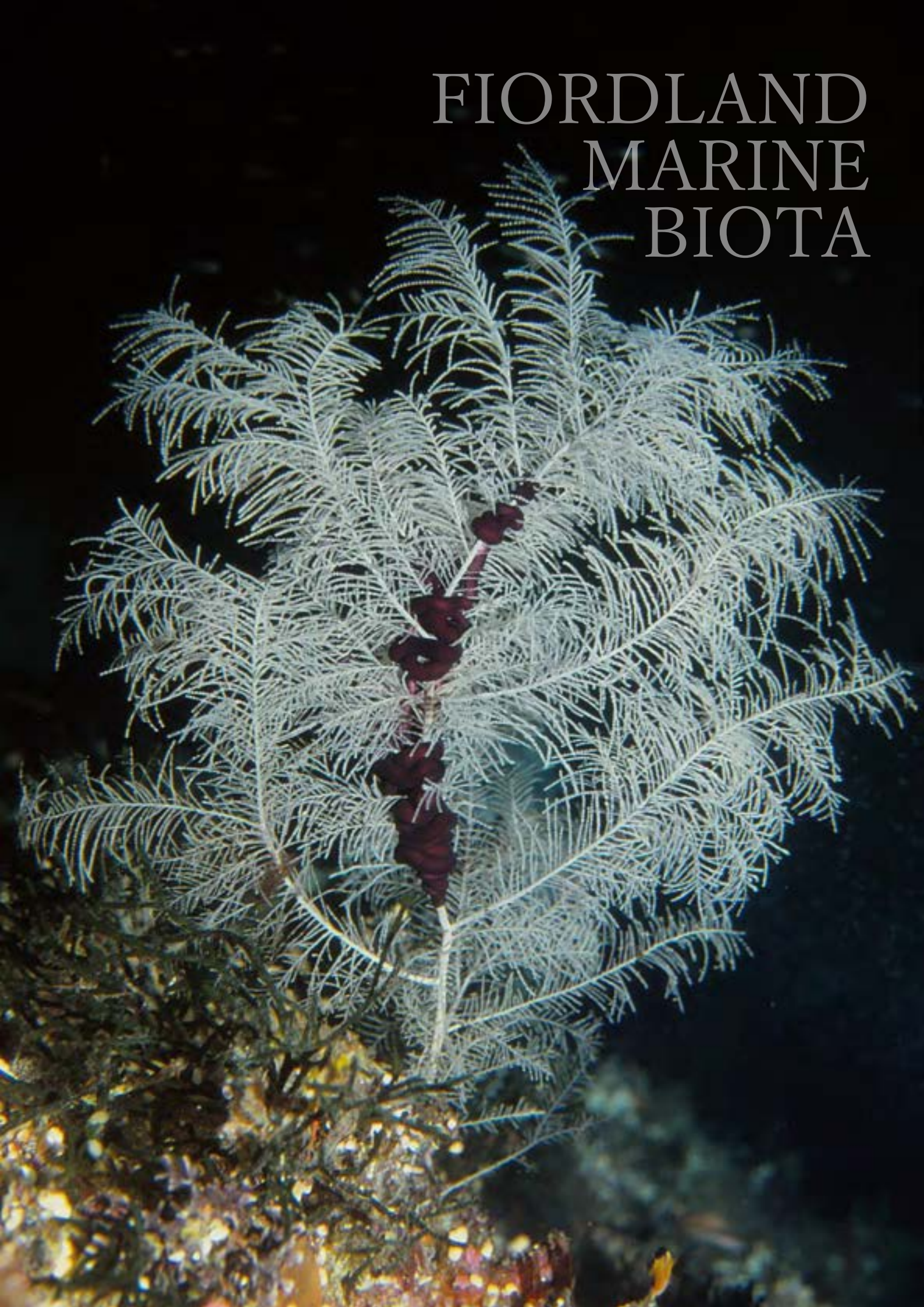
Inner fiord habitats have a unique deep-water species assemblage of lamp shells, black coral and sponges. A transition zone in communities occurs where fresh and seawater mix. This transition layer moves vertically in response to rainfall. Mussels are abundant in less saline water, and starfish (which are less freshwater tolerant) follow movements in this layer to feed on the mussels.



Mid-fiord habitats are steep walls where water is partially mixed, but still light-limited. Increased water movement creates more diverse assemblages of sponges, hydroids, coral, ascidians and bryozoans that feed on plankton and particulate matter in currents along the walls.

The **outer fiord** environment is influenced by wave action from the open sea, mixing fresh and sea water. Here the marine community is not limited by light, and so macroalgae such as large brown seaweeds, fine red algae and coralline algae dominate. Urchins and pāua graze and shape this community and the emergent deep-water species are pushed to greater depths.

FIORDLAND MARINE BIOTA



ASCIDIANS

SEA SQUIRTS

about ascidians

Ascidians (sea squirts) are amongst the most common fouling animals in ports and harbours around the world. They settle and grow in great abundance on artificial substrates such as wharf piles, seawalls, ship hulls and aquaculture structures. While most endemic species are found in relatively low numbers in intertidal and most subtidal environments around New Zealand, the high tidal flow along the Fiord rock walls creates a habitat for a diverse number of species to grow in great abundance.

Introduced (invasive) species are usually highly successful, invading in great abundance and often in densities that preclude other species. They have abundant, highly mobile larvae that settle and grow quickly, competing with other species for food and space. The potential consequences of this for the aquaculture industry can be serious.

Sea squirts are animals that feed by filtering the water through their body via an inhalant and exhalent siphon. Some are solitary animals, and some live in groups (colonial), some are stalked, and some encrust the substrate. Individual animals are enclosed within a leathery or gelatinous test which can be translucent. Fertilisation may be internal or external with embryos brooded in colonial and some solitary species, followed by a very short lived free-living larval stage before settlement.

There are three main groups of ascidians: orders Aplousobranchia, Phlebobranchia and Stolidobranchia. The Aplousobranchia are by far the most common and diverse ascidians, and the ones that you are most likely to meet while snorkelling or diving.

Sea squirts come in two main forms: **solitary** and **colonial**

Solitary sea squirts are individual animals with an inhalant siphon and an exhalent siphon, often with a thick leathery test that encloses the body of the animal.

Colonial sea squirts are groups of small animals (zooids) embedded in a gelatinous test as a colony. Zooids can be arranged in circular or linear systems, sharing common exhalent canals and apertures. Other types can have zooids opening independently or on stalks connected to a common basal test.

ascidian species index

For additional information about ascidians

Awesome Ascidians
https://niwa.co.nz/coasts-and-oceans/marine-identification-guides-and-fact-sheets/seasquirt-id-guide

Awesome Ascidians of New Zealand Ports & Harbours
https://niwa.co.nz/coasts-and-oceans/marine-identification-guides-and-fact-sheets/sea-squirts-of-nz-ports

Didemnum jucundum Kott, 2001

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Colonies are thin and appear highly inflated in life. Texture soft, filmy. Test covered in closely spaced inhalant apertures, occasional common exhalent apertures are visible. Surface layer of the test is coloured dark chocolate brown to black; the cream-coloured interior can be seen below the translucent surface and through exhalent apertures.

Didemnum jucundum typically encrusts bivalves, solitary ascidians and dead black coral trees. This species has been recorded from Fiordland to Bluff. It was first described from Western and South Australia.

It could also be.....
Lissoclinum notti

Kott, P. (2001) The Australian Ascidiacea Part 4: Aplousobranchia (3), Didemnidae. *Memoirs of the Queensland Museum*, 47 (1), 1–407.

images
Mike Page

Didemnum candidum Savigny, 1816

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Didemnum candidum has many close relatives with very similar characters; this species has a global distribution and is likely to be a large group that is, in reality, composed of many similar species. The name given to these Fiordland specimens may be inaccurate, however, until this group is reviewed the name remains.

Colonies are thin encrusting and can form sheets up to about 250 mm long, and 5 mm thick. They can be lobed or form drooping tendrils. The species often overgows other sessile species. Colonies are brittle and easily torn because of high spicule concentration throughout. Zooids are small, up to 2 mm long and appear to have no regular arrangement. But close-up, subdermal canals can be observed radiating towards obvious common exhalent apertures that are located terminally on the end of small lobes.

This species is common throughout Fiordland in mid to outer fiord habitats. It appears to be more tolerant of lower salinity than other colonial ascidian species, found encrusting mussels in the mixing zone between fresh and seawater.

It could also be.....
Didemnum spp.

images
Mike Page

Kott, P. (2001) The Australian Ascidiacea Part 4: Aplousobranchia (3), Didemnidae. *Memoirs of the Queensland Museum*, 47 (1), 1–407.
Millar, R.H. (1982) The Marine Fauna of New Zealand: Ascidiacea. *New Zealand Oceanographic Institute Memoir* 85, 117 pp.

Didemnum sp. (orange mottled)

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This species is usually found encrusting dead tree branches. Colonies are pale orange and have a distinctly mottled appearance where pale pigment cells are incorporated into the test. Colonies are about 250 mm long and thin (5 mm), fragile and easily torn when removed. Common exhalent apertures, approximately 2 mm in diameter, are regularly spaced on low mounds over the colony surface, and the inhalent apertures of zooids are evident as regular tiny pinholes over the entire surface.

Small stellate spicules are densely packed in the surface of the test which comes off in a papery layer.

Didemnum sp. (orange mottled) is found predominantly between 10 to 20 m in mid to inner fiord environments where high tidal currents occur and where there is moderate light penetration through sparse *Ecklonia* seaweed cover and abundant coralline algae. This species has been collected from Eleanor Island in Charles Sound. It is likely to be endemic to Fiordland, but the extent of its biogeographic distribution remains unconfirmed until further collections are made in the region.

It could also be.....
Didemnum spp.

images
Mike Page

Kott, P. (2001) The Australian Ascidiacea Part 4: Aplousobranchia (3), Didemnidae. *Memoirs of the Queensland Museum*, 47 (1), 1–407.
Millar, R.H. (1982) The Marine Fauna of New Zealand: Ascidiacea. *New Zealand Oceanographic Institute Memoir* 85, 117 pp.

Didemnum sp. (ghost)

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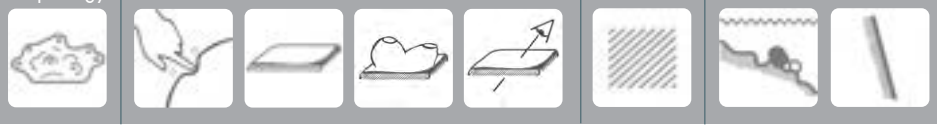

Ghost *Didemnum* colonies are distinguished from most other didemnids in Fiordland by the translucent orange, ghost-like appearance of the test covering the zooids. This species is unusual in genus *Didemnum* in that it lacks spicules, but has the typical feature of the genus, a vas deferens coiled spirally around zooid testes. Colonies are small interconnected lobes with terminal common exhalent cloacal apertures visible at the apex of each lobe, typically 100 mm long and about 50 mm thick. The inhalent branchial apertures appear as small white pin dots when contracted on the colony. The colonies are soft, compressible and deflate when removed from the water.

Didemnum sp. (ghost) is found on walls in mid to inner fiord environments, from 15 to 20 m depth. It has been recorded at Breaksea Sound and on the south side of Emelius Arm, Charles Sound. At present it is considered endemic to Fiordland.

It could also be.....
Diplosoma velatum

Kott, P. (2001) The Australian Ascidiacea Part 4: Aplousobranchia (3), Didemnidae. *Memoirs of the Queensland Museum*, 47 (1), 1–407.
Millar, R.H. (1982) The Marine Fauna of New Zealand: Ascidiacea. *New Zealand Oceanographic Institute Memoir* 85, 117 pp.

images
Mike Page

Diplosoma velatum Kott, 2001

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Colonies form irregular lobed fleshy sheets with large common cloacal apertures up to 10 mm diameter at the terminal ends of lobes. Groups of zooids supported by connective test can be seen inside the colony through the common cloacal apertures. The test is generally an opaque orange colour in colonies exposed to light. Colonies collected from low-light conditions, such as at the head of Crooked Arm, Fiordland, are cream. The test is soft and slimy and colonies collapse when removed from water. About 8–10 zooids are grouped in test connectives with clear spaces, these can be seen through the test.

Diplosoma velatum was first described from Australia and is known from Fiordland, the east coast of the South Island, South Australia, Western Australia and Victoria.

images
Mike Page

Kott, P. (2001) The Australian Ascidiacea Part 4: Aplousobranchia (3), Didemnidae. *Memoirs of the Queensland Museum*, 47 (1), 1–407.
Page, M., Willis, T., Handley, S. (2014) The colonial ascidian fauna of Fiordland, New Zealand with a description of two new species. *Journal of Natural History*, 48 (27–28), 1653–1688.

Diplosoma sp. (network)

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Delicate cream-coloured colonies of this species have characteristic transparent halos of test around zooid inhalent apertures. The surrounding test appears to be invested with granular cream pigmented cells. Colonies are small and thin, up to 100 mm diameter and 10 mm thick, encrusting and easily torn from the substrate as a slimy amorphous jelly. There are regularly spaced, large common exhalent siphons on low conical mounds. Zooids are not arranged in obvious systems.

Diplosoma sp. (network) is undescribed and likely to be endemic. It has been recorded from Dusky Sound at Anchor Island, Parrot Island, Breaksea Sound and Sunday Cove in Fiordland. It inhabits outer Sound habitats on walls and rocky reefs.

images
Mike Page

Kott, P. (2001) The Australian Ascidiacea Part 4: Aplousobranchia (3), Didemnidae. *Memoirs of the Queensland Museum*, 47 (1), 1–407.
Millar, R.H. (1982) The Marine Fauna of New Zealand: Ascidiacea. *New Zealand Oceanographic Institute Memoir* 85, 117 pp.

Diplosoma sp. (orange star)

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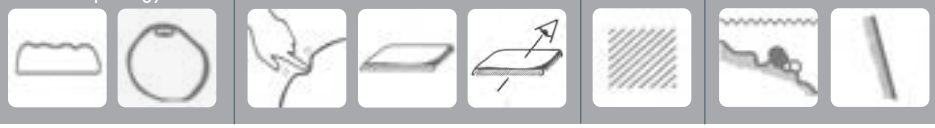

Diplosoma sp. (orange star) is distinguished by small orange to cream coloured colonies that have distinctive white dots on the test surface (inhalent apertures of individual zooids) that appear star-shaped on closer view. Zooids usually have an orange stomach. Colonies are generally globular or elongate and sausage-shaped with a single large exhalent aperture 5–6 mm in diameter, the whole colony can be up to 100 mm long and 20 mm thick. They are firm yet gelatinous to the touch, collapsing when removed from water. Zooids are embedded and suspended internally in sticky test strands within a large internal common cavity. Large larvae with six long median ampullae distinguish this species as new to the genus *Diplosoma*.

This species is found on walls in mid fiord habitats. It can grow on other sessile species such as hydrozoans and dead black coral trees. It has been recorded from Dusky Sound to Caswell Sound, Fiordland.

It could also be.....
Diplosoma velatum

images
Mike Page

Kott, P. (2001) The Australian Ascidiacea Part 4: Aplousobranchia (3), Didemnidae. *Memoirs of the Queensland Museum*, 47 (1), 1–407.
Millar, R.H. (1982) The Marine Fauna of New Zealand: Ascidiacea. *New Zealand Oceanographic Institute Memoir* 85, 117 pp.

Lissoclinum notti Brewin, 1958

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Colonies are characteristically thin and encrusting, <2 mm thick and fragile. Zooids are not in marked systems, but there are relatively large, common exhalent apertures evenly distributed throughout the colony or on the apex of lobes. Test is papery and easily torn. Colour in life is opaque cream or brown, sometimes purple.

Spicules are found in two layers; at the surface and at the base of the colony, and have distinctive burr-shaped ends.

Lissoclinum notti is common on shallow subtidal reefs, wharf piles and aquaculture structures. This species was first recorded from the Cook Strait region and is now known to ocurr in the Hauraki Gulf. It is found in Fiordland, in Emelius Arm, Charles Sound, and Sunday Cove at the entrance to Breaksea Sound and is common in most New Zealand ports and harbours.

It could also be.....
Didemnum spp.

Brewin, B.I. (1958) Ascidians of New Zealand. Part 12. Ascidians of the Hauraki Gulf, Part 3. *Transactions and Proceedings of the Royal Society of New Zealand* 85 (3), 455–458.

images
Mike Page

Tridemnum shawi Page, Willis & Handley, 2014

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The species forms irregularly-shaped hollow cushions with common cloacal apertures up to 5 mm diameter at the end of the lobes. The colony collapses on removal from water. Colonies are peach-coloured with characteristic clusters of red pigment cells scattered randomly throughout the test. The texture is gelatinous with zooids regularly packed around the outside edge and sparse spicules concentrated in a layer around zooid branchial apertures.

Spicules are of two shapes and sizes; star-shaped spicules with seven conical rays (30–75 µm) and small fine spicules with delicate needle-like rays (15–40 µm).

Tridemnum shawi was first described from Fiordland and has not been recorded elsewhere. It may be endemic to the region.

images
Mike Page

Page, M., Willis, T., Handley, S. (2014) The colonial ascidian fauna of Fiordland, New Zealand with a description of two new species. *Journal of Natural History*, 48 (27–28), 1653–1688.

Hypsistozoa fasmeriana (Michaelsen, 1924)

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Colony consists of a short fleshy stalk topped with a much larger ovoid body, attached individually to the substrate. Body is often button- or mushroom-shaped. Stalks are often not visible. Soft and gelatinous to the touch. Zooids are set in linear, parallel systems across the body. Larger exhalent apertures with raised membranous rims are scattered over the body. Colonies can often occur in patchy groups 20–30 cm in diameter. Colour in life is usually fuchsia pink to violet.

Most common in shallow coastal reefs and on artificial structures in open harbours with high tidal flow. Colonies can be found down to 20 m depth in areas of moderate exposure. This species is widespread around New Zealand.

It could also be.....

Aplidium benhami

images
Mike Page

Brewin, B.I. (1946) Ascidians in the vicinity of the Portobello Marine Biological Station, Otago Harbour. *Transactions and Proceedings of the Royal Society of New Zealand* 76 (2), 87–131.
Millar, R.H. (1982) The Marine Fauna of New Zealand: Ascidiacea. *New Zealand Oceanographic Institute Memoir* 85, 117 pp.

Hypsistozoa sp. (red cushion)

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Colonies form large bright red cushions up to 150 mm in diameter and 50 mm thick. The test is gelatinous, but firm. Zooids appear to be in circular systems around regularly spaced, raised, common cloacal apertures. The colonies are found in highly exposed surge areas on boulder faces and walls in relatively shallow water.

This species is closely related to *Hypsistozoa fasmeriana*. However, the size of the colonies, arrangement of the zooid systems and preferred habitat confirms that it is not the same species.

This species has been recorded on the outer coast of Doubtful Sound (Hare's Ears) and the outer side of the entrance to Port Pegasus, Stewart Island.

It could also be.....

Hypsistozoa fasmeriana

image
Mike Page

Brewin, B.I. (1956) The growth and development of a viviparous compound ascidian, *Hypsistozoa fasmeriana*. *Quarterly Journal of Microscopical Science*, series 3, 97 (3), 435–454.

Brewin, B.I. (1959) An account of larval budding in the compound ascidian, *Hypsistozoa fasmeriana*. *Quarterly Journal of Microscopical Science*, series 3, 100 (4), 575–589.

Aplidium benhami (Brewin, 1946)

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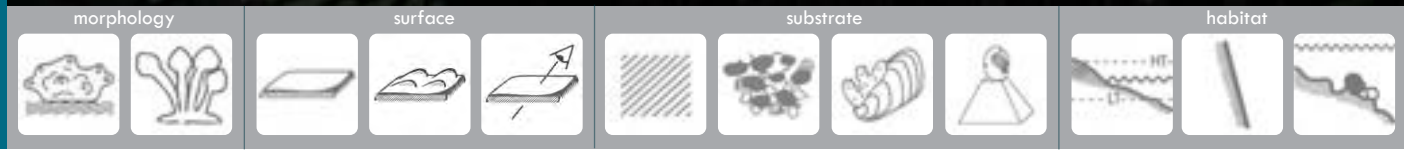

Colonies stalked with cauliflower-shaped heads containing zooids in star-shaped to circular systems. Rims of inhalant siphons have a distinctive white ring that is visible in the animals in life. Larger, more lobate specimens have been observed on wharf piles in areas of high tidal flow. Colour in life, deep reddish orange to brilliant crimson.

Aplidium benhami lives on the undersides of intertidal rocks, overgrows bryozoans, seaweed fronds and holdfasts in the subtidal. Can be found on wharf piles. Locally abundant on intertidal and shallow subtidal reefs down to 10 m. This species is found around Cook Strait, Kaikoura, Portobello Peninsula, Chatham Islands, Stewart Island and Fiordland.

It could also be.....
Hypsistozoa fasmeriana

images
Mike Page

Brewin, B.I. (1946) Ascidians in the vicinity of the Portobello Marine Biological Station, Otago Harbour. *Transactions and Proceedings of the Royal Society of New Zealand* 76 (2), 87–131.
Millar, R.H. (1982) The Marine Fauna of New Zealand: Ascidiacea. *New Zealand Oceanographic Institute Memoir* 85, 117 pp.

Aplidium coronum Page, Willis & Handley, 2014

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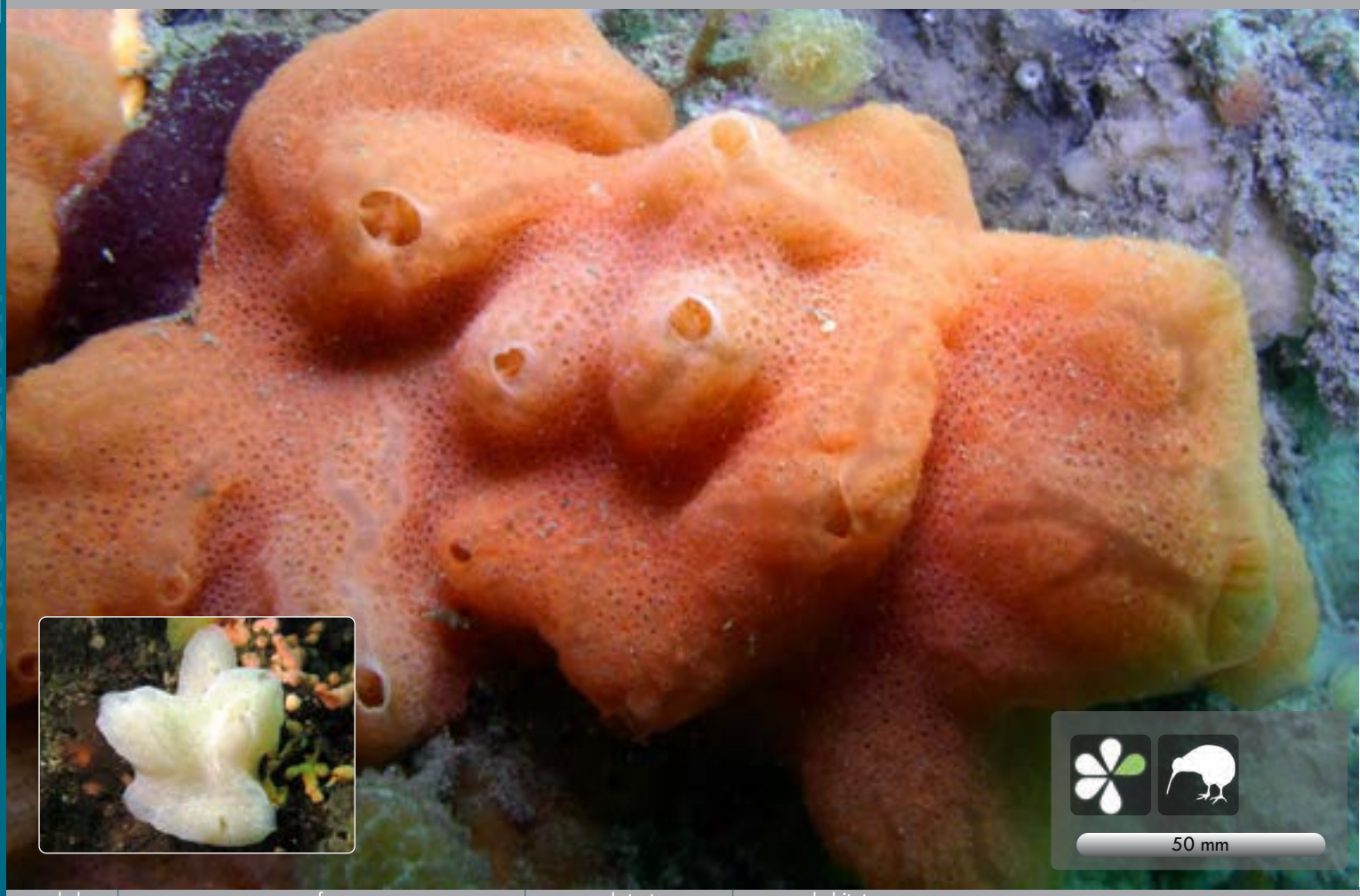

morphology | surface | substrate | habitat

This species forms massive lobed colonies that are peach to white coloured and fleshy. The colour appears to depend on exposure to light. In the shaded upper reaches of fiords such as Crooked Arm, the colonies are white. The zooids are arranged in parallel double rows on each side of large common cloacal canals. The canals branch and radiate out from numerous large (5 mm diameter) terminal common cloacal apertures at the end of conical lobes. The test is soft, gelatinous and transparent.

There are small tunic cells measuring 15 µm in maximum diameter scattered throughout the test.

Aplidium coronum was first described from Fiordland. It is also known to occur from Bluff to Dunedin on the east coast of the South Island.

images
Mike Page

Page, M., Willis, T., Handley, S. (2014) The colonial ascidian fauna of Fiordland, New Zealand with a description of two new species. *Journal of Natural History*, 48 (27–28), 1653–1688.

Aplidium sp. (golden)

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The golden *Aplidium* is distinguished from other colonial ascidians in Fiordland by its distinctive golden colour, branching common cloacal canals and double rows of zooids. Radiating canals between zooid systems exit to raised common exhalent siphons approximately 5 mm in diameter, the latter seen at the top of the ascidian in the main image, as transparent, raised collars. Colonies are small, firm and gelatinous to the touch, typically 100 mm diameter and about 10 mm thick.

Colonies of *Aplidium* sp. (golden) are found encrusting walls and vertical surfaces from 10 to 25 m in mid to inner fiord habitats, often in close association with coralline algae. The species has been recorded from Wet Jacket Arm, Gaer Arm and Breaksea Sound, Fiordland. It is currently undescribed, has not been found outside Fiordland, and is likely to be endemic to the region.

images
Mike Page

Kott, P. (1990) The Australian Ascidiacea, Part 2, Aplousobranchia (1). *Memoirs of the Queensland Museum* 29 (1), 1–266.
Millar, R.H. (1982) The Marine Fauna of New Zealand: Ascidiacea. *New Zealand Oceanographic Institute Memoir* 85, 117 pp.

Synoicum occidentalis Millar, 1982

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morphology | surface | substrate | habitat

Smooth flat cushion or several cushions fused at the base. Gelatinous, no sediment incorporated in the test. Zooids in circular systems at times visible under the test. Common exhalent apertures at times not visible in aging (senescent) colonies. Colour in life patchy yellow orange, translucent.

Infrequently found over-growing coralline paint on rock walls or shallow subtidal habitats. Also known from benthic trawls on the shelf-break to 300 m. This species was first found in benthic trawls on the west coast of the South Island. It is now known to occur off Kaikoura and is common in Fiordland.

to 300 m

abundance

images
Mike Page

Millar, R.H. (1982) The Marine Fauna of New Zealand: Ascidiacea. *New Zealand Oceanographic Institute Memoir* 85, 117 pp.

Synoicum stewartense (Michaelsen, 1924)

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A small colonial ascidian, often found with heads of the colonies embedded among bryozoans and turfing red algae. Colonies are up to 100 mm across and 20 mm thick. The colonies are composed of numerous flat-topped, bright blue to grey chalice-shaped heads that taper to a common basal mat. Each head generally has a circular system of 15–20 zooids around a central raised common cloacal aperture. Some colony heads may have two systems. Sand invests the basal test and sparsely invests the posterior half of the colony. The test is firm but gelatinous and the zooids heavily pigmented red when fixed in formalin.

Found on rocky reefs and walls in moderately exposed coast and fiords. Occurs in Fiordland, Stewart Island and on the Chatham Rise.

It could also be.....
Botryllus stewartensis

images
Mike Page

Millar, R.H. (1982) The Marine Fauna of New Zealand: Ascidiacea. *New Zealand Oceanographic Institute Memoir* 85, 117 pp.
Page, M., Willis, T., Handley, S. (2014) The colonial ascidian fauna of Fiordland, New Zealand with a description of two new species. *Journal of Natural History*, 48 (27–28), 1653–1688.

Botrylloides leachii (Savigny, 1816)

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Colonies are encrusting, about 3–5 mm thick and up to 20 cm diameter, often overgrowing other species, giving colonies a lobate appearance. Parallel systems of zooids are usually obvious because of light pigmentation around the inhalant apertures. Systems connect to numerous common exhalent apertures. Colour in life is highly variable, ranging from typically purple to green to orange and cream. The test is transparent, soft and gelatinous. Small granular bodies are visible near the surface of the test between the zooid systems and the border of the colony.

Botrylloides leachii encrusts moorings, jetties and wharf piles, and is very common in ports and harbours, and around New Zealand. It may have been introduced by early sailing ships. The native range appears to be from the northeastern Atlantic Ocean to the Mediterranean, and from the Red Sea to the tropical Indo-West Pacific down to the temperate waters of South Australia and New Zealand.

images
Mike Page

Brewin, B.I. (1946) Ascidians in the vicinity of the Portobello Marine Biological Station, Otago Harbour. *Transactions and Proceedings of the Royal Society of New Zealand* 76 (2), 87–131.
Millar, R.H. (1982) The Marine Fauna of New Zealand: Ascidiacea. *New Zealand Oceanographic Institute Memoir* 85, 117 pp.

Botrylloides sp. (Page, Willis & Handley, 2014)

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Cushion-shaped colonies vary in colour from lavender with white-ringed branchial apertures (main image), to cream with a lavender ring around the base of the white-ringed branchial aperture. The test in lavender-coloured colonies is transparent and the cream-coloured zooid branchial sacs clearly visible through the test. Double rows of zooids are tightly packed in a soft fleshy test. There are numerous common cloacal apertures, approximately 5 mm in diameter, randomly distributed throughout the colonies.

This species is most commonly found from 5 to 25 m on walls in Fiordland. The cream colour variant is found on wharf piles in Bluff. *Botrylloides* sp. is easily recognisable because of the white branchial rings which give the species a conspicuous polka-dotted appearance over the surface. The species was first recorded from Fiordland.

images
Mike Page

Page, M., Willis, T., Handley, S. (2014) The colonial ascidian fauna of Fiordland, New Zealand with a description of two new species. *Journal of Natural History*, 48 (27–28), 1653–1688.

Botryllus stewartensis Brewin, 1958

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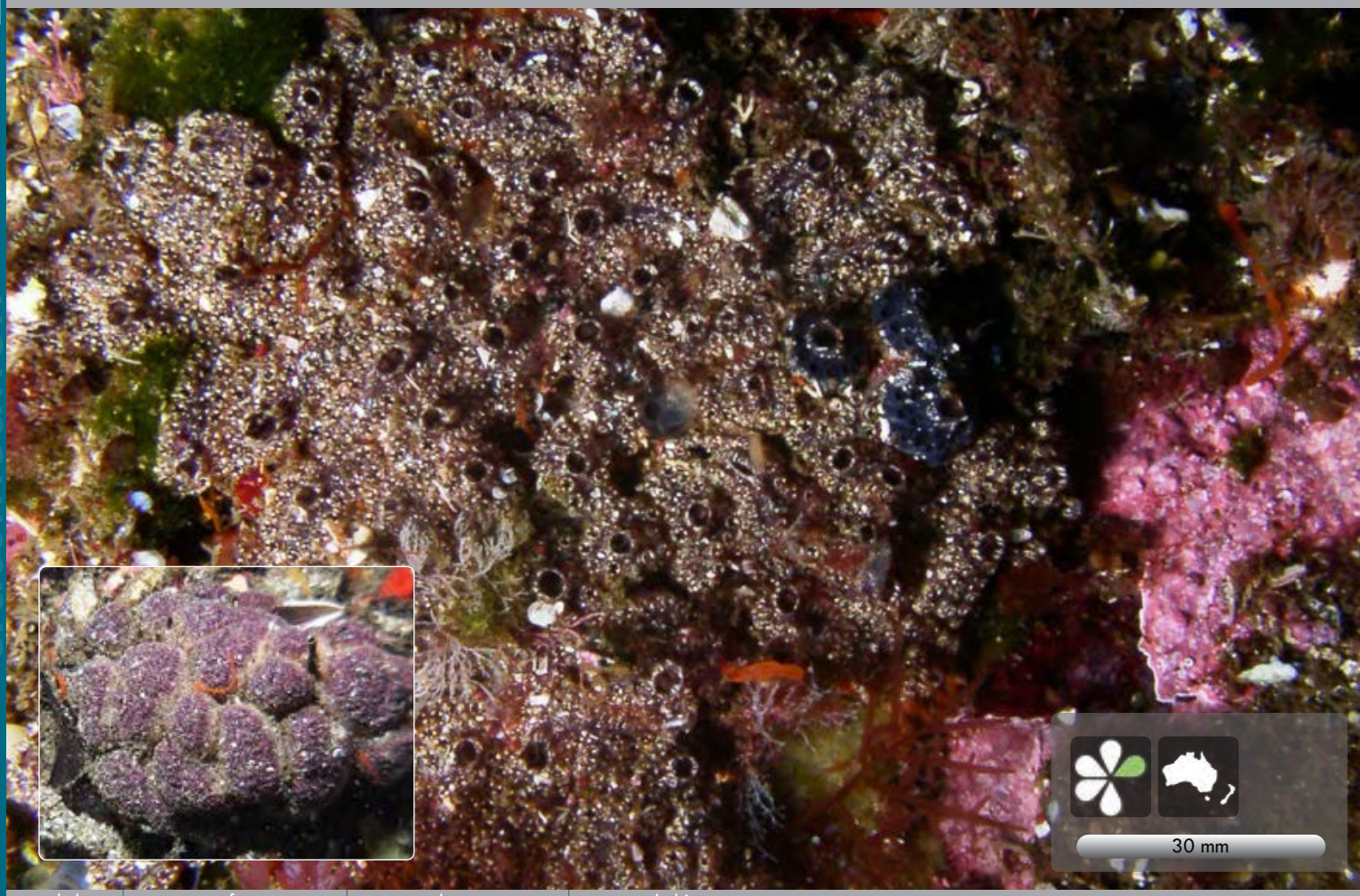

morphology | surface | substrate | habitat

Colonies are low sandy lobes approximately 30 mm wide, tightly packed on a basal mat. Each lobe has a central common exhalent aperture with a circle of zooids. Morphology and colour in life vary with sediment levels and exposure. Colour in life is sandy violet or cream. The test is delicate and soft, when present, sediment is confined to the outer test.

Found occasionally on reefs in sheltered coves and on walls in fiords. This species has been recorded from Lyttleton Harbour, Stewart Island, and Foveaux Strait and Fiordland. It is also known from southern, eastern and Western Australia.

abundance

It could also be.....

Botrylloides leachii
Synoicum stewartense

images
Mike Page

Brewin, B.I. (1958) Ascidians of New Zealand. Part 11. Ascidians of the Stewart Island region. *Transactions of the Royal Society of New Zealand* 85 (3), 439–453.
Kott, P. (1985) The Australian Ascidiacea Part 1. Phlebobranchia and Stolidobranchia. *Memoirs of the Queensland Museum* 23, 1–440.

Cnemidocarpa bicornuta (Sluiter, 1900)

saddle sea squirt

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morphology | surface | substrate | habitat

Saddle-shaped with the inhalant siphon usually at the top and the exhalent siphon nearer to the base. Siphons are separated by a distinctive saddle, and are sometimes covered in warty processes. Characterised by four bands of magenta pigment on the orange siphon lining. Gill slits are elongate, folded, tentacles are smooth. Gonads attached to the body wall under the gill sac are long and tubular, sometimes bent backwards at their terminal end. Test leathery and longitudinally wrinkled. Colour in life light orange to cream. Often fouled with hydrozoans, bryozoans and filamentous algae.

Very common in ports, harbours, and coastal environments. May be locally abundant on shallow reefs and wharf piles. This species is widespread around New Zealand.

images
Mike Page

Brewin, B.I. (1946) Ascidians in the vicinity of the Portobello Marine Biological Station, Otago Harbour. *Transactions and Proceedings of the Royal Society of New Zealand* 76 (2), 87–131.
Millar, R.H. (1982) The Marine Fauna of New Zealand: Ascidiacea. *New Zealand Oceanographic Institute Memoir* 85, 117 pp.

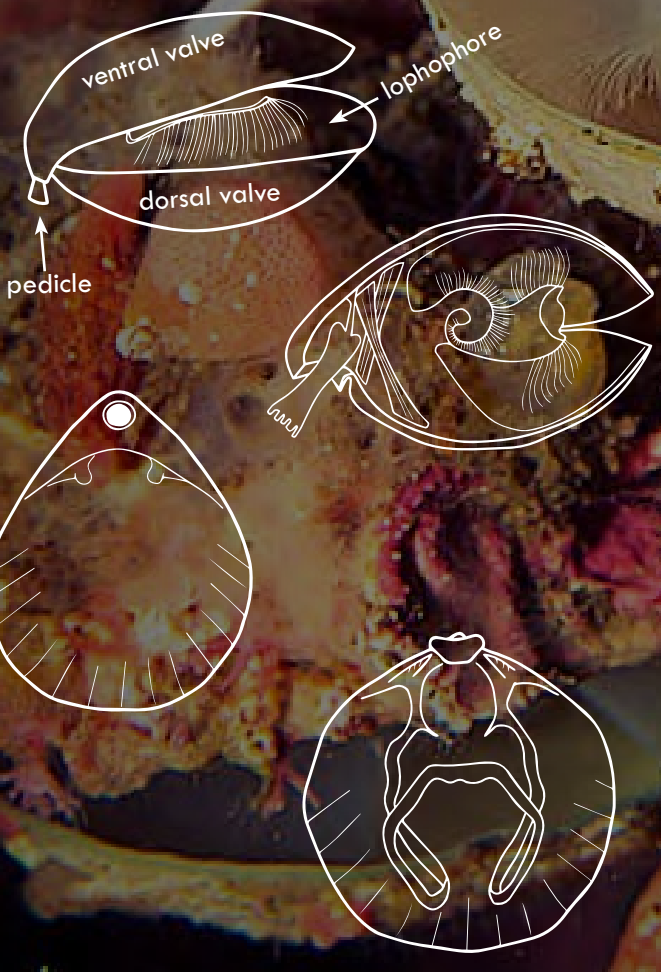
BRACHIOPODS

LAMP SHELLS

about brachiopods

Brachiopods (lamp shells) are bivalved animals with two shells. The larger shell, the ventral valve, has a hole at the back (posterior) for the stalk (the pedicle) that usually attaches them to rock walls or shells or the underside of boulders. The smaller shell, the dorsal valve, has a variety of shell prongs or loops that support the lophophore (the feeding and breathing organ).

Brachiopods open the front (anterior) of their shells and tiny waving filaments on the lophophore draw water inside the shell where very tiny food particles are collected.



There are two main types of brachiopod: **Articulate** species have 'articulated' shells that have teeth on the ventral valve and sockets on the dorsal valve that form a hinge. The shells are opened and closed by muscles. **Inarticulate** species have no teeth or sockets, the shells are held together by muscles.

Brachiopods have a variety of lifestyles: they may be attached by their pedicle for their whole life; they may attach to small particles as juveniles but lie on the seafloor as adults; they may have a 'motile' pedicle and live unattached, able to make small pushing movements with their pedicles to orient to currents or dig themselves out when buried by sand; and some species do not have a pedicle at all and cement their ventral valve to the rock.

Brachiopods have a very long fossil history, the first ones appeared in the Cambrian, about 500 million years ago. There are currently about 400 living species. In Fiordland there are six Articulate species, ranging in size from 5 mm long to 50 mm long. Several species can commonly be found attached to each other in clusters. There are also two Inarticulate species that cement to rocks at the bottom of the deep fiords.

brachiopod species index

Liothyrella neozelanica Thomson, 1916

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Liothyrella neozelanica is large, typically 40 to 60 mm long, and elongately oval. The shell is smooth and may be white, grey, brown or brownish pink. The foramen is labiate. The key internal taxonomic feature is the short triangular loop that supports the lophophore, the long and coiled filter-feeding and gas exchange organ in brachiopods.

Specimens of *Liothyrella neozelanica* are often attached to each other in grape-like clusters. In the fiords, specimens often have a wide variety of marine invertebrates attached to their shells. *Liothyrella neozelanica* is endemic and is found all around New Zealand, the Chatham Islands and in the Southern Ocean. In Fiordland the species ranges from 6 m to ~500 m depth. In the open ocean it has been found down to 3220 m at the Three Kings Ridge but is usually at depths of less than 500 m.

The ridged, pinkish brachiopod in the lower middle, is *Magasella sanguinea*.

to 500 m

main image
Paddy Ryan

inset image
Jeffrey Robinson

Grange, K.R., Singleton, R.J., Richardson, J.R., Hill, P.J., Main, W. deL (1981) Shallow rock-wall biological associations of some southern fiords of New Zealand. *New Zealand Journal of Zoology* 8, 209–227.

Lee, D.E., *et al.* (2006) Terebratulida. *Treatise on Invertebrate Paleontology*, Part H (Revised): Volume 5: Brachiopoda (2006), Geological Society of America, H1965–H2251.

Calloria inconspicua (Sowerby), 1846

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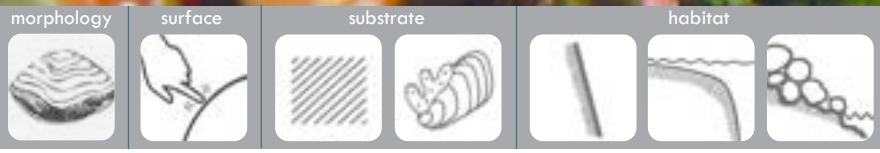
Class Rhynchonellata Order Terebratulida Family Terebratulidae



Calloria inconspicua is a small brachiopod, ranging in size from 15 to 25 mm long. The shell is smooth, usually bright red but may be reddish brown, and subpentagonal to drop-shaped in outline. The dorsal valve has a distinct sulcus, a lengthwise groove on the dorsal valve that widens and deepens as the animal grows. An important internal taxonomic feature is the long calcitic loop.

Calloria specimens may attach to rock or shells, including other brachiopods. *Calloria inconspicua* is unusual in that it is the only New Zealand brachiopod that can survive being exposed at low tide (in Otago Harbour). The species range typically extends from the intertidal to around 100 m deep, but has been collected at 450 m on the Chatham Rise. This species is endemic and found all around New Zealand.

main image
Paddy Ryan

inset image
Jeffrey Robinson

Cooper, G.A., Lee, D.E. (1993) *Calloria*; a replacement name for the Recent brachiopod genus *Waltonia* from New Zealand. *Journal of the Royal Society of New Zealand* 23 (3), 257–270.

Doherty, J.P. (1979) A demographic study of a subtidal population of the New Zealand articulate brachiopod *Terebratella inconspicua*. *Marine Biology* 52, 331–342.

BRYOZOANS

MOSS ANIMALS, SEA MATS, LACE CORALS

about bryozoans

Bryozoans are very common marine organisms of rocky coasts and can be found in the intertidal zone of your local sea shore, through diving depths and beyond onto the continental shelf and down to some of the deepest parts of our oceans, but few people will actually recognise what they are. There are about 6,500 recognised living species worldwide and more than 1000 in New Zealand, of which, more than 300 are undescribed. Eight of New Zealand's species can be found in freshwater, but the great majority are marine.

Bryozoans are made up of lots of individuals, called zooids, united in a large colony. Whereas freshwater bryozoans and all bryozoans in the order Ctenostomata have uncalcified zooids, most marine bryozoans have a partially calcified, hard, body wall. Feeding zooids can be tubular (in the order Cyclostomata), or more or less box-like (order Cheilostomata) with a 'lid' (operculum) at the opening where the tentacles emerge. You can just see the feeding zooids on a bryozoan with the naked eye if you look very carefully, as they range in size from 0.3 to 1.5 mm long.

There are three main groups of bryozoans, of which two are featured in this e-guide: class Gymnolaemata, containing orders Cheilostomata and Ctenostomata, and class Stenolaemata, containing order Cyclostomata. Cheilostomata are by far the most common and diverse bryozoans, and the ones that you are most likely to meet while snorkelling or diving.

Bryozoans form erect, encrusting, solid or flexible colonies. Here are some examples of these forms:

Erect flexible colonies with shrub-like, bushy, flat, fan-shaped, tree-like branches

Erect, rigid colonies with branching, folded, pleated, plate-like, solid, lacy, stalk-shaped, or discoid forms

Encrusting colonies

bryozoan species index

For additional information about bryozoans

Bountiful Bryozoans
https://niwa.co.nz/coasts-and-oceans/marine-identification-guides-and-fact-sheets/Bryozoans

Adeonellopsis macewindui Liow & Gordon, 2020

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A large, hard colony with many flattened branches. The branches are short and rounded, or lobed at their tip, erect, and branched like a stag's horn. The colony is purplish-cream with paler tips, but it can appear bleached white.

Adeonellopsis macewindui can be found on rocky substrata from the Three Kings Islands to the Otago Shelf, Snares Platform and Puysegur Bank. There are at least four other species in New Zealand and none of them are named.

to 197 m

Bilaminar. Zooid openings occur on both sides of the branches.

main image
Malcolm P. Francis

Gordon, D.P. (1984) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata from the Kermadec Ridge. *New Zealand Oceanographic Institute Memoir* 91, 198 pp.

Smith A.M. (2009) *Bryozoans of southern New Zealand*. Field identification guide. Department of Marine Science, University of Otago, Dunedin, New Zealand. Version 4, 30 pp.

Beania bilaminata (Hincks, 1881)

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morphology | surface | substrate | habitat

A small, erect, fawn-coloured colony with flat and somewhat flexible, 2-layered fronds. If viewed underwater, zooids can be seen extending out from openings on both sides of the frond.

Found under rock overhangs and attached to brown algae, or the stalks of the bryozoan species *Steginoporella neozelanica*. An endemic species found on Macauley Island (Kermadecs) and around New Zealand.

It could also be.....
Beania serrata

Lightly calcified zooids with membranous frontal wall, small distal operculum. Corners of distal rim have slight projection, short stalked avicularium on most zooids. Tentacle crown with 24–26 tentacles. No ovicells, internal borders.

main image
Malcolm P. Francis

Gordon, D.P. (1984) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata from the Kermadec Ridge. *New Zealand Oceanographic Institute Memoir* 91, 198 pp.
Hutton, F.W. (1904) *Index Faunae Novae Zelandiae*. Dulau & Co, London. 372 pp.

Beania serrata Souto, Nascimento, Reverter-Gil & Vieira, 2018

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morphology | surface | substrate | habitat

This small, orange colony is encrusting, but is very loosely attached and can easily be peeled off the substrate it is growing on. Occasionally this species grows outwards into the water as pictured. Zooids are large so might be visible to the naked eye when viewed under water. When disturbed, mandibles of structures called avicularia attached to zooids close simultaneously, which is visible as a tiny movement to the naked eye.

Found under boulders and on subtidal rock faces around New Zealand from the Kermadec Islands to Foveaux Strait.

to 220 m

It could also be.....

Beania bilaminata

Lightly calcified, large zooids with membranous frontal wall. Zooids arranged in a distinct network, each linked by six tubes to its neighbour and not overlapping. One to two stalked bird's-head avicularia with pointed beak attached beside orifice of zooid. Tentacle crown with 27 tentacles. No spines and no ooecium.

main image
Malcolm P. Francis

Gordon, D.P. (1984) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata from the Kermadec Ridge. *New Zealand Oceanographic Institute Memoir* 91, 198 pp.
Hutton, F.W. (1904) *Index Faunae Novae Zelandiae*. Dulau & Co, London. 372 pp.

Caberea zelandica (Gray, 1843)

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morphology | surface | substrate | habitat

Small and erect, orange colony with simple branches spread out in fan. The colony is rooted to the substratum and is flexible to the touch. The branches fork and are non-jointed with a double row of zooids.

Endemic, found New Zealand-wide.

It could also be.....

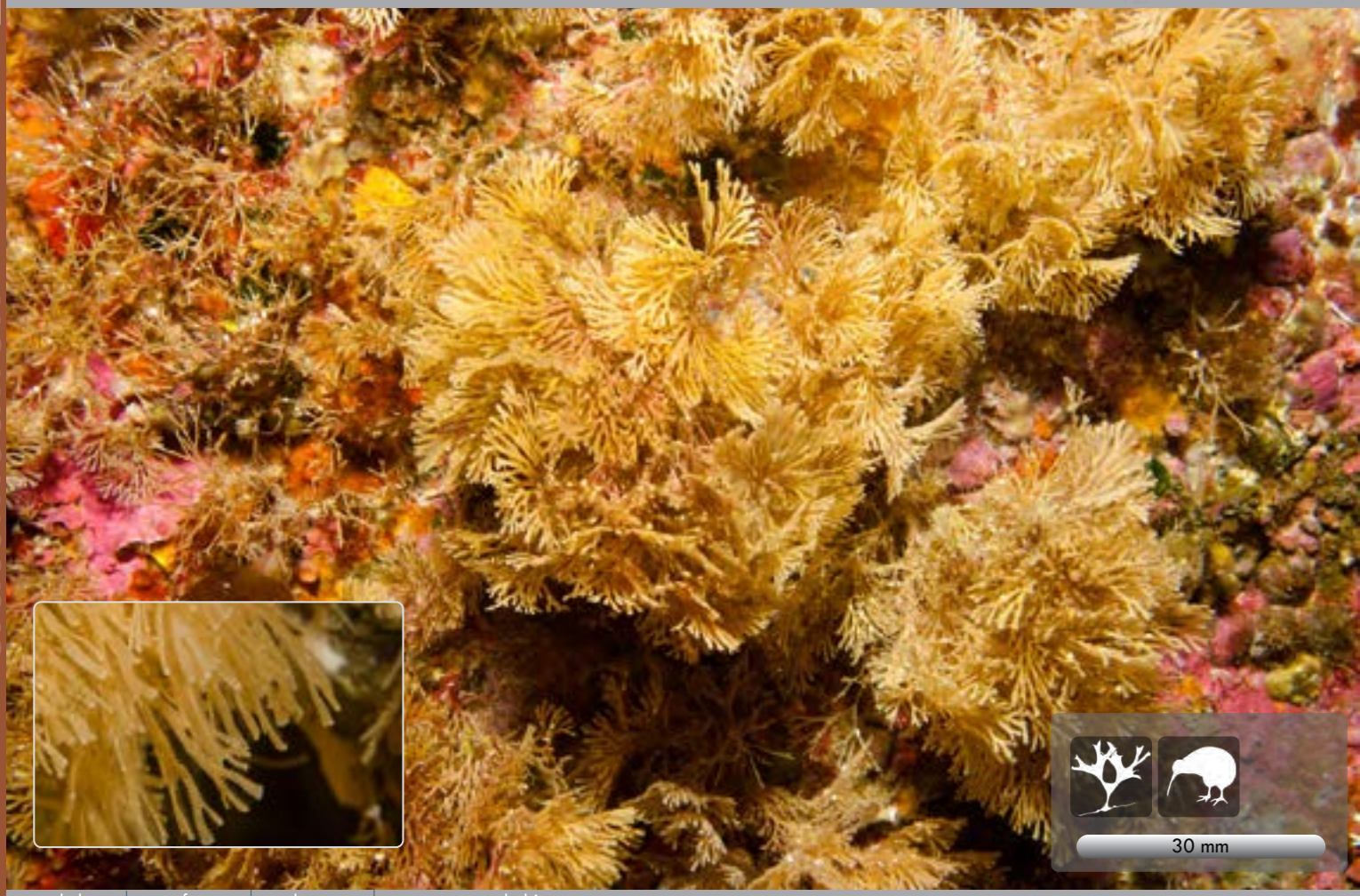
Menipea vectifera

Proximal part of zooid calcified, smooth, with narrow granular crypocyst under frontal membrane. Short pair of spines on either side of orifice, small avicularium adjacent to orifice. Dorsal side of each branch has diverging rows of vibracula, narrow chambers each with long serrated bristle. Just visible to the naked eye. On one side of each branch is a row of serrated bristles. When colonies are disturbed there is a visible movement of the bristles. Ooecium flattened.

main image
Malcolm P. Francis

Gordon, D.P. (1986) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata (Ctenostomata and Cheilostomata Anasca) from the Western South Island Continental Shelf and Slope. *New Zealand Oceanographic Institute Memoir* 95, 121 pp.
Hutton, F.W. (1904) *Index Faunae Novae Zelandiae*. Dulau & Co, London. 372 pp.

Menipea vectifera Harmer, 1923



morphology | surface | substrate | habitat

Erect and flexible bush-like colony which is rooted to substratum. The branches are flattened, and frond-like, 2 mm wide. The colony is opaque beige.

Lives on rock faces. Only occasionally found, but it can be common in those areas. Endemic, occurring at the Three Kings Islands, Cook Strait and Fiordland.

abundance

It could also be.....
Caberea zelandica

Zooids open on one-side, three to 10 longitudinally arranged across whole front wall of branch. Cryptocyst present along margins and under proximal third of zooids. One to two spines distally. Avicularia at proximal end of zooids that lack an ooecium. Ooecium prominent, flattened, smooth with pair of avicularia at distal corners. Dorsal surface of branch occasionally has large avicularia set transversely; smaller of these occur near branch axis.

main image
Malcolm P. Francis

inset image
Crispin Middleton

Gordon, D.P. (1986) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata (Ctenostomata and Cheilostomata Anasca) from the Western South Island Continental Shelf and Slope. *New Zealand Oceanographic Institute Memoir* 95, 121 pp.
Hastings, A.B. (1943) Polyzoa (Bryozoa) I. Scrupocellariidae, Epistomiidae, Farciminariidae, Bicellariellidae, Aeteidae, Scrupariidae. *Discovery Reports* 22, 301–510.

Scrupocaberea ornithorhyncus (Thomson, 1858)

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morphology | surface | substrate | habitat

Colony bushy, twiggy, branching, flexible and jointed. Branches are biserial and bifurcating, semi-transparent with a pale brownish-orange tinge. The colony grows to around 2–3 cm high.

Found under low-tidal boulders and on subtidal rock faces in many parts of the world. The known depth range is about 1 to 250 m.

Individual zooids in the colony have a smooth frontal surface in the proximal half and a large opening in the distal half covered by a membranous wall. Several spines occur on the distal margins of the zooid, typically three to four on the outer corner, two on the inner corner, with a large flattened spine (scutum) covering the membranous frontal wall. Sides of branches can have large triangular avicularia that give branches a serrated profile. Tiny modified avicularia (vibracula) with bristle-like setae occur between the large avivularia, and a pair of these occurs in each branch axil. Ovicells are prominent and smooth with a tiny central pore.

main image
Mike Page

Gordon, D.P. (1986) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata (Ctenostomata and Cheilostomata Anasca) from the Western South Island Continental Shelf and Slope. *New Zealand Oceanographic Institute Memoir* 95, 121 pp.

Tricellaria aculeata (d'Orbigny, 1847)

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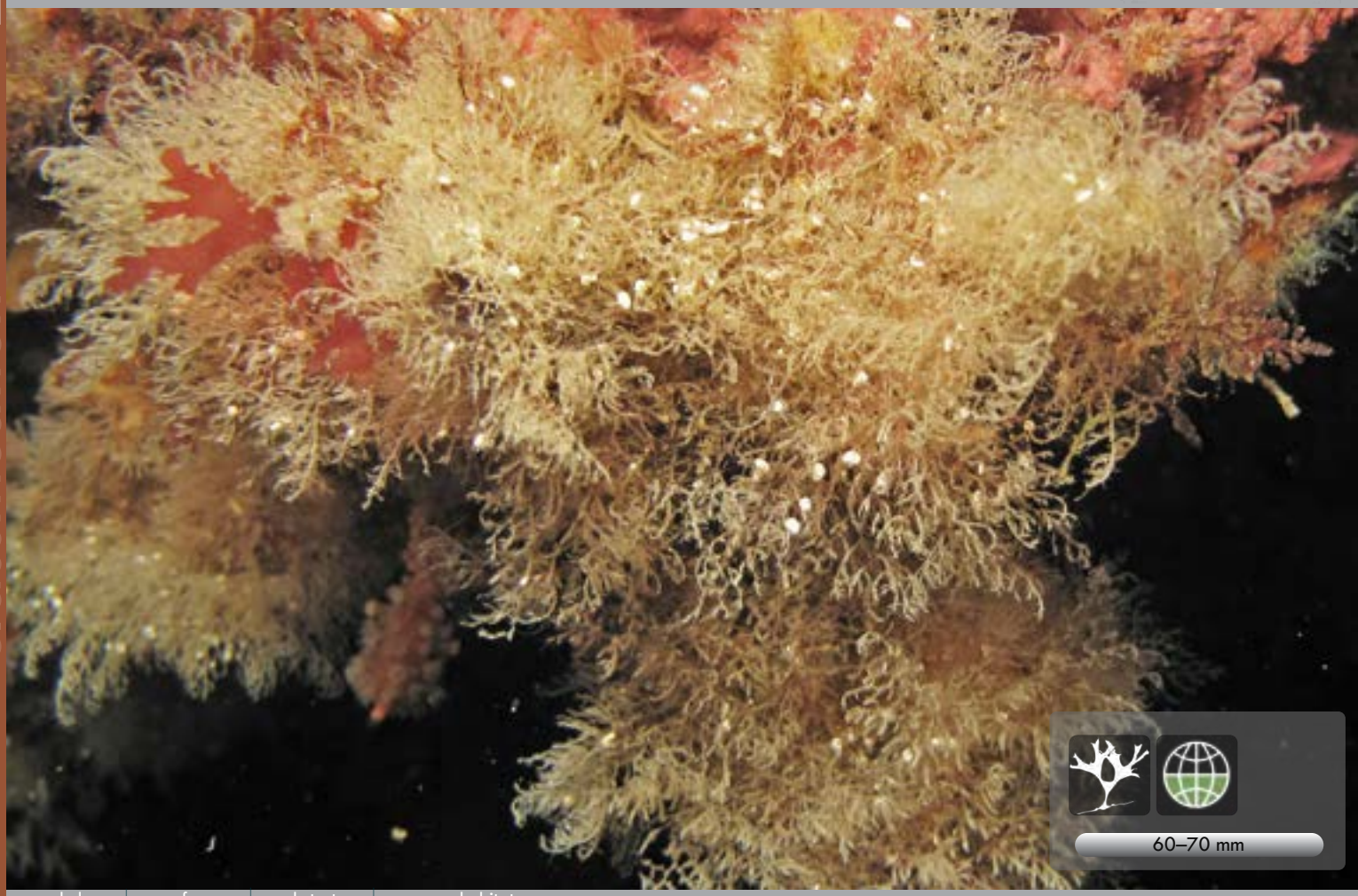

morphology | surface | substrate | habitat

Colony bushy, delicate, branching, flexible and jointed, the branch tips curving inwards a little. Branches are biserial and bifurcating, semi-transparent with creamy tinge. The colony grows to around 6–7 cm high.

Found on subtidal rock faces in many parts of the world. The known depth range is about 16 to 164 m.

Branches comprise successive groups of three zooids, each group separated from its neighbour by a joint. Zooids in the colony have a smooth frontal surface in the proximal half and a large opening in the distal half covered by a membranous wall. Several spines occur on the distal margins of the zooid, typically three to five on the outer corner, two smaller spines on the inner corner, with a forked spine (scutum) arching over the membranous frontal wall. A small avicularium borne frontally on most zooids. Reproductive zooids occur in internodes of four to six zooids. Ovicells are prominent and smooth.

main image
Mike Page

Gordon, D.P. (1986) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata (Ctenostomata and Cheilostomata Anasca) from the Western South Island Continental Shelf and Slope. *New Zealand Oceanographic Institute Memoir* 95, 121 pp.

Catenicella elegans Busk, 1852

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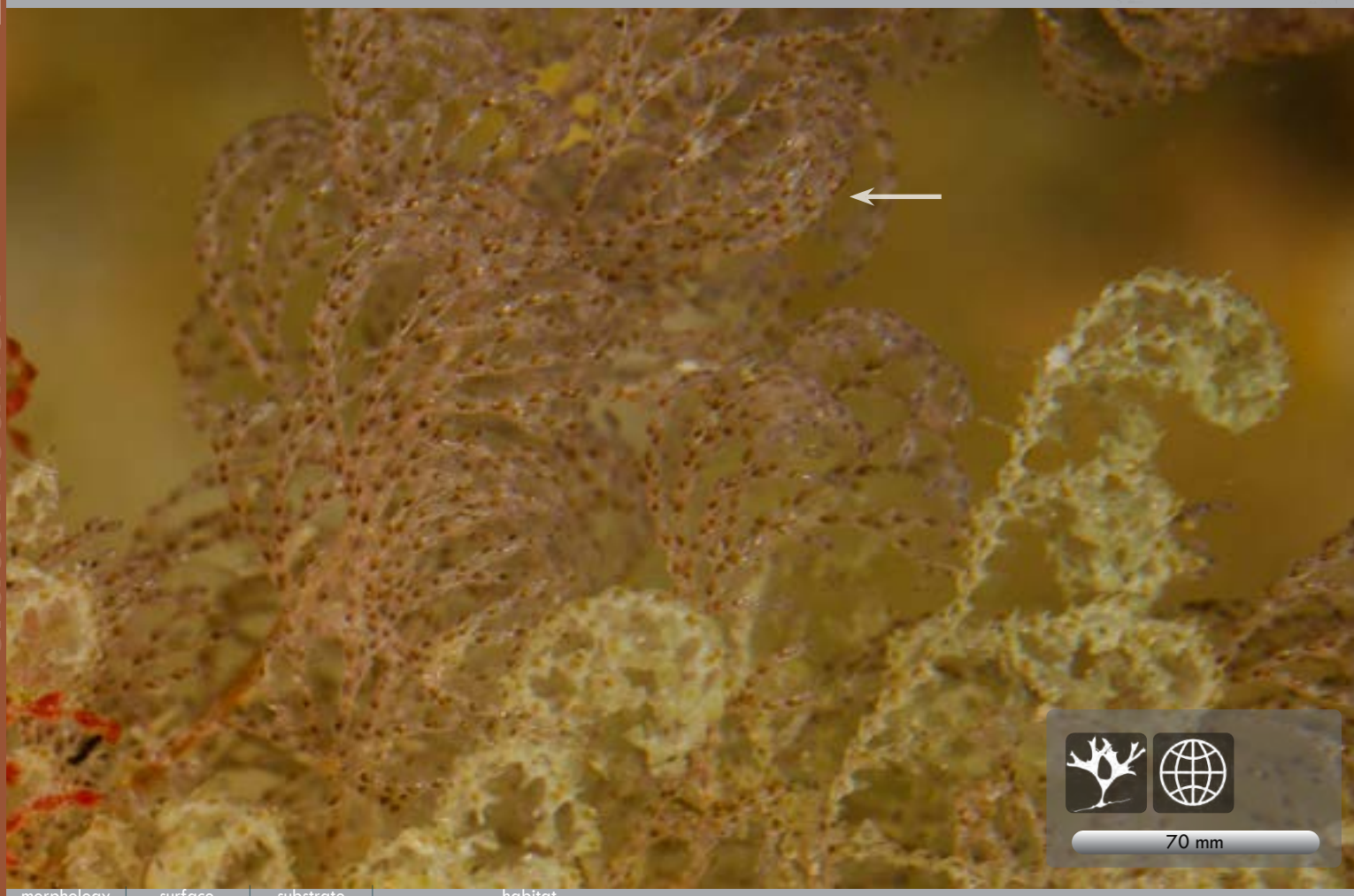

morphology | surface | substrate | habitat

to 220 m

Erect, flexible, delicately bushy translucent colony. Branches curl around slightly towards their tips and are composed of jointed chains of one to two zooids. Brownish-purple.

Found on rock faces and overhangs around New Zealand on both coasts from the Kermadec Ridge to Foveaux Strait. Also known from Australia, South America, Bermuda and Japan.

It could also be.....

Other catenicellid spp.

We recommend microscopic examination of these species to identify further than family level.

Body wall (gymnocyst) smooth with parallel pair of narrow porous slits. Smaller shallow openings next to orifice. Small, outward-facing avicularia at each outer corner. Fertile segment with two zooids, ooecium bulging in between, with slits curving from the sides to the front and one or two pores frontally.

main image
Crispin Middleton

Gordon, D.P. (1984) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata from the Kermadec Ridge. *New Zealand Oceanographic Institute Memoir* 91, 198 pp.
Gordon, D.P. (1989) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata (Cheilostomida Ascophorina) from the Western South Island Continental Shelf and Slope. *New Zealand Oceanographic Institute Memoir* 97, 158 pp.

Pterocella scutella (Hutton, 1880)

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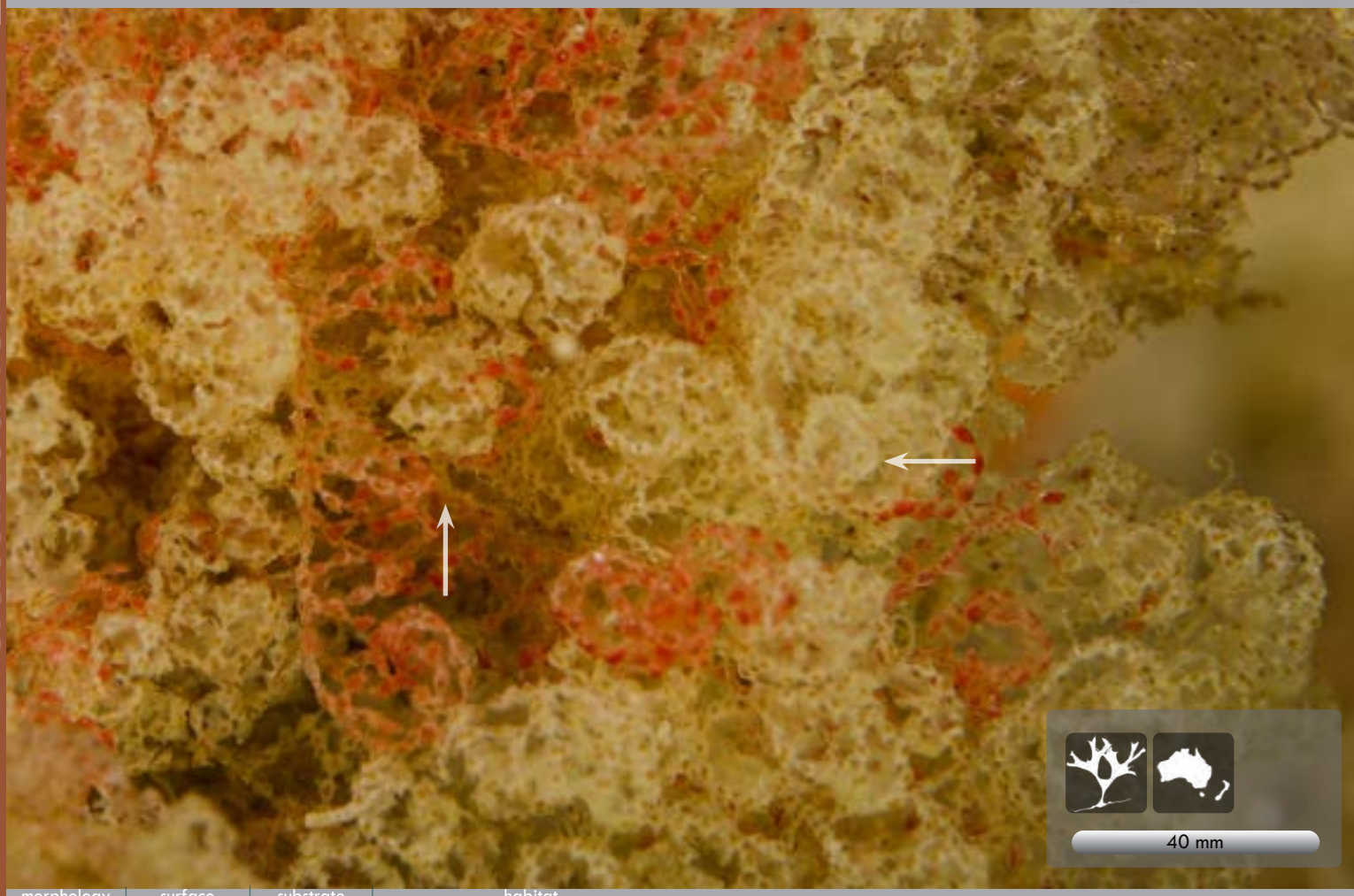

morphology | surface | substrate | habitat

Erect, flexible and bushy colony. Branches curl around at the tips and are made up of chains of one or two zooids separated by flexible chitinous joints. Single zooids are triangular. The photo shows two species of *Pterocella*. The pale yellow one (horizontal arrow) is *P. scutella*, and the red one (vertical arrow) is *P. vesiculosa* (not in this guide).

Usually found growing with other bushy bryozoans or on algal holdfasts between 15–220 m. It is found around New Zealand from the Three Kings Islands to Foveaux Strait. It is also found in Bass Strait and Victoria, Australia.

It could also be.....

Other pale catenicellid species having a similar colony form

We recommend microscopic examination of these species to identify further than family level.

Triangular zooids generally a little wider than long because of projecting corners. Six pore chambers visible in frontal view of zooid, back of each segment is keel shaped. Fertile segment three zooids long with ooecium in first proximal zooid.

main image
Crispin Middleton

Gordon, D.P. (1989) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata (Cheilostomida Ascophorina) from the Western South Island Continental Shelf and Slope. *New Zealand Oceanographic Institute Memoir* 97, 158 pp.
Powell, N.A. (1967) Polyzoa (Bryozoa) – *Ascophora* – from north New Zealand. *Discovery Reports* 34, 199–393.

Cellaria immersa (Tenison-Woods, 1880)

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morphology | surface | substrate | habitat

to 220 m

An erect colony with jointed and fork-tipped cylindrical stems. The colony is anchored to substratum by rootlets giving it some flexibility. White to very pale pink. Colony pictured appears a lot more orange than in life.

Common subtidally to 220 m deep on rock and shelly gravel on both coasts of the South Island of New Zealand and in New South Wales, Australia.

It could also be.....

Cellaria tenuirostris (smaller, with slimmer branches)

Zooids alternating in eight to 22 longitudinal series, with hexagonal or diamond-shaped outline. Membranous frontal wall has extensive, granular cryptocyst beneath. Orifice shaped like a cashew nut. No spines. Avicularia large, triangular and replace zooids in a series. Ooecia occur as inconspicuous bulges, each with small opening above the orifice.

main image
Malcolm P. Francis

Gordon, D.P. (1986) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata (Ctenostomata and Cheilostomata Anasca) from the Western South Island Continental Shelf and Slope. *New Zealand Oceanographic Institute Memoir* 95, 121 pp.

Tenison-Woods, J.E. (1880) *Palaeontology of New Zealand, Part IV. Corals and Bryozoa of the Neozoic Period in New Zealand*. Government Printer, Wellington, 34 pp.

Cellaria tenuirostris (Busk, 1852)

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morphology | surface | substrate | habitat

Erect, flexible branching colony with a forked cylindrical stem. The branches of this species are slender and forked, similar morphologically to *Cellaria immersa*, but with slimmer branches. White.

Found on rock faces and shelly gravel subtidally around New Zealand from Kermadec Islands to Foveaux Strait. Also recorded in southeastern Australia, Japan and the Ogasawara (Bonin) Islands south of Japan.

It could also be.....

Cellaria immersa, which has shorter, thicker branches

Zooids five to eight in longitudinal series. Cryptocyst has pair of curved longitudinal ridges. Orifice cashew nut-shaped and ovicell similar to *Cellaria immersa*, but avicularia narrower.

main image
Malcolm P. Francis

inset image
Crispin Middleton

Gordon, D.P. (1986) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata (Ctenostomata and Cheilostomata Anasca) from the Western South Island Continental Shelf and Slope. *New Zealand Oceanographic Institute Memoir* 95, 121 pp.

Uttley, G.H., Bullivant, J.S. (1972) Biological Results of the Chatham Islands 1954 Expedition Part 7. Bryozoa *Cheilostomata*. *New Zealand Oceanographic Institute Memoir* 57, 59 pp.

Galeopsis polyporus (Brown, 1952)

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morphology | surface | substrate | habitat

Colony firm, with a coral-like branching form. However, it can be found as an encrusting form in shallow water, for example under boulders at Leigh Marine Reserve, which develops into a branched erect form when mature. Cream colour.

Endemic, widespread around New Zealand, however much less commonly encountered than *G. porcellanicus*.

It could also be.....
Galeopsis porcellanicus

Morphologically similar to *Galeopsis porcellanicus* but with numerous small pores in frontal shields of zooids. Ooecium also has small ribbed area, not present in the other species.

main image
Malcolm P. Francis

Gordon, D.P. (1984) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata from the Kermadec Ridge. *New Zealand Oceanographic Institute Memoir* 91, 198 pp.
Gordon, D.P. (1989) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata (Cheilostomida Ascophorina) from the Western South Island Continental Shelf and Slope. *New Zealand Oceanographic Institute Memoir* 97, 158 pp.

Galeopsis porcellanicus (Hutton, 1873)

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morphology | surface | substrate | habitat

to 235 m

Upright, rigid colony with unjointed stems and forked coral-like branching. Rough branches with obvious zooids. Whitish to pink when breeding.

Endemic, found on rock or shelly gravel in sublittoral fringe to 235 m around New Zealand from Three Kings Islands to Foveaux Strait and the Antipodes Islands.

abundance

It could also be.....
Galeopsis polyporus

Zooids arranged in whorls transversely but alternating with zooids above and below. Smooth calcareous frontal shield, with two to four pores on margins. Zooid orifice with small u-shaped notch. Pair of avicularia form a bridge creating a large hole in front of orifice. Tentacle crown has 13–14 tentacles. Ooecium calcified, with a shallow subcircular area outlined on it at front and a short, wide process protruding into the orifice.

main image
Crispin Middleton

Gordon, D.P. (1984) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata from the Kermadec Ridge. *New Zealand Oceanographic Institute Memoir* 91, 198 pp.
Gordon, D.P. (1989) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata (Cheilostomida Ascophorina) from the Western South Island Continental Shelf and Slope. *New Zealand Oceanographic Institute Memoir* 97, 158 pp.

Euthyroides episcopalis (Busk, 1852)

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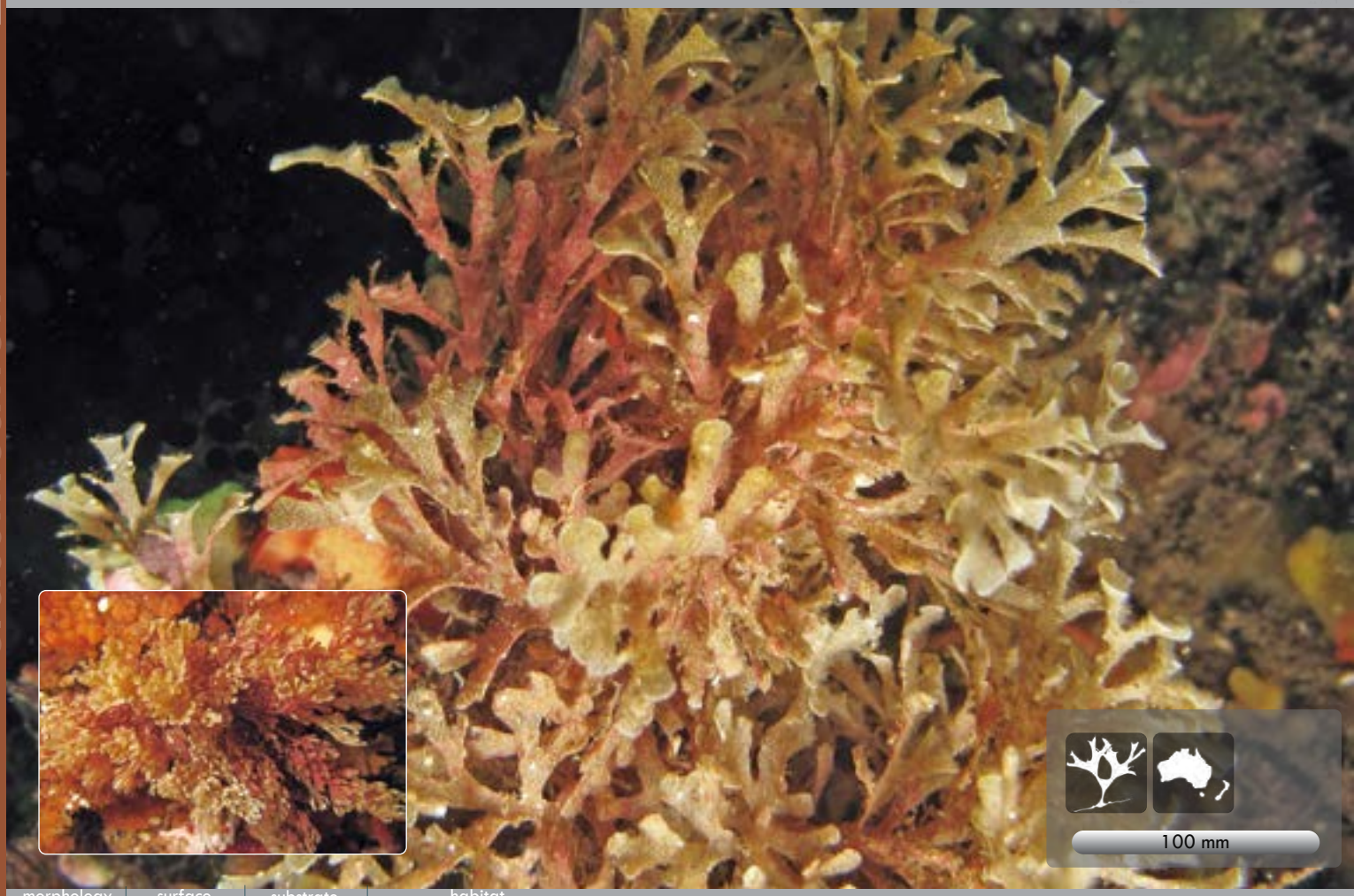

morphology | surface | substrate | habitat

Colony bushy and flexible. Branches are flattened and one-layered, around 1.5 mm wide, bifurcating in one plane. The colony is anchored by rootlets and grows to around 10 cm high. The texture is almost parchment-like, and the colour is creamy, but encrusting coralline algae can turn the branches pinkish-red. No other species in New Zealand has such thinly flattened branches. *Euthyroides episcopalis* could be mistaken for *Menipea vectifera*, which has narrower branches that are two-layered and somewhat stiffer.

Found on subtidal rock faces from Hawke Bay to Chatham Rise and Stewart Island. Also found in southeastern Australia. The depth range is about 10 to 134 m.

It could also be.....

Menipea vectifera

Individual zooids in the colony have a very smooth frontal surface and a rounded operculum. There are no spines or avicularia. Female zooids are recognisable by having flattened rib-like spines proximal to the operculum and conspicuous ovicells shaped like a bishop's mitre, each with a pair of large frontal 'windows' in the calcification.

images
Mike Page

Gordon, D.P. (1989) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata (Cheilostomida Ascophorina) from the Western South Island Continental Shelf and Slope. *New Zealand Oceanographic Institute Memoir* 97, 158 pp.

Celleporaria agglutinans (Hutton, 1873)

Tasman Bay coral

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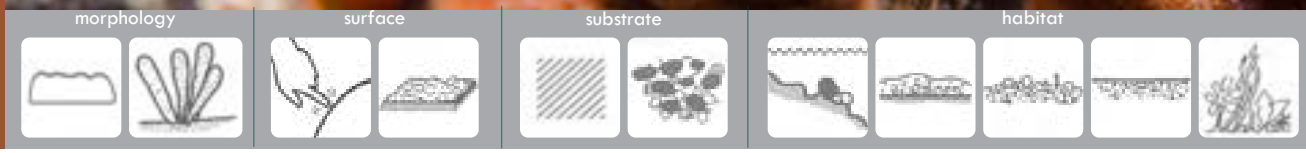

This species forms variable sized encrusting colonies which may have a raised mounded surface or have coral-like tubular projections. The coarse textured surface has semi-erect, chaotically arranged zooids forming multiple layers. The bumpy areas on the side of the colony correspond to areas of exhalant siphons or 'chimneys' where water and food particles flow out over the crown of tentacles of the feeding zooids. Pale pink to orange.

Found on rock faces under the brown seaweed, *Ecklonia radiata*, or attached to shelly rubble in current swept areas. Common around Separation Point in Tasman Bay forming extensive coral-like growths, providing ecologically important habitat for many epifaunal invertebrates and commercially important fish species. Found on both coasts from the Poor Knights to Stewart Island.

to 220 m

Zooid has smooth calcareous frontal surface with tiny pores along margins. Tall spike infront of semi-circular orifice with tiny avicularium in base. Larger avicularia occasional. Hood-like ooecium.

main image
Crispin Middleton

inset image
Malcolm P. Francis

Bradstock, M., Gordon D.P. (1983) Coral-like bryozoan growths in Tasman Bay, and their protection to conserve commercial fish stocks. *New Zealand Journal of Marine & Freshwater Research* 17, 159–163.

Hutton, F.W. (1904) *Index Faunae Novae Zelandiae*. Dulau & Co, London. 372 pp.

Margaretta barbata (Hutton, 1873)

bearded Margaret

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Class Gymnolaemata Order Cheilostomata Family Margarettidae

morphology | surface | substrate | habitat

Erect, flexible colony, rooted to the substratum. The branches are jointed with 4–5 mm long bristles arising from each zooid, giving an overall and distinctive hairy appearance to colony. Light orange.

Lives on rock faces in high current areas. Common, often washed up on the beach after storms in the Cook Strait. Found around New Zealand, from Cape Reinga to Foveaux Strait and in South Australia to New South Wales.

to 275 m

Zooids four-serial, alternating back-to-back pairs. Calcareous frontal shield with longitudinal network of granular ridges, separated by shallow grooves with minute pores. Zooid orifice and operculum concealed by tubular peristome with nearly circular opening. Small ascopore at base of peristome, flanked by bristles. No avicularia or oral spines. Female zooids have upturned spout-like peristome with swollen base.

main image
Malcolm P. Francis

inset image

Gordon, D.P. (1989) The Marine Fauna of New Zealand. Bryozoa: Gymnolaemata (Cheilostomida Ascophorina) from the Western South Island Continental Shelf and Slope. *New Zealand Oceanographic Institute Memoir* 97, 158 pp.

Gordon, D.P., Taylor, P.D., Bigey, F.P. (2009) 13. Phylum Bryozoa: moss animals, sea mats, lace corals. Pp. 271–297 *in*: D.P. Gordon (Ed), *New Zealand Inventory of Biodiversity Volume 1, Kingdom Animalia: Radiata, Lophotrochozoa, and Deuterostomia*, Canterbury University Press, Christchurch, 566 pp.

Membranipora membranacea (Linnaeus, 1767)

morphology | surface | substrate | habitat

Sheet-like, lacy encrusting colony. The colony has distinctive rectangular zooids arranged in a brick-like pattern. White.

Encrusts brown seaweed fronds in the low intertidal, common on less exposed shores. Widespread in New Zealand, with a cosmopolitan distribution.

Transparent membrane covers entire frontal area with semicircular operculum at one end. Seventeen tentacles on tentacle crown. Short tubercles at distal corners of rectangular zooids.

main image
Malcolm P. Francis

Morton, J., Miller, M. (1973) *The New Zealand Sea Shore*. 2nd edition. Collins, 653 pp.
Uttley, G.H. (1951) The Recent and Tertiary Polyzoa (Bryozoa) in the collection of the Canterbury Museum, Christchurch. *Records of the Canterbury Museum* 6, 15–39.

Reteporella aurantium Gordon, 2009

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Colony stiff, brittle, lacy. Branches anastomose, forming a meshwork with holes. Branches are one-layered, facing inwards. The colony grows to around 4 cm high. *Reteporella aurantium* could be mistaken for *Hippellozoon novaezelandiae* (not in this guide), which is very similar, but larger and slightly more robust with thicker branches when mature.

Found under low-tidal boulders and on subtidal rock faces. It was first described from the Wellington south coast (Taputeranga Marine Reserve) as *Reteporella aurantiaca* (a preoccupied name) and later renamed in the same year. It was subsequently found in Fiordland (Charles, Bligh and Doubtful Sounds). The known depth range is about 1 to 18 m.

Individual zooids in the colony have a smooth frontal surface. The operculum is at the bottom of a shaft-like peristome that has a median longitudinal groove and pore in the front. There are no oral spines. Avicularia are mostly small and triangular with ocasional very large avicularia with a hooked tip borne on the front of some zooids. Ovicells have a conspicuous longitudinal slit in the front. This slit is lacking in *Hippellozoon novaezelandiae*, the ovicell of which has a broad opening.

main image
Mike Page

Gordon, D.P. (2009) New bryozoan taxa from a new marine conservation area in New Zealand, with a checklist of Bryozoa from Greater Cook Strait. *Zootaxa* 1987 (1), 39–60.
Gordon, D.P. (2009) New names for bryozoan homonyms. *Zootaxa* 2133 (1), 64–68.

Telopora lobata (Tenison-Woods, 1880)

morphology | surface | substrate | habitat

Small, hard, umbrella-like colony with narrow conical stalk radiating out with slender spiny brittle forked lobes to a stellate 'head'. Zooids arranged in the outward flaring, forked lobes. Off-white colony with pink centre when brooding embryos.

Found on rock faces, loose rock or shell rubble and other bryozoans. Probably widespread around New Zealand from extreme low intertidal to 220 m.

to 220 m

abundance

Centre of disc in mature colonies has flat-surfaced brood chamber with small hood-like openings.

main image
Malcolm P. Francis

inset image
Peter Marriott

Hutton, F.W. (1904) *Index Faunae Novae Zelandiae*. Dulau & Co, London. 372 pp.
Tenison-Woods, J.E. (1880) *Palaeontology of New Zealand, Part IV. Corals and Bryozoa of the Neozoic Period in New Zealand*. Government Printer, Wellington, 34 pp.

Tubulipora anderssoni Borg, 1926

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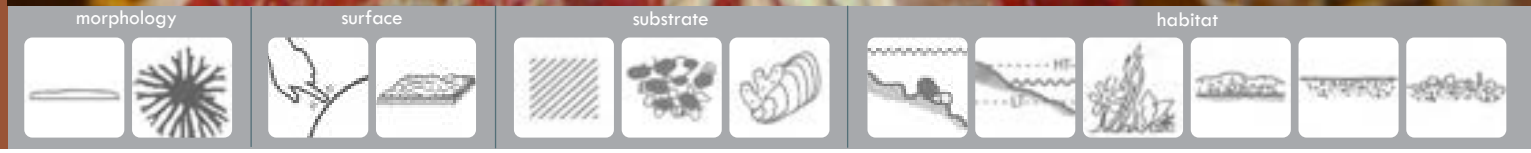

Hard, white, encrusting colony with a snowflake-shaped radiating branching pattern spreading out over the substrate. Peg-like outgrowths along edges of triangular shaped lobes help anchor it to algae.

There are numerous undescribed species of *Tubulipora* in New Zealand waters. *Tubulipora anderssoni* is a brown seaweed or red algal encruster, most common on fronds of *Ecklonia radiata*, but also found on rock and gravel from low intertidal to 20 m. This species has a widespread New Zealand, Antarctic and South American distribution.

Tiny zooids in parallel rows of two to six either side of the midline of lobes. Ten tentacles on tentacle crown. Gonozooid branches along the mid-line of a lobe, extending between zooid rows.

main image
Malcolm P. Francis

Borg, F. (1944) The stenolaematous Bryozoa. *Further Zoological Results of the Swedish Antarctic Expedition 1901–1903* 3 (5), 1–276.
Morton, J., Miller, M. (1973) *The New Zealand Sea Shore*. 2nd edition. Collins, 653 pp.

CNIDARIANS

ANEMONES, CORALS, HYDROZOANS, SEA PENS

about cnidarians

The phylum Cnidaria is a group of over 11,000 species of aquatic animals found predominantly in marine environments. Their distinguishing characteristic is the possession of specialised stinging cells called nematocysts, or cnidae, that they use to capture their prey.

Cnidarians are classified into four main groups that include class Anthozoa (sea anemones, true corals, soft corals, sea fans, sea whips and sea pens), class Cubozoa (box jellyfish), class Hydrozoa (hydroids, hydromedusae, hydrocorals, siphonophores), class Scyphozoa (true jellyfish) and class Staurozoa (stalked jellyfish).

anemones

anemones, tube anemones, jewel anemones, zoanthids

There are four taxonomic orders of anemones or anemone-like creatures included in this guide: Actiniaria (sea anemones), Corallimorpharia (jewel anemones), Spirularia (tube anemones), and Zoantharia (zoantharians). Anemones are generally solitary animals, although jewel anemones live together, and zoanthids are mostly colonial with multiple polyps; only one genus secretes a skeleton, the gold coral. Anemones have a column, an oral disc with a mouth in the middle surrounded by tentacles, and either a pedal disc, firmly or loosely attached to the seafloor, or an inflatable bulb that helps burrowing anemones anchor in soft sediment. The number of layers of body wall tissues (mesenteries) in anemones is used to differentiate species.

corals
black corals

Antipatharia (black corals) are colonial corals with a hard, flexible, proteinaceous, black skeleton that may form branched or unbranched colonies in the form of bottlebrushes, fans, feathers, trees or whips. They are long-lived (recent radiocarbon dating suggested colony ages of 129 and 187 years old) and they are large, growing up to 4 m high. All have small white, orange, or red polyps, with six unbranched tentacles. The shallow-water Fiordland black coral, *Antipathella fiordensis* appears as a ghostly whitish tree to divers, occurs as male and female corals, producing weak swimming larvae with limited dispersal.

hydrozoans
hydroids, hydromedusae, stylasterid hydrocorals, siphonophores

Class Hydrozoa is the most diverse group of cnidarians, most having two life-cycle stages, the polyp and the medusa: the solitary or colonial polyp is referred to as a 'hydroid', and the 'hydromedusa' (resembling a very small jellyfish) is the sexual phase. Two families of athecate hydroids and their medusae (order Anthoathecata) are represented in this guide: family Solanderiidae (containing only the genus *Solanderia*, commonly known as the tree hydroid because of its large size); and family Stylasteridae (containing the hard hydrocoral, *Errina novaezelandiae*), commonly known as lace corals, and which are fragile, usually small, uniplanar to slightly arborescent colonial hydrozoans in phylum Cnidaria. Their calcium carbonate skeleton is often brightly pigmented orange, red, pink, blue, brown, or violet. Stylasteridae have internal fertilisation and brood larvae.

sea pens

The pennatulaceans (sea pens) are colonial marine cnidarians belonging to the octocoral group with eight tentacles on their polyps. Most sea pens attach into soft sediment seafloors by a muscular peduncle that keeps them stable and upright. The primary polyp (oozooid) forms the main body of the sea pen and secondary polyps are used for feeding, reproduction, and water circulation. Sea pens are an important species in soft-sediment and sill communities in Fiordland. Their erect structures may provide refuge for small fish and invertebrates and are likely to be an important food source to specialised nudibranch and ophiuroid predators.

cnidarian species index

For additional information about cnidarians

Adorable Anemones
https://niwa.co.nz/coasts-and-oceans/marine-identification-guides-and-fact-sheets/Adorable-anemones

Actinia tenebrosa Farquhar, 1898

beadlet or waratah anemone, kōtore

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Strongly adherent base. Column is smooth, light to very dark red, appearing lighter when the column is expanded and darker when contracted. Marginal spherules (acrorhagi) under the bases of the outer tentacles are light blue to white in colour. Oral disc and tentacles completely covered when retracted and anemone resembles a dome-shaped blob. The tentacles are conical, numerous (200+) in three concentric cycles around the column, and a lighter red than the column. The pedal disc is strongly attached and wider than the column.

Actinia tenebrosa is a common anemone on the rocky shore, in rockpools and cracks at mid to low tide level. This species is shade-loving so can usually be found under ledges or in caves, and on the bottom of boulders so they can stay cool and moist when the tide is out. Found around New Zealand (including Kermadecs and Auckland Islands) and in eastern and southern Australia (from Perth to New South Wales, Victoria and Tasmania) in the intertidal zone.

It could also be.....

Corynactis australis

main image
Crispin Middleton

inset images
Chris Woods

Farquhar, H. (1898) Preliminary account of some New Zealand Actiniaria. *Journal of the Linnean Society of London (Zoology)* 26, 527–536.
Stuckey, F.G.A. (1909) A Review of the New Zealand Actiniaria known to Science, together with a Description of Twelve New Species. *Transactions of the New Zealand Institute* 41, 374–398.

Phlyctenactis tuberculosa (Quoy & Gaimard, 1833)

wandering anemone, humenga

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Class Anthozoa Order Actiniaria Family Actiniidae

morphology | surface | substrate | habitat

Base only slightly adherent so the anemone can float or crawl and reattach to surfaces easily. Column entirely covered in simple, smooth, blister-like warts (verrucae) arranged in almost vertical rows. Column can be a variety of colours from orange to olive-green, to red-brown, to pale pink and light to dark grey-blue. Numerous short tentacles arranged in six cycles, yellow, brown or orange-coloured. Tentacles and oral disc can be completely hidden when withdrawn.

This is the largest shallow water anemone in New Zealand. Can be found in rockpools and subtidally on sheltered and exposed rocky coasts usually among algae or on rock. Found around New Zealand, including the Chatham Islands, and in southern Australia.

main image
Jennifer Howe

inset images
Chris Woods
Crispin Middleton

Grange, K.R., Watson, J., Cook S.deC., Barnett, T.J., Brook, F.J., Cairns, S.D. (2009) 3. Phylum Cnidaria. Pp. 137–248 *in*: S.deC. Cook (Ed), *New Zealand Coastal Marine Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Morton, J., Miller, M. (1973) *The New Zealand Sea Shore*. 2nd edition. Collins, 653 pp.

Mimetridium cryptum Hand, 1961

plumose anemone

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Adherent base. Translucent white to dark green striped, smooth column. Edge of oral disc undulating, wider than the column, with a white to pale pink mouth. Five to eight cycles of long slender white-green tentacles, numbering up to 400.

Symbiotic algae live within the tissues of this species, hence the occasional green colouration. Lives on hard substrates in Fiordland, but can also withstand being partially buried in muddy sand where it has been found in Otago Harbour, in shady spots under wharf piles. This is a New Zealand endemic species.

images
Malcolm P. Francis

Grange, K.R., Watson, J., Cook S.deC., Barnett, T.J., Brook, F.J., Cairns, S.D. (2009) 3. Phylum Cnidaria. Pp. 137–248 *in*: S.deC. Cook (Ed), *New Zealand Coastal Marine Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Hand, C.H. (1961) Two new acontiate New Zealand sea anemones. *Transactions of the Royal Society of New Zealand* 1, 75–89.

Diadumene neozelanica Carlgren, 1924

striped anemone

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morphology | surface | substrate | habitat

Disc semi-adherent, so anemone can move around. Column, striped and variable in colour from bright orange (as pictured) to dull green and brown hues, smooth with two distinct sections. The basal section is thicker with white longitudinal stripes running down it; the upper part obviously narrower. The orange oral disc is folded into fat lobes and is usually difficult to see for the numerous tentacles covering it. There are two types of tentacles in this species: the outer slender, pale orange and more numerous, the inner longer and slightly thicker, darker orange and with a special type of nematocyst in them to catch prey. Acontia (stinging threads) are released from the column if disturbed. This species can reproduce asexually through fission.

Lives in the low intertidal to shallow subtidal in shady spots, for example under wharf piles, often in association with mussels. An endemic found around New Zealand.

It could also be.....

Mimetridium cryptum

images
Chris Woods

Grange, K.R., Watson, J., Cook S.deC., Barnett, T.J., Brook, F.J., Cairns, S.D. (2009) 3. Phylum Cnidaria. Pp. 137–248 *in*: S.deC. Cook (Ed), *New Zealand Coastal Marine Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Handactis nutrix (Stuckey, 1909)

brooding anemone, nurse anemone

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morphology | surface | substrate | habitat

Small anemone with a smooth column. Column can be orange, dark brown, yellow, blue or green, and sometimes iridescent with small smooth papillae in longitudinal stripes down the column. Short, slender tentacles crowded at edge of disc in three or four cycles, orange to brown colour. About as long as the diameter of the oral disc. Iridescent pink mouth, but this can be variable.

This species has a brood pouch, a fold in the column about 1/3 up from the base, that it keeps young anemones in until formed (see inset image). Lives on the fronds of brown seaweeds in the low intertidal and shallow subtidal zone on rocky shores. It occurs throughout New Zealand, in Southern Australia and Tasmania.

In the NIWA *Marvellous Marine Biota* e-guide, *Adorable Anemones* (Version 1, 2019, page 24), and in Cook's (2010) *New Zealand Coastal Marine Invertebrates* (Volume 1, page 160), the orange and blue-striped anemone was incorrectly identified as *H. nutrix*. We now know that this orange and blue striped anemone is an undescribed species in family Actiniidae, similar to genus *Epiactis* (see for example, *Epiactis thompsoni* on page 15 of the *Adorable Anemones* e-guide), and that it is also a brooder and lives in the same habitat as *H. nutrix*, but is less common.

images
Tony Wills

Grange, K.R., Watson, J., Cook S.deC., Barnett, T.J., Brook, F.J., Cairns, S.D. (2009) 3. Phylum Cnidaria. Pp. 137–248 *in*: S.deC. Cook (Ed), *New Zealand Coastal Marine Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Stuckey, F.G.A. (1909) A Review of the New Zealand Actiniaria known to Science, together with a Description of Twelve New Species. *Transactions of the New Zealand Institute* 41, 374–398.

Corynactis australis Haddon & Duerden, 1896

jewel anemone, humenga

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Class Anthozoa Order Corallimorpharia Family Corallimorphidae

morphology | surface | substrate | habitat

Column is smooth, and comes in a stunning variety of colours: pink, brown, fluorescent green, yellow, apricot. Tentacles are in several cycles, becoming longer towards the margin of the column, and each tentacle has a small ball on the end, called an acrosphere. The tentacles tend to be slightly translucent with the acrosphere more solid and in a contrasting colour to the column. The oral disc is the same colour as the column. This species forms a calcareous basal plate corresponding to the beginnings of a stony coral-like cup. Current genetic research shows that this group is more closely related to stony corals than to anemones. This species reproduces asexually by splitting apart to form several new animals so they occur in close groups together.

Found in deep tidal pools and on shaded vertical walls and under ledges and boulders subtidally on the open coast. The different colour varieties were all thought to be distinct species but are now considered to be one species. This species is found around New Zealand and Australia.

main image
Jennifer Howe

inset images
Serena Cox
Crispin Middleton

Grange, K.R., Watson, J., Cook S.deC., Barnett, T.J., Brook, F.J., Cairns, S.D. (2009) 3. Phylum Cnidaria. Pp. 137–248 *in*: S.deC. Cook (Ed), *New Zealand Coastal Marine Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Stuckey, F.G.A. (1909) A Review of the New Zealand Actiniaria known to Science, together with a Description of Twelve New Species. *Transactions of the New Zealand Institute* 41, 374–398.

Ceriantheopsis zealandiaensis Stampar, Mills, Keable, 2020

tube anemone

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Class Anthozoa Order Spirularia Family Cerianthidae

morphology | surface | substrate | habitat

A long and thin tube dwelling anemone. Numerous (64–70) light brown, marginal tentacles (20–22 mm in preserved specimens, which would be longer when alive), with a longitudinal line running down the tentacles. Numerous (56–62) darker brown, short (less than 1 cm long in preserved specimens) labial tentacles, in three rows. Tough, fibrous but flexible sand-encrusted tube.

Like the other species described in this guide, tube anemones are able to very rapidly disappear into their tubes when approached by divers or potential predators, and the tube can extend some way down into the coarse sand or shell hash on slopes or sediment-filled ledges in the deep rock wall zones in the fiords. This species is only known and described from two specimens collected in Fiordland from a rock wall habitat at Gaer Arm in Kaikiekie/Bradshaw Sound.

The two species of tube anemones present in Fiordland cannot be differentiated easily in the field. Fiordland endemic, *Ceriantheopsis zealandiaensis*, appears to have slightly shorter inner labial (mouth) tentacles and is slightly thinner in diameter than the more widespread and larger species, *Pachycerianthus fiordlandensis*. Because these species have been described from only a few animals, the full geographic range of C. *zealandiaensis* is not yet confirmed.

It could also be.....

Pachycerianthus fiordlandensis

images
Mike Page

Stampar, S.N., Mills, V.S., Keable, S.J. (2020) Ceriantharia (Cnidaria) from Australia, New Zealand and Antarctica with descriptions of four new species. *Records of the Australian Museum* 72 (3), 81–100.

Pachycerianthus fiordlandensis Stampar, Mills, Keable, 2020

tube anemone

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Class Anthozoa Order Spirularia Family Cerianthidae

morphology | surface | substrate | habitat

A large tube dwelling anemone. Brown coloured column hidden by the tough fibrous corrugated tube, sometimes covered in sand grains or encrusted with other invertebrate species. The body inside the tube can be up to 11 cm long. Numerous (60–88) long (~12 cm in preserved specimens but longer when alive) flowing marginal tentacles brown to light brown, about 2 mm thick. Numerous (56–72) shorter (~ 5 cm long in preserved specimens) dark brown labial tentacles around the mouth of the anemone.

Tube anemones are able to very rapidly disappear or retract into their tubes when approached by divers or potential predators, and the tube can extend some way down into the coarse sand or shell hash on slopes or sediment-filled ledges in the deep rock wall zones in the fiords. This species has a relatively wide range around New Zealand and was initially described from specimens collected in Doubtful Sound and Milford Sound, in Fiordland, off Moeraki in Otago, and Great Exhibition Bay in Northland from 15–100 m deep. It differs from the Fiordland endemic, *Ceriantheopsis zealandiaensis*, in being slightly thicker in column diameter and having slightly longer mouth tentacles; the two species present in Fiordland cannot be differentiated easily in the field.

It could also be.....

Ceriantheopsis zealandiaensis

images
Mike Page

Stampar, S.N., Mills, V.S., Keable, S.J. (2020) Ceriantharia (Cnidaria) from Australia, New Zealand and Antarctica with descriptions of four new species. *Records of the Australian Museum* 72 (3), 81–100.

Epizoanthus sp.
white zoanthid anemone

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Tight clumps of small anemone-like polyps joined together at the base as a colony. Column tall and skinny, and embedded with sand grains and generally pale translucent pink to white colour. Tentacles very fine, translucent white, in two cycles (up to 24 in each cycle).

Usually found growing on sponges in recreational diving depths in small patches. Some deeper species have become specialised to live on the shells of hermit crabs. Known from Fiordland, but distribution is likely much wider than that around New Zealand and in deeper waters.

abundance

It could also be.....

Parazoanthus elongatus

main image
Crispin Middleton

Grange, K.R., Watson, J., Cook S.deC., Barnett, T.J., Brook, F.J., Cairns, S.D. (2009) 3. Phylum Cnidaria. Pp. 137–248 *in*: S.deC. Cook (Ed), *New Zealand Coastal Marine Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Parazoanthus elongatus McMurrich, 1904

yellow zoanthid anemone

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Clumps of small anemone-like polyps joined together as a colony with a thin layer of tissue joining them at the base. Column tall and thin, bright yellow to orange coloured. Pale yellow short tentacles in two cycles (23–24 in each cycle). Pale yellow oral disc and mouth.

Commonly covering over the branches of other invertebrates such as sponges or corals. These are found on subtidal reefs around New Zealand. This species was first described from Chile, and may be the same species as found in Australia, however zoanthids in this region are not well studied so further taxonomic research including gene sequencing may reveal more species.

It could also be.....

Epizoanthus sp.

images
Crispin Middleton

Grange, K.R., Watson, J., Cook S.deC., Barnett, T.J., Brook, F.J., Cairns, S.D. (2009) 3. Phylum Cnidaria. Pp. 137–248 *in*: S.deC. Cook (Ed), *New Zealand Coastal Marine Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Sinniger, F., Häussermann, V. (2009) Zoanthids (Cnidaria: Hexacorallia: Zoantharia) from shallow waters of the southern Chilean fjord region, with descriptions of a new genus and two new species. *Organisms Diversity & Evolution* 9 (1), 23–36.

Antipathella fiordensis (Grange, 1990)

Fiordland black coral

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Black coral is a tree-like colonial animal that grows up to 4 m tall, with fine, irregular branches made of a rigid protein (chitin) that forms a black internal skeleton overlaid with a living white covering of small feeding polyps. Some colonies have mutualistic relationships with the snake star, *Astrobrachion constrictum* (Farquhar, 1900), that entwines the delicate branches of the black coral (inset). The host provides a perch for the snake star to feed on (and clear away) organisms that settle on the coral polyps.

While black corals (order Antipatharia) are usually found in waters as deep as 2000 m elsewhere, the Fiordland black coral, *Antipathella fiordensis*, is unusual in that it is typically found between 15 to 30 m deep, on steep rock walls, in the fiords, due to the special brackish and low-light conditions in the fiords. Tagging studies have determined annual growth rates of 1.5 to 25 mm so larger colonies may be up to 400 years old.

The Fiordland species is similar to other *Antipathella* species that are found beyond Fiordland. These have been observed on deep reefs around offshore islands off the northeast coast of the North Island, but typically, in waters deeper than 40 m. Other Antipathella species are widespread to 500 m depths and have been recorded from the eastern Chatham Rise as well as Norfolk, Macquarie and Kermadec Ridges.

It could also be.....

Solanderia ericopsis

images
Mike Page

Grange, K.R. (1990) *Antipathes fiordensis*, a new species of black coral (Coelenterata: Antipatharia) from New Zealand. *New Zealand Journal of Zoology* 17, 279–282.

Ryan, P., Paulin, C. (1998) *Fiordland Underwater, New Zealand's Hidden Wilderness*. Exisle Publishers, Auckland, 192 pp.

Pteroeides bollonsi Benham, 1906

sea pen

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Feather-shaped with paired polyp leaves either side of a fleshy stem (rachis). The polyp leaves are armed with needle-like sclerites along the edge of each leaf. The peduncle, the part of the body usually buried in the substrate, broadens immediately below the lowest leaves; the whole peduncle can reach a similar length to that of the upper portion. Colour is pale apricot to cream to white in life.

Found in enviroments where the seabed enables the sea pen to anchor the peduncle into the substrate. This species was first described from Fiordland in 1906; it has been frequently photographed by divers but has been infrequently collected since. Records for the genus are also not common, with only a few collections confirmed from around north and northeastern New Zealand and Fiordland. There may be an additional two undescribed species of *Pteroeides* in New Zealand waters, and they may occur in deeper waters than this species. The distribution map reflects the known distribution of *Pteroeides bollonsi* to date.

main image
Ken Grange

inset images
Ken Grange
Richard Kinsey

Cairns, S.D., Gershwin, L., Brook, F.J., Pugh, P., Dawson, E.W., Ocaña O.V., Vervoort, W., Williams, G., Watson, J.E., Opresko, D.M., Schuchert, P., Hine, P.M., Gordon, D.P., Campbell, H.J., Wright, A.J., Sánchez, J.A., Fautin, D.G. (2009) 4. Phylum Cnidaria: corals, medusae, hydroids, myxozoans. Pp. 59–101 *in*: D.P. Gordon (Ed), *New Zealand Inventory of Biodiversity Volume 1, Kingdom Animalia: Radiata, Lophotrochozoa, and Deuterostomia*, Canterbury University Press, Christchurch, 566 pp.

Williams, G., Tracey, D., Mackay, E. (2014) Pennatulacea (sea pens) descriptions for the New Zealand region. A field guide of commonly sampled New Zealand sea pens including illustrations highlighting technical terms and sea pen morphology. *New Zealand Aquatic Environment and Biodiversity Report* No. 132, 22 pp.

Solanderia ericopsis (Carter, 1873)

tree hydroid

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to 209 m

Very large, branched, hydroid colonies, mostly fan-shaped or bushy in appearance. Thick main stems arise from hydrorhizal tubes. Branches grow and divide randomly from the main stem, usually in the same plane, creating a fan-shaped structure. Stem and branches are yellow to light brown and are moderately flexible, firm but spongy in texture. White, tubular to club-shaped polyps (hydranths), extend from the horny substance covering stems and branches (perisarc), through small openings, and are covered in whorls of capitate tentacles. Polyps are more common at the terminal branches than the main stems. Clusters of white to creamy pink balloon-shaped reproductive structures (gonophores) can be seen along the branches amongst the polyps.

These conspicuous colonies can be found in rather shallow water, and are sometimes confused with gorgonian corals by divers. They can be long-lived: one colony was observed for more than 15 years during long-term monitoring and reached more than 50 cm in height.

Solanderia ericopsis is often found perching on subtidal rock walls, tolerating some surge and currents. *Solanderia* spp. can form forests which provide shelter and food to other animals such as polychaete worms, nudibranchs, bryozoans and ophiuroids, and in turn *Solanderia* spp. feed on particulates from the water column. This endemic species is found all around the country, including the Auckland Islands, in depths from 10 to 209 m.

It could also be.....

Anipathella fiordensis

main image
Richard Kinsey

inset images
Mike Page
Richard Kinsey

Grange, K.R., Watson, J., Cook S.deC., Barnett, T.J., Brook, F.J., Cairns, S.D. (2009) 3. Phylum Cnidaria. Pp. 137–248 *in*: S.deC. Cook (Ed), *New Zealand Coastal Marine Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Schuchert, P. (1996) The Marine Fauna of New Zealand: Athecate hydroids and their medusae (Cnidaria: Hydrozoa). *New Zealand Oceanographic Institute Memoir* 106, 159 pp.

Errina novaezelandiae Hickson, 1912

red coral

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to 177 m

Errina novaezelandiae is a bright red to red-orange, hard calcified stylasterid hydrocoral, with a uniplanar or fan shape, growing up to 17 cm tall and 21 cm across, with a thick basal stem up to 3 cm thick. The branching pattern is dichotomous and unequal, branches circular to slightly eliptical in cross section, curving and tapering towards narrow tips. The branch core and regenerated branch tips are white. Surface texture feels like coarse sand-paper as it is covered in dense, closely packed, small spines. Feeding pores, more common on the anterior face of the colony, are up to 0.3 mm diameter, and may be seen nestled in the branch surfaces. Colonies are exclusively either male or female and reproduction is by released planula larvae that develop within ampullae, visible as small, superficial hemispheres, embedded in the branch surface, about 0.5–0.8 mm in diameter.

While red corals are usually deep-water species, Fiordland's *E. novaezelandiae* is unusual in that the species is typically attached to walls within the fiords preferring habitats with some current flow around 20 m, due to the special brackish and low-light conditions in the fiords. This species is endemic to New Zealand and protected, and found in Fiordland south to the Auckland Islands where it occurs down to 177 m.

main image
Mike Page

inset image
Ken Grange

Cairns, S.D. (1991) The Marine Fauna of New Zealand: Stylasteridae (Cnidaria: Hydroida). *Memoir of the New Zealand Oceanographic Institute* 98, 99 pp.

DECAPODS

LOBSTERS, CRABS, CRAYFISH, PRAWNS, SHRIMP

The phylum Arthropoda is a large group of animals distinguished from all others by their hard exoskeleton (outer shell) and segmented body. The dominant marine arthropods are the crustaceans, and among these are the Decapoda, which includes the lobsters, crabs, crayfish, prawns and shrimps. Decapoda literally means 'ten-footed', referring to their five pairs of legs.

about rock lobsters

The New Zealand red rock lobster, *Jasus edwardsii* (koura; crayfish) is a nationally significant kai moana species and highly valuable commercially. They are wild caught and regularly fished by commercial, recreational, and customary fishers.

Red rock lobsters are typically associated with creviced reef habitats. Like crabs and prawns, they belong to the order Decapoda and possess five pairs of jointed walking legs along each side of their cylindrical shaped body or carapace. The paired front legs are powerful and used to crush prey but not clawed like some northern hemisphere 'true' lobster species.

The colouration in life is dark red with flecks of yellow to orange throughout. The outer hard shell is intricately sculptured and covered in spines and, along with two long antennae, provide protection. The segmented tail (abdomen) attached to the carapace contains powerful muscles; when the rock lobster is alarmed it can be rapidly flexed to escape any predator. Red rock lobsters are generalist scavenging omnivores but mostly feeding on molluscs and echinoderms.

Red rock lobsters are thought to be relatively long-lived and have a complex life history. After mating, the eggs are carried for four to six months under the female lobster's tail. Upon hatching larvae rapidly moult and spend the next 18 to 24 months as plankton drifting amongst oceanic currents. Eventually, some larvae may settle back towards shore to recommence the life cycle. Settlement fluctuates widely from year to year. Mature rock lobsters grow by an annual moult where they shed their hard exoskeleton and a new softer swollen shell beneath hardens over a period of days.

All commercial supply is sustainably wild caught under the Government quota management system and tightly managed by MPI fishery regulations for commercial, recreational, and customary take. (see MPI recreational take regulations www.mpi.govt.nz/fishing-aquaculture/recreational-fishing/fishing-rules/fiordland-fishery-management-area). Some of these include minimum legal size for both sexes, daily bag limits and further protection such as females when carrying eggs and when lobsters are in a 'soft shell' state.

about crabs

In crabs, the first pair of walking legs has enlarged pincers or claws (chelipeds) and the remaining pairs are used for walking or swimming. Like lobsters and prawns, the main body of a crab is protected by a well-developed, hard outer shell (carapace).

The margins of the carapace may be spiny, with pointed teeth and lobes or completely smooth. The shape and ornamentation of the carapace can be very helpful in identifying crabs. Crabs also have a wide body and very short tail (abdomen), which is usually tucked underneath the body, making crabs wide and compact.

Many crabs are scavenging omnivores, eating any plant or meat scraps they come across. Some species are particularly aggressive and prey upon other invertebrates, and occasionally the odd human finger may get nipped if it comes too close. Crabs live in many different habitats that range from the high intertidal on land, to the deep sea. These habitats include sandy shores, mudflats, estuaries, rockpools and crevices. Some species prefer to hide inside mussels and on seaweed.

The crabs included in this guide belong to two different major groups within the Decapoda, the Anomura and Brachyura.

anomuran crabs

hermit crabs, porcelain crabs, mole and sand crabs

Infraorder Anomura contains 17 families and about 2500 species and includes the hermit and deep-sea king crabs, squat lobsters and porcelain crabs. Only some of these are crab-like. In this guide we include one family, the Porcellanidae, also known as the porcelain crabs, false or half crabs. They have a pair of chelipeds but only three pairs of large walking legs. The last pair of legs, however, is hardly visible, being very small and tucked under the abdomen. Other distinguishing characters are the very long antennae, and flattened chelipeds that are held out flat in front of the body.

true crabs

Infraorder Brachyura contains more than 100 families and more than 6500 species worldwide and are called ‘true’ crabs. The true crabs are common on coasts and in harbours around New Zealand.

decapod species index

For additional information about decapods

Coastal Crabs
https://niwa.co.nz/coasts-and-oceans/marine-identification-guides-and-fact-sheets/Coastal%20Crabs

Jasus edwardsii (Hutton, 1875)

southern rock lobster

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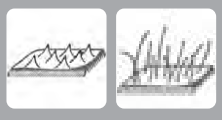
250–400 mm

morphology

surface



substrate

habitat

to 200 m

Jasus edwardsii, the New Zealand red rock lobster, is well known for its distinctively deep red outer shell, bright orange legs, large spiny carapace, long antennae, large abdomen and fanned tail. Males are robustly proportioned compared to females, with prominent front walking legs. The tails of females are wider than those of the males, brooding and holding thousands of small bright red eggs during winter months.

Rock lobsters are found throughout Fiordland from depths of 1 to 200 m but mostly in the mid to outer fiords amongst rocky habitats. They are often found in shallower, open sea areas at the entrances of fiords, where most rock lobsters are caught commercially. The rock lobster is one of New Zealand's most valuable commercial species, highly prized and sought after internationally.

The rock lobster is widely distributed around the coast of New Zealand and offshore islands including Stewart Island and the Chatham Islands. It is also found around the southern coast of Australia (called the 'southern rock lobster', locally), between 1 to 200 m.

While the names 'crayfish' and 'koura' are the most commonly used colloquial names for *Jasus edwardsii*, we prefer to call them 'red rock lobster' as crayfish are strictly freshwater species and koura can refer to both. Although the packhorse rock lobster, *Smagmariasus verreauxi*, is not in this e-guide, it should be mentioned as it can be found in Fiordland, albeit rarely. The packhorse rock lobster has a much larger body size than the red rock lobster and is green, and found in the north and east of the North Island.

main image
Sean Handley

inset image
Stephen Williams

MacDiarmid, A., Booth, J. (2003) 15. Crayfish. Pp. 120–127 in: Andrew, N., Francis, M. (Eds), *The Living Reef: The Ecology of New Zealand's Rocky Reefs*. Craig Potton Publishing, Nelson, 283 pp.

Fisheries New Zealand (2019) *Fisheries Assessment Plenary, November 2019: stock assessments and stock status*. Compiled by the Fisheries Science and Information Group, Fisheries New Zealand, Wellington, New Zealand, 579 pp.

Petrolisthes elongatus (H. Milne Edwards, 1837)

blue half-crab

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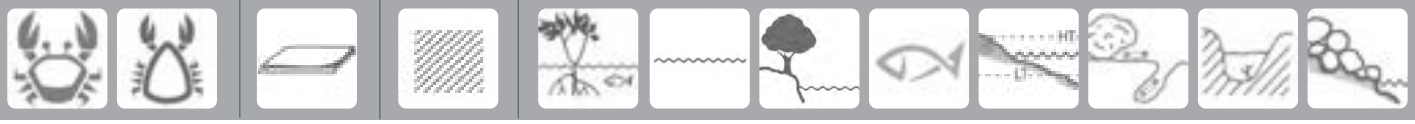

Carapace elongate, flattened, smooth, oval-shaped, front bluntly triangular, rear relatively straight. Carapace margins without teeth. Antennae longer than carapace, whip-like. Eyes large and prominent. Chelipeds very large and flattened, without large teeth or serrations. Last pair of legs setose, reduced, and folded, partially concealed under abdomen. Only three pairs of walking legs. Variable colour on carapace and dorsal surface of claws and legs: black, blue, greyish, greenish or pinkish; ventral surfaces lighter (white, yellow, blue-green).

Endemic, widely distributed around New Zealand, including Stewart and Auckland Islands. Introduced to Tasmania. Common beneath boulders, in mussel beds, the intertidal region of rocky shores, wharf piles and extending into estuaries. Upper littoral down to just below low tide.

main image
Shane Ahyong

inset image
Chris Woods

McLay, C. (1988) Crabs of New Zealand. *Leigh Laboratory Bulletin* 22, 1–463.
Yaldwyn, J.C., Webber, R.W. (2011) Annotated checklist of New Zealand Decapoda (Arthropoda: Crustacea). *Tuhinga* 22, 171–272.

Heterozius rotundifrons A. Milne-Edwards, 1867

big-handed crab

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Carapace oval-shaped, flattened and smooth. Front of carapace smooth except for one small notch between eyes. Surface of carapace and legs are covered almost completely by a compact mat of short setae, often loaded with silt. Chelipeds well-developed and rounded except for slender pincers. Males have one claw that is significantly larger than the other. Walking legs short and stout. Dull yellowish grey/green and often coated with mud, carapace sides and fingers are brighter yellow. Tips of legs dark brown, antennules and eyestalks lighter yellow.

Endemic to New Zealand: found around North Island, South Island and Chatham Island. Buries in sand/gravel, under stones and boulders on rocky shores, very common, slow moving. Littoral and intertidal.

images
Shane Ahyong

McLay, C. (1988) Crabs of New Zealand. *Leigh Laboratory Bulletin* 22, 1–463.
Yaldwyn, J.C., Webber, R.W. (2011) Annotated checklist of New Zealand Decapoda (Arthropoda: Crustacea). *Tuhinga* 22, 171–272.

Metacarcinus novaezelandiae (Hombron & Jacquinot, 1846)

pie-crust crab

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Carapace oval, wider than long. Carapace margins wavy, resembling the margins of a pie-crust. Chelipeds large, with granular surface and four longitudinal ridges. Dark brown or red with darker rim around carapace margin. Chelipeds with black finger tips. Young crabs can be mottled green on carapace with dark brown spots. Legs orange banded and with orange dactyls.

Widely distributed around New Zealand including Chatham and Stewart Islands. Found under stones and among large seaweeds. Adults are found in deeper water on sandy bottoms. Intertidal to at least 40 m. Introduced to southeastern Australia.

main image
Shane Ahyong

inset image
Pete Notman

McLay, C. (1988) Crabs of New Zealand. *Leigh Laboratory Bulletin* 22, 1–463.
Poore, G.C.B. (2004) Marine Decapod Crustacea of Southern Australia: a guide to identification (with chapter on Stomatopoda by Shane Ahyong). Melbourne: CSIRO Publishing, 574 pp.

Leptograpsus variegatus (Fabricius, 1793)

swift-footed shore crab

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Carapace squarish in shape with well defined grooves on surface and along sides. Eyes short, near corners of carapace front. Chelipeds smooth and swollen in mature males (compared with females). Legs long and compressed, third leg longest. Tips of legs pointed and with sharp, spine-like bristles. Carapace can be quite variable and patchy in colour. Juveniles commonly bluish steely grey and transversly lineated with black. Mature animals dark purple with some white patches. Chelipeds white and purple with some white spots.

Widespread around New Zealand (predominantly North Island and northern South Island). Also found in Australia, Indo-Pacific, South America.

A large, active crab, common in the upper intertidal on exposed rocky shores, in cracks, crevices and tide pools, hiding under boulders or seaweed. Also found in muddy harbours. Can often be seen running over the surface of rocks above the water line. Its counterpart on the lower shore and in the subtidal zone is the red rock crab, *Guinusia chabrus*.

It could also be.....

Guinusia chabrus

main image
Shane Ahyong

inset image
Chris Woods

Griffin, D.J.G. (1973) A revision of the two southern temperate shore crabs *Leptograpsus variegatus* (Fabricius) and *Plagusia chabrus* (Linnaeus) (Crustacea, Decapoda, Grapsidae). *Journal of the Royal Society of New Zealand* 3 (3), 415–440.
Yaldwyn, J.C., Webber, R.W. (2011) Annotated checklist of New Zealand Decapoda (Arthropoda: Crustacea). *Tuhinga* 22, 171–272.

Notomithrax spp.

camouflage crabs

morphology | surface | substrate | habitat

Carapace triangular to pear-shaped and covered in short, blunt spines or tubercles, or short, hooked bristles. Two rostral spines protrude between eyes forming a V. Carapace margin with 9–12 outwardly directed spines, may also have two posterior spines. Chelipeds long and slender in males, walking legs slender with first pair being the longest, getting progressively shorter. Carapace often covered in short bristles or long, stout setae, with tufts of seaweed or sponges attached, giving a shaggy, camouflaged appearance.

Carapace may also accumulate mud and debris giving a 'muddy' appearance. Colouration variable depending on species. Body and appendages may be yellowish, with upper surface of claws dark red or purple, tips of walking legs white (*N. minor*). Dorsal surface of carapace may be orange to deep red, with tips of fingers white and chelipeds greenish brown (*N. peronii*). Chelipeds may be orange to dark red, with tips of fingers white (*N. ursus*).

Widely distributed around New Zealand including Stewart and Chatham Islands. Also found in southeastern Australia. Can be common in harbours, on sandy, muddy or coarse shell bottoms and rocky shores, rockpools and sometimes amongst seaweed, down to 75 m. *Notomithrax peronii* is more common offshore, *N. ursus* is often buried in sand/coarse substrates.

main image
Serena Cox

inset image
Shane Ahyong

Griffin, D.J.G. (1966) The Marine Fauna of New Zealand: spider crabs, family Majidae (Crustacea, Brachyura). *New Zealand Oceanographic Institute Memoir* 35, 111 pp.
McLay, C. (1988) Crabs of New Zealand. *Leigh Laboratory Bulletin* 22, 1–463.

Ovalipes catharus (White, 1843)
paddle crab

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Carapace slightly wider than long, oval-shaped, surface slightly evenly grainy, sides with five teeth behind eyes. Carapace margin between eyes with four teeth. Walking legs flattened and unspined. Last pair of legs flattened into rounded paddles, fringed with setae. Very aggressive. Overall sandy-gray background with orange-red highlights, especially on chelipeds. Upper rear surface of carapce with pair of reddish-maroon eye-spots. Swimming paddles with purplish tint. Underside white.

Widespread around New Zealand including Stewart and Chatham Islands; also southern Australia. Found in the surf zone on sheltered and open coasts on sand or sandy-mud. Intertidal to 100 m deep.

main image
Shane Ahyong
inset image

Stephenson, W., Rees, M. (1968) A revision of the genus *Ovalipes* Rathbun, 1898 (Crustacea, Decapoda, Portunidae). *Records of the Australian Museum* 27, 213–261.
McLay, C. (1988) Crabs of New Zealand. *Leigh Laboratory Bulletin* 22, 1–463.

Guinusia chabrus (Linnaeus, 1758)

red rock crab

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Carapace as wide as long, squarish in profile, with four well-defined spines on sides. Front between eyes with deep notches. Carapace, chelipeds and legs covered with red-brown furry velvet; naked ridges on dorsal surfaces darker brick red. Chelipeds moderately long and enlarged in mature males, covered in rows of tubercles. Strong walking legs with serrated anterior margins on first segment. Very fast moving. Underside of body and inner face of claws and tubercles creamy-white.

Widely distributed around New Zealand (not as common in southern South Island) and Chatham Islands. Also found in the Indo-Pacific, Australia, South Africa, Chile. Subtidal along exposed rocky coasts and reefs, cryptic. Nocturnal in rockpools at low tide, rarely out of the water. Low tide to 25 m.

It could also be.....

Leptograpsus variegatus

main image
Shane Ahyong

inset image
Serena Cox

Griffin, D.J.G. (1973) A revision of the two southern temperate shore crabs *Leptograpsus variegatus* (Fabricius) and *Plagusia chabrus* (Linnaeus) (Crustacea, Decapoda, Grapsidae). *Journal of the Royal Society of New Zealand* 3 (3), 415–440.

Dawson, E.W. (1987) A key to the world species of *Plagusia* (Crustacea: Brachyura) with a new record of *P. depressa tuberculata* Lamarck from New Zealand. *National Museum of New Zealand Records* 3 (4), 37–45.

ECHINODERMS

STARS (SEA, BRITTLE, SNAKE, FEATHER), SEA URCHINS, SEA CUCUMBERS

about echinoderms

Echinoderms are found in a great number of habitats from the shallow intertidal zone, at snorkelling and diving depths, right down to the deepest trenches and abyssal plains of our oceans. So it is quite likely that whenever you are in or on the sea an echinoderm won't be far away.

Echinoderm means 'spiny skin' and this is seen in many of the echinoderm species, though not all of them have obvious spines. The basic body plan of an echinoderm is made up of a five-sided (pentaradial) symmetry and they don't have a head or eyes. They all share a water vascular system, usually with tube feet, which helps them with breathing, feeding and movement in their habitat.

Within all of the groups there are species that are filter feeders, deposit feeders, scavengers and predators. With few exceptions the echinoderms have separate sexes and breed by fertilisation to create an embryo, but the sexes are usually very difficult or impossible to tell apart.

Echinoderms are fed on by fish, other echinoderms and humans. The most well-known species that makes up part of the human diet is kina, *Evechinus chloroticus* (Valenciennes, 1846), and the sea cucumber, *Australostichopus mollis* (Hutton, 1872). Some echinoderms have the remarkable ability of autonomous self-regeneration if they are injured or about to be eaten. Sea cucumbers are able to eviscerate or spew out their internal organs and regrow a new set, while sea stars and brittle stars can drop an arm (or several) and regenerate it.

There are **five** classes of echinoderms, the **Asteroidea** (sea stars), **Ophiuroidea** (brittle, basket and snake stars), **Crinoidea** (feather stars and sea lilies), **Echinoidea** (sea urchins) and **Holothuroidea** (sea cucumbers).

The five classes are arranged throughout this guide according to their position in three subphyla Asterozoa (Asteroidea, Ophiuroidea), Crinozoa (Crinoidea) and Echinozoa (Echinoidea, Holothuroidea).

sea star
Asteroidea

brittle star
Ophiuroidea

feather star
Crinoidea

sea urchin
Echinoidea

sea cucumber
Holothuroidea

asteroids
starfish, sea stars

Asteroidea are generally star-shaped with a central disc and five or more long or short arms; the ratio of the central disc size to the arm length can differentiate species. Starfish bodies are made up of calcified plates which are either obvious (like paving) or are partially or totally covered in skin, spines, and granules. Starfish are distinguished from brittle stars and snake stars by the presence of a canal or furrow on the underside of their arms. These furrows contain tube feet for 'walking'. There are eight orders of starfish; all eight orders are found in New Zealand waters.

ophiuroids
brittle stars, snake stars

Ophiuroidea are star-shaped echinoderms with a distinct central disc and five slender arms, though there are some species with six, seven or eight arms. Ophiuroids are distinguished from starfish by the underside of their arms, which lack a grooved canal from which the tube feet emerge. Ophiuroid tube feet emerge from small pores in the underside of their arms, which are sometimes covered by bony scales. They are split into several orders but have three forms that look quite different to each other, the brittle stars (in several different orders), the basket stars and snake stars (in order Euryalida).

crinoids
feather stars

Crinoidea fall into two general groups: the deep-sea stalked crinoids or sea lilies that may be permanently attached to the substrate, and the diverse, mobile feather stars that occur in all depths. The main body (crown) of the crinoid consists of a calyx (cup) housing the internal organs and numerous upward pointing feather-like arms. These arms are composed of many small jointed segments that are used to filter small organic particles from the passing currents. The anus and mouth lie adjacent to each other on the upper surface of the calyx, leaving the underside free to bear the jointed cirri used to grip the substrate.

echinoids
sea urchins

Echinoidea are circular or oval-shaped echinoderms in two main forms: the ball-shaped 'regular' echinoids such as the common kina, and the 'irregular' forms including heart urchins and sand dollars. Regular echinoids are usually found on rocky reefs while irregular species live almost exclusively on soft substrates. There are over 100 echinoid species recorded from New Zealand and all are endemic, but some are also found in Australia and others have a Pacific or worldwide distribution. Many either live deeper than 150 m or are tropical species found at the southern limit of their range only in the Far North.

holothuroids
sea cucumbers

Holothuroidea possess a conspicuous spiny skeleton and the body wall is soft or leathery. The calcified skeleton is composed of unique microscopic ossicles embedded in the body wall; these beautiful geometric structures (perfect wheels, anchors, cups, tables, plates) are used to distinguish species. The water vascular system consists of anterior feeding tentacles and true tube feet that vary in their arrangement on the body wall. Holothurians are often common and conspicuous in New Zealand waters but mostly in offshore habitats. They are generally slow moving and/or sedentary and are often targeted as food by fish and crustaceans. There are seven orders of living Holothuroidea.

echinoderm species index

For additional information about echinoderms

Extraordinary Echinoderms

https://niwa.co.nz/coasts-and-oceans/tools-and-resources/Echinoderm%20ID%20Guide

Coscinasterias muricata Verrill, 1870

eleven-arm starfish

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Eleven arms, disc radius ~ 1/6 the length of the arms. Upper surface with rows of single pointed spines, spines inside little rosettes, marginal plates not obvious. Pale orange to grey/blue.

Intertidal to subtidal. This predatory species is common in sandy and rocky areas where prey abundance is high, such as on rocky reefs, and on man-made structures such as wharf piles and under mussel farms. Found throughout mainland New Zealand and Australia.

main image
Chris Woods

inset image
Pete Notman

McKnight, D.G. (2006) The Marine Fauna of New Zealand: Asteroidea (sea-stars). 3. Orders Velatida, Spinulosida, Forcipulatida, Brisingida with addenda to Paxillosida, Valvatida. *NIWA Biodiversity Memoir* 120, 187 pp.

Skold, M., Barker, M.F., Mladenov P.V. (2002) Spatial variability in sexual and asexual reproduction of the fissiparous sea star *Coscinasterias muricata*: the role of food and fluctuating temperature. *Marine Ecology Progress Series* 233, 143–155.

Stegnaster inflatus (Hutton, 1872)

ambush starfish

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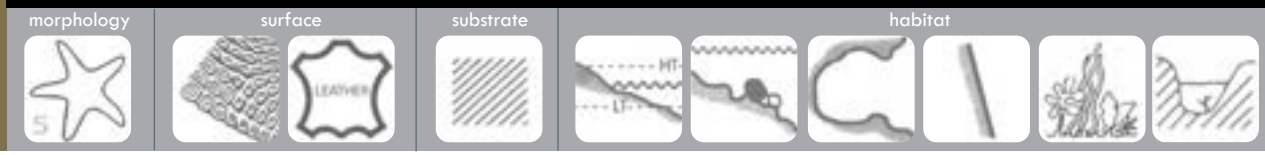
Class Asteroidea Order Valvatida Family Asterinidae



Five arms, disc radius about 2/3 the length of the arms. Upper surface covered in overlapping skin-covered plates, marginal plates not obvious. Colour highly variable, red, orange, pink, yellow, olive green. Sometimes mottled.

Intertidal to shallow subtidal. Known as the ambush star as this predatory species raises itself off the substrate, creating a refuge underneath for small invertebrates. The starfish then lowers itself onto them, trapping them and eating them. Widespread around New Zealand in shallow water.

images
Andy Miller

Clark, H.E.S., McKnight, D.G. (2001) The Marine Fauna of New Zealand: Echinodermata: Asteroidea (sea-stars) order Valvatida. *NIWA Biodiversity Memoir* 117, 269 pp.

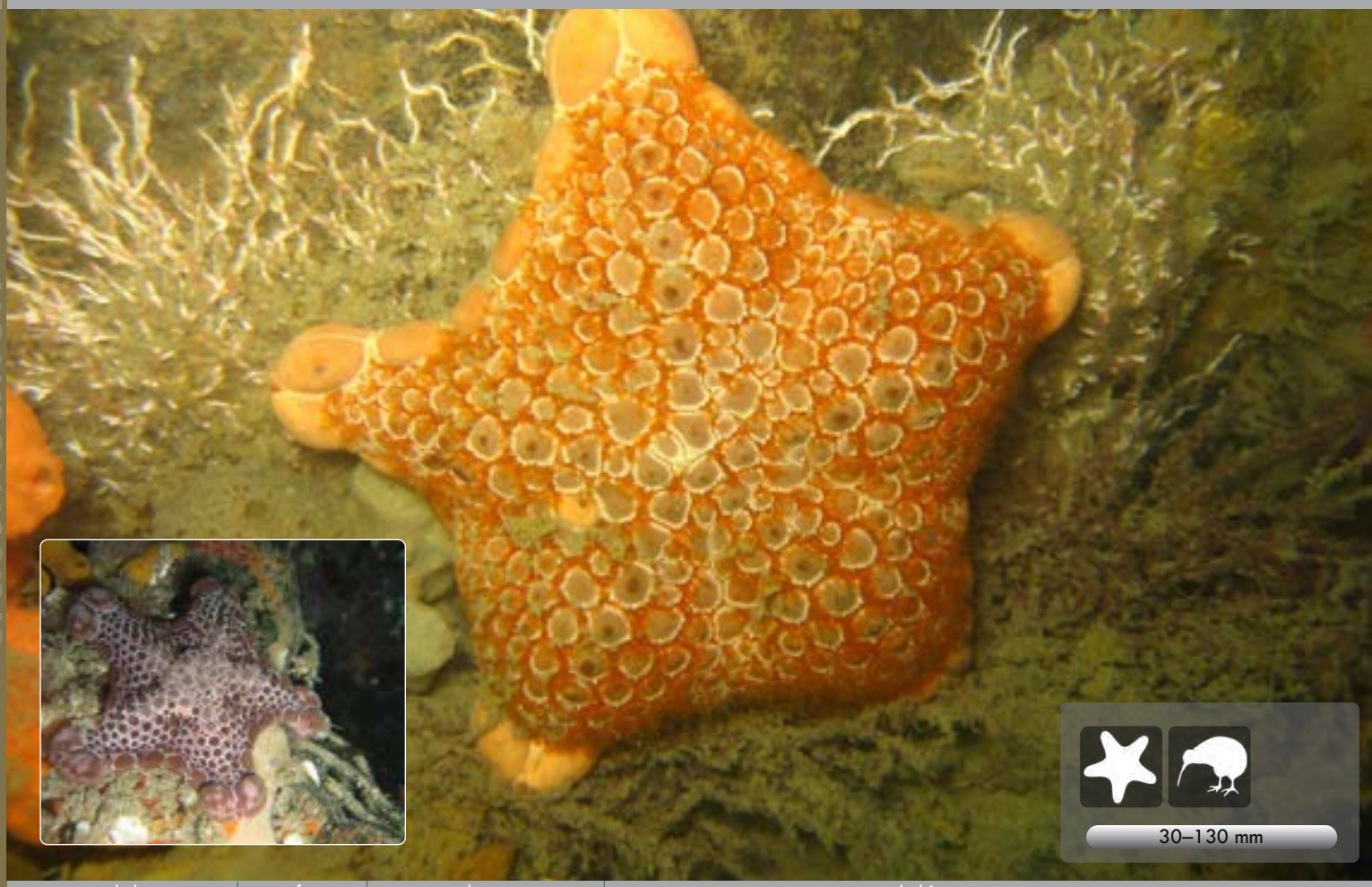
Grace, R.V. (1974) Feeding behaviour of *Stegnaster inflatus* Hutton (Class: Asteroidea, Family: Asterinidae). *Tane* 20, 163–165.

Pentagonaster pulchellus Gray, 1840

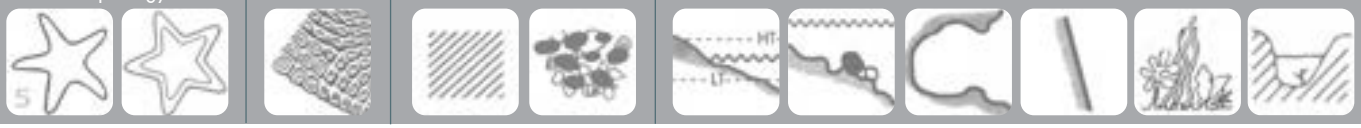
biscuit star

Return to Index

Class Asteroidea Order Valvatida Family Goniasteridae



morphology | surface | substrate | habitat



Five arms, disc radius ~ 2/3 the length of the arms. Upper surface covered in hard, naked plates, marginal plates very obvious. Marginal plates at arm tips are enlarged. Red, orange or purple/brown.

Intertidal to subtidal. From northern North Island south to the Snares Islands, and east to the Chatham Islands. Particularly common in Cook Strait and around the South Island.

to 300 m

main image
Chris Woods

inset image
Rachel Boschen

Clark, H.E.S., McKnight, D.G. (2001) The Marine Fauna of New Zealand: Echinodermata: Asteroidea (sea-stars) order Valvatida. *NIWA Biodiversity Memoir* 117, 269 pp.

McKnight, D.G. (1993) Records of echinoderms (excluding holothurians) from the Chatham Islands. *New Zealand Journal of Zoology* 20 (3), 191–200.

Diplodontias miliaris (Gray, 1847)

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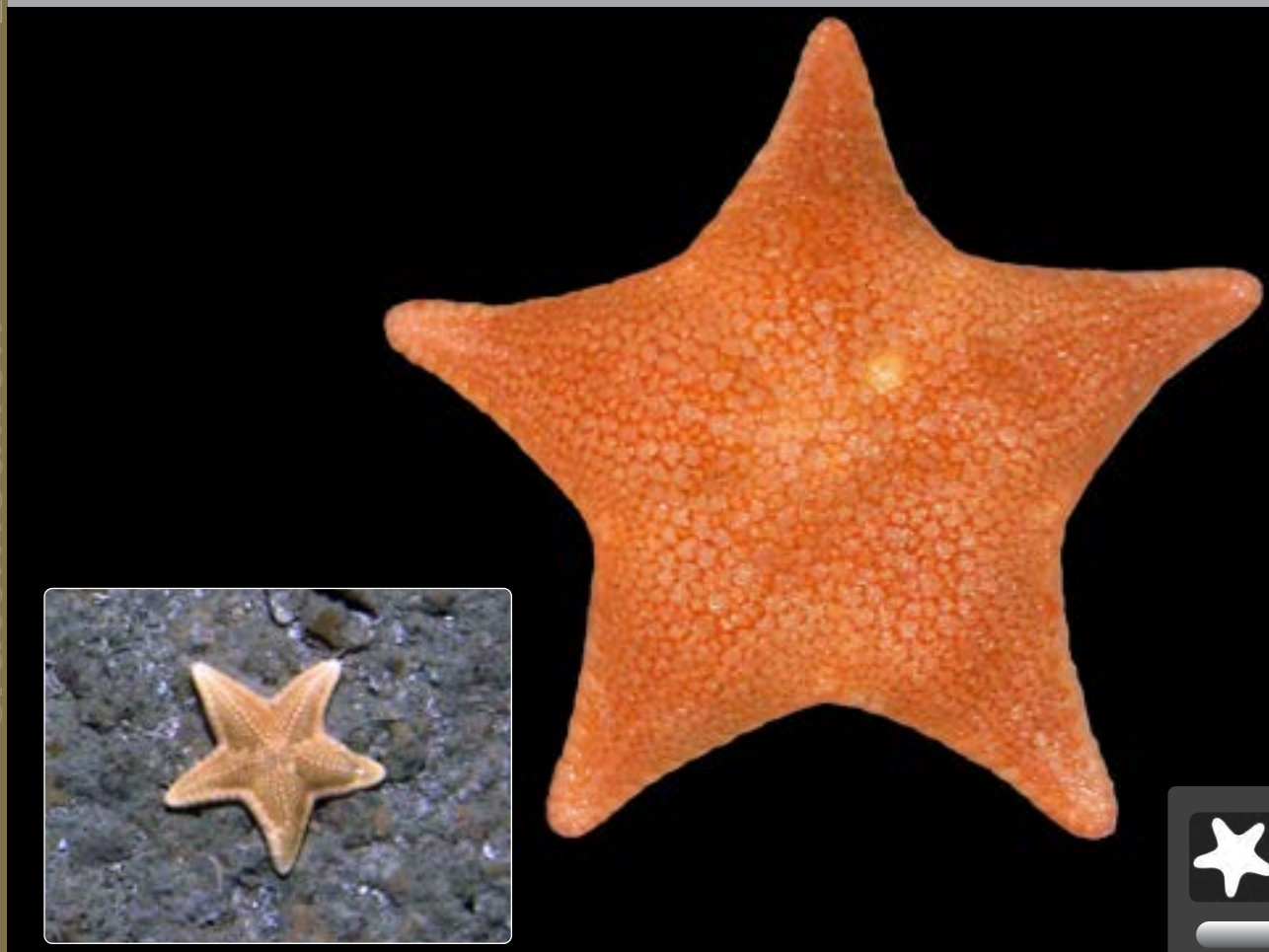
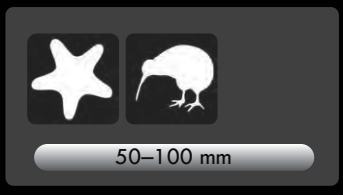
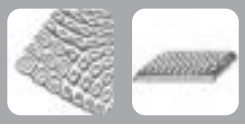




morphology

surface



substrate

habitat

to 200 m

Five arms, disc radius ~ 1/2 the length of the arms. Upper surface with plates covered in small granules, marginal plates obvious and all of a similar size. Dull to bright orange.

Intertidal to subtidal. East Coast of South Island, from Kaikoura to Foveaux Strait. A single record from Fiordland. Endemic to New Zealand.

It could also be

Pentagonaster pulchellus

main image
Warrick Lyon

inset image
NIWA

Clark, H.E.S., McKnight, D.G. (2001) The Marine Fauna of New Zealand: Echinodermata: Asteroidea (sea-stars) order Valvatida. *NIWA Biodiversity Memoir* 117, 269 pp.

Mah, C.L., McKnight, D.G., Eagle, M.K., Pawson, D.L., Ameziane, N., Vance, D.J., Baker, A.N., Clark, H.E.S., Davey, N. (2009) 21. Phylum Echinodermata: sea stars, brittle stars, sea urchins, sea cucumbers, sea lilies. Pp. 371–400 *in*: D.P. Gordon (Ed), *New Zealand Inventory of Biodiversity Volume 1, Kingdom Animalia: Radiata, Lophotrochozoa, and Deuterostomia*, Canterbury University Press, Christchurch, 566 pp.

Anneissia benhami (A.H. Clark, 1916)

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Class Crinoidea Order Comatulida Family Comatulidae

Previously known as *Oxycomanthus benhami*

morphology | substrate | habitat

Feather star with usually 31–44 feather-like arms composed of a central segmented spine bearing dozens of segmented pinnules, the main food-gathering device. There are 33–73 cirri (appendages used to anchor the animal to the substrate), each comprising 30–37 segments. Colour mainly burgundy, chocolate-purple, deep brown, or black. They cling to rock surfaces or other organisms, e.g. black corals, and can move short distances by using their arms to swim.

Found all around New Zealand and widespread around Australia and the Southwest Pacific where they can occur down to 930 m. In Fiordland they are common as shallow as 8 m, but elsewhere are usually deeper than 30 m.

Cenolia spanoschistum (not in this guide) is a similar colour but has fewer arms (usually < 20) and has yellowish tips to the arm pinnules.

main image
Malcolm Francis

McKnight, D.G. (1977) Additions to the New Zealand crinoid fauna. *New Zealand Oceanographic Records* 3 (11), 93–112.
Naughton, K.M., O'Hara, T.D., Appleton, B., Gardner, M.G. (2014) Sympatric cryptic species in the crinoid genus *Cenolia* (Echinodermata: Crinoidea: Comasteridae) delineated by sequence and microsatellite markers. *Molecular Phylogenetics and Evolution* 78, 160–171.

Evechinus chloroticus (Valenciennes, 1846)

kina

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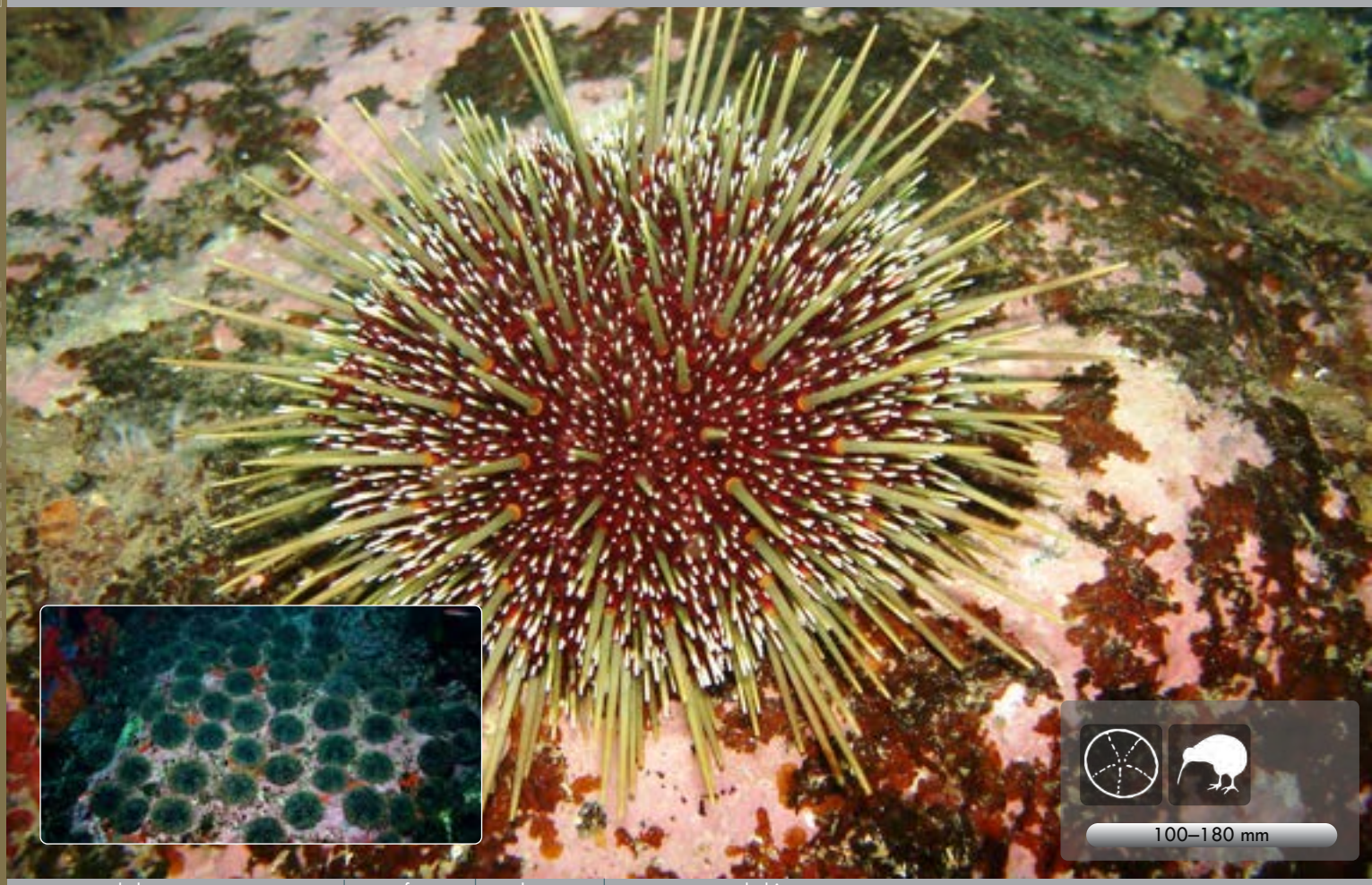

morphology

surface

substrate

habitat

Round to slightly sub-pentagonal sea urchin, flattened, with solid sharp pale green spines. Spine tips of the smaller secondary spines, and occasionally the larger primary spines, white. Tube feet and the skin layer reddish-brown, but the test (skeleton) is green when cleaned. Mouth central on the lower side with five, sharp-tipped teeth. Can be very large (up to 180 mm diameter) especially in southern areas.

Kina are found nestled in cracks and under ledges or fully exposed on open reefs. They often form large aggregations, stripping stands of seaweed to form areas of bare rock. Kina are edible, supporting significant commercial and recreational fisheries. Found all around New Zealand.

main image
Chris Woods

inset image
Malcolm Francis

Dix, T.G. (1970) Biology of *Evechinus chloroticus* (Echinoidea: Echinometridae) from different localities 1. General. *New Zealand Journal of Marine and Freshwater Research* 4 (2), 91–116.

Dix, T.G. (1972) Biology of *Evechinus chloroticus* (Echinoidia: Echinometridae) from different localities 4. Age, growth, and size. *New Zealand Journal of Marine and Freshwater Research* 6 (1–2), 48–68.

Pseudechinus huttoni Benham, 1908

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morphology

surface

substrate

habitat

to 550 m

Ball-shaped, varying in height from moderately flattened to slightly conical on the upper surface. On larger specimens tubercles form distinctive rows on the widest part of the test. Spines short and solid, about 10–12 mm long. Test and spines white to pink in life, straw-coloured when dried; spines may be greenish in some or a darker colour around the base.

Mouth, central on the lower side, with five, sharp-tipped teeth. Especially common in Fiordland and other southern regions, they are often found on a shelly-sand substrate where there is an abundance of drift or attached algae, and on rocky reefs.

main image
Malcolm Francis

inset image
Owen Anderson

McKnight, D.G. (1979) An outline distribution of the New Zealand shelf fauna. Benthos survey, station list, and distribution of the Echinoidea. *New Zealand Oceanographic Institute Memoir* 47, 91 pp.
Fell, H.B. (1952) Echinoderms from Southern New Zealand. *Zoology Publications of Victoria University* 18, 1–37.

Amphicyclus thomsoni (Hutton, 1878)

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Amphicyclus thomsoni has a pentagon-shaped body with numerous transverse wrinkles. It reaches up to 7.5 cm in length and is yellowish-brown. It has numerous tube feet radially and 25 dendritic tentacles arranged in two concentric rings. This species is squishy to touch and contracts easily.

It lives cryptically in coarse muddy shelly sand where it covers itself with debris. It is also found under and between boulders. It lives down to 180 m depth but can be seen at diveable depths and is distributed from the North Island's East Cape south to Stewart Island.

main image
Niki Davey
inset image

Pawson, D.L. (1970) The Marine Fauna of New Zealand: Sea Cucumbers (Echinodermata: Holothuroidea). *Bulletin New Zealand Department of Scientific and Industrial Research* 201, 69 pp.

Squamocnus brevidentis (Hutton, 1872)

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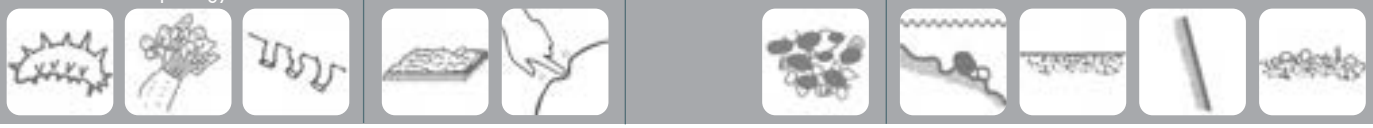
morphology | surface | substrate | habitat



to 130 m

Squamocnus brevidentis is a stunning deep red holothurian covered in small white bumps (tubefeet or papillae) reaching lengths of 5.5 cm. It has a tough bumpy integument and extensive dendritic tentacles which are extended into the currents when feeding. The females brood their young on the ventral surface so at times tiny pink specks can be found underneath a specimen.

This species is found covering rock walls and platforms in Fiordland, in densities up to 800 per m^2. Alternatvely it can be found cryptically under rocks, in crevices and amongst rubble in other locations.

main image
Jason Moore

inset image
NIWA

O'Loughlin, P.M., Alcock, N.K. (2000) The New Zealand Cucumariidae (Echinodermata, Holothuroidea). *Memoirs of Museum Victoria* 58 (1), 1–24.

Australostichopus mollis (Hutton, 1872)

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Australostichopus mollis is New Zealand's most conspicuous sea cucumber, characterised by its mottled light brown or black body. It can reach up to 30 cm long and has a warty dorsal surface with numerous radial rows of ventral tube feet, and a squishy texture. It is regulary seen with forward extended shield-shaped tentacles shoveling sediment into its mouth and a thick mud faecal coil emerging behind.

It lives in many habitats from shallow rockpools to subtidal sandy mud bottoms. It is distributed all around New Zealand with higher densities in Fiordland, Stewart Island and the Marlborough Sounds. Also found around the New South Wales coast around to southwestern Australia.

to 280 m

images
Chris Woods

Sewell, M.A. (1990) Aspects of the ecology of *Stichopus mollis* (Echinodermata: Holothuroidea) in north-eastern New Zealand, *New Zealand Journal of Marine and Freshwater Research* 24 (1), 97–103.

Mah, C.L., McKnight, D.G., Eagle, M.K., Pawson, D.L., Ameziane, N., Vance, D.J., Baker, A.N., Clark, H.E.S., Davey, N. (2009) 21. Phylum Echinodermata: sea stars, brittle stars, sea urchins, sea cucumbers, sea lilies. Pp. 371–400 *in*: D.P. Gordon (Ed), *New Zealand Inventory of Biodiversity Volume 1, Kingdom Animalia: Radiata, Lophotrochozoa, and Deuterostomia*, Canterbury University Press, Christchurch, 566 pp.

Astrobrachion constrictum (Farquhar, 1900)

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to 307 m

Disc diameter 15 mm, five long coiling arms. Several colour morphs: solid dark red/ brown, creamy yellow, or black and white striped (pictured). Two armspines. Body covered in skin, smooth to the touch.

Lives mutualistically on black coral, such as *Antipathella fiordensis*, feeding on planktonic particles collected in the mucus of the host coral. They are distributed down to 307 m in New Zealand, and are well-known from being seen by SCUBA divers in Fiordland. Also known from the Tasman Sea and southeastern Australia down to 540 m.

It could also be

Astroceras elegans

main image
Rob Stewart

McKnight, D.G. (2000) The Marine Fauna of New Zealand: Basket-stars and snake-stars (Echinodermata: Ophiuroidea: Euryalinida). *NIWA Biodiversity Memoir* 115, 79 pp.

Mills, V.S., O'Hara, T.D. (2013) Ophiuroids (Echinodermata: Ophiuroidea) of biogenic habitats on the continental shelf of New Zealand. *Zootaxa* 3613 (5), 401–444.

Astroceras elegans (Bell, 1917)

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30–50 mm

morphology | surface | substrate | habitat

to 705 m

Disc diameter 10 mm, five coiling arms. Two colour morphs: solid yellow, and tan and cream banded (see inset images), both with white spiny tubercles. two armspines. Body covered with skin and tubercles, slimy and rough to the touch.

Found on branching corals, such as plexaurid sea fans, where they feed on plankton from the water column. They are distributed down to 705 m in New Zealand, and are also found between 300 and 875 m in the Tasman Sea, around 140 m in eastern Australia and between 350 and 700 m in New Caledonia.

It could also be ...

Astrobrachion constrictum

images
Rob Stewart

McKnight, D.G. (2000) The Marine Fauna of New Zealand: Basket-stars and snake-stars (Echinodermata: Ophiuroidea: Euryalinida). *NIWA Biodiversity Memoir* 115, 79 pp.
Mills, V.S., O'Hara, T.D. (2013) Ophiuroids (Echinodermata: Ophiuroidea) of biogenic habitats on the continental shelf of New Zealand. *Zootaxa* 3613 (5), 401–444.

Ophiopsammus maculata (Verrill, 1869)

Return to Index

morphology | surface | substrate | habitat

Large, common, disc diameter up to 48 mm, five snaky arms up to four times size of disc diameter. Dark crimson with distinctive small red spots over entire dorsal surface and ventral disc. Rounded granules cover dorsal and ventral disc plates. Ten to 11 short, blunt armspines pressed close to arm. Two tentacle scales. Body hard.

Lives on rocky shores and bryozoan beds, common subtidally but can occasionally be found in deep intertidal rockpools. One of the largest brittle stars, they are agile predators. Distributed from Bay of Islands to Stewart Island.

main image
Chris Woods

inset images
KA Raharaha
Rachel Boschen

Mills, V.S., O'Hara, T.D. (2013) Ophiuroids (Echinodermata: Ophiuroidea) of biogenic habitats on the continental shelf of New Zealand. *Zootaxa* 3613 (5), 401–444.

Vail, L.L., Rowe, F.W.E. (1989) Status of the genera *Ophiopeza* and *Ophiopsammus* (Echinodermata: Ophiuroidea) in Australian waters, with the description of a new species. *Proceedings of the Linnean Society of New South Wales* 110, 267–288.

MOLLUSCS

SEA SNAILS, SEA SLUGS, CHITONS, MUSSELS, SCALLOPS, OCTOPUSES

about molluscs

The phylum Mollusca is an enormous group of aquatic and terrestrial invertebrates, with about 200,000 living species, known from predominantly marine environments. Molluscs are highly diverse in anatomical structure, size and behaviour. They are characterised by five features (but some or all of these features have been lost during evolution within every class): the possession of a calcareous shell produced by a layer of specialised tissue (mantle) beneath which the organs for breathing and excretion are located; a combined ventral head-foot (for sensory perception and locomotion); a dorsal visceral mass (containing the internal organs); a set of gills for breathing; a specialised feeding organ (radula). The phylum is currently divided into eight living taxonomic classes, which include the snails and slugs (class Gastropoda) and the amazingly 'advanced' squid and octopus (class Cephalopoda). Although the molluscs are highly diverse in Fiordland, and in New Zealand waters generally, we have only presented a small sample to start with. We anticipate that future versions will see a greatly expanded section on Mollusca in Fiordland.

sea snails

shelled gastropods, top snails, pāua, shield shells

Molluscs that produce a single shell (class Gastropoda) comprise a very ancient and incredibly morphologically and ecologically diverse taxonomic group such that it is presently divided into six subclasses. New Zealand has representatives of all but one (Neomphaliones, for which there is no common name) of these subclasses. They are Patellogastropoda (true limpets), Vetigastropoda (herbivorous snails and allies), Neritimorpha (nerites), Caenogastropoda (carnivorous snails and allies), and Heterobranchia (marine and terrestrial snails and slugs). The greatest number of living species today (over 100,000) is found in the Caenogastropoda, but the Patellogastropoda, Vetigastropoda and Neomphaliones had numerical dominance in early geological epochs.

sea slugs

nudibranchs, sea slugs, bubble snails, sea hares

Of the 11 taxonomic orders of sea slugs (class Gastropoda: subclass Heterobranchia), only five representatives of the numerically largest and commonest order that lives in New Zealand is included in this guide: Nudibranchia (the true nudibranchs). Though the orders of sea slugs are not related to each other, they share a common evolutionary progression (i.e. from externally shelled species, to species with a tiny external shell, to species with a thin internal shell, to species with no shell at all) and similar ecologies.

polyplacophorans

chitons

All chitons have eight, separate, calcareous shell plates on top of the animal and the shell plates are bounded by a flexible, leathery belt called a girdle. We have included only one chiton in this guide.

bivalves

mussels, scallops, clams

All bivalves have two, separate, calcareous shell plates enclosing the animal side to side. The shell plates are held closed by muscles internally and opened by an elastic ligament forming a hinge at the top. We have included four bivalves in this guide.

cephalopods

octopuses, squid

All cephalopods have their limbs coming directly off the head. The limbs, called tentacles, most often have suckers to hold onto prey. Cephalopods are voracious top-level predators with large brains and complex behaviours. We have only included one octopus in this guide.

mollusc species index

For additional information about molluscs

Super Sea Slugs
https://niwa.co.nz/coasts-and-oceans/marine-identification-guides-and-fact-sheets/super-sea-slugs

Sypharochiton pelliserpentis (Quoy & Gaimard, 1835)

snakeskin chiton

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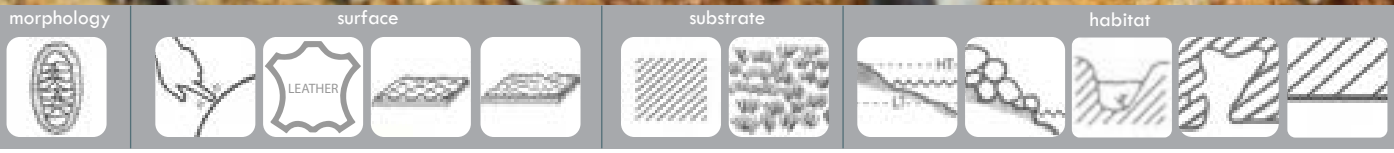

New Zealand's most common and widespread chiton, reaching 60 mm long (but 32–42 mm is typical for adults), oval in shape and moderately flattened. Like all chitons it has eight, separate, calcareous shell valves on top of the animal, bounded by a flexible, leathery girdle. The semicircular head and tail valves and the rectangular median valves are sculptured with nodulose radial ribs, whereas the central area of the median valves is finely grooved longitudinally. In young animals the uneroded valves are mottled brown to olive green, but in mature animals these markings are lost as the surface of the valves erodes to uniform creamish grey. Girdle with embedded, flattened, overlapping, calcareous granules resembling the skin of a snake; a similarity reinforced by the alternate greyish brown and white bands. Pending genetic analysis, individuals with variably sculptured shell valves and bright blue markings are interpreted as a form (*sinclairi*) of the single supposedly polymorphic *S. pelliserpentis*.

Lives on rocky reefs from exposed, open shores, to the quietest estuarine sites. Mean density is about 50 animals per m^2, whereas maximum density can be 228 animals per m^2. Mature adults live in permanent depressions (home scars) on bedrock. *Sypharochiton pelliserpentis* broadcasts its larvae directly into the water, whereas another New Zealand congeneric species, *S. aorangi*, broods its larvae. Found from the high intertidal, through the mid-intertidal (where commonest), to neap low tide. It occurs throughout both mainland islands of New Zealand, as well as the Three Kings, Stewart and Chatham Islands. Elsewhere, it occurs in southern New South Wales, eastern Victoria and Tasmania.

main image
Jean McKinnon

Boyle, P.R. (1970) Aspects of the ecology of a littoral chiton, *Sypharochiton pelliserpentis* (Mollusca: Polyplacophora). New Zealand Journal of Marine and Freshwater Research 4, 364–384.
Creese, R.G., O'Neill, M.H.B. (1987) *Chiton aorangi* n. sp., a brooding chiton (Mollusca: Polyplacophora) from northern New Zealand. New Zealand Journal of Zoology 14, 89–93.

Haliotis australis Gmelin, 1791

yellow-foot pāua

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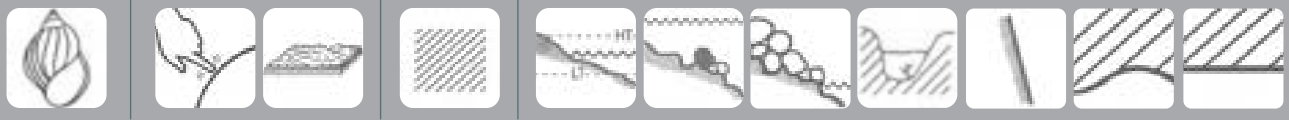
morphology | surface | substrate | habitat



Species of *Haliotis* (known overseas as abalone, or ormer) have flattened, nearly bilaterally symmetrical shells, with an extremely large final whorl punctured by a series of small holes (tremata). The shell's exterior is sculptured with corrugated spiral cords; the aperture is broad, occupying most of the undersurface of the shell; interior always with a pearly lustre. Maximum shell length recorded 123 mm (but 80–105 mm is typical for adults). Foot, large and strong, with a well developed epipodium elaborated with tentacles. Mantle deeply split into two lobes, one on either side of tremata, with one gill situated beneath each lobe. *Haliotis australis* has a black foot with orange pigment over the sole and epipodium, the latter contrasting vividly with the white tentacles that arise from it. Both cephalic tentacles and epipodial tentacles are long, easily the longest of any New Zealand species of *Haliotis*.

Solitary, living on rocky reefs on open coasts, usually among seaweed and sponges on rock walls. Lives from the low intertidal to the moderate subtidal, and is most abundant from 0–10 m depth. It occurs throughout both mainland islands of New Zealand, as well as the Three Kings, Stewart, Chatham, and Snares Islands.

It can be mistaken for *H. iris*, the shell of which is smoother externally and bluish green internally, the foot sole and epipodium are black.

It could also be.....

Haliotis iris

main image
Rod Morris

inset image
Peter Poortman

Geiger, D.L., Poppe, G.T. (2000) A Conchological Iconography: The Family Haliotidae. ConchBooks, Hackenheim, Germany, 139 pp.
Willan, R.C, Spencer, H.G., Creese, R.G., Cook, S.deC. (2010) Class Gastropoda. Pp. 316–468 in: Willan, R.C, Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D., Phylum Mollusca. Pp. 296–566 in: S.deC. Cook (Ed), *New Zealand Coastal Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Haliotis iris Gmelin, 1791

pāua

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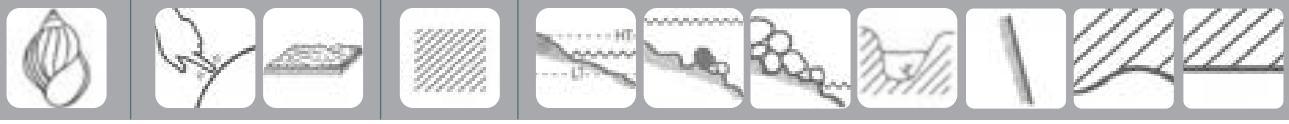
Class Gastropoda Order Lepetellida Family Haliotidae

morphology | surface | substrate | habitat



An iconic New Zealand gastropod. Its thick shell can reach 198.5 mm in length (but 120 mm is typical for adults); adults grow largest at highest latitudes. Dorsal surface with irregular small undulations, but shell itself concealed – always in adults – by covering of crustose coralline algae; aperture is broad, occupying most of the undersurface of the shell; columella with wide and flat flange; interior of shell always highly iridescent, being described by Powell (1979) as, "Prussian blue and metallic green, with firey flashes". Foot very large and strong, with moderately developed epipodium elaborated with tentacles. The pedal muscle scar has spiral striations. The mantle is deeply split into two lobes, one on either side of tremata, with one gill situated beneath each lobe. *Haliotis iris* has a black foot and epipodium, and dark grey foot sole.

Juveniles live singly under boulders whereas adults congregate on upper surfaces of rocks and rock walls – aggregations of more than 500 individuals were recorded historically! Such aggregative behaviour is not published for any other species of *Haliotis*. It feeds on drift algae. When disturbed, individuals are capable of crawling very rapidly – up to 70 m per hour for one overseas species – which is claimed as the fastest movement of all marine gastropods. Lives from low intertidal to 15 m (the greatest depth being attained where large oceanic swells are prevalent), and is most abundant from 0–5 m depth. It occurs throughout both mainland islands of New Zealand, as well as the Three Kings, Stewart, Chatham, and Subantarctic Islands.

It could also be.....

Haliotis australis

main image
Ben Ackerley

inset image
Mark Sherwood

Andrew, N., Naylor, R. (2003) 14. Paua. Pp. 114–119 in: Andrew, N., Francis, M. (Eds), The Living Reef: The Ecology of New Zealand's Rocky Reefs. Craig Potton Publishing, Nelson, 283 pp.

Poore, G.C.B. (1972) Ecology of New Zealand abalones, *Haliotis* species (Mollusca: Gastropoda). 1. Feeding. New Zealand Journal of Marine and Freshwater Research 6, 11–22.

Scutus breviculus (Blainville, 1817)

shield shell

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Class Gastropoda Order Lepetellida Family Fissurellidae

morphology

surface

substrate

habitat

This odd-looking gastropod reveals two evolutionary trends that are pervasive throughout molluscs – towards reduction and internalisation of the shell, and towards bilateral symmetry. Indeed, *Scutus breviculus* is externally a completely bilateral 'slug' with its shell plate situated anteriorly over the mantle cavity and covered by upward extensions of the front of the foot. These extensions are only withdrawn to reveal the shell when an animal is disturbed. The animal's body can reach 150 mm in length when fully extended (but 80–100 is typical for adults). Its thick, shield-like shell can reach 120 mm in length (but 50–70 mm is typical for adults). The body itself is plump and the foot is large and muscular; it is completely jet-black. At the front is a large proboscis-like snout and thick cephalic tentacles with the eyes at their outer bases. Secretes a noxious fluid from dorsal glands to deter predators.

Lives amongst assemblages of encrusting organisms on rocky coasts of almost all exposures. It is very photo-phobic, hiding under stones during the day and emerging at night to graze on a variety of algae. It returns to a specific 'home' site after a feeding trip. Found from low intertidal to subtidal (20 m), but is most abundant from 0–5 m. It is known from both mainland islands as well as Stewart Island.

main image
Rod Morris

inset images
Peter Poortman

Morley, M. (2004) *Seashells of New Zealand*. New Holland Publishers, Auckland, 143 pp.
Willan, R.C, Spencer, H.G., Creese, R.G., Cook, S.deC. (2010) Class Gastropoda. Pp. 316–468 in: Willan, R.C, Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D., Phylum Mollusca. Pp. 296–566 in: S.deC. Cook (Ed), *New Zealand Coastal Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Maurea tigris (Gmelin, 1791)

tiger maurea

morphology | surface | substrate | habitat

to 220 m

Maurea tigris is the largest of some 25 species of *Maurea* snails that are endemic to New Zealand. Its rather thin shell can reach 96 mm in height (but 50–70 mm is typical for adults), with the biggest animals in colder waters (i.e. below about 50 m) and in southern latitudes. Its unusually-shaped shell is like a pagoda with the tall, concave upper whorls contrasting with the swollen-sided latter whorls. The colour pattern on the exterior of the shell consists of rich brown, vertical, tiger-like stripes on a creamy white background, whereas the interior of the aperture is iridescent pink. The shell itself is seldom encrusted with marine life and this is probably because the animal regularly 'wipes' its shell clean with the back of its foot as other calliostomatid snails do.

Maurea tigris lives on semi-exposed and exposed rocky coasts, below just low tide down to 220 m. It regularly attaches upside-down under ledges on rock walls. It is often found on the massive, grey sponge *Ecionema alata*. It either grazes directly on this sponge or it eats the hydroids that grow on the surface of the sponge – its diet is yet to be determined exactly. Females attach gelatinous egg ribbons directly onto the rocks where they live. *Maurea tigris* occurs widely throughout the North, South and Stewart Islands, as well as the Chathams and Auckland Islands.

main image
Alison Perkins

inset images
Peter Poortman

Morley, M. (2004) *Seashells of New Zealand*. New Holland Publishers, Auckland, 143 pp.
Willan, R.C, Spencer, H.G., Creese, R.G., Cook, S.deC. (2010) Class Gastropoda. Pp. 316–468 in: Willan, R.C, Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D., Phylum Mollusca. Pp. 296–566 in: S.deC. Cook (Ed), *New Zealand Coastal Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Astraea heliotropium (Martyn, 1784)

circular saw shell

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Class Gastropoda Order Trochida Family Turbinidae

morphology | surface | substrate | habitat

to 150 m

One of the most distinctively shaped of all New Zealand's marine molluscs, its thick shell can reach 129.3 mm in maximum diameter including the peripheral flanges (but 70–100 mm is typical for adults). The shell is flat and broadly conical, with a series of saw-like, compressed, triangular flanges projecting radially at the periphery. Ventrally, there is a prominent central umbilicus. The shell's colour is beige-pink to bluish grey above, with a paler base; aperture with a pearly lustre. Heavy, oval operculum on rear of foot; externally with thickened white callus, internally with thick dark brown layer. Distinctive features of the animal are the blunt snout with transverse black streaks, stubby eye stalks with small black terminal eye, and the enrolled flap-like right neck lobe (a modified section of the epipodium) with a simple margin to conduct the exhalant water stream out of the mantle cavity.

Lives on rocky reefs on open coasts, among encrusting organisms such as sponges on rock walls, the diet is macroscopic calcareous and microscopic seaweed. Also known from channels and cave mouths. It is found subtidally from 20–150 m depth. It is known from Three Kings Islands, throughout both mainland islands, and also Stewart and Chatham Islands. More common south of Cook Strait.

main image
Luke Colmer

inset images
Peter Poortman

Powell, A.W.B. (1979) New Zealand Mollusca: Marine, Land and Freshwater Shells. Collins, Auckland, 500 pp.
Willan, R.C, Spencer, H.G., Creese, R.G., Cook, S.deC. (2010) Class Gastropoda. Pp. 316–468 in: Willan, R.C, Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D., Phylum Mollusca. Pp. 296–566 in: S.deC. Cook (Ed), *New Zealand Coastal Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Cadlina willani Miller, 1980

Willan's nudibranch

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Small, firm-bodied dorid nudibranch. Mantle with small, rounded pustules when examined closely. Oral tentacles small and triangular, grooved along outer edge. Easily identifiable by the distinctive colouration - mantle translucent white with a bright lemon-yellow longitudinal stripe that forks into two short branches just in front of the gills (only one individual has ever been recorded that lacks this stripe); pustules opaque white. Both mantle and foot have a narrow, pale yellow marginal band. Rhinophores and branched gills are uniformly white. Maximum size of adults 21 mm (12–15 mm is more usual).

Feeds on siliceous sponges. Lives amongst assemblages of encrusting organisms on rocky reefs. Probably the commonest nudibranch, subtidally, in New Zealand. The usual depth range is from the lowest intertidal to 25 m (commonest in 10–18 m); it is more frequent intertidally in the South Island. Endemic to New Zealand. Occurs from the Three Kings Islands to Banks Peninsula on the east coast and to New Plymouth on the west coast.

It could be mistaken for *Goniobranchus aureomarginatus*; but that species is more elongate and narrow, its mantle is completely smooth, and it has narrow, gold and opaque white bands at the mantle margin.

It could also be.....

Goniobranchus aureomarginatus

main image
Herbert Segmuller

inset image
Rachel Boschen

Miller, M.C. (1980) *Cadlina willani*, a new dorid nudibranch from New Zealand (Gastropod: Opisthobranchia) from New Zealand. New Zealand. *Journal of Zoology 7*, 165–171.

Willan, R.C, Spencer, H.G., Creese, R.G., Cook, S.deC. (2010) Class Gastropoda. Pp. 316–468 in: Willan, R.C, Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D., Phylum Mollusca. Pp. 296–566 in: S.deC. Cook (Ed), *New Zealand Coastal Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Goniobranchus aureomarginatus (Cheeseman, 1881)

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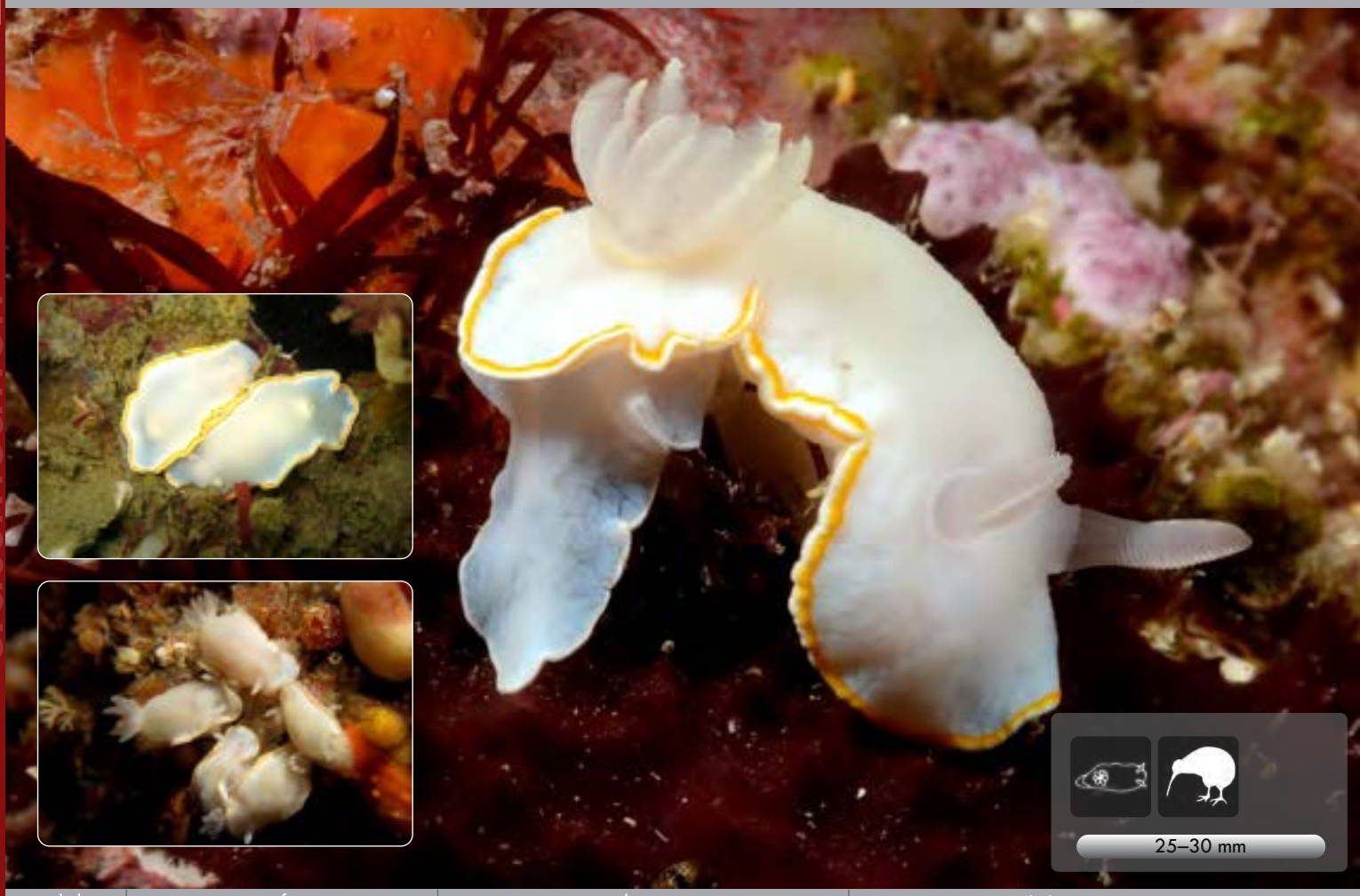

Widely known in New Zealand under the former name of *Chromodoris aureomarginata*.

Moderately large, narrow-bodied dorid nudibranch. Mantle very soft and completely smooth, expanded slightly in front of the rhinophores. The tail extends behind the rear of the mantle when animal is crawling actively. Mantle uniformly opaque white, with a thin golden or orange-yellow band submarginally and a thin white band marginally. The foot is translucent white with a thin white marginal band. Rhinophores and gills are plain white. Maximum size of adults 45 mm (25–30 mm is more usual).

Feeds on siliceous sponges. Lives amongst assemblages of encrusting organisms on rocky reefs. Depth range is from the lowest intertidal to 24 m (commonest in 5–10 m). Endemic to New Zealand. Occurs around both main islands of New Zealand, also Three Kings Islands and Chatham Islands.

Sometimes mistaken for *Cadlina willani*, but that species is smaller, firmer-bodied and more rounded in outline, its mantle is covered with low pustules, it has a vivid yellow median stripe on the mantle, and there is a pale lemon-yellow band at the mantle margin.

It could also be.....
Cadlina willani

main image
Crispin Middleton

inset images
Chris Woods
Crispin Middleton

Rudman, W.B. (1985) The Chromodorididae (Opisthobranchia: Mollusca) of the Indo-West Pacific: *Chromodoris aureomarginata*, C. *verrieri* and C. *fidelis* colour groups. *Zoological Journal of the Linnean Society* 83, 241–299.
Willan, R.C, Spencer, H.G., Creese, R.G., Cook, S.deC. (2010) Class Gastropoda. Pp. 316–468 in: Willan, R.C, Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D., Phylum Mollusca. Pp. 296–566 in: S.deC. Cook (Ed), *New Zealand Coastal Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Doris wellingtonensis Abraham, 1877

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Growing to the size of a rugby ball, this is easily New Zealand's largest nudibranch. Body firm, fleshy, and very convex or rounded in profile. Mantle covered with large, close-set, soft, dome-shaped pustules, the biggest in the middle. Unlike the mantle, the foot's upper surface is completely smooth. Upper lip of mucous gland, at the front of the foot, without a philtrum. Gills are particularly large, being almost pressed flat onto the mantle when fully extended. The dorsal surface is uniformly khaki brown to pale yellowish; gills are paler than the body; foot sole bright orange. Maximum size of adults 300 mm (70–100 mm is more usual).

Feeds on siliceous sponges of the genera *Halichondria* and *Hymeniacidon*. It is not uncommon to find groups of 3–5 individuals aggregated together, but not feeding. Lives amongst assemblages of encrusting organisms on rocky reefs, often where kelp provides shelter. Depth range is from the low intertidal to 20 m (commonest in 0–3 m). Occurs around both main islands of New Zealand and Chatham Islands. Also central and eastern Victoria and Tasmania.

main image
Chris Woods
inset image

Debelius, H., Kuiter, R.H. (2007) Nudibranchs of the World. IKAN-Unterwasserarchiv, Frankfurt, Germany, 361 pp.
Willan, R.C, Spencer, H.G., Creese, R.G., Cook, S.deC. (2010) Class Gastropoda. Pp. 316–468 in: Willan, R.C, Cook, S.deC., Spencer, H.G., Creese, R.G., O'Shea, S., Jackson, G.D., Phylum Mollusca. Pp. 296–566 in: S.deC. Cook (Ed), *New Zealand Coastal Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Alloiodoris lanuginata (Abraham, 1877)

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Large, firm-bodied dorid nudibranch. Body broadly ovate in outline, flat in profile. Mantle feels like sandpaper because of numerous, microscopic spicule-laden papillae, but they are not true caryophyllidia because the spicules do not emerge through the skin. Some people can detect a faint aroma when the mantle is rubbed lightly. Upper lip of mucous gland at front of foot with a philtrum. Background colour of mantle variable – dull reddish brown to grey – darker centrally, with an overlay of dark brown spots and white speckles that produce a mottled pattern. Rhinophores dark orange to black. Gills speckled, dark grey. Maximum size of adults 80 mm (50–60 mm is more usual).

Feeds on siliceous sponges. Lives amongst assemblages of encrusting organisms in rocky habitats. Occurs in exposed, through semi-exposed, to semi-sheltered situations. Nocturnal; retreats under stones during the day, rarely encountered in an aggregation. Occurs from the low intertidal to 17 m (commonest in the subtidal fringe). Endemic to New Zealand, occurs around both main islands, Three Kings Islands and Chatham Islands.

main image
Chris Woods

inset image
Rachel Boschen

Morton, J.E., Miller, M.C. (1968) The New Zealand Sea Shore. Collins, Auckland, 638 pp.
Willan, R.C., Morton, J.E. (1984) *Cape Rodney to Okakari Point Marine Reserve. Marine Molluscs Part 2 Opisthobranchia.* Leigh Marine laboratory, Leigh, New Zealand, 106 pp.

Jason mirabilis Miller, 1974

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morphology

surface

substrate

habitat

Spectacular, endemic New Zealand nudibranch; one of the largest aeolid sea slugs in the world. Body high, rather heavily built for an aeolid. Oral tentacles long, about one-quarter body length. Rhinophores club-shaped, lamellate, irregularly subdivided posteriorly giving a wrinkled appearance. Cerata numerous, arranged in arches. Body delicate, uniformly translucent pink or lavender (appears grey underwater), slightly darker on the head; cerata completely milk-white, thus presenting a startling contrast to body colouration. Spawn crinkled and pale pink, laid directly on food hydroid. Maximum size of adults 60 mm.

Lives and feeds only on the tall, tree-like hydroid *Solanderia ericopsis*, on which it is highly visible. Forms groups of up to 15 individuals on this hydroid, and such groups can completely denude a host hydroid. Endemic to New Zealand, found around North and South and Three Kings Islands.

main image
Crispin Middleton

inset images
Crispin Middleton

Miller, M.C. (1974) Aeolid nudibranchs (Gastropoda: Opisthobranchia) of the family Glaucidae from New Zealand waters. *Zoological Journal of the Linnean Society* 54, 31–61.
Willan, R.C., Coleman, N. (1984) *Nudibranchs of Australasia*. Australasian Marine Photographic Index, Caringbah, Australia, 56 pp.

Atrina zelandica (Gray, 1835)

horse mussel

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morphology | surface | substrate | habitat

At an enormous 447 mm (maximum length on record), the horse mussel is New Zealand's largest bivalve (but 260–300 mm is typical for adults). Its vertically-oriented lifestyle is peculiar compared to other infaunal bivalves in that the oldest part of the shell (the narrow umbo) is buried deepest in the sediment and the youngest part (the broad ventral margin) rises above the sediment. This fascinating animal possesses three unique derived characters for keeping the water intake clear of surface deposits: a set of pallial retractor muscles that can pull the mantle lips away from the shell margin; a 'waste gutter' running transversely across the mantle; and a piston-like hydrostatic organ consisting of a stalk and a more or less conical head which aids in cleansing the mantle cavity of debris. The shell itself is wedge-shaped, thin and brittle, with vertically arranged rows of hollow tubular spines (see inset); these spines are ground off on larger shells (see main image) by the abrasive action of suspended sand. These spines and the byssus help to anchor the shell securely in the substrate. The exposed section of the shell is often encrusted with sponges, barnacles and sea squirts, but there is no suggestion that any of them have a mutualistic relationship with the horse mussel. However, horse mussels do host the commensal crab *Neopinnotheres atrinicola*.

Lives in sheltered muddy estuaries through to more exposed offshore sandy sites, from just below low tide to 45 m depth. Interestingly, high densities of horse mussels in sheltered sites can alter meiobenthic diversity as the result of the production of large amounts of pseudofaeces which reduces the oxygen concentration in the sediment. It is known from throughout both mainland islands as well as Stewart Island.

main image
Richard Kinsey

inset image
Peter Poortman

Schultz, P.W.W., Huber, M. (2013) Revision of the worldwide Recent Pinnidae and some remarks on fossil European Pinnidae. Acta Conchyliorum 13, 1–164.
Warwick, R.M., McEvoy, A.J., Thrush, S.F. (1997) The influence of *Atrina zelandica* Gray on meiobenthic nematode diversity and community structure. Journal of Experimental Marine Biology and Ecology 24, 231–247.

Talochlamys gemmulata (Reeve, 1853)

radiate scallop

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50-65 mm

morphology | surface | substrate | habitat

to 293 m

The thin valves of *Talochlamys gemmulata* can reach 72.5 mm in length (but 50–65 mm is typical for adults). The shell shape is oblong, its auricles are unequal in size, the byssal notch is deep, the ctenolium is prominent. The surface of both valves is ornamented with irregularly spaced, fine primary and secondary radial ribs supporting fine scales. The colour of the shell valves varies enormously – from deepest purple, through mauves and pale browns, to flaming orange. The mantle, which lacks any fusion at the margins and is uniformly white, has two inner lobes, the innermost forming a curtain supporting a row of very flexible, extensible, transparent, tentacles (the 40 longest being on the upper/left valve) interspersed with multiple, well-developed pallial eyes. This species has long been known to have its shell valves encased in an encrusting sponge (see main image), most likely either a hymedesmiid, microcionid, or myxillid poecilosclerid demosponge species, and there may be a mutualistic association with this scallop as has been suggested for two other New Zealand scallops, *Talochlamys dichroa* and *Psychrochlamys delicatula*, and the top snail *Herpetopoma bellum*. The scallop is able to 'swim' by clapping the valves together to escape a predator.

Though attached by a byssus when young, adults live freely on soft and hard substrates. The set of pallial eyes affords this species great awareness of predators; individuals will scatter at the approach of a diver. It is found from 10–293 m depth, though commonest between 20–60 m. It is known from throughout both main islands and also Stewart, Snares and Chatham Islands. Although common throughout most of its range, it is rare off the northern tip of the North Island and absent from the Three Kings Islands.

New Zealand's best known scallop, the queen scallop (*Pecten novaezelandiae*), is also its most atypical because the left shell valve is flat and the right valve is strongly convex, so instead of treating it here, a more typically-shaped species of scallop with both valves convex is treated.

main image
Richard Kinsey

inset image
Peter Poortman

Dijkstra, H.H., Marshall, B.A. (2008) The Recent Pectinoidea of the New Zealand region (Mollusca: Bivalvia: Propeamussiidae, Pectinidae and Spondylidae). Molluscan Research 28, 1–88.
Penniket, J.R. (1970) New Zealand Seashells in Colour. A.H. & A.W Reed, Wellington, 112 pp.

Mytilus galloprovincialis Lamarck, 1819

New Zealand blue mussel

The blue mussel's thickish, pear-shaped shell can reach 149.6 mm maximum length (but 60–80 mm is typical for adults). The thick periostracum is blue-black to black, whereas the shell itself is uniformly bluish-black outside, silvery-white inside anteriorly and violet-black posteriorly. The umbones are pointed with small hinge teeth internally. The ventral margin of each valve is straight. The mantle margin has an outer and two inner folds and the adductor muscle coalesces with the pedal retractor muscle. The foot is small and finger-like, and it produces the byssus.

Lives on a variety of natural and artificial hard substrates, such as rocky reefs, concrete revetments, wharf piles and ropes. It is found from the mid-intertidal down to the subtidal, and is most abundant at the low intertidal zone (where dense aggregations, as shown in the main image, can form a broad belt). It is known from both mainland islands as well as Stewart, Chatham and all the Subantarctic Islands; but not Three Kings Islands. Commoner in the South Island, but populations (probably a diferent genetic strain) are rapidly expanding in the North Island. It can be mistaken for *Perna canaliculus*, but that has a thinner shell with a distinctly convex ventral margin, and the periostracum is green.

It is quite possible that the situation regarding the identity of the blue mussel in New Zealand is analagous to that of Australia. Recent research in Australia has shown that the species there consists of three genetic strains: the oldest self-introduced during the Pleistocene (thus technically endemic), and the two younger strains arriving independently accidentally by shipping but from different parts of the species' original range in the northern hemisphere (thus introduced). All these strains are capable of hybridisation.

main image
Jean McKinnon

inset image
Mark Sherwood

Cook, S.deC. (2010) Class Bivalvia. Pp. 471–541 in: Cook, S.deC. (Ed.), New Zealand Coastal Marine Invertebrates, Volume One. Canterbury University Press, Christchurch, New Zealand, 640 pp.

Popovic, I., Matias, A.M.A., Bierne, N., Riginos, C. (2019) Twin introductions by independent invader mussel invaders are both associated with recent admixtures with a native congener in Australia. Evolutionary Applications 13, 515–532.

Perna canaliculus (Gmelin, 1791)

green-lipped mussel

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The green-lipped mussel's thinish, elongate shell can reach an enormous 240.6 mm in maximum length (but 120–160 mm is typical for adults). The ventral margin of each shell valve is convex anteriorly. The thin periostracum, which readily peels off dead valves, is pale yellowish to emerald-green sometimes with thin dark rays, and it folds inside the valves' edges at their margins – hence the common name. Interestingly, it is dull greenish brown to almost black on shells living on sheltered coasts, but bright green on shells on open coasts. Exterior often covered with dense growth of hydroid *Amphisbetia bispinosa*, commonly called ''mussel's beard'. The shell itself is creamy white outside, and iridescent with smudges of purple-blue and pink inside. The umbones are pointed with small hinged teeth internally; these teeth are comparatively stronger in young specimens than adults. Mantle margin has a brown outer and two inner folds and the adductor muscle is separate from the pedal retractor muscle. Foot is small and finger-like. Mature males have cream-colured viscera when ripe, whereas females have apricot orange viscera.

Larvae metamorphose on filamentous substrates like hydroids or byssal clumps of adult green-lipped mussels, then crawl onto hard substrates where they attach permanently. Adults live on a variety of substrates, such as rocky reefs, wharf piles and ropes (see inset image). Occasionally found as clumps formed by intertwined byssal threads. Found from the mid-intertidal to the subtidal (55 m), and is most abundant at the low intertidal zone (where dense aggregations, such as shown in the main image, can form a broad belt). Almost completely absent from regions where there is little suspended matter, such as parts of Cook Strait. It is known from both mainland islands as well as the Three Kings and Stewart Islands, and is more abundant in the north. Not Chatham or Subantarctic Islands. It can be mistaken for *Mytilus galloprovincialis*, but that has a shorter, thicker, blue-black shell with a straight ventral margin.

main image
Neil Wright

inset image
Richard Kinsey
Mark Sherwood

Cook, S.deC. (2010) Class Bivalvia. Pp. 471–541 in: Cook, S.deC. (Ed), New Zealand Coastal Marine Invertebrates, Volume One. Canterbury University Press, Christchurch, New Zealand, 640 pp.
Siddall, S.E. (1980) A clarification of the genus *Perna* (Mytilidae). Bulletin of Marine Science 30, 858–870.

Octopodidae sp. (numerous small pustules and white spots on the arms)

octopus

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Class Cephalopoda Order Octopoda Family Octopodidae

morphology surface substrate habitat

External features common to all octopuses are the sack-like body lacking fins, the relatively large funnel-like opening to the mantle cavity, lidded eyes, eight arms with two rows of suckers of which the twelfth of each row is largest, no cirri adjacent to arm suckers, and the reduced membrane between the arms. It seems that a characteristic feature of the medium-sized, reef-dwelling octopus shown in the main image from Fiordland is the numerous small pustules and white spots on the arms.

Octopuses live on rocky reefs and soft substrata on open coasts. Most (but not all) adults live in cave-like lairs, emerging to feed on molluscs and crustaceans. Their ability to change colour and skin texture is remarkable; such rapid changes serving for camouflage and signalling to other octopuses. Most species possess an ink sack. They are found from the low intertidal to the subtidal. Octopuses occur throughout both mainland islands, as well as the Three Kings, Stewart, Chatham and Subantarctic Islands.

Although an octopus is a familiar mollusc to everyone, the species living in New Zealand are not well understood taxonomically because, despite the intense research over the last 30 years, the characters differentiating them are still unresolved and many are internal, meaning that it is difficult to tell the species apart by just looking at the animal on the outside; this one could be either *Macroctopus maorum* or *Pinnoctopus cordiformis* or *Robsonella huttoni*! It is also true to say that 99% of octopuses cannot be reliably identified from live animal images. So for the purpose of this e-guide, the animal in the image has been given what we call a tag name or OTU (Operational Taxonomic Unit) name – 'Octopodidae sp. (abundant small pustules and white spots on the arms)', which means that the octopus can only be identified to the taxonomic rank of family. Without an examination of the specimen, it is impossible to tell what the genus or species is.

images
Richard Kinsey

O'Shea, S.J., Jackson, G.D. (2010) Class Cephalopoda. Pp. 545□559 in: Cook, S.deC. (Ed.), New Zealand Coastal Marine Invertebrates 1. Canterbury University Press, Christchurch, 640 pp.
Reid, A. (2016) Cephalopods of Australia and Sub-Antarctic Territories. CSIRO Publishing, Clayton South, Australia, 446 pp.

SEAWEEDS

BROWNS, GREENS, REDS

about seaweeds

Seaweeds or marine macroalgae occur around the world and are found from the high shore to depths of around 200 m in some places. They are the marine equivalent of land plants and they vary in size from small filament-like species to huge kelps.

brown seaweed

Brown seaweeds (phylum Ochrophyta) are the most abundant and the best characterised group in New Zealand. They include multicellular species which range from tiny filaments to the giant kelp, many metres in length. Kelp and fucoid algae provide three-dimensional structure and habitat for many other coastal species - invertebrates, fishes and other seaweeds. They also influence the physical environment, affecting light, nutrient concentrations and water movement. Brown seaweeds are more closely related to various types of microscopic algae than they are to red or green seaweeds. There are about 180 species in New Zealand.

green seaweed

Green seaweeds (phylum Chlorophyta) are common in the intertidal zone, in proximity to freshwater and can bloom over summer, forming large assemblages. Some species of the genus *Caulerpa* form large beds in deeper water. Green seaweeds include fewer species than brown and red seaweed with about 140 species in New Zealand, but there are still undescribed species. Green seaweeds include filamentous, foliose, bushy and prostrate species characterised by different shades of green due to the presence of chlorophyll *a* and *b* in their chloroplast – features that they share with land plants.

red seaweed

Red seaweeds (phylum Rhodophyta) are an ancient phylum mainly living in marine environments. They occur from the upper intertidal zone to great depths, growing on rocky substrates under the canopy of large brown algae, in rockpools or forming algal meadows on soft sediments. Red algae include species with diverse morphologies from simple filaments to complex multicellular and calcified thalli. The colour red is due to the presence of phycoerythrin, a pigment in the chloroplast that reflects red light. However not all Rhodophyta are red - sometimes they can be brownish or greenish especially in the intertidal zone where they are exposed to sunlight. A unique characteristic of red algae is the lack of flagella in the male gametes. In New Zealand there are over 600 species of red algae and many are still undescribed.

seaweed species index

seaweed species index

RED SEAWEED

For additional information about seaweed

Beautiful Browns

https://niwa.co.nz/coasts-and-oceans/marine-identification-guides-and-fact-sheets/beautiful-browns

Zonaria turneriana J. Agardh

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Thalli flattened, fan-shaped, up to to 30 cm high, divided in more or less narrow segments terminating in thin tips with concentric lines. Texture firm, colour brown. Subtidal down to 30 m on rocky reefs on open coasts. Native species also found in Australia from where it was first descibed. In New Zealand it occurs around the Three Kings, North Island, South Island and Stewart Island. There are four species of *Zonaria* in New Zealand.

images
Roberta D'Archino

Adams, N.M. (1994) *Seaweeds of New Zealand: An illustrated guide*. Canterbury University Press, Christchurch, 360 pp.
Nelson, W.A. (2020) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press. Wellington, New Zealand, 351 pp.

Adenocystis utricularis (Bory) Skottsb.

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Thalli up to 10 cm high, consisting of oblong or pear-shaped bladders filled with water, attached by a solid stipe. Colour in life, golden to olive brown, texture firm and turgid, not slippery. Thalli solitary or growing together sometimes from a common base.

Adenocystis utricularis is found on intertidal rocky reefs on open coasts. It can be abundant in some locations. Common around New Zealand from the North Island to the Subantarctic Islands; also occurs at the Falkland Islands from where it was first described. There is another species of *Adenocystis* in New Zealand restricted to the Subantarctic Islands, *A. rimosa*.

images
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Adams, N.M. (1994) *Seaweeds of New Zealand: An illustrated guide*. Canterbury University Press, Christchurch, 360 pp.
Nelson, W.A. (2020) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press. Wellington, New Zealand, 351 pp.

Hormosira banksii (Turner) Decne.

Neptune's necklace

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morphology substrate habitat

Plants up to 30 cm (sometimes 50 cm) high and consist of branched chains of hollow 'beads', joined together by thin constrictions and can vary in size according to habitat and exposure. Attaches by a small disc. Yellow-green to grey-brown. Fertile structures are scattered over the 'beads' and are easily visible as small bumps.

Found on rocks or stones in the intertidal zone in sheltered or exposed sites. North, South, Stewart and Chatham Islands. Also Australia.

main image
Kate Neill

inset image
Tracy Farr

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Phyllotrichia verruculosum (C.Agardh) R.R.M Dixon & Huisman

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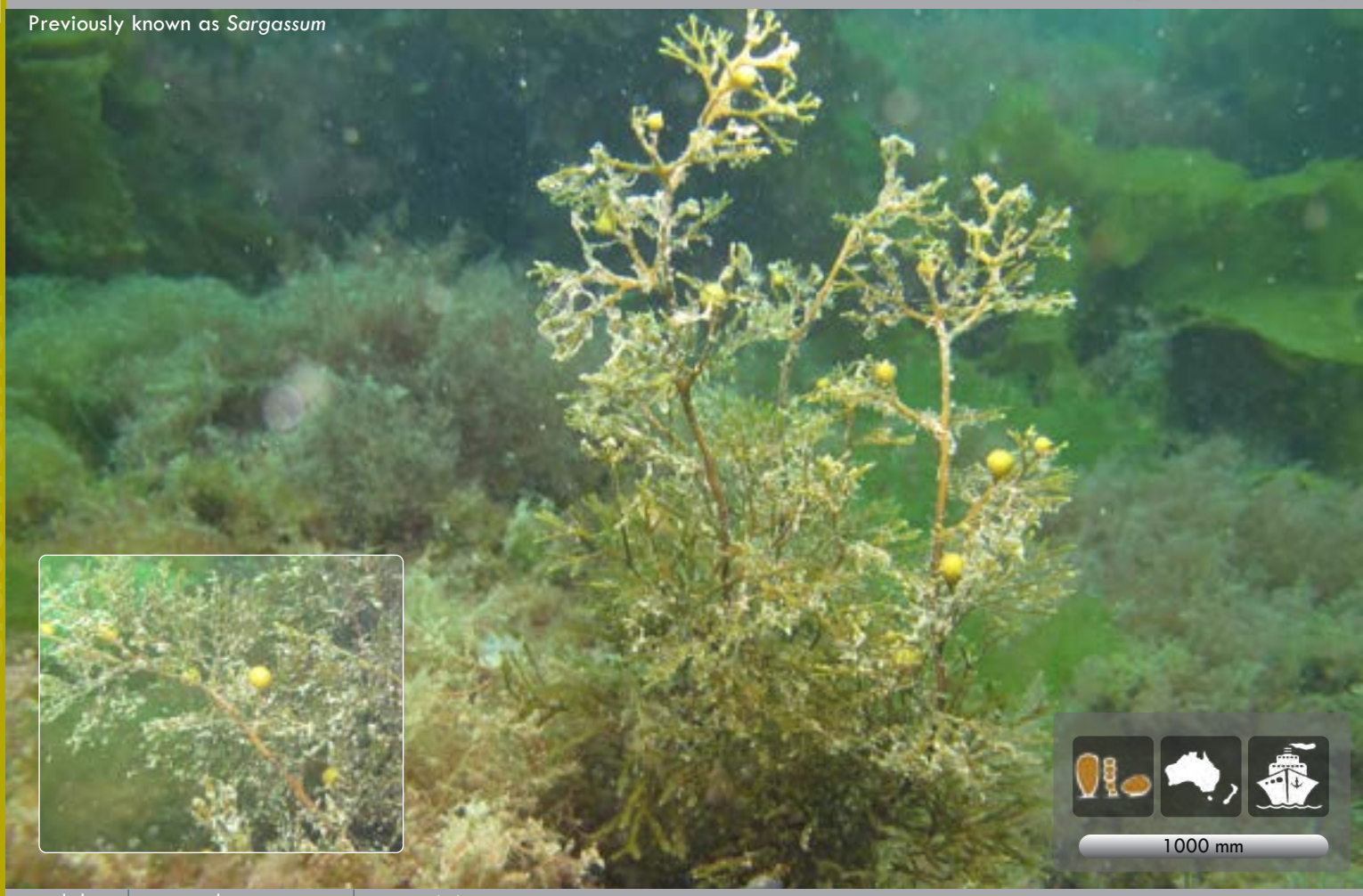
Previously known as *Sargassum*



morphology

substrate

habitat

Plants grow up to 1 m or more high and are shrub-like with blades that are leaf-like and variably shaped, carried on forked branches. Main stem is thick at the base but becomes thinner further up. Air bladders rounded. Holdfast conical and disc-like with developing branches. Mid-brown. Reproductive structures scattered in upper branches and not easily visible.

Subtidal in sheltered bays and harbours. South Island and Stewart Island. Also Australia.

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Nelson, W. (2013) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press, Wellington, 328 pp.

Carpophyllum flexuosum (Esper) Grev.

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morphology

substrate

habitat

Plant is shrub-like and up to 2 m high. Leaf-like blades are carried on branches either side of a main stem, which is flattened and zig zags slightly. Lower leaves are broader and have a midrib; air bladders are rounded. Holdfast is flattened and creeping. Golden brown to dark brown. Fertile structures occur on specialised upper branches with small leaves. These specialised branches are found in the angle between the stem and leaves.

Found in the upper subtidal, or in deep pools and channels, or deeper in sheltered areas. North, South, Stewart and Chatham Islands.

main image
Roberta D'Archino

inset image
Tracy Farr

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Marginariella boryana (A.Rich) Tandy

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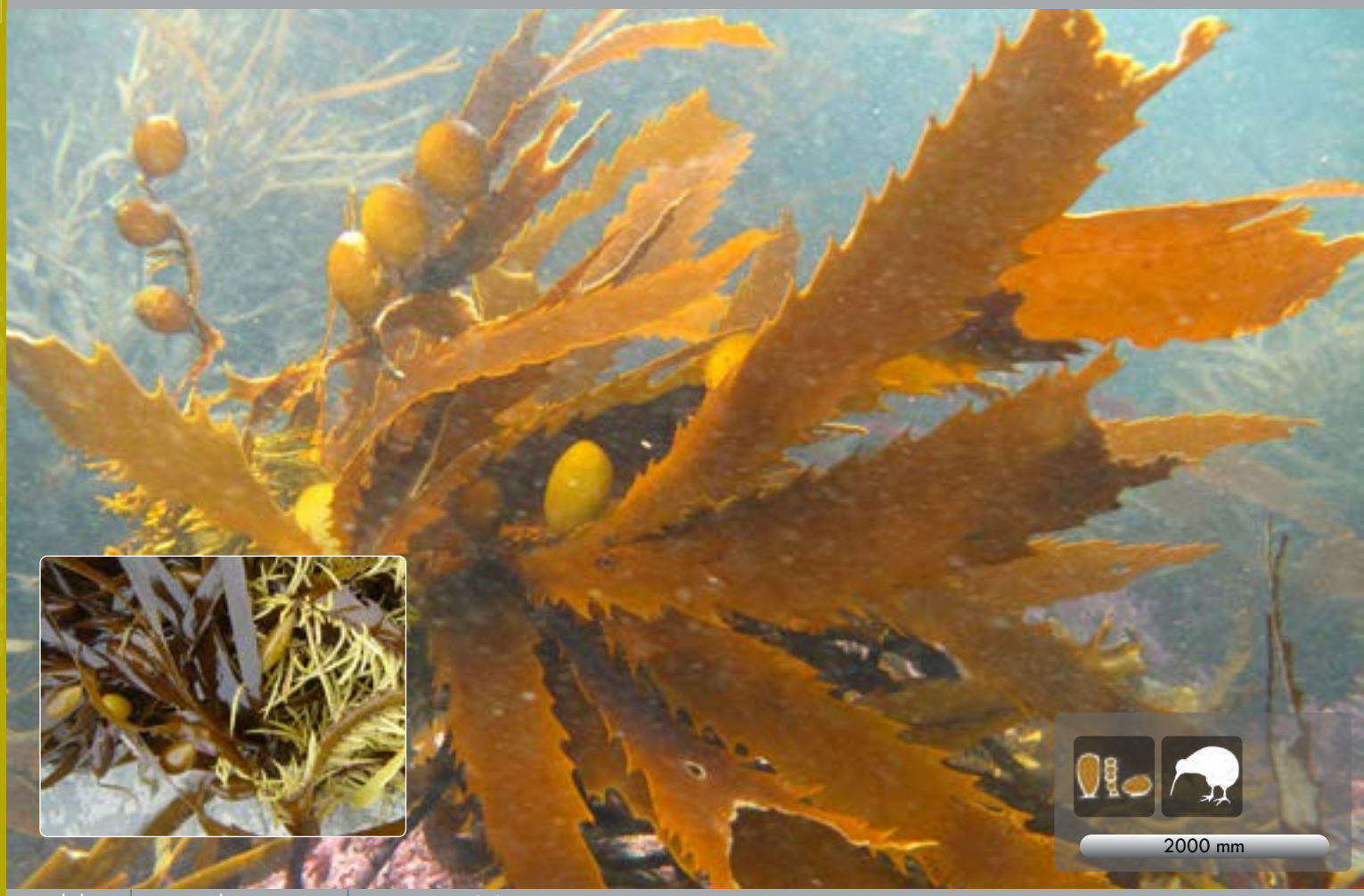

morphology

substrate

habitat

Plants grow to more than 2 m high and are comprised of blades that are long and strap-like with toothed edges. Blades alternate on opposite edges of the stem, which is flattened and twists sharply above the holdfast, stem is bare below; air bladders egg-shaped and occur on the margin of the blades, sometimes with a point. Holdfast conical and made up of many thin branches. Golden brown. Fertile structures are finger-like and grow from the edges of the bases of blades.

Found from the low intertidal to subtidal on exposed coasts. Southern North Island, South Island, Stewart Island, Chatham Islands and Snares Islands.

It could also be.....

Marginariella urvilliana

main image
Chris Hepburn

inset image
Erasmo Macaya

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Marginariella urvilliana (A.Rich) Tandy

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morphology

substrate

habitat

Plants grow up to 2 m high and consist of long strap-like blades with toothed edges. Blades alternate on opposite edges of the stem, which is flattened and twists sharply above the holdfast, stem is bare below; air bladders round and grow on margins of blades. Holdfast conical and made up of many thin branches. Golden brown. Fertile structures are finger-like and grow from the edges of the blades.

Grows from the low intertidal to subtidal on exposed coasts. Southern North Island, South Island, Stewart Island, Chatham Islands, Snares Islands, Auckland Islands.

It could also be.....

Marginariella boryana

main image
Roberta D'Archino

inset image
Lou Hunt

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Xiphophora gladiata (Labill.) Mont. Ex Kjellm.

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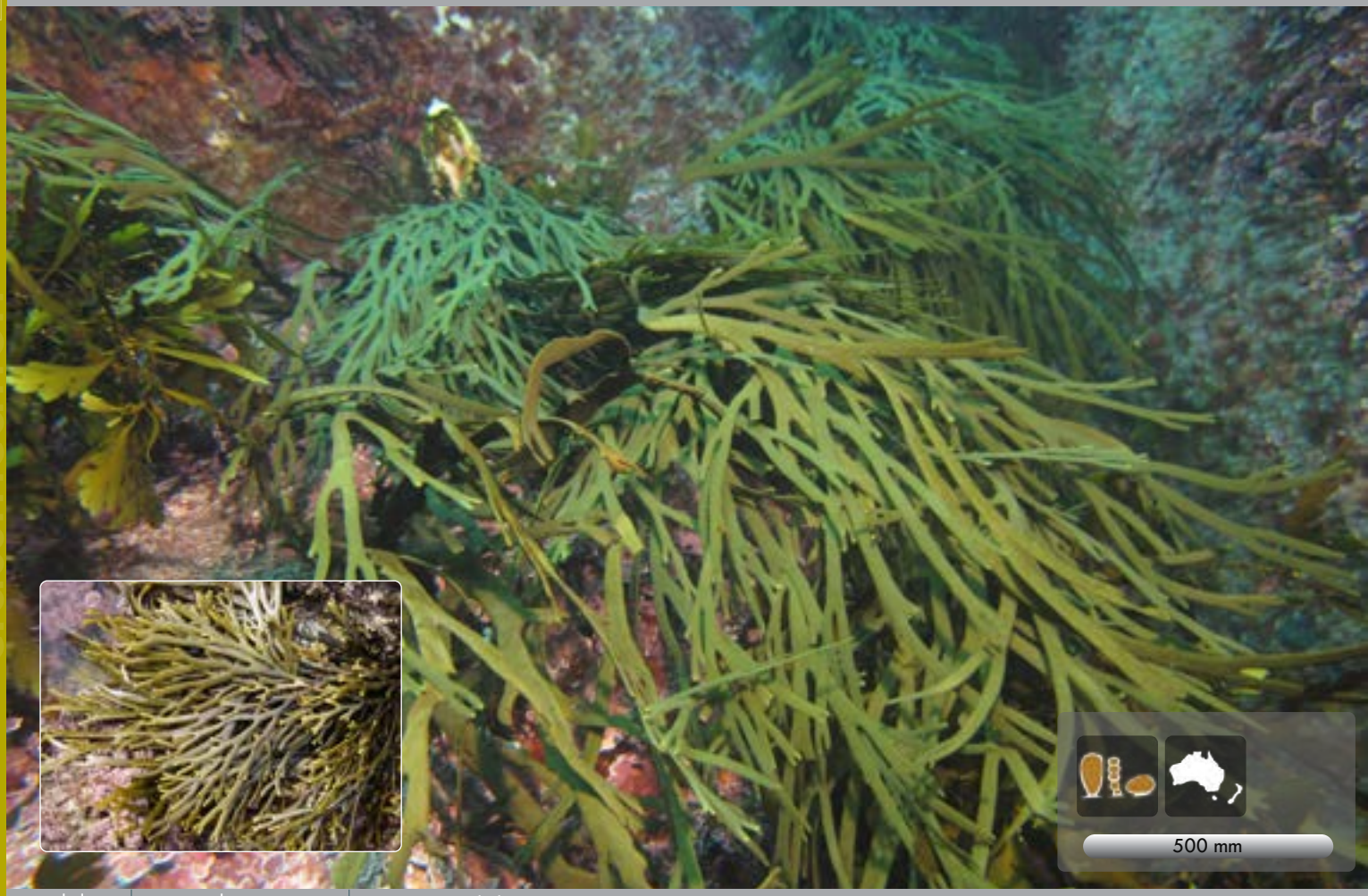

morphology | substrate | habitat

Plants grow up to 50 cm high and consist of strap-like, flattened and elongate blades, on forked branches, forming flattened, fan-shaped plants. Holdfast solid and disc-like. Grey-green-brown. Reproductive structures are sunken in the upper branches and not easily visible.

Found from the low intertidal to subtidal on exposed coasts. Southern North Island, South Island, Stewart Island, Chatham Islands, and Subantarctic Islands (Snares, Antipodes, Auckland and Campbell Islands). Also Australia.

main image
Roberta D'Archino

inset image
Jenn Dalen

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Undaria pinnatifida (Harv.) Suringar

wakame

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Class Phaeophyceae Order Laminariales Family Alariaceae

morphology substrate habitat

Plants grow up to 1 m high and consist of a large blade, often deeply divided into lobes. Blades have a well defined midrib which continues into the stalk. Holdfast of forked finger-like branches. Pale golden brown to dark brown. Reproductive structure (the sporophyll) varies in size and is found at the base of the stalk. It is thicker and often darker brown than the blades, and deeply folded and when big appears to spiral around the stalk.

Low intertidal to subtidal depths, grows on any hard surface, including concrete and wood. Introduced to New Zealand; found in the North Island, South Island, Stewart Island, and Subantarctic Islands (Snares Islands). It has also been reported from a shipwreck in the Chatham Islands but eradication efforts appear to have been successful in preventing its spread. Fiordland sightings require verification as this species has only been reported in Breaksea Sound and Northport in Chalky Inlet.

Native to Japan, Korea and China. Also invasive in Australia, Argentina, Britain, France, Italy, North America and Spain.

It could also be.....

Ecklonia radiata

main image
Kate Neill

inset image
Sheryl Miller

Nelson, W. (2013) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press, Wellington, 328 pp.
Uwai, S., Nelson, W., Neill, K., Wang, W.D., Aguilar-Rosas, L.E., Boo, S.M., Kitayama, T., Kawai, H. (2006) Genetic diversity in *Undaria pinnatifida* (Laminariales, Phaeophyceae) deduced from mitochondria genes – origins and succession of introduced populations. *Phycologia* 45, 687–695.

Macrocystis pyrifera (LL.) C.Agardh

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morphology

substrate

habitat

Plants can be huge, growing up to 20 m high. Consists of long cylindrical stipes that carry the blades up to the surface of the water. Blades are long and leaf-like, wrinkled with small teeth on the edges and an oval bladder at the base. Blades grow from a terminal area where they split off sequentially. Holdfast of intertwined cylindrical haptera forming a massive dome-shaped structure. Golden brown. Reproductive structures occur as patches on smooth blades that have no air bladders.

Subtidal on open coasts but sheltered from direct wave action. Southern North Island, South Island, Chatham Islands, Stewart Island and Subantarctic Islands (Bounty, Antipodes, Auckland and Campbell Islands). Widespread in temperate waters.

main image
Erasmo Macaya

inset image
Chris Hepburn

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Ecklonia radiata (C.Agardh) J.Agardh

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morphology substrate habitat

Plants consist of a large blade, deeply divided into lobes. Blades may be smooth or wrinkled. Stipe is cylindrical and unbranched. Plants are 0.5 to 1 m tall. Holdfast made up of finger-like cylindrial branches or haptera. Golden brown. Reproductive structures occur as patches on the lobes of the blade and are visible as darker areas.

Low intertidal to subtidal on moderately exposed or exposed coasts, sometimes forms large beds. Three Kings, North, South, Stewart and Snares Islands. Absent from the Chatham Islands but found on Mernoo Bank 200 km east of the South Island. Also Australia, South Africa, Madagascar, West Africa and Oman.

abundance

It could also be.....
Undaria pinnatifida

main image
Malcom Francis

inset image
Svenja Heesch

Adams, N.M. (1994) *Seaweeds of New Zealand: an illustrated guide*. Canterbury University Press, Christchurch, 360 pp.
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Codium convolutum (Dellow) P.C.Silva

dead man's fingers

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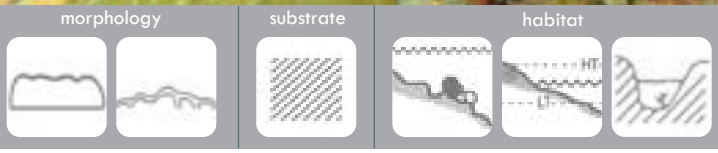

Thalli prostrate, adhering firmly to the substrate when young, becoming more loose when older, forming lobed cushions, 2–3 cm thick, up to 20 cm in diameter, with a convoluted surface. Texture firm, velvety, colour dark green.

Common on rocks in open to sheltered coasts, from the intertidal to the upper subtidal. *Codium convolutum* is an endemic species first described from the Auckland region and it is found in North and South Islands, and Chatham and Stewart Islands. Other species of prostrate *Codium* in New Zealand include the northern species, C. *cranwelliae*, and C. *dimorphum*, which occurs in southern locations and can be distinguished from C. *convolutum* by its smooth and glassy texture.

main image
Roberta D'Archino

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Codium fragile subsp. *novae-zelandiae* (J. Agardh) P.C.Silva

dead man's fingers

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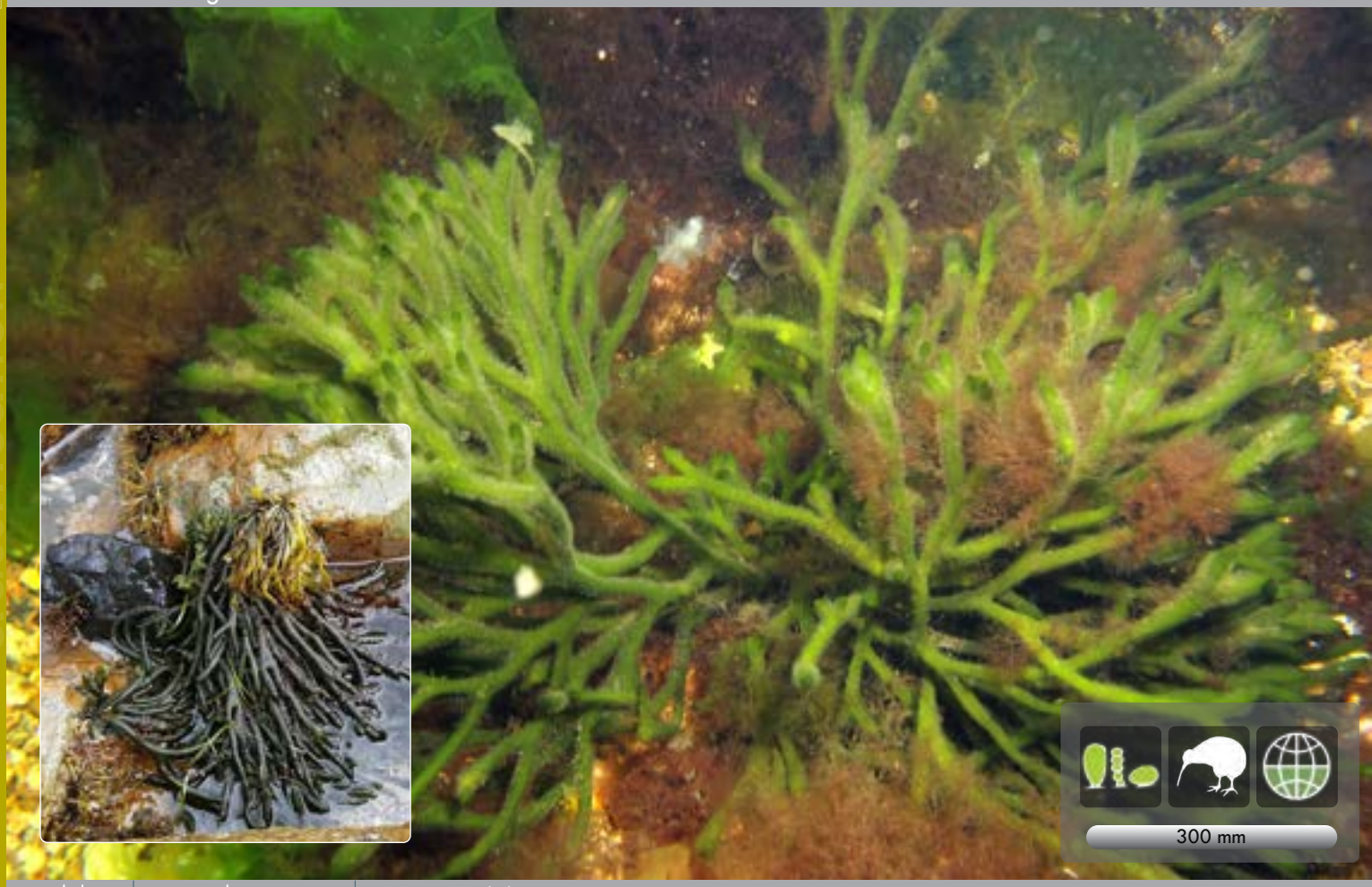

morphology substrate habitat

Plants erect, conspicuous, up to 30 cm or more high, dichotomously branched several times, attached by a large basal disc. Branches cylindrical, up to 1 cm wide, often with abundant colourless hairs. Texture firm and slightly spongy, colour green to dark green.

Found in the low intertidal and upper subtidal all around New Zealand. Plants solitary or in patches, on rocks or attached to small rocks or shells on soft sediment. This species is not distinguishable from the introduced species *Codium fragile* subsp. *fragile* which is also common in New Zealand and widespread. Also found in the Falkland Islands in the southern Atlantic Ocean.

images
Roberta D'Archino

Armitage, P.R., Nelson, W.A., Sutherland, J.E. (2017) Mismatch of morphological and molecular identifications in native and invasive subspecies of *Codium fragile* (Bryopsidophyceae, Chlorophyta). *Journal of Phycology* 53, 218–229.
Nelson, W.A. (2020) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press. Wellington, New Zealand, 351 pp.

Ulva spp.
sea lettuce

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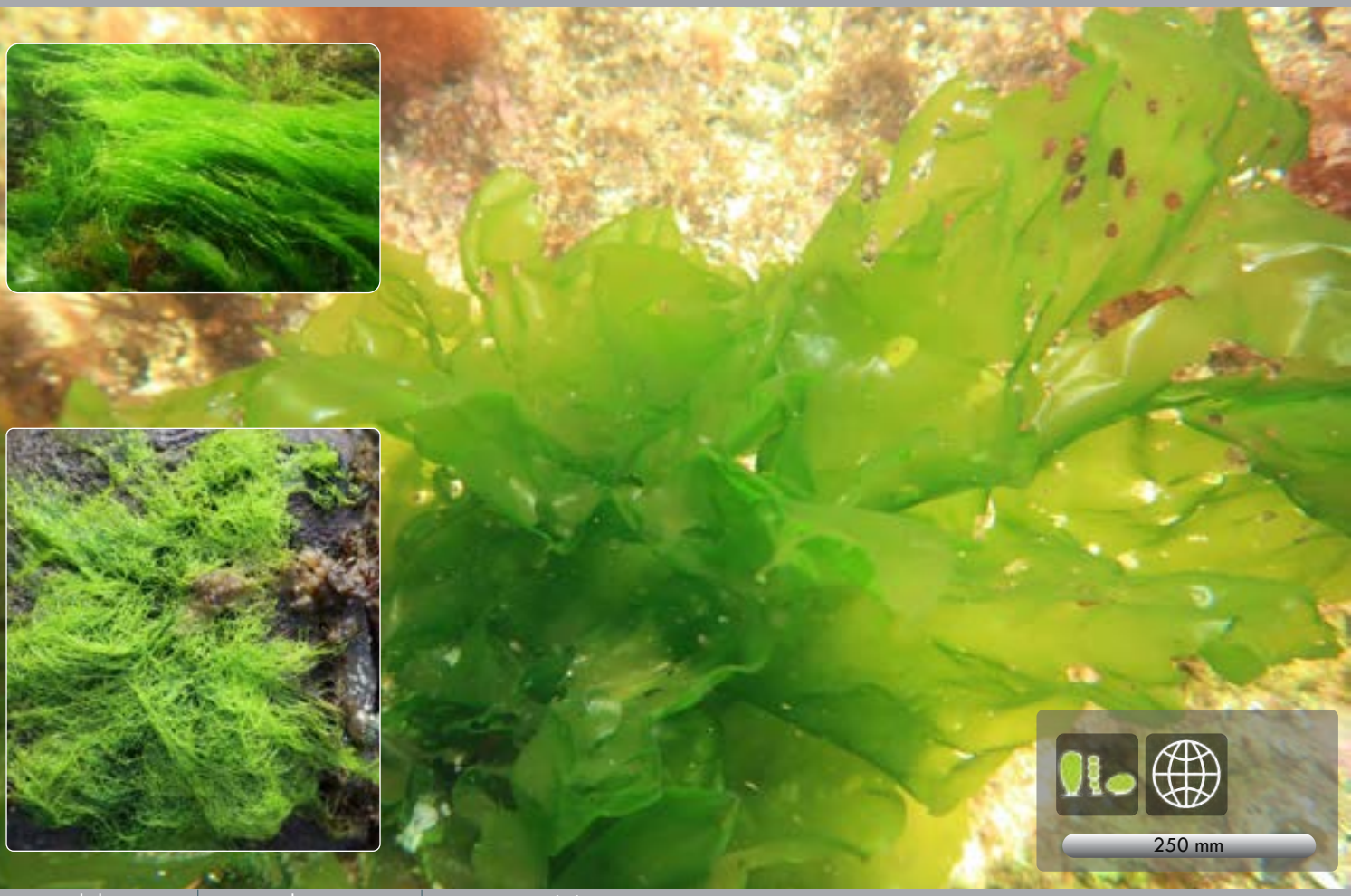

morphology

substrate

habitat

Thalli flat, thin, sheet-like or tubular; length of the thalli varies from a few cm to 1 m long. Texture firm and papery when dry, colour light, bright green.

At least 19 species occur in New Zealand, and are difficult to differentiate by morphology. *Ulva* species grow in a wide range of habitats from the upper intertidal to subtidal zones, in sheltered or exposed areas, in pristine or polluted water. Species of *Ulva* can tolerate a wide range of salinity and grow well in the freshwater surface layer in Fiordland. *Ulva* species can be abundant in summer and may form large patches. *Ulva* species are common and widespread worldwide.

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Ballia callitricha (C.Agardh) Kütz.

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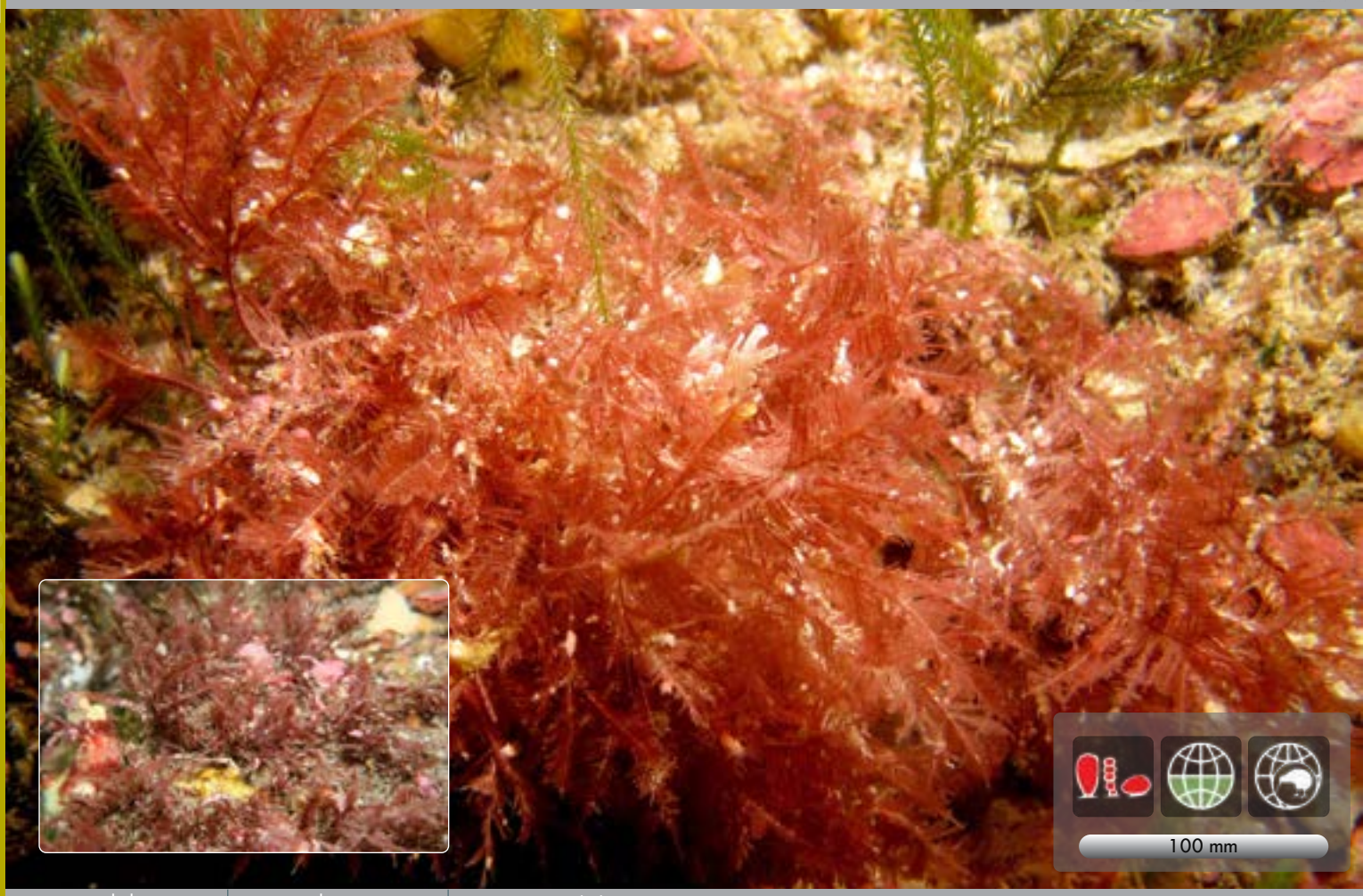

morphology

substrate

habitat

Thalli erect, fan-shaped, usually about 10 cm high, attached by a holdfast made by clumps of rhizoids. The branches are pinnate with a triangular outline as the branchlets decrease in length towards the apices. Thalli have a delicate appearance. Texture firm and furry, colour crimson.

Ballia callitricha is a native species common in New Zealand, from the Three Kings to the Subantarctic Islands, and widespread in the Southern Hemisphere. It was first described from the Falkland Islands. The species is epiphytic or epilithic (growing directly on rock substrate) and found in the low intertidal to subtidal down to 40 m on open coasts.

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Asparagopsis armata Harv.

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Gametophytic thalli erect, up to 25 cm high, forming soft tufts, composed by cylindrical axes with radially arranged delicate branchlets and short spiny barbs. Globular reproductive structures (cystocarps) are easily visible as white spots on the thallus. Colour in life pale pink. Texture soft and flaccid.

Asparagopsis armata is found in the subtidal in moderately sheltered areas or open coasts and is native to Australia and New Zealand; it has been introduced to the Northern Hemisphere. In New Zealand it occurs from the Three Kings to southern regions including Auckland Island. Found mostly entangled with other algae, locally abundant during summer. The life cycle includes a filamentous stage, previously known as *Falkenbergia*, which consists of small tufts about 1 cm wide. This species has potential to reduce methane emissions from ruminants.

images
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Ptilonia willana Lindauer

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Class Florideophyceae Order Bonnemaisoniales Family Bonnemaisoniaceae

morphology

substrate

habitat

Thalli erect, up to 40 cm high, lying in one plane, attached by a discoid holdfast, consisting of a main axis up to 1 cm wide, with regular and alternate branches. Branch apices pointed. Texture soft, not slimy, colour in life light red to crimson. The reproductive structures (cystocarps) stand out as white globose spots on the outer branches.

Ptilonia willana is found in the summer in the subtidal on rocky reefs on open coasts, and is sometimes epiphytic. It is a native species, occurring around the southern North Island (Cook Strait), South, Chatham, Stewart, Antipodes, and Auckland Islands. It is also found in Australia and Chile. It was first described from Port Pegasus, Stewart Island.

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images
Roberta D'Archino

inset image

Euptilota formosissima (Mont.) Kütz.

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Thalli 15–30 cm high, lying in one plane, fan-shaped, composed of branches with lateral fine branches, alternate and pinnate. Texture soft, colour in life bright red to crimson.

Euptilota formosissima is an endemic species first described from the Auckland Islands. It occurs around the North, South, Chatham, Stewart, Antipodes, Auckland, and Campbell Islands, however molecular data suggests there may be other undescribed species. It is found subtidally to 40 m depth, growing on rocky reefs on open coasts.

images
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Haraldiophyllum crispatum (Hook.f & Harv.) Showe Mei Lin, Hommers. & W.A.Nelson

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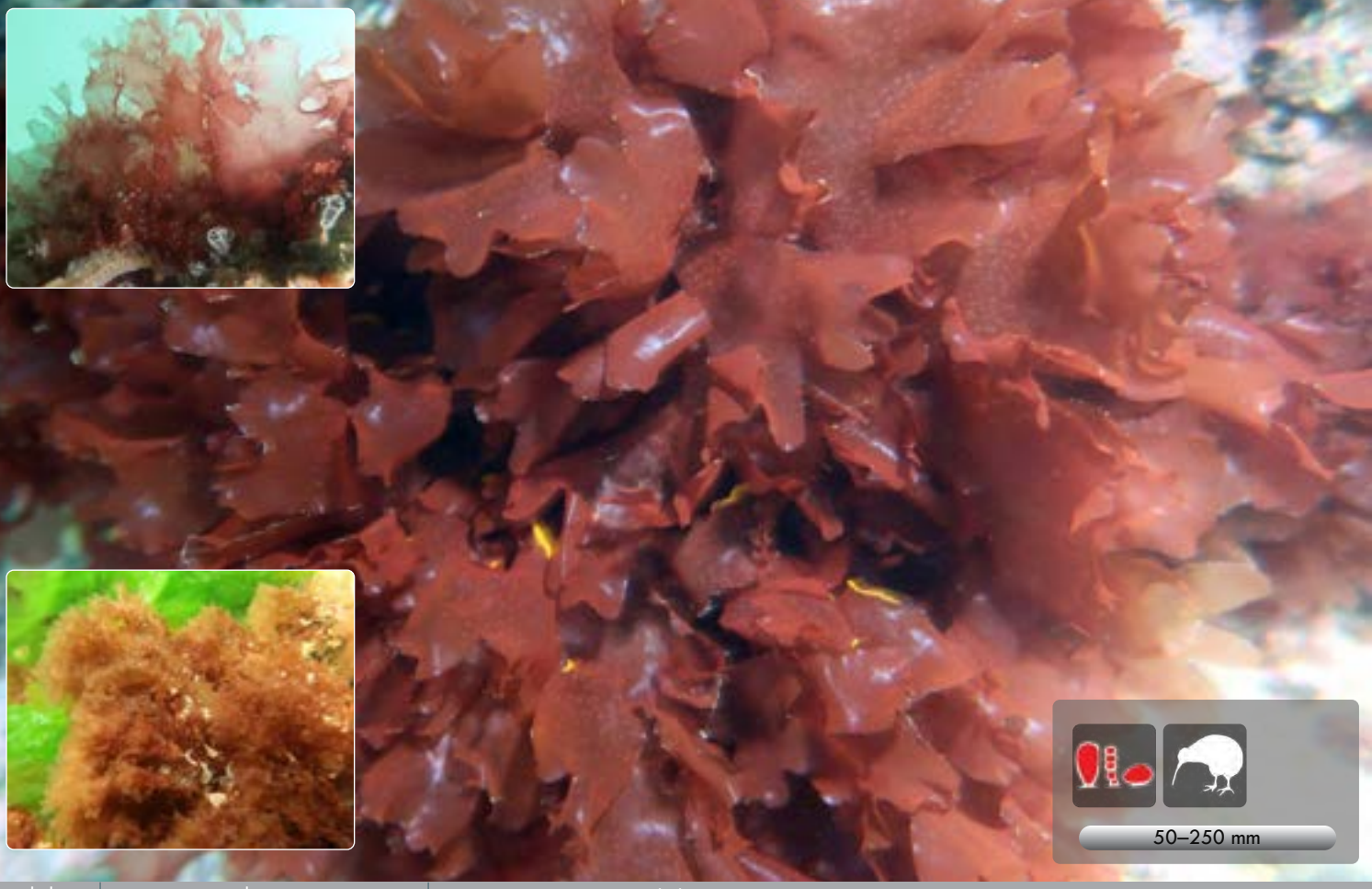

morphology

substrate

habitat

Thalli erect, 5–25 cm high, composed of a thin blade, variable in shape and colour, usually dichotomously divided into broad lobes. Blades have undulating margins often with small teeth. Reproductive structures scattered over the blades, easily visible as darker spots on the surface. Texture delicate and firm, colour in life crimson to brownish red.

Haraldiophyllum crispatum is an endemic species, common around New Zealand. It was first described from Campbell Island. It is found in the low intertidal to subtidal, common in harbours and marinas where it grows on piles and ropes, also found on open coasts.

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Hymenena durvillei (Bory) Kylin

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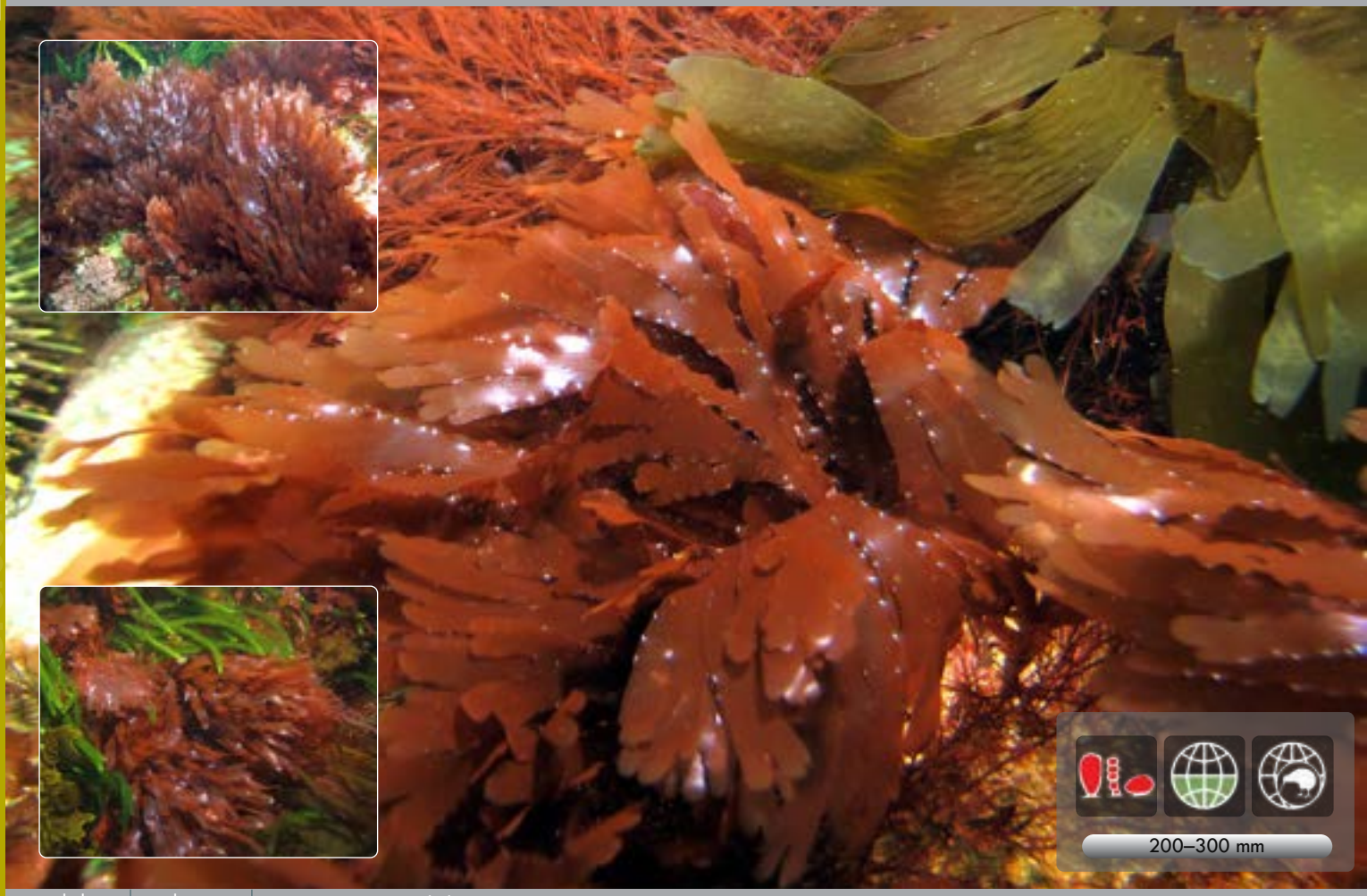

morphology | substrate | habitat

Thalli erect, 20–30 cm high, flattened, arising from a rigid stipe that divides dichotomously and forms a midrib in the bottom part of the branch. Branches narrow with parallel sides and tips slightly pointed or rounded. Margins smooth or undulating. Texture firm and crisp, colour in life dark red, often with a blue iridescence in the water.

Hymenena durvillei is a southern native species occuring from the southern North Island south to the Subantarctic Islands, and is also found in Chile where it was first described. It is found in the low intertidal to subtidal, on rocky reefs on open coasts.

images
Roberta D'Archino

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Nancythalia humilis A.Millar & W.A.Nelson

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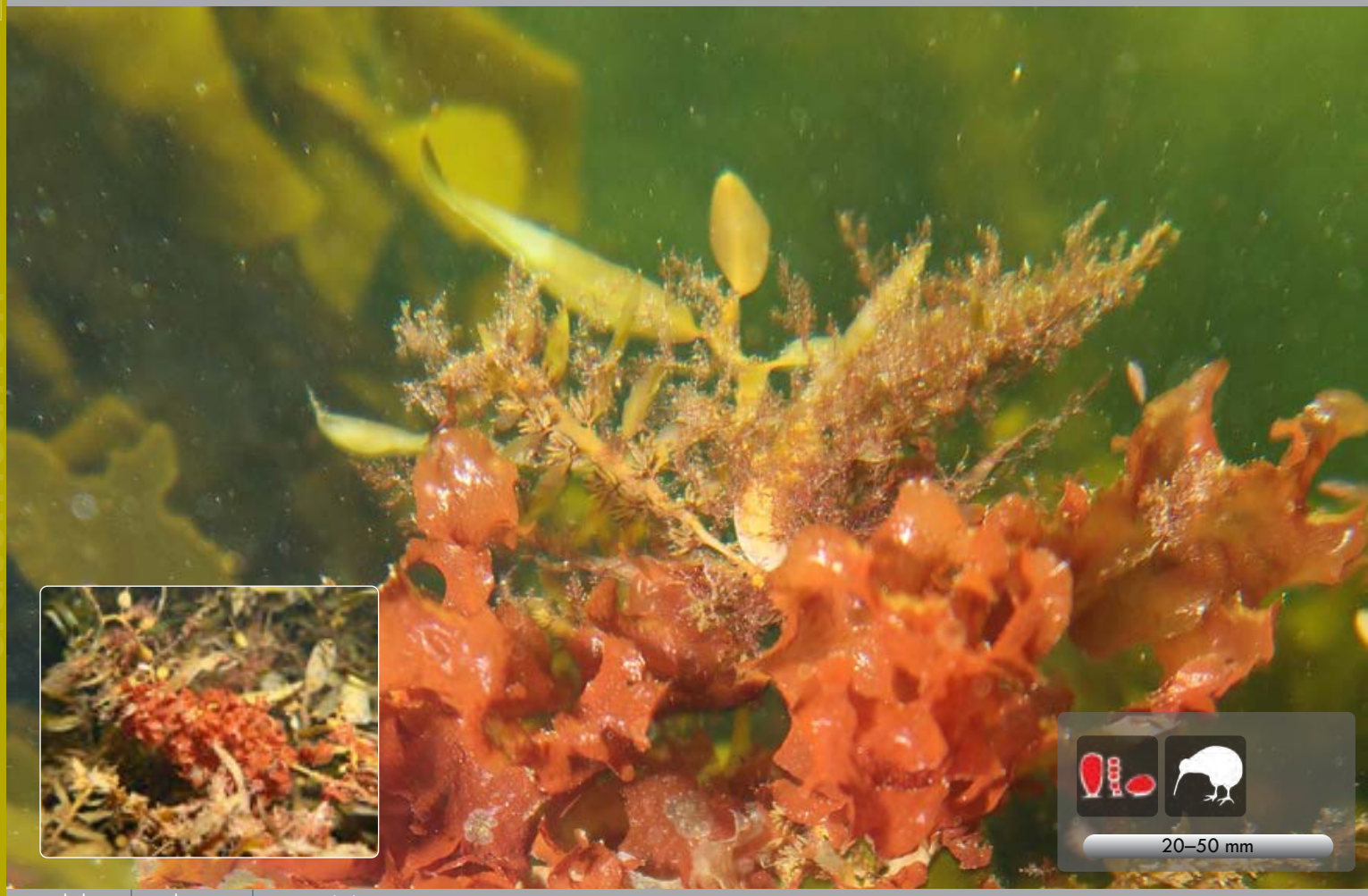
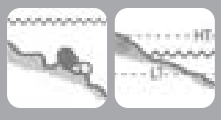
Class Florideophyceae Order Ceramiales Family Delesseriaceae



morphology

substrate

habitat



Thalli composed by delicate blades, 2–5 cm high, arising from a short stipe. Blades initially oval in shape, divided or lobed when older, margins undulating. Texture firm, color in life orange-red to dark red.

Nancythalia humilis is an endemic species that grows epiphytically on *Carpophyllum* and *Landsburgia* and also with the other endemic epiphyte species *Abroteia suborbicularis* (Harv.) Kylin. The species is found in the lower intertidal to subtidal. It was first described from Island Bay, Wellington and it is found around the North and South Islands. The genus is endemic and was named in honour of the New Zealand phycologist Nancy Adams.

images
Roberta D'Archino

Millar, A.J.K., Nelson, W.A. (2002) *Nancythalia humilis* gen. et sp. nov. and *Abroteia suborbiculare* (Delesseriaceae, Rhodophyta) from New Zealand. *Phycologia* 41, 245–253.

Nelson, W.A. (2020) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press. Wellington, New Zealand, 351 pp.

Adamsiella chauvinii (Harv.) L.E.Phillips & W.A.Nelson

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Thalli flattened, erect, 10–20 cm high, composed of blades about 1.5 cm wide with rounded apices that are often rolled inwardly. Blades arise from the midrib or occasionally from the margins. Thalli are attached by discoidal holdfasts or stolons. Mature blades are often covered by coralline algae and bryozoa. Texture firm, colour in life, dark red to brownish to crimson.

Adamsiella chauvinii is an endemic species first described from Otago Harbour. Found on the lower intertidal to subtidal, often at the edge of the reef in sheltered areas, and on soft sediments attached to pebbles and shell gravel where it can form large beds. The genus was named to acknowledge the New Zealand phycologist Nancy Adams.

It could also be.....
Crassiophycus proliferus

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Adams, N.M. (1994) *Seaweeds of New Zealand: an illustrated guide*. Canterbury University Press, Christchurch, 360 pp.
Nelson, W.A. (2020) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press. Wellington, New Zealand, 351 pp.

Bostrychia arbuscula Hook.f. & Harv.

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Class Florideophyceae Order Ceramiales Family Rhodomelaceae

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Thalli tufted up to 5 cm high, composed of compact branches with curled apices. Texture firm and springy, colour in life dark brown to purple or discolored to yellowish brown at the branch tips.

Bostrychia arbuscula forms wide, dense patches in the upper intertidal, and is an endemic species first described from Otago. It occurs in Cook Strait, and South, Stewart, Chatham, and Snares Islands.

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Adams, N.M. (1994) *Seaweeds of New Zealand: an illustrated guide*. Canterbury University Press, Christchurch, 360 pp.
Nelson, W.A. (2020) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press. Wellington, New Zealand, 351 pp.

Echinothamnion sp.

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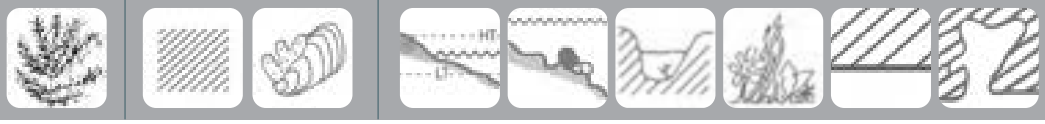

Thalli erect, up to 20 cm high, forming bushy clumps consisting of much branched cylindrical axes, bearing whorls of secondary short branchlets arising at right angles. Texture soft, colour in life dark red to brownish.

This undescribed native species is common in New Zealand, especially in southern locations. It is found from the low intertidal in rockpools, extending into the subtidal, in sheltered or open coasts, occasionally in algal meadows. The genus is also found in Australia and includes four species, two of which occur in New Zealand. However there are still undescribed species around the New Zealand coastline.

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Anotrichium crinitum (Kütz.) Baldock

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Thalli erect, 10–15 cm high, forming tufts of filaments with relatively large cells, dichotomously branched. Thalli attached by a holdfast made by clumps of rhizoids covering the basal parts of the branches. Texture turgid and firm. Sterile thalli pinkish, bright red, darker when fertile. Reproductive structures are formed at the tips of the filaments.

Anotrichium crinitum is epiphytic or epilithic on sheltered or open coasts in the subtidal between 2–25 m, often on algal meadows. It is native to New Zealand and Australia and was first described from Tasmania. The genus *Anotrichium* includes several species with a worldwide distribution.

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Adams, N.M. (1994) *Seaweeds of New Zealand: an illustrated guide*. Canterbury University Press, Christchurch, 360 pp.
Nelson, W.A. (2020) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press. Wellington, New Zealand, 351 pp.

geniculate coralline algae

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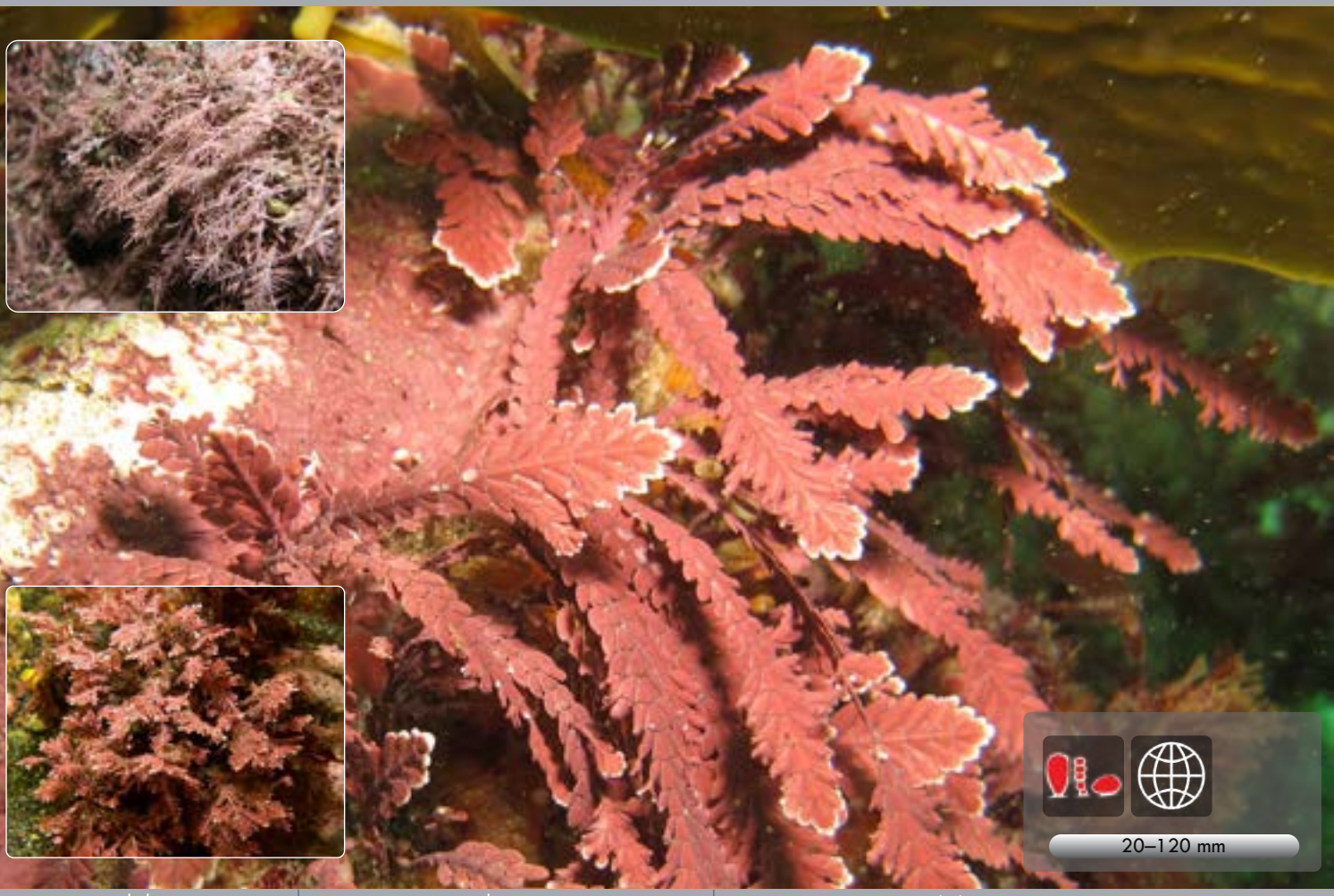

20–120 mm

morphology

substrate

habitat

Geniculate coralline algae are characterised by a calcified thallus with uncalcified or flexible joints (genicula). Geniculate algae provide habitat and refuge for many species of fish and invertebrates, often forming dense turfs. As calcifying organisms, they are vulnerable to ocean acidification.

Thalli erect, 2–12 cm high, tufted or fan shaped, dichotomously or pinnately branched. Texture stiff, firm and brittle when dry. Colour in life varies from bright rose pink to purplish, sometimes bleached.

Found in the intertidal and in the subtidal down to 30 m. Widespread in New Zealand and worldwide.

In New Zealand there are four genera: *Corallina*; *Arthrocardia*; *Jania*; and *Amphiroa* (which only occurs around the northern North Island), and several species are still undescribed.

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Adams, N.M. (1994) *Seaweeds of New Zealand: an illustrated guide*. Canterbury University Press, Christchurch, 360 pp.
Nelson, W.A. (2020) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press. Wellington, New Zealand, 351 pp.

non-geniculate coralline algae

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Non-geniculate coralline algae are characterised by prostrate, calcified thalli, and grow on different types of substrata including invertebrates and algae to which they adhere, partially or completely. They provide habitat for grazing and burrowing fauna, enhance the settlement of benthic invertebrates such as pāua, and stabilise reefs. As calcifying organisms, they are vulnerable to ocean acidification.

Non-geniculate coralline algae are also referred to as crustose or encrusting algae. They display a wide range of morphologies from delicate thin crusts to conspicuous, warty or convoluted crusts. Texture is hard and/or brittle, the colour in life ranges from bright pink to purplish. The non-genticulate corallines are difficult to identify to species or even genus.

In southern New Zealand recent studies have highlighted unexpected diversity. Non-geniculate coralline algae are widespread in New Zealand and worldwide. They are found in the intertidal and subtidal down to over 150 m depth.

to 150 m

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Roberta D'Archino

Nelson, W.A. (2020) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press. Wellington, New Zealand, 351 pp.
Twist, B.A., Neill, K.F., Bilewitch, J., Jeong, S.Y., Sutherland, J.E., Nelson, W.A. (2019) High diversity of coralline algae in New Zealand revealed: Knowledge gaps and implications for future research. PLoSONE 14 (12), e0225645. https://doi.org/10.1371/journal.pone.0225645

Rhodophyllis membranacea (Harv.) Hook.f. & Harv.

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Thalli lying in one plane, attached by a holdfast or stolon, flattened, up to 15 cm high, composed by irregularly divided branches more or less broad, further pinnately branched. Tips blunt. Texture crisp and papery when dry, colour in life red to brownish red. Thalli have a characteristic pungent odour.

Rhodophyllis membranacea is found in the subtidal on rocky reefs on open or sheltered coasts. It is a native species also found in Australia where it was first described. In New Zealand found around the North, South, Chatham, Stewart, Auckland, and Campbell Islands. There are three other species of *Rhodophyllis* in New Zealand and an obligate parasite species *R. parasitica* that is easily visible on the thalli.

It could also be.....

Crassiphycus proliferus

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Adams, N.M. (1994) *Seaweeds of New Zealand: an illustrated guide*. Canterbury University Press, Christchurch, 360 pp.
Nelson, W.A. (2020) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press. Wellington, New Zealand, 351 pp.

Ectophora depressa J.Agardh

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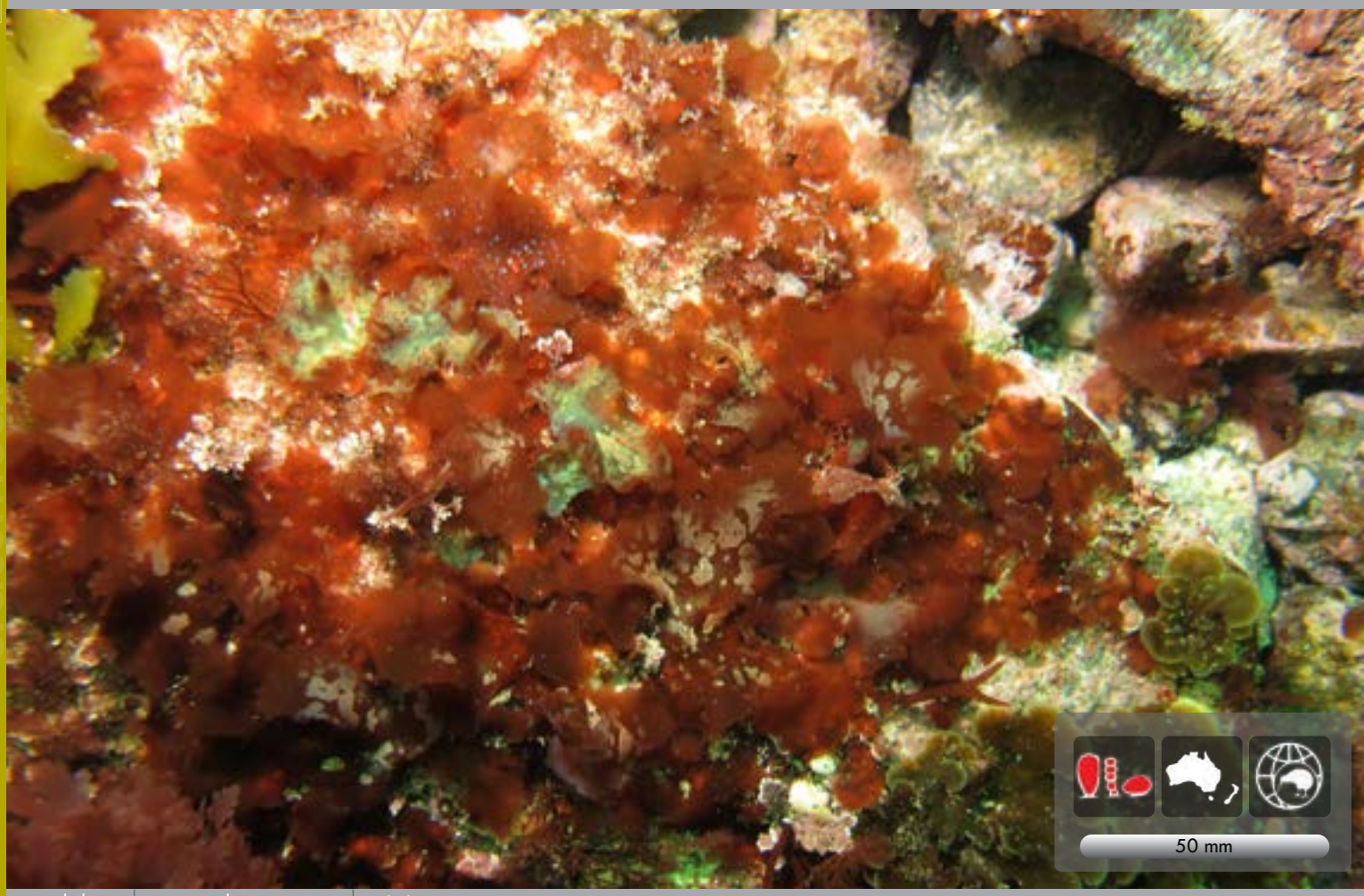

morphology | substrate | habitat

Thalli flattened, spread recumbently from a single holdfast with adjacent blades often coalescing. Hapteral outgrowths arising from the ventral surfaces provide tenacious secondary attachment points to the substrate. Thalli small (up to 5 cm in diameter) and lobed, markedly iridescent when living. Texture firm, colour in life red.

Ectophora depressa is a native species common from the Three Kings Islands to Stewart and Chatham Islands, where it occurs in the subtidal between 2–25 m, growing on rocks or on the stipes of large brown algae. Also found around Australia.

It could also be.....

Psaromenia berggrenii

main image
Roberta D'Archino

D'Archino, R., Nelson, W.A., Zuccarello, G.C. (2011) Diversity and complexity in New Zealand Kallymeniaceae (Rhodophyta): recognition of the genus *Ectophora* and description of *E. marginata* sp. nov. *Phycologia* 50, 241–255.
Nelson, W.A. (2020) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press. Wellington, New Zealand, 351 pp.

Psaromenia breggrenii (J.Agardh) D'Archino, W.A.Nelson & Zuccarello

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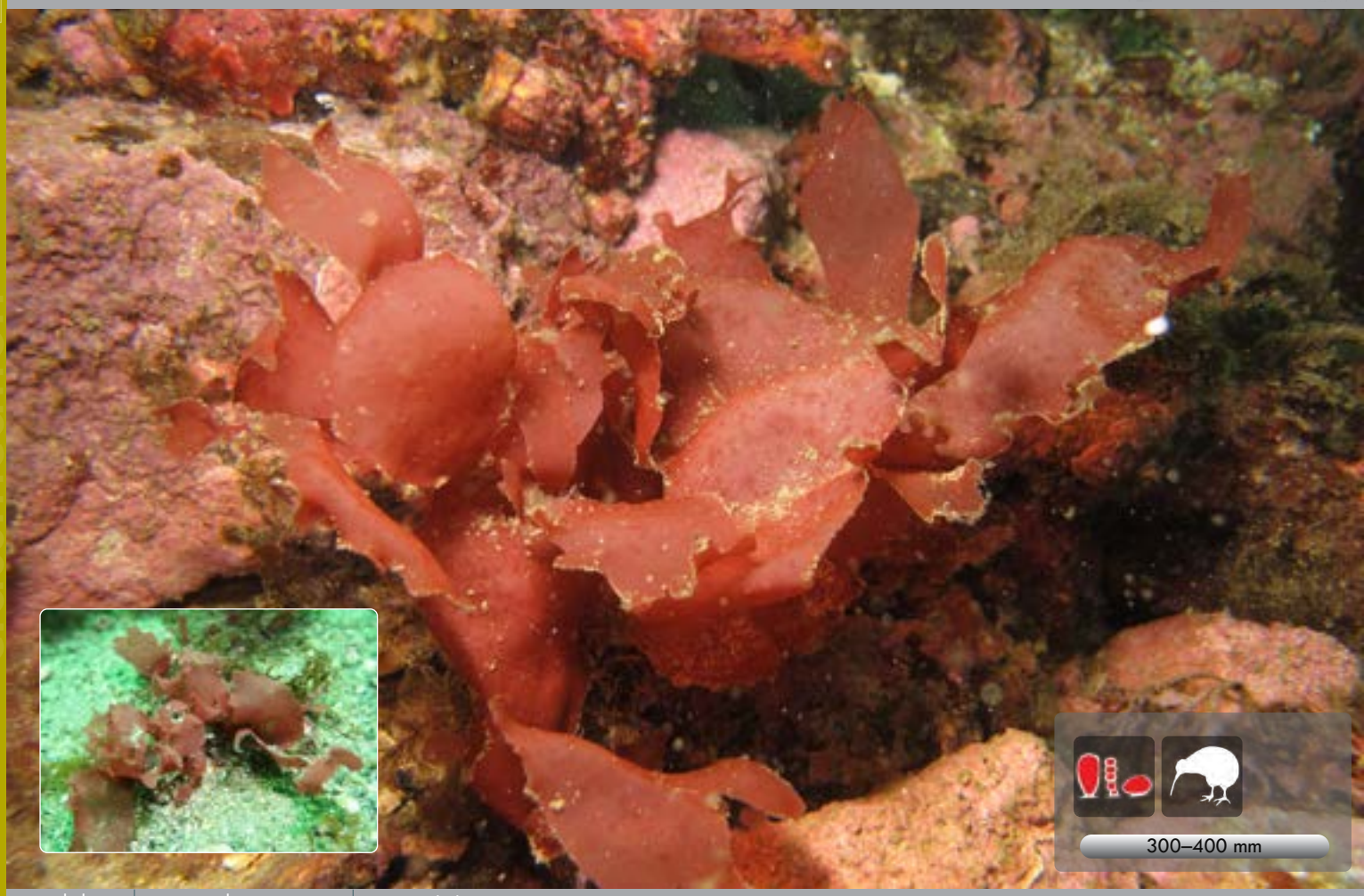

morphology | substrate | habitat

Thalli erect, flattened, usually broader than high, up to 40 cm wide to 30 cm high. Thalli foliose, much divided, either shortly stipitate or sessile and have a distinctive speckled or mottled appearance. Thalli iridescent underwater, sometimes markedly blue/purple, whereas out of water they are bright rosy carmine to dark red.

Psaromenia breggrenii is an endemic species that is widespread at the Three Kings Islands and around the North Island. It was first described from the Bay of Islands. The species is subtidal, occurring between 3 and 25 m, growing mainly on rocks but also found attached to different substrata, such as pebbles, coralline algae and shells.

images
Roberta D'Archino

D'Archino, R., Nelson, W.A., Zuccarello, G.C. (2010) *Psaromenia* gen. nov. Kallymeniaceae, Rhodophyta): a new genus for *Kallymenia berggrenii*. *Phycologia* 49, 73–85.
Nelson, W.A. (2020) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press. Wellington, New Zealand, 351 pp.

Crassiphycus proliferus (Harv.) Gurgel, J.N.Norris & Fredericq

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previously known as *Gracilaria truncata*, Kraft

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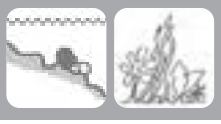

Thalli flattened, erect, 12–18 cm high, occasionally fan-shaped, composed of strap-like blades, 3–7 mm wide, up to 15 mm wide, irregularly dichotomously divided, decreasing in width towards the base. Apices rounded, not rolled inwardly. Texture firm and crisp, colour in life variable from dark red, to pinkish orange.

Crassiphycus proliferus, is an endemic species first described from Hawke Bay. It is found in the lower intertidal and subtidal down to 10 m on open or sheltered coasts, attached to rocks and shells on soft sediment, and found in algal meadows with *Adamsiella* species. It occurs around North, South, and Stewart Islands.

It could also be.....

Adamsiella chauvinii

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Adams, N.M. (1994) *Seaweeds of New Zealand: an illustrated guide*. Canterbury University Press, Christchurch, 360 pp.
Nelson, W.A. (2020) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press. Wellington, New Zealand, 351 pp.

Pachymenia dichotoma J.Agardh

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Thalli erect, robust, up to 60 cm high, composed by thick, dichotomously divided or unbranched blades, departing from a wedge-shaped (cuneate) stipe, and attached by a solid holdfast from which several blades can arise. Blades rarely with proliferations on the lower part of the thalli. Texture cartilaginous and leathery, color in life varies from dark red to brownish.

Pachymenia dichotoma forms large patches in the intertidal zone. It is an endemic southern species, occurring from the southern North Island to Stewart Island and the Chatham Islands. It was first described from Bluff.

images
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Adams, N.M. (1994) *Seaweeds of New Zealand: an illustrated guide*. Canterbury University Press, Christchurch, 360 pp.
Nelson, W.A. (2020) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press. Wellington, New Zealand, 351 pp.

Apophlaea lyallii Hook.f. & Harv.

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Thalli in tough clumps, typically 5–10 cm high, but can be up to 18 cm high, composed by cylindrical branches, dichotomously divided, attached to the rock by a fleshy crust. Colour in life, brick red to blackish, texture cartilaginous and rubbery, rigid when dry.

Apophlaea lyallii forms large patches in the upper intertidal zone in moderately sheltered areas. It is an endemic species, first described from Preservation Harbour (now known as Rakituma/Preservation Inlet), Fiordland. It occurs around southern New Zealand, including Stewart, Snares, and Chatham Islands.

images
Roberta D'Archino

Adams, N.M. (1994) *Seaweeds of New Zealand: an illustrated guide*. Canterbury University Press, Christchurch, 360 pp.
Nelson, W.A. (2020) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press. Wellington, New Zealand, 351 pp.

Plocamium cirrhosum (Turner) M.J.Wynne

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Thalli up to 30 cm high, flattened and branched in one plane, attached by a small discoidal holdfast. Branches are up to 3 mm wide with alternating side branchlets with serrated margins. Texture firm, color in life bright rosy red.

Plocamium cirrhosum is found in the low intertidal to subtidal on rocky reefs on open coasts. It is a native species, widespread in New Zealand from the Three Kings Islands to the Snares Islands, and also occurs in Australia. It was first described from Dusky Sound. There are several species of *Plocamium* in New Zealand, some still undescribed.

images
Roberta D'Archino

Adams, N.M. (1994) *Seaweeds of New Zealand: an illustrated guide*. Canterbury University Press, Christchurch, 360 pp.
Nelson, W.A. (2020) *New Zealand Seaweeds: An Illustrated Guide*. Te Papa Press. Wellington, New Zealand, 351 pp.

SPONGES

GLASS SPONGES, CALCAREOUS SPONGES, DEMOSPONGES

about sponges

The phylum Porifera (sponges) is a large group of marine and freshwater invertebrates with almost 10,000 species described world-wide. In the New Zealand EEZ, we know of almost 1500 species of which just over 600 have been described to date. Marine sponges are generally filter-feeders that use specialised choanocyte cells which collectively propel a unidirectional water current through the body to capture particulates as food and expel waste on the excurrent. A large range of cells take the role of feeding, digestion, secretion, excretion, reproduction, and defence. Sponges reproduce asexually by budding or fragmentation, and sexually by the production of eggs from archaeocytes and sperm from choanocytes, with timing and release of gametes in myriad formats. Sponges are found in all environments in the New Zealand EEZ: in intertidal rockpools and silty harbours, on subtidal rocky reefs, hydrothermal vents, seamounts, volcanic ridges, on the continental shelf and in the deep abyss.

There are four main groups of sponges: class Homoscleromorpha (liver sponges), class Demospongiae (demosponges), class Hexactinellida (glass sponges) and class Calcarea (calcareous sponges).

liver sponges

Class Homoscleromorpha (liver sponges) are quite different from other sponges, being more closely related to class Calcarea than to the demosponges or glass sponges. They are relatively cryptic in habitat and typically inhabit caves and shaded overhangs. Sponges in the family Plakinidae may be large and more abundant and frequently have a texture of liver or putty. They are often brightly coloured and are more common in the tropics. There are very few homoscleromorph sponges in New Zealand waters and none are featured in this guide.

calcareous sponges

Class Calcarea (calcareous sponges) are marine sponges that are characterised by spicules of calcium carbonate in the form of calcite or aragonite. Calcareous sponges form vases and tubes or are very lacey and delicate, forming networks of thin tubes. They are easily crushed and do not spring back as they lack spongin fibre in their skeletons. They are often white or cream with beautiful pale shades of pink, lemon or blue. Calcareous sponges are particularly abundant in Fiordland and the diversity there includes several well-known New Zealand species.

glass sponges

Class Hexactinellida (glass sponges) are relatively uncommon and typically deep-water inhabitants. They have silica spicules based on a six-rayed design, and their cells lack membranes so that the cytoplasm is multinucleate. Some groups have rigid frames, while others are like woven fibreglass or basket-weave vases. While most glass sponges are found in deep-water, there are two well-known shallow-water glass sponges in New Zealand waters; *Symplectella rowi* and *Rossella ijimai* were first described from northern New Zealand but are also found in Fiordland.

demosponges

Class Demospongiae (demosponges) is the largest group, consisting of predominantly marine species, although freshwater sponges are relatively common (but limited to a single family in the order Haplosclerida). Demosponge skeletons are extremely variable, composed generally of mineral (siliceous spicules and sand) and organic components (spongin fibre and fibrillar collagen), in myriad combinations and architectures. There are many groups that do not contain spicules. Demosponges are renowned for their beautiful colouration and forms; they are by far the most common and diverse sponges, and the ones that you are most likely to meet while snorkelling or diving.

sponge species index

sponge species index

For additional information about sponges

Splendid Sponges
https://niwa.co.nz/coasts-and-oceans/marine-identification-guides-and-fact-sheets/Splendid-Sponges

Splendid Sponges (intertidal)
https://niwa.co.nz/coasts-and-oceans/marine-identification-guides-and-fact-sheets/intertidal_sponges

Cymbastela lamellata (Bergquist, 1961)

leather sponge

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Plate-shaped or shallow funnel-shaped sponge, up to 20 cm diameter and 15 cm high, attached to rocky substrate by a short tough stalk. Older sponges may have secondary 'petals' or funnels in the centre of the sponge. Lamella thin, leathery, pliable, flexible, smooth, slightly felty to the touch, incompressible. Oscules are difficult to see but are situated on the concave, inner surface. Colour in life kahki brown to dark forest green. An unidentified species of zooanthid (*Epizoanthus* sp.) is often found embedded in the sponge surface.

Cymbastela lamellata is a common southern New Zealand and subantarctic species found typically on the rocky walls and canyons of Fiordland deep reefs, between about 10–30 m depth. They are also reasonably common at great depths around the Subantarctic Islands where they are found down to 600 m. Occasionally dredged from the Taranaki to Wanganui coastline around 80 m depth. Southland coastal specimens found around 40–90 m depth.

main image
Mike Page

inset image
NIWA

Bergquist, P.R. (1961) Demospongiae (Porifera) of the Chatham Islands and Chatham Rise, collected by the Chatham Islands 1954 Expedition. *New Zealand Oceanographic Institute Memoir* 13 (139), 169–206.

Battershill C.N., Bergquist, P.R., Cook, S.deC. (2010) Phylum Porifera, Pp. 58–135 *in*: S.deC. Cook (Ed), *New Zealand Coastal Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Axinella sp. (brick-red chalice sponge)

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Shallow chalice-shaped sponge, about 4 cm diameter and high, attached to rocky substrate by a short tough stalk. Sponge walls thick, margins rounded. Stalk tough, cup and margins pliable, slightly felty to the touch. Colour in life, brick-red.

Axinella sp. is a distinctive species found attached to shaded vertical walls between 15 to 30 m depth. The species resembles *Axinella richardsoni* Bergquist, 1970, but without being able to check the microscopic spicules, our colleague Dr Belinda Alvarez, an expert in order Axinellida, refers to this species as simply *Axinella* sp. So far, this species appears to be endemic to Fiordland.

main image
Mike Page
inset image

Bergquist, P.R. (1970) The Marine Fauna of New Zealand: Porifera: Demospongiae. Part 2 (Axinellida and Halichondrida). *New Zealand Oceanographic Institute Memoir* 51, 85 pp.

Raspailia topsenti Dendy, 1924

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Large bushy tree-like sponge up to 60 cm high, or candelabra-like with erect branchlets arising from several lateral branches, more-or-less in a single plane, or squat shrubby bush up to 20 cm high. Branches with rounded tips, occasionally forked, up to 2 cm diameter, attached to rock by a short stem. Surface smooth to undulating and covered with a fine transparent dermal membrane. Small oscules less than 1 mm in diameter are sparsely scattered over the surface, with star-shaped canals draining into them, oscules may be aligned in rows along branches in some specimens. Texture firm, compressible, flexible, velvety to the touch, with a hard woody axis. Colour in life deep dull orange to bright orange.

Common in sponge gardens and deep reef flats with sediment cover, particularly along the Rodney Coast and Hauraki Gulf. Found elsewhere around New Zealand from North Cape, Three Kings and Poor Knights Islands, along the east coast to Ranfurly Banks off East Cape, Kaikoura, Marlborough Sounds, Mernoo Bank, and Doubtful Sound, Fiordland.

main image
Crispin Middleton

inset image
Mike Page

Bergquist, P.R. (1970) The Marine Fauna of New Zealand: Porifera: Demospongiae. Part 2 (Axinellida and Halichondrida). *New Zealand Oceanographic Institute Memoir* 51, 85 pp.

Pritchard, K., Ward, V., Battershill, C., Bergquist, P.R. (1984) Marine sponges: Forty-six sponges of northern New Zealand. *Leigh Laboratory Bulletin* 14, 149 pp.

Darwinella cf. *gardineri* Topsent, 1905

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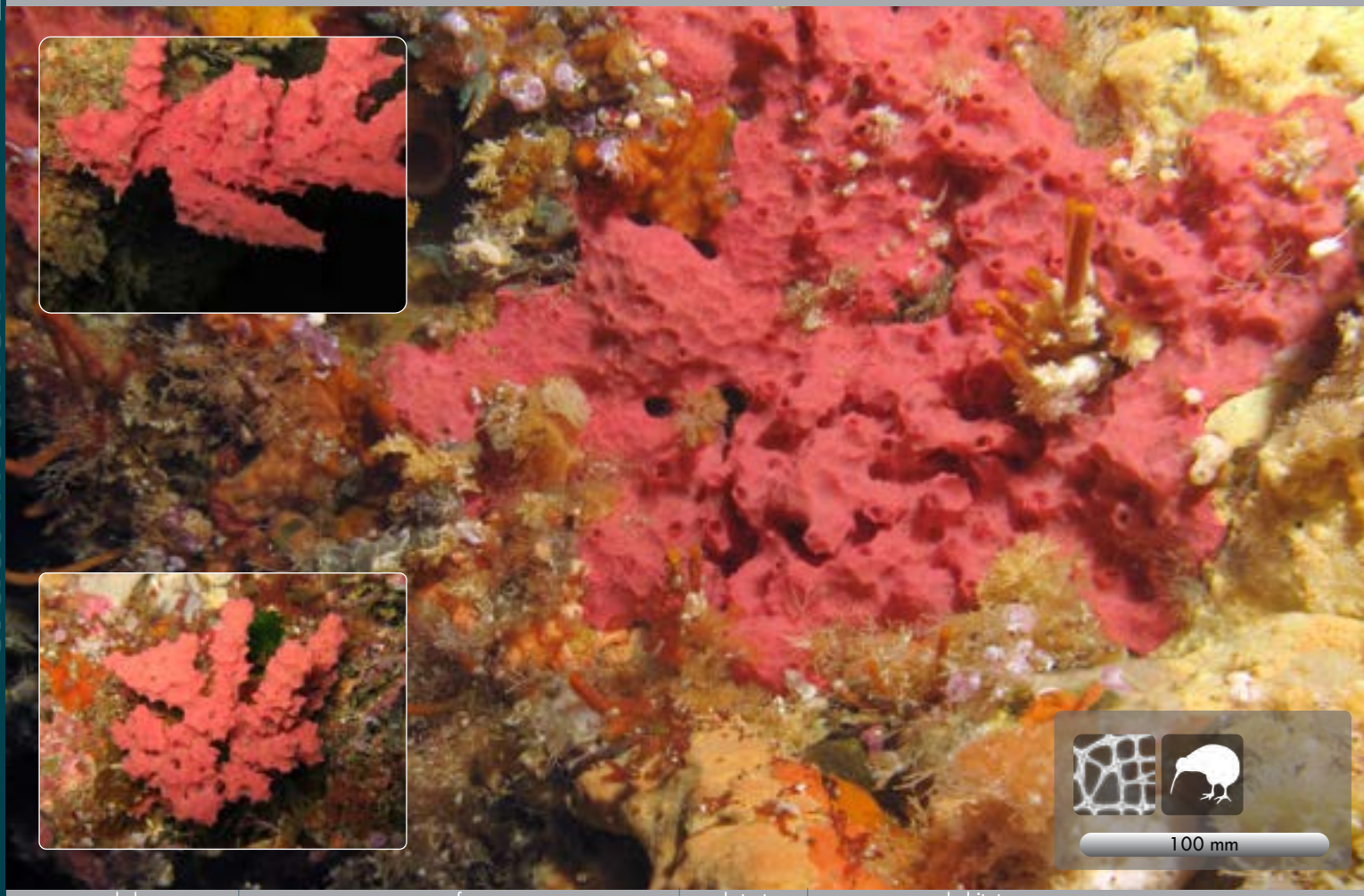

morphology | surface | substrate | habitat

Thickly encrusting sponge forming mats up to 1 m^2, sometimes with digitate projections, up to about 1 cm thick. Surface is sparsely conulose with pale gold hair-like fibres that project from a basal layer of spongin, sometimes branching to form fingers. Sponge body is soft, cavernous, draping between fibres. Surface has a fine lacy appearance, scattered with one to two mm wide oscules with transparent raised margins. Texture delicately fleshy, slimy to the touch. Colour in life bright pinkish red. Differentiated from *Dendrilla rosea* by the less spiky appearance and largely encrusting form.

Occurs in shaded regions in the shallow subtidal down to deep reef slopes, found commonly on the sides of canyons and in the shade of crevices and overhangs. Common from 10–30 m depth around New Zealand, south to Campbell Plateau (160 m).

The type locality of this species is Maldives in the Western Indian Ocean, and it has since been described from European waters and the southern Red Sea. The New Zealand specimens are highly likely to be endemic, but the genus has few characters on which to differentiate species as they lack mineral spicules. Until the New Zealand material is formally re-described and re-named, it should be referred to as *Darwinella* cf. *gardineri*, rather than *Darwinella gardineri*.

to 160 m

images
Crispin Middleton

Bergquist, P.R. (1996) The Marine Fauna of New Zealand: Porifera: Demospongiae. Part 5. Dendroceratida and Halisarcida. *New Zealand Oceanographic Institute Memoir* 107, 53 pp.
Pritchard, K., Ward, V., Battershill, C., Bergquist, P.R. (1984) Marine sponges: Forty-six sponges of northern New Zealand. *Leigh Laboratory Bulletin* 14, 149 pp.

Darwinella oxeata Bergquist, 1961

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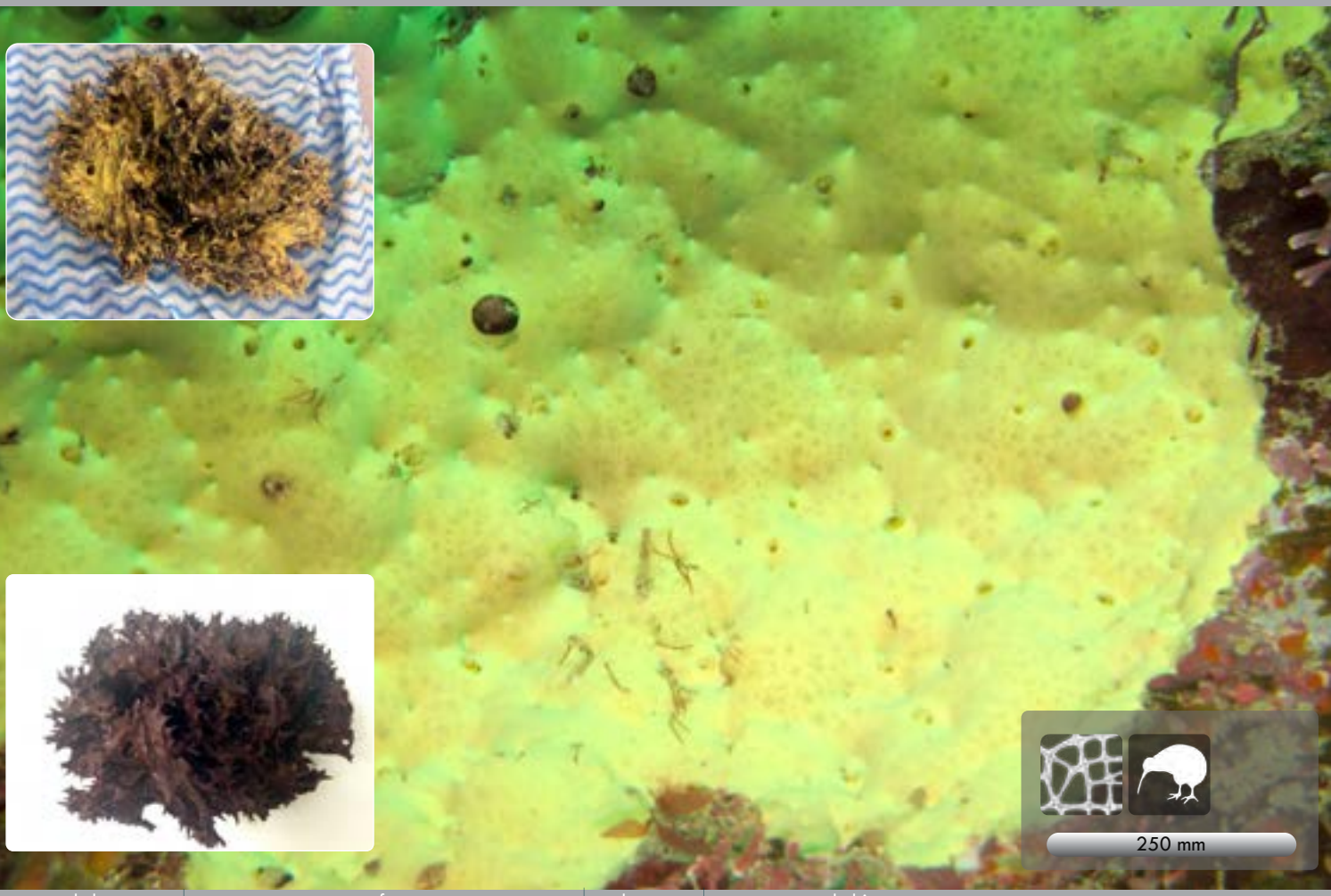

morphology | surface | substrate | habitat

Thickly encrusting sponge forming mats up to 25 cm wide, but can be up to half a metre square. Up to 2 cm thick, sometimes with prominent fingers especially in deep-water (see upper inset). Surface is conulose with pale gold hair-like fibres that project from a basal layer of spongin. Sponge body is soft, cavernous, draping between fibres. Surface has a fine lacy appearance, scattered with up to 1 mm wide oscules with transparent raised margins. Texture delicately soft, slimy to the touch. Colour in life translucent sulphur yellow turning royal blue-purple on damage, collection or on preservation (see lower inset).

Occurs in shaded regions in the shallow subtidal down to deep reef slopes, found commonly on the sides of canyons and in the shade of crevices and overhangs. Abundant down to about 40 m depth around New Zealand including Otago and North Taranaki Bight. Commonly found growing over oysters in Foveaux Strait (inset images). Reported from Stewart and Chatham Islands, and Auckland Islands in the New Zealand Subantarctic Islands region.

images
Crispin Middleton

inset images
NIWA

Bergquist, P.R. (1996) The Marine Fauna of New Zealand: Porifera: Demospongiae. Part 5. Dendroceratida and Halisarcida. *New Zealand Oceanographic Institute Memoir* 107, 53 pp.

Pritchard, K., Ward, V., Battershill, C., Bergquist, P.R. (1984) Marine sponges: Forty-six sponges of northern New Zealand. *Leigh Laboratory Bulletin* 14, 149 pp.

Fasciospongia turgida (Lamarck, 1814)

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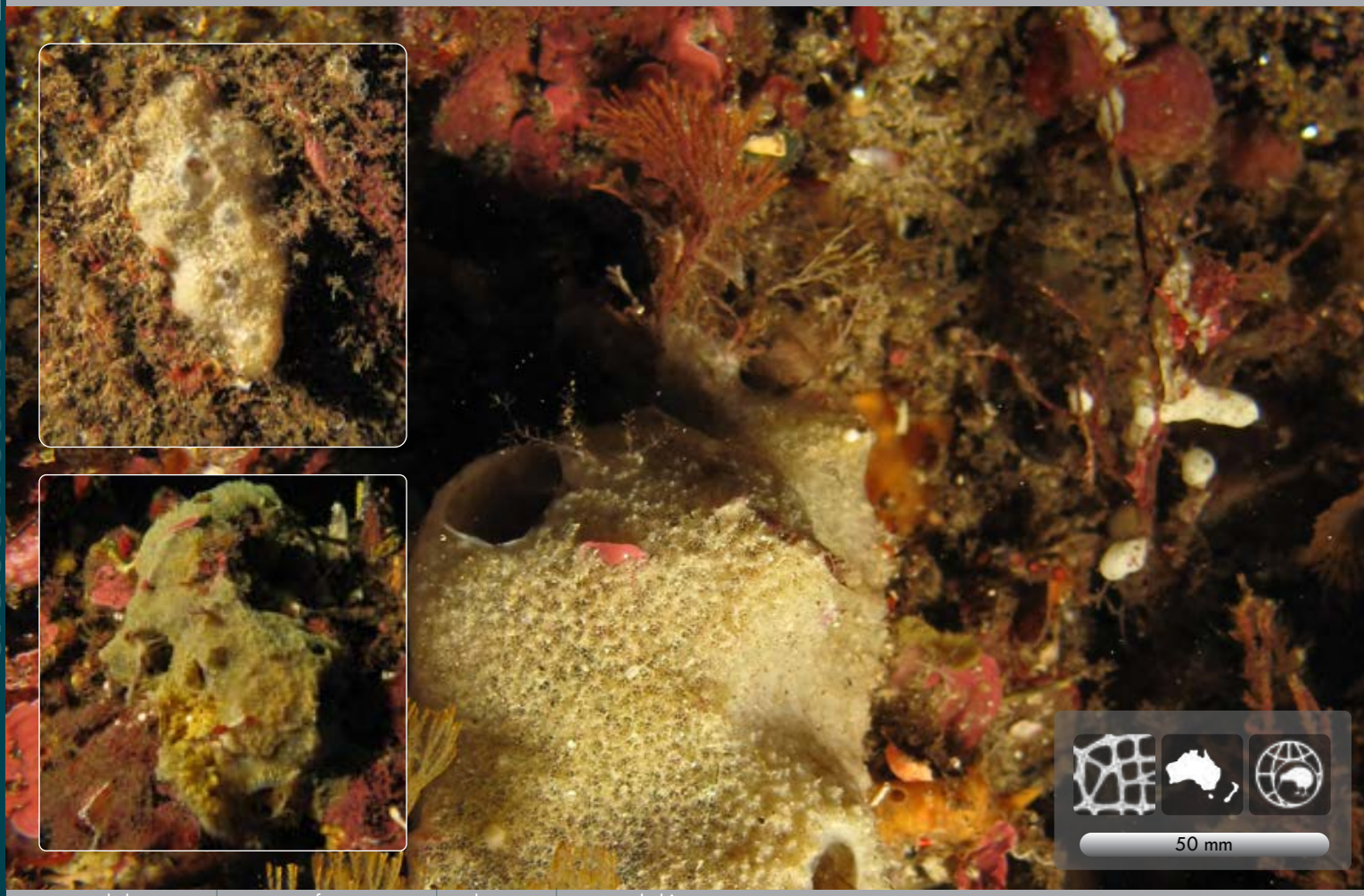
Class Demospongiae Order Dictyoceratida Family Thorectidae



morphology | surface | substrate | habitat

Thickly encrusting to massive, with cylindrical mounds, up to 50 mm wide and about 30 mm thick. Surface generally almost smooth, appearing translucent with opaque fibres forming a lacy pattern on the surface, ends of fibres only just visible forming faint conules. Oscules are large, membranous, slightly sunken, up to 10 mm diameter. Texture soft, compressible, fleshy and elastic, highly mucous. Colour in life rich golden brown.

Fasciospongia turgida was first described from South Australia and is well known from the west, east and south coasts of that nation. In New Zealand the species is known from Fiordland, Chatham Rise, Stewart Island, and Bounty Plateau, between 10–155 m. The species has also been collected in ports survey at Picton, Dunedin and Bluff. Like many other sponges that share this distribution, the species may have been historically introduced, but the direction is unknown. We consider *F. turgida* to be native to New Zealand and Australia.

to 155 m

It could also be.....

Strongylacidon conulosum

images
Mike Page

Bergquist, P.R. (1961) The Keratosa (Porifera) collected by the Chatham Islands 1954 Expedition. *New Zealand Oceanographic Institute Memoir* 13 (139), 207–219.

Kelly, M., Edwards, A.R., Wilkinson, M.R., Alvarez, B., Cook, S.deC., Bergquist, P.R., Buckeridge, J.S., Campbell, H.J., Reiswig, H.M., Valentine, C., Vacelet, J. (2009) 1. Phylum Porifera: sponges. Pp. 23–46 *in*: D.P. Gordon (Ed), *New Zealand Inventory of Biodiversity Volume 1, Kingdom Animalia: Radiata, Lophotrochozoa, and Deuterostomia*, Canterbury University Press, Christchurch, 566 pp.

Callyspongia cf. *annulata* (Ridley & Dendy, 1886)

organ-pipe sponge

Return to Index

Class Demospongiae Order Haplosclerida Family Callyspongiidae

Previously known incorrectly as *Callyspongia latituba*

morphology | surface | substrate | habitat

Branching sponge up to 60 cm high with hollow, irregular, softly ribbed tubes with a spherical to oval opening at the apex. Some tubes are finger-like, cylindrical, and narrow along their length, 2–4 cm wide, while others are flattened and flared to about 10 cm wide. Tubes may be fused. Wall thickness about 2.5–5 mm thick. Total fan width up to 40 cm. Attached to rock by a solid flaring stem. Surface is fuzzy to the touch but looks smooth, internal surface of each tube has abundant small oscules from which the aquiferous stream emerges at the top of the tube. Texture soft and compressible, flexible and elastic, easily torn. Colour in life mauve throughout, tops of the tubes are tan.

Very common along the northeastern coastline of the North Island and offshore islands on shallow rock flats, boulder slopes, sandy areas around the bases of reefs, and in macroalgal forests, down to about 20 m. First recorded from North Cape at 140 m, and known from East Cape, Marlborough Sounds and Fiordland, down to 30 m.

Callyspongia annulata was first described from Bass Strait, Tasmania and strongly resembles our New Zealand species which has been commonly referred to as C. *latituba* Dendy, 1924. Until a careful taxonomic comparison can be made, the sponge is now cross referenced to the Australian species *annulata*, as *Callyspongia* cf. *annulata*.

main image
James Williams

inset image
Crispin Middleton

Dendy, A.O. (1924) Porifera. Part I. Non-Antarctic Sponges. Natural History Report. British Antarctic ("Terra Nova") Expedition, 1910. *Zoology* 6, 269–392.

Pritchard, K., Ward, V., Battershill, C., Bergquist, P.R. (1984) Marine sponges: Forty-six sponges of northern New Zealand. *Leigh Laboratory Bulletin* 14, 149 pp.

Chondropsis kirkii (Bowerbank, 1841)

Return to Index

morphology

surface

substrate

habitat

Thickly encrusting with short fat fingers or palmate with fat rounded tubular single or multiple fingers arising from a spreading base. Often the base is detached in places, sponge meanders along substrate. Base up to 3 cm thick, fingers up to 8 cm high and 2–3 cm thick. Whole sponge can become a large mat up to 20 cm wide. Surface is smooth to granular and covered by a thin dermal membrane beneath which the skeleton of sand grains is visible. Oscules line the internal surface of each finger and the exhalent current emerges from the large opening at the top of each tube. Encrusting forms have large, well separated, raised oscules that are often aligned along ridges, and often surrounded by a ring of lighter colouration. Texture firm, fleshy, resilient but easily torn due to sandy fibres. Smooth to the touch and slimy on removal from water. Colour in life apricot grey to ochre red, pinkish brown, internally yellowish-grey from abundant sand grains that pack the interior.

Commonly found attached to sand-covered rock surfaces on deep rocky reefs and flats. Often found in silty inshore environments including harbours attached to horse-mussel shells.

The species was first described from Sydney Harbour and has been recorded from Port Phillip Bay, South Australia and the Bass Strait. In New Zealand, the species is common in Northland waters south to the Hauraki Gulf and Coromandel Peninsula, and has been reported from the West Coast of the South Island.

main image
Crispin Middleton,

inset image
Patrick L. Colin

Bergquist, P.R., Fromont, P.J. (1988) The Marine Fauna of New Zealand: Porifera: Demospongiae. Part 4. Poecilosclerida. *New Zealand Oceanographic Institute Memoir* 96, 197 pp.
Pritchard, K., Ward, V., Battershill, C., Bergquist, P.R. (1984) Marine sponges: Forty-six sponges of northern New Zealand. *Leigh Laboratory Bulletin* 14, 149 pp.

Strongylacidon conulosum Bergquist & Fromont, 1988

Return to Index

morphology | surface | substrate | habitat

Thickly encrusting, massive, mounded sponge, up to 70 mm wide and about 30 mm thick. Surface fleshy, membranous, with a pimpled to conulose surface and large, slightly raised oscules, up to 10 mm diameter. Texture soft, compressible, resilient and elastic, flabby. Colour in life light browny grey with tinges of blue-grey.

Strongylacidon conulosum is an endemic species first described from Milford Sound, from 35 m depth. It has been recorded subsequently from Fordland, Kaikoura, Dunedin and Wellington.

It could also be.....
Fasciospongia turgida

Bergquist, P.R., Fromont, P.J. (1988) The Marine Fauna of New Zealand: Porifera: Demospongiae. Part 4. Poecilosclerida. *New Zealand Oceanographic Institute Memoir* 96, 197 pp.

images
Mike Page

Crella incrustans (Carter, 1885)

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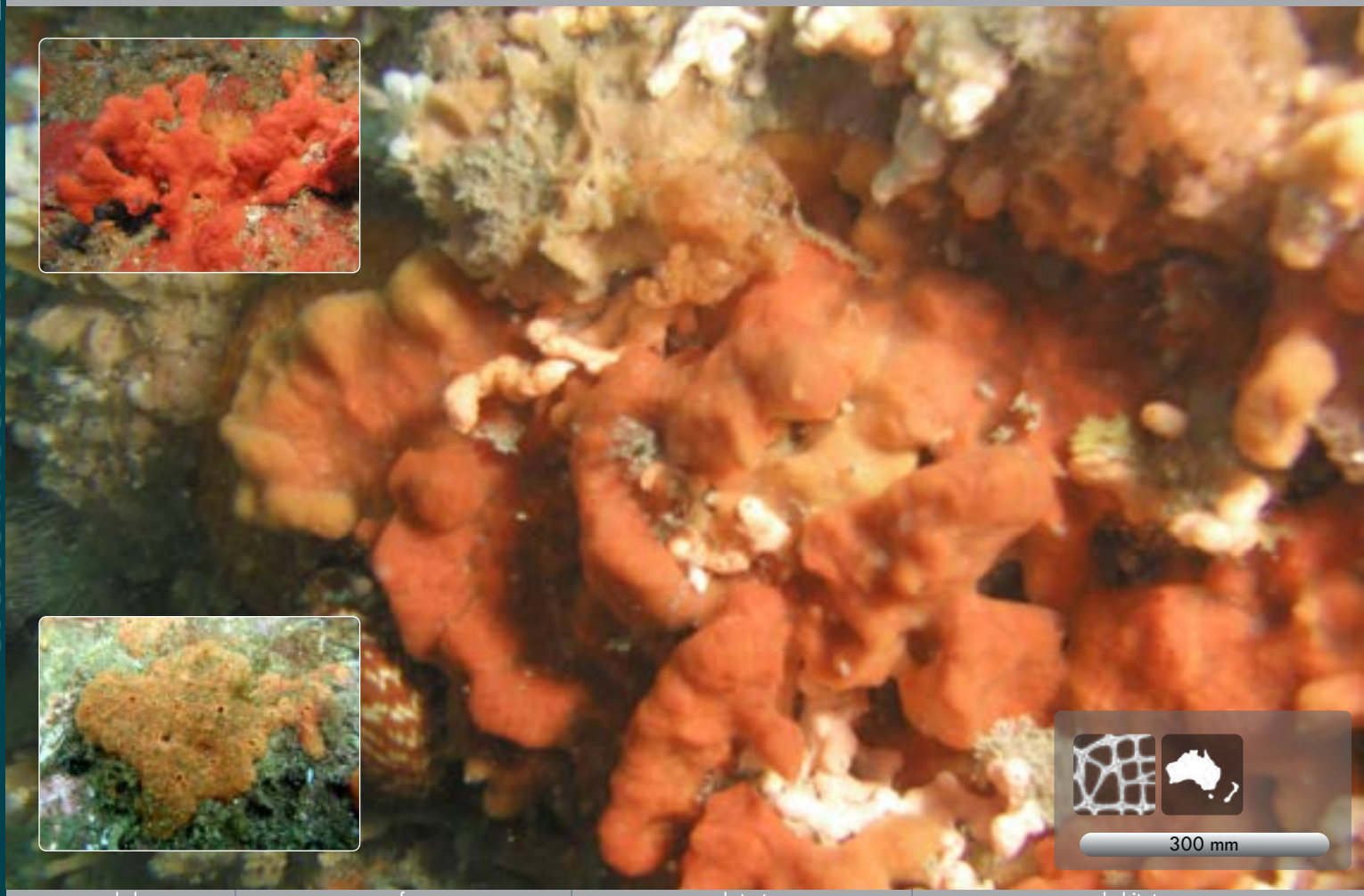
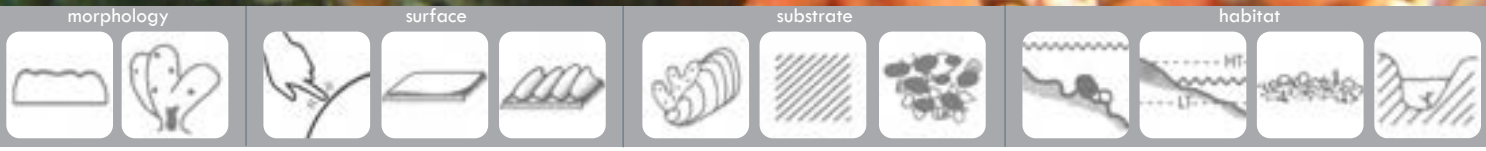
Class Demospongiae Order Poecilosclerida Family Crellidae





Extremely variable shape, from thinly to thickly encrusting, to branching with erect palmate fans or club-shaped expansions, to lamellate with an undulating margin, up to 30 cm wide and 20 cm high, one to two cm thick. Attached to rock substrate along the whole length of the sponge or by a narrow base. Surface irregular, folded, wrinkled, inflated in life. Oscules 3–7 mm in diameter are moderately densely scattered over the surface. Texture fibrous, elastic, flexible, tough, smooth to felty to the touch where the dermal membrane is intact, otherwise rough. External colour bright rich burnt red in relatively shallow North Island specimens, orange to yellow in deeper and South Island specimens.

First described from Port Philip Heads, South Australia, this species is extremely common all around New Zealand in a wide range of sheltered and exposed habitats including under rock ledges in the intertidal, shallow coastal rocky reefs, and deeper continental shelf seamounts and banks.

images
Mike Page

Bergquist, P.R., Fromont, P.J. (1988) The Marine Fauna of New Zealand: Porifera: Demospongiae. Part 4. Poecilosclerida. *New Zealand Oceanographic Institute Memoir* 96, 197 pp.

Pritchard, K., Ward, V., Battershill, C., Bergquist, P.R. (1984) Marine sponges: Forty-six sponges of northern New Zealand. *Leigh Laboratory Bulletin* 14, 149 pp.

Latrunculia fiordensis Alvarez, Bergquist & Battershill, 2002

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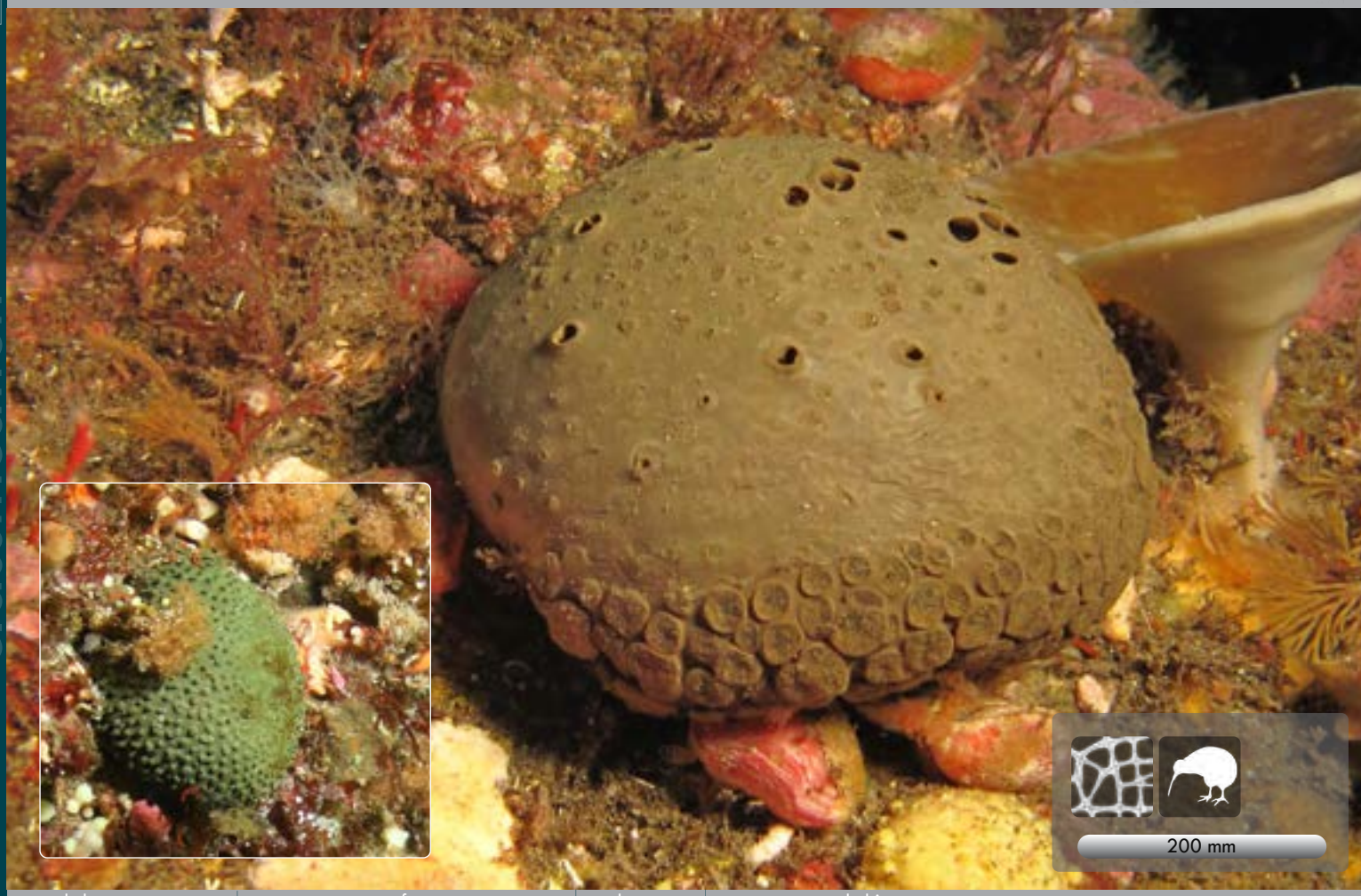

Spherical to hemispherical loaf-like sponge, up to about 20 cm diameter and typically 6–8 cm thick. Upper surface has small, densly packed, circular or elaborately shaped sieve-pores with raised margins. Oscules of various sizes up to 2 cm diameter on the apex of the sponge. Texture soft, compressible. Colour in life green to kahki green. Typically turns dark brownish black upon preservation.

Latrunculia fiordensis is endemic to Fiordland and locally abundant in Milford and Doubtful Sounds, and other fiord locations, on steep walls from about 9–40 m, in low light conditions. This species co-exists with *L. millerae* but cannot be differentiated from it by external morphology.

The chalice-shaped sponge to the upper right of *L. fiordensis* is *Cymbastela lamellata*.

main image
Mike Page

Battershill C.N., Bergquist, P.R., Cook, S.deC. (2010) Phylum Porifera, Pp. 58–135 *in*: S.deC. Cook (Ed), *New Zealand Coastal Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Alvarez, B., Bergquist, P.R., Battershill, C.N. (2002) Taxonomic revision of the genus *Latrunculia* Du Bocage (Porifera: Demospongiae: Latrunculiidae) in New Zealand. *New Zealand Journal of Marine and Freshwater Research* 36, 151–184.

Polymastia hirsuta Bergquist, 1968

Return to Index

morphology | surface | substrate | habitat

Cushion-shaped spherical sponge up to 20 cm diameter and 8 cm high. Surface covered in smooth, short, squat well-spaced inhalant and exhalant papillae, 3–12 mm wide and 1–10 mm high. Surface between the papillae is very hispid and often covered in sediment and sand trapped by projecting spicules. Texture soft, compressible, surface between papillae velvety to the touch. External colour in life yellow orange with maroon to pinkish papillae, internal colour yellow orange. When sediment is trapped in projecting spicules between the papillae, the surface is often grey.

Uncommon, but known from the Poor Knights Islands, Rodney Coast and offshore islands including Little Barrier and Great Barrier Islands. Reported from Doubtful Sound down to 30 m.

main image
Tony Ayling

inset image
Floor Anthoni
NIWA

Pritchard, K., Ward, V., Battershill, C., Bergquist, P.R. (1984) Marine sponges: Forty-six sponges of northern New Zealand. *Leigh Laboratory Bulletin* 14, 149 pp.

Kelly-Borges, M., Bergquist, P.R. (1997) Revision of south-west Pacific Polymastiidae (Porifera, Demospongiae, Hadromerida) with descriptions of new species of *Polymastia* Bowerbank, *Tylexocladus* Topsent, and *Acanthopolymastia* nov. gen. from New Zealand and the Norfolk Ridge, New Caledonia. *New Zealand Journal of Marine and Freshwater Research* 31, 367–402.

Polymastia aurantium Kelly-Borges & Bergquist, 1997

Return to Index

morphology

surface

substrate

habitat

Thick encrusting to hemispherical sponge, circular to elongate, several sponges often conjoined, up to 30 cm long and up to 20 mm thick. Surface covered with low broad conical papillae up to 10 mm high, single oscules situated on ends of exhalent papillae, surface may be quite smooth in exposed locations. Texture soft, compressible, velvety to the touch. External colour in life deep bright orange, extending 5 mm into sponge surface, internal colour mustard.

Commonly encrusting the sides of surge channels on exposed western beaches of the North Island, and silty mudstone platforms on inshore rocky reefs on Northland coasts. Reported from Kaikoura (20 m) and the east coast of the South Island down to 120 m.

main image
Mike Page

inset image
Malcolm Francis

Kelly-Borges, M., Bergquist, P.R. (1997) Revision of south-west Pacific Polymastiidae (Porifera, Demospongiae, Hadromerida) with descriptions of new species of *Polymastia* Bowerbank, *Tylexocladus* Topsent, and *Acanthopolymastia* nov. gen. from New Zealand and the Norfolk Ridge, New Caledonia. *New Zealand Journal of Marine and Freshwater Research* 31, 367–402.

Tethya bergquistae Hooper, 1994

pink golfball sponge

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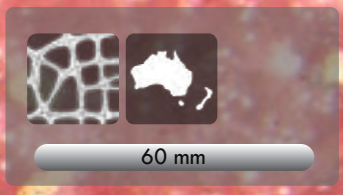
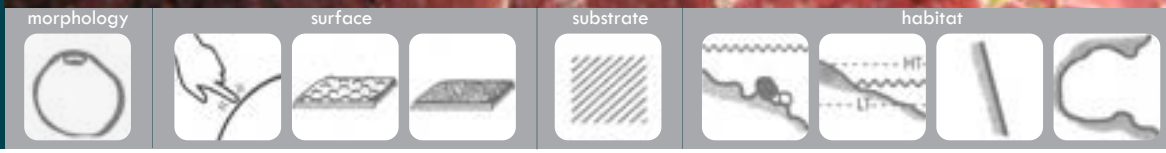
Previously known incorrectly as *Tethya ingalli*





Small, solitary, spherical sponge up to 6 cm diameter, attached to rock by short thick filaments. Surface irregularly bumpy and tasselled with buds extended on thin filaments in spring and summer. Several oscules 2–3 mm diameter are grouped on the apex. Texture barely compressible, granular and waxy to the touch. External colour in life distinctive deep rose pink, internal colour dull yellow.

Found singly or in small clusters of up to five sponges on low tide indents and walls subjected to strong currents or wave action, between macroalgae holdfasts on subtidal reef flats, and on vertical faces and under overhangs down to 30 m. Common on exposed northern coastlines and offshore islands. Also known from the Kermadec Volcanic Arc and Sunday Cove, Fiordland. Also reported from South Australia.

images
Crispin Middleton

Bergquist, P.R., Kelly-Borges, M. (1991) An evaluation of the genus *Tethya* (Porifera: Demospongiae: Hadromerida) with descriptions of new species from the Southwest Pacific. *The Beagle, Records of the Northern Territory Museum of Arts and Sciences* 8 (1), 37–72.

Pritchard, K., Ward, V., Battershill, C., Bergquist, P.R. (1984) Marine sponges: Forty-six sponges of northern New Zealand. *Leigh Laboratory Bulletin* 14, 149 pp.

Clathrina sp. (Fiordland lacey tubes)

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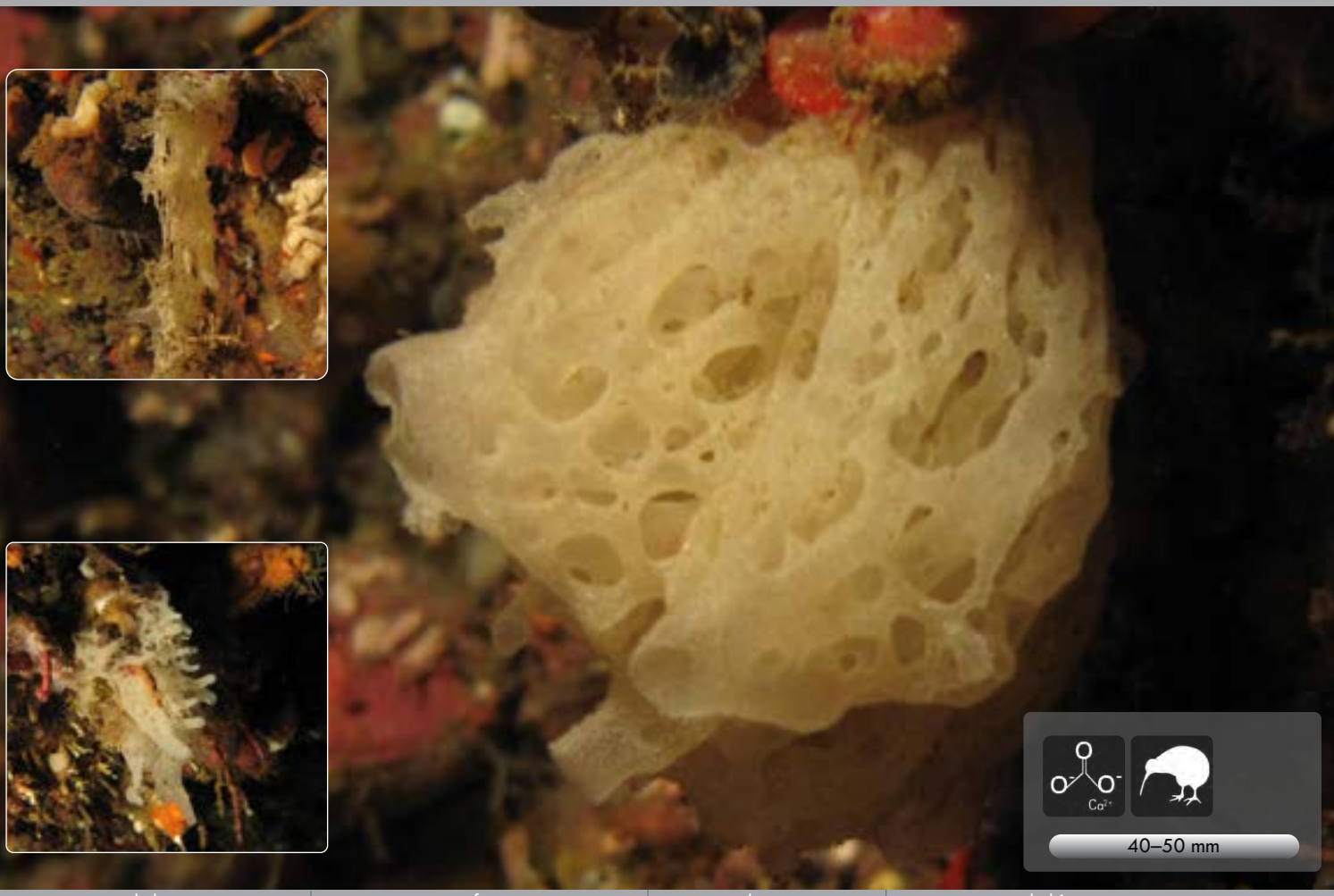
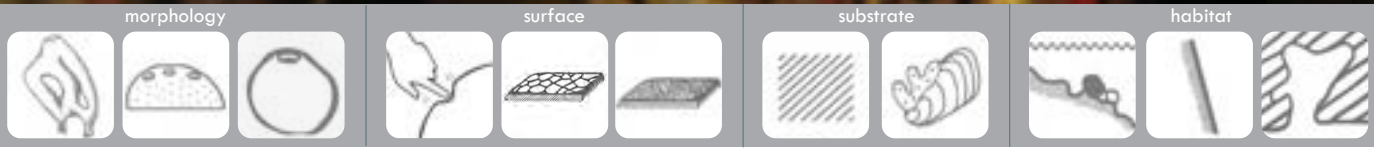
Class Calcarea Order Clathrinida Family Clathrinidae





Variable shape, often spherical to oval-shaped, about 4–5 cm diameter and 3 cm high, forming a loose cormus, a mass of very thin interconnected tubes converging on several large, raised membranous oscules. May also form elongate, dripping masses of delicate tubes, 3 cm diameter, 10 cm long. Surface appears punctate, with interconnected, inflated tubes, leading to larger tubes and oscule openings. Texture of tubes extremely delicate, fragile; the mass crushes easily with no resistance, tubes collapsing. Slightly felty to the touch. Colour in life translucent creamy white.

Attached to masses of encrusting invertebrates and algae on shaded vertical walls, within indentations and in caves in areas of low current activity. So far, this species appears to be endemic to Fiordland.

images
Mike Page

Kelly, M., Edwards, A.R., Wilkinson, M.R., Alvarez, B., Cook, S.deC., Bergquist, P.R., Buckeridge, J.S., Campbell, H.J., Reiswig, H.M., Valentine, C., Vacelet, J. (2009) 1. Phylum Porifera: sponges. Pp. 23–46 *in*: D.P. Gordon (Ed), *New Zealand Inventory of Biodiversity Volume 1, Kingdom Animalia: Radiata, Lophotrochozoa, and Deuterostomia*, Canterbury University Press, Christchurch, 566 pp.

Leucettusa lancifera Dendy, 1924

white flask sponge

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Class Calcarea Order Clathrinida Family Leucaltidae

20–30 mm

morphology | surface | substrate | habitat

Bulbous flask-shaped sponges, typically single but may be clustered in a group up to 20 cm wide. Single sponges are 2–3 cm maximum diameter, and up to 8 cm high. Surface smooth with tiny inhalant pores clearly visible, small oscules line the inner surface of each bulb, expelling water into an atrium which exits at the top of each flask through a flared opening, 3–5 mm diameter. Texture brittle, hard, easily crushed, no elasticity, interior fleshy, granular to the touch. Colour in life typically white to cream with a tinge of peach, surface glistens.

Individuals attach to rock by a short stalk, forming groups by spreading from the base. Common down to 40 m on deep rocky reefs, usually in shaded environments such as under macroalgae, but may be in the open on deep reefs. Found off the east coast of the North Island, west coast of the South Island including Fiordland, and Cook Strait, down to 50 m.

main image
Patrick L. Colin

inset image
Crispin Middleton

Battershill C.N., Bergquist, P.R., Cook, S.deC. (2010) Phylum Porifera, Pp. 58–135 *in*: S.deC. Cook (Ed), *New Zealand Coastal Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Pritchard, K., Ward, V., Battershill, C., Bergquist, P.R. (1984) Marine sponges: Forty-six sponges of northern New Zealand. *Leigh Laboratory Bulletin* 14, 149 pp.

Grantia ramulosa Dendy, 1924

Return to Index

Class Calcarea Order Leucosolenida Family Grantiidae

classification

morphology | surface | substrate | habitat

Variable shape, may form single tubes with incipient or multiple branches arising from a single tubular base (main image), or multiple branches arising from a common base (inset), tubes vary in width but usually about 10 mm diameter, mass of branches about 6 cm diameter. May also form elongate, dripping singular tubes. Surface smooth and the ends of each tube are open and fringed with a collar of radiating spicules. Tubes about 0.25 mm thick. Texture delicate, fragile; the mass crushes easily, tubes collapsing. Slightly felty to the touch. Colour in life opaque creamy white.

Attached to masses of encrusting invertebrates and algae on shaded vertical walls, within indentations, and in caves in areas of low current activity. Like several other species including the glass sponges *Rossella ijimai* and *Symplectella rowi*, this species was first described from the very northern reaches of the North Island, but is also found in the Fiordland region.

main image
Mike Page

inset image
Peter Marriott

Dendy, A.O. (1924) Porifera. Part I. Non-Antarctic Sponges. Natural History Report. British Antarctic ("Terra Nova") Expedition, 1910. *Zoology* 6, 269–392.

Kelly, M., Edwards, A.R., Wilkinson, M.R., Alvarez, B., Cook, S.deC., Bergquist, P.R., Buckeridge, J.S., Campbell, H.J., Reiswig, H.M., Valentine, C., Vacelet, J. (2009) 1. Phylum Porifera: sponges. Pp. 23–46 *in*: D.P. Gordon (Ed), *New Zealand Inventory of Biodiversity Volume 1, Kingdom Animalia: Radiata, Lophotrochozoa, and Deuterostomia*, Canterbury University Press, Christchurch, 566 pp.

Leucosolenia rosea Kirk, 1896

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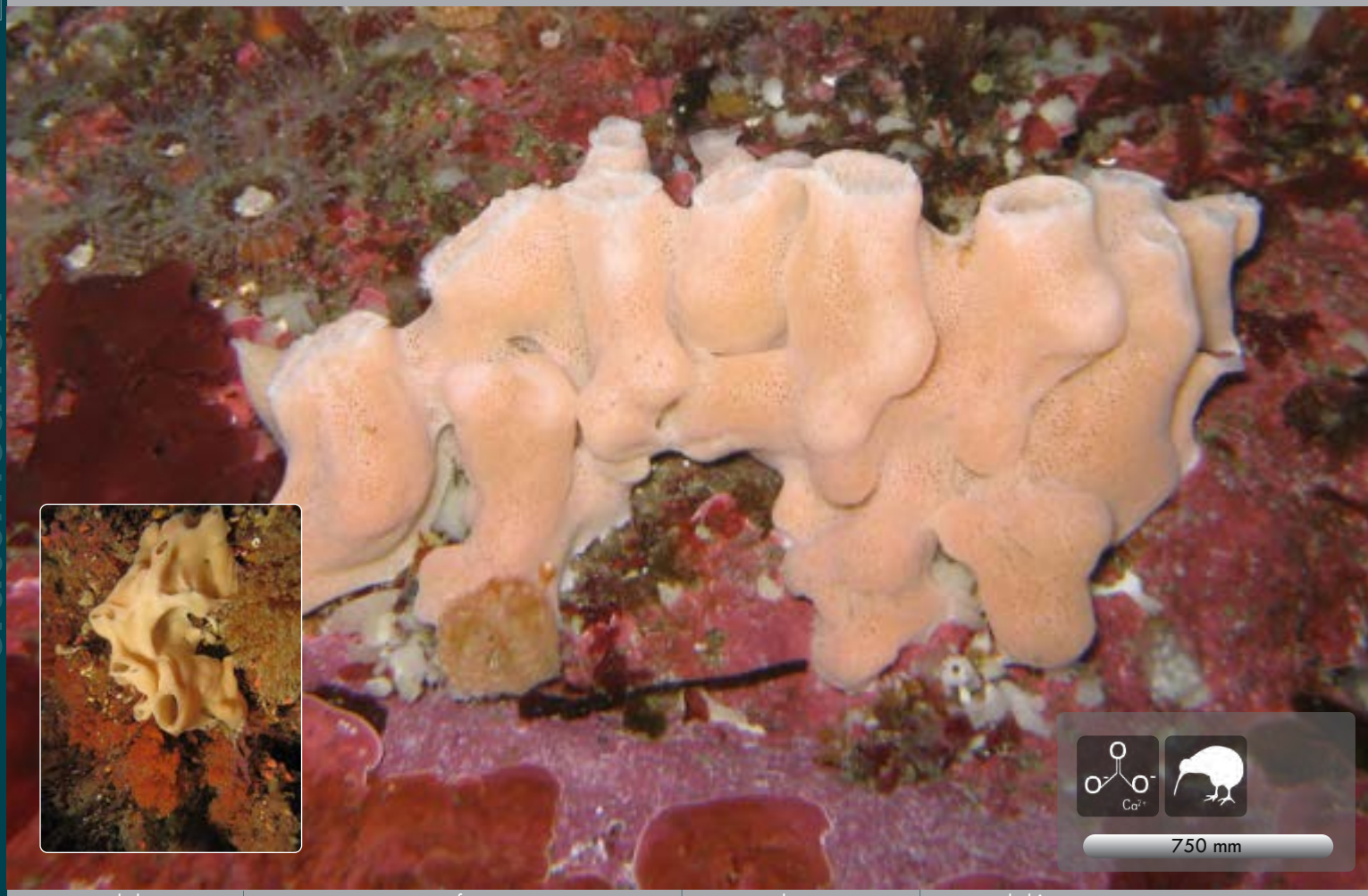
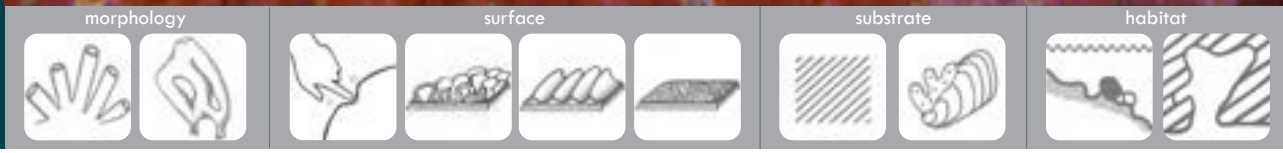
Class Calcarea Order Leucosolenida Family Leucosoleniidae





Variable shape, typically forms a spreading, linear, hollow, floppy tubular mass, with a smooth, lobed, ridged or wrinkled exterior, and may attain a good size for a calcaeous sponge, up to 5 cm diameter and 75 cm long. May also form a solid mass of thick, broad tubes, connected basally or almost to the apex of the sponge (main image). Surface may be even or ridged, wrinkled, and is always punctured with visible pseudopores (perforations in the exterior of the sponge), visible to the unaided eye. Texture relatively compact but crushes easily, tubes collapsing. Slightly felty to the touch. Colour in life pale pink to salmon-coloured.

Attached to masses of encrusting invertebrates and algae on shaded vertical walls, or on rocky substrate in sheltered harbours under full illumination. Kirk (1896) did not state where this species was first collected. The species is also known from Port Pegasus, Stewart Island, and Fiordland.

main image
Debbie Freeman

inset image
Mike Page

Kirk, H.B. ([1895] 1896). New Zealand sponges. Third paper. *Transactions of the New Zealand Institute* 28, 204–210.

Kelly, M., Edwards, A.R., Wilkinson, M.R., Alvarez, B., Cook, S.deC., Bergquist, P.R., Buckeridge, J.S., Campbell, H.J., Reiswig, H.M., Valentine, C., Vacelet, J. (2009) 1. Phylum Porifera: sponges. Pp. 23–46 *in*: D.P. Gordon (Ed), *New Zealand Inventory of Biodiversity Volume 1, Kingdom Animalia: Radiata, Lophotrochozoa, and Deuterostomia*, Canterbury University Press, Christchurch, 566 pp.

Rossella ijimai Dendy, 1924

orange purse sponge

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Class Hexactinellida Order Lyssacinosida Family Rossellidae

classification

morphology

surface

substrate

habitat

Goblet-shaped sponge with an atrial opening at the top that varies in width and depth, forming a shallow cup or a deep vase, up to 10 cm high and about 6 cm wide. Opening of the cup has a thin vertical margin. Wall of cup is very thick, resilient, compressible, and highly cavernous, being perforated in all directions with large branching canals which exit on the outer wall of the sponge. Surface smooth to slightly uneven, texture soft and papery. Colour in life in Fiordland is white, elswhere, bright 'Fanta' orange to dull peach. White in Fiordland.

Rossella ijimai is the second species of two that are known from comparatively shallow waters around New Zealand; glass sponges are typically found in the abyss, well over 1000 m depth. *Rossella ijimai* grows on rock, sand-covered rock, or on rubble from about 130 to over 500 m depth and has been photographed from relatively shallow waters in Fiordland. The species was first described from North Cape in 1924 and was not re-discovered until 2015 where it was found to be relatively common in the North Taranaki Bight between about 200–400 m. *Rossella ijimai* has also been recorded from the West Norfolk Ridge, the east coast of Northland, and the Chatham Rise.

It could also be.....

Symplectella rowi

images
NIWA

Dendy, A.O. (1924) Porifera. Part I. Non-Antarctic Sponges. Natural History Report. British Antarctic ("Terra Nova") Expedition, 1910. Zoology 6, 269–392.

Kelly, M., Edwards, A.R., Wilkinson, M.R., Alvarez, B., Cook, S.deC., Bergquist, P.R., Buckeridge, J.S., Campbell, H.J., Reiswig, H.M., Valentine, C., Vacelet, J. (2009) 1. Phylum Porifera: sponges. Pp. 23–46 *in*: D.P. Gordon (Ed), *New Zealand Inventory of Biodiversity Volume 1, Kingdom Animalia: Radiata, Lophotrochozoa, and Deuterostomia*, Canterbury University Press, Christchurch, 566 pp.

Symplectella rowi Dendy, 1924

glass colander sponge

Return to Index

Class Hexactinellida Order Lyssacinosida Family Rossellidae

classification

morphology | surface | substrate | habitat

Sack-shaped sponge resembling a squat covered bowl with a perforated lid on the upper surface, and projecting props or extensions on the underside. The concave 'lid' is a sieve-plate, perforated and lacy with groups of openings. The underside 'prop-legs' are attached to rock at multiple points. Sponge up to 17 cm diameter, 13 cm high. Surface smooth, slightly granular. Texture fragile, papery, felty, easily torn. Living colour peach, white or pale yellow.

This species is unusually shallow for a glass sponge. Most glass sponges are typically abyssal in depth distribution. It is relatively common approximately 100 m deep around the offshore islands and continental shelf off Northland, and North Taranaki Bight. Recorded from Ranfurly Banks off East Cape, Chatham Rise, and reported from Fiordland at diveable depths (~30 m).

This species was first photographed in Fiordland diving depths by Dr Ken Grange, to whom this guide is dedicated. The main image was taken by him.

to 240 m

main image
Ken Grange

inset image
Lori J. Bell

Battershill C.N., Bergquist, P.R., Cook, S.deC. (2010) Phylum Porifera, Pp. 58–135 *in*: S.deC. Cook (Ed), *New Zealand Coastal Invertebrates 1*. Canterbury University Press, Christchurch, 640 pp.

Dendy, A.O. (1924) Porifera. Part I. Non-Antarctic Sponges. Natural History Report. British Antarctic ("Terra Nova") Expedition, 1910. Zoology 6, 269–392.

icon glossary

BODY PLAN

ascidians

	solitary	one animal bound by a single test
	colonial	multiple animals bound by a single test

brachiopods

	brachiopod	group of animals with hard valves on the upper and lower surfaces hinged at the rear end, while the front can be opened for feeding; lamp shells

bryozoans

	erect	erect or upright colonies of bryozoans that are cemented to or loosely rooted into the substrate
	encrusting	flat, planar or lumpy colonies of bryozoans encrusting on rock or other substrate

cnidarians

	anemone	individual anemone with a base that may be growing close to others but never joined
	zoanthid	multiple individuals living in a colony with a joined base
	tube anemone	anemone living inside a leathery tube in the sand, which it can quickly retract into
	sea pen	sea pens (order Pennatulacea) are octocorals with eight tentacles on their polyps. Most sea pens attach into soft sediment seafloors by a muscular peduncle that keeps them stable and upright
	black coral	black corals (order Antipatharia) are large, tree-shaped corals recognised by their black, chitinous, internal skeleton enclosed by living polyps. The skeleton of black coral is prized for jewellery making. Black corals are fully protected under Appendix II of CITES, the Convention on International Trade in Endangered Species.
	tree hydroid	hydrozoans (class Hydrozoa) are very large, branched, hydroid colonies, most having two life-cycle stages, the polyp and the medusa: the solitary or colonial polyp is referred to as a 'hydroid', and the 'hydromedusa' (resembling a very small jellyfish) is the sexual phase
	red coral	hydrocorals (stylasterid hydrocorals) are not true corals, but a family of hydroids closely related to stony corals in the phylum Cnidaria. The hard skeleton of red coral is prized for jewellery making. Red corals are fully protected under Appendix II of CITES, the Convention on International Trade in Endangered Species

decapods

	decapod crustacean	Order Decapoda (crustacean with 10 legs)

echinoderms

	brittle star	class Ophiuroidea, ophiuroid
	snake star	class Ophiuroidea, ophiuroid with coiling arms
	feather star	class Crinoidea, crinoid

	sea cucumber	class Holothuroidea, holothurian
	sea egg	class Echinoidea, echinoid
	sea star	class Asteroidea, asteroid

molluscs

	aeolid nudibranch	order Nudibranchia (suborder Cladobranchia), with appendages other than posterior naked gills on the back
	dorid nudibranch	order Nudibranchia (suborder Doridina), with a circle of naked gills at the rear on the back
	sea snail	marine shelled mollusc (class Gastopoda) with a single, spirally coiled calcareous shell. The head has a pair of tentacles and associated eyes. The foot has a ventral creeping sole for locomotion and a thickening, the operculum, on the upper surface used to seal the mouth of the shell when the animal is retracted.
	chiton	coat-of-mail animal (class Polyplacophora). Dorso-ventrally flattened marine mollusc with eight, separate but overlapping, dorsal, calcareous shell plates held together by a flexible, leathery girdle. The foot has a ventral creeping sole for locomotion and the gills lie in the groove between the foot and the girdle. The head has a pair of tentacles and associated eyes, and sometimes accessory sensory organs (aesthetes) are also present on shell plates

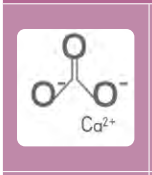
	mussel	marine and freshwater molluscs (class Bivalvia) with two equal-shaped, calcareous, smooth shell valves joined by an elastic ligament antero-dorsally. Small pointed beak at anterior end and broadly convex posterior end. Attached to hard substrate by byssal threads produced by small foot
	horse mussel	marine mollusc (class Bivalvia) with brittle, calcareous, fan-shaped shell consisting of two, equal-shaped shell valves jointed antero-dorsally by a long, flexible ligament. Lives partially buried in muddy sand with small pointed beak, which is anatomically anterior, downward in substrate. Permanently attached to particles in soft substrate by byssal threads produced by small foot
	scallop	marine mollusc (class Bivalvia) with calcareous, fan-shaped shell consisting of two, equal or unequal shell valves joined anteriorly by a short, flexible ligament. Shell valves often sculptured with radial ridges. All juvenile scallops attach to hard substrates by byssal threads produced by small foot, but some adults become free-living and are capable of swimming by clapping the shell valves together
	octopus	marine mollusc (class Cephalopoda) with sac-like body. Eyes well developed, lidded and protuberant. Arms very flexible, with one or two rows of suckers. An ink sac is present (rarely secondarily lost) and produces a cloud of inky fluid for defence. Very sophisticated mollusc with highly developed brain. Capable of utilising its colouration for camouflage and signalling

seaweed

	brown seaweed	brown seaweeds (phylum Ochrophyta) are the most abundant and the best characterised group, including multicellular species which range from tiny filaments to the giant kelp, many metres in length
	red seaweed	red seaweeds (phylum Rhodophyta) include species with diverse morphologies from simple filaments to complex multicellular and calcified thalli. The colour red is due to the presence of phycoerythrin, a pigment in the chloroplast that reflects red light

	green seaweed	green seaweeds (phylum Chlorophyta) are common in the intertidal zone and include filamentous, foliose, bushy and prostrate species characterised by different shades of green due to the presence of chlorophyll *a* and *b* in their chloroplast – features that they share with land plants

sponges

	calcareous	sponge with spicules made of calcium carbonate ($CaCO_3$) in the form of calcite, often three-rayed, Class Calcarea
	glass	sponge with silicon dioxide (SiO_2) spicules occurring as long fine hairs, free or woven into a fused scaffold, free spicules often six-rayed, Class Hexactinellida

	common	sponge with silicon dioxide (SiO_2) spicules, and/or sand, and/or fibrillar collagen, and/or fibrous (spongin) collagen, Class Demospongiae

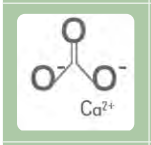
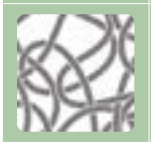
LIFE HISTORY

	Southern Hemisphere	region south of the Equator
	temperate tropical / circumtropical	region between the Tropics of Cancer and Capricorn
	Indo-Pacific	loosely defined as the region encompassing the Western Indian Ocean, Southeast Asia, Oceania and the broader Pacific
	Western Pacific	loosely defined as countries of Southeast Asia and Oceania in the western portion of the Pacific Ocean
	antipodean	naturally occuring around New Zealand and Australia only
	Southwest Pacific	naturally occuring around New Zealand, Australia and other Pacific locations
	widespread	species recorded globally

	introduced	species naturally ocurring outside of New Zealand waters and has been introduced into New Zealand, invasive
	endemic	biota native and restricted to New Zealand
	intertidal species	only found in the intertidal zone
	native	biota naturally occurring in New Zealand, and may also occur naturally elsewhere
	range extension	since first described in New Zealand, this species has been recorded elsewhere
	nocturnal	hides during the day, is active and feeding during the night
	protected	species listed in Appendix II of CITES, the Convention on International Trade in Endangered Species

MORPHOLOGY

common morphology icons

	ball	spherical, globular		branching	tree or bush-like branching, may appear fluffy or feathery
	thick encrusting	spreading over substratum, more than about 20 mm thick		amorphous	without definable shape, often with lobed surface, potato or tuber-shaped, massive
	thin encrusting	spreading over substratum, less than about 20 mm thick		loaf	rounded elongate, hemispherical
	meandering	wandering along and above substratum attached at intervals, repent		calcareous	thallus calcified (contains calcium carbonate)
	fan	thin lamella in one plane, elevated by a stem		shrub-like	bushy, composed of numerous branches and branchlets that emerge from a central stem
	feather-shaped	feather-like, supported on a thin stem, pinnate		tangled branches	long ramose branches forming tangles

ascidians

	stalked grouped	stalked with club-shaped bodies attached to a common basal mat		lobed cluster	closely packed flat topped lobes joined by basal mat
	solitary saddle	widely spaced siphons with low saddle in between			

brachiopod

	ribbed	dorsal valve has a distinct sulcus, a lengthwise groove on the dorsal valve that widens and deepens as the animal grows		smooth	dorsal valve smooth

bryozoans

	lacy	net or lace-like colony		stellate	star or snowflake-shaped, radiating pattern
	lobate	flattened fan, frond, lobe or leaf-shaped sheet		tubular	tube or club-shaped form to erect colonies

cnidarians

	acrosphere	rounded ball on end of a tentacle, often cloudy white, filled with stinging cells		in tube	anemone living inside a leathery tube, which it can quickly retract into
	adherant base	base of the anemone firmly attached to the surface it is sitting on		semi-adherant base	anemone is only loosely attached to the surface it is sitting on it and can be easily dislodged or fall off and can re-attach elsewhere

decapods

	red rock lobster	Spiny lobsters (Infraorder Achelata, order Decapoda) are decapod crustaceans with a long abdomen that extends from the thorax. They are found throughout the coastal waters of New Zealand and Australia. These prized kai moana are carnivorous and nocturnal and live around depths of 5 to 200 m		crabs	crabs (Infraorders Anomura and Brachyura, order Decapoda) are decapod crustaceans with a short, projecting abdomen, usually hidden under the thorax
	triangular	carapace triangular, pear-shaped		square to oblong	carapace square to oblong-shaped
	oval	carapace oval, wider than long		paddles	paddles present on tip of 5th walking leg, used for swimming

echinoderms

	5 arms	five long or short arms, sometimes four or six if damaged		dendritic tentacles	branching, tree-like tentacles around sea cucumber mouth
	5+ arms	> five arms, may be between six and 12		gherkin	gherkin-shaped sea cucumber with sharp or blunt protrusions
	aristotle's lantern	intricate feeding mechanism		margins	an obvious series of marginal plates which may or may not bear spines
	ball	spherical, globular or semi-spherical		peltate tentacles	shield-shaped tentacles around sea cucumber's mouth
	brittle arms	can bend horizontally, no vertical coiling		snake arms	coiling vertically, can wrap around coral branches
	crinoid arms	very brittle, feather-like arms in multiples of five		tube feet	flexible, stalked tentacles, sometimes with suckers, protruding from body wall

molluscs

	sea snail	gastropod mollusc with a single, spirally coiled calcareous shell
	chiton	polyplacophoran mollusc with eight, separate, calcareous shell valves on top of the animal surrounded by a flexible, leathery girdle
	lamellate rhinophore	a type of ornamentation in which there is a series of closely arranged, alternating, horizontal leaflets on the posterior face of the upper half of the rhinophore; some authors use perfoliate to describe the same structure
	branching gill	gill which has side branches coming off the main axis

	bivalve	bivalve mollusc with two, hinged shells
	octopus	cephalopod mollusc with eight arms
	tapering cerata	tapering processes on the back of sea slugs that are the main sites of respiration for sea slugs lacking gills
	philtrum	a vertical notch in the upper lip of the anterior foot's transverse groove of dorid nudibranchs belonging to all genera of the family Discodorididae

seaweeds

	bladders	inflated, hollow, or jelly-filled, flexible chamber
	bladed	flattened or sheet-like thallus; may be simple, divided, or include multiple blades

	strap-like	composed of flattened, elongate, branches that are longer than they are wide

sponges

	bowl	shallow cavity with a restricted base, turbinate
	bulb	single or conjoined, with a central exhalent cavity (atrium) into which oscules empty, bulbous
	cormus	body composed of several joined tubes (Class Calcarea)
	sack	hollow body with thin papery walls and perforations
	plate	thick, flattened in one place, margin may be folded, attached along a broad margin
	hand	thick fan flattened in one plane with indented margins, palmate

	strappy	tree-like, giving rise to flattened pliable branches usually without a condensed axis
	shrubby	bushy with irregular branches and short stem, arborescent
	branching fingers	finger-like, often arising from an encrusting or restricted base, digitate
	tube	hollow erect cylinder
	tube cluster	cluster of hollow erect cylinders with a common base

SURFACE

common surface icons

	deeply wrinkled, corrugated	bearing irregularly parallel ribs and grooves along the body wall
	shaggy	bearing ragged conulose brushes of underlying spicules or fibres
	bumpy	bearing small, rounded bumps
	smooth	even, hairless, silky, can be slightly undulating
	transparent	gelatinous and see-through, translucent
	leathery	thick skin, tough, flexible, slightly elastic
	spiky	surface covered in raised peaks

	warty	bearing small flattened bumps or tubercles
	honeycomb	surface with ridges in a honeycomb pattern
	hard	hard to the touch, not compressible, rigid
	soft	soft to the touch, easily compressible, elastic
	slimy	surface film slippery to touch
	rough	irregularly pitted and ridged surface, rugose
	granular	surface feels like fine sandpaper

ascidians

	radial systems	zooid apertures line subdermal canals radiating and branching away from common apertures
	circular systems	zooid apertures form rings around common cloacal apertures
	no systems	zooids open separately forming paired openings on low humps in the test

	parallel systems	zooid oral apertures in parallel lines along subdermal canals
	raised lobes	common cloacal apertures raised at the terminal end of lobes
	spicules	star-shaped carbonate granules visible in and on the test

bryozoans

	flexible	colony bendy, can be flexed

cnidarians

	flexible	bendy, can be flexed

	polyp	one of two main body forms in the Cnidaria - it may be solitary as in the sea anemone or colonial as in coral

decapods

	setae	dense mat of hair-like bristles covering the carapace and/or legs
	blunt spines	surface covered with blunt spines, may be regular or irregular

echinoderms

	granulated	surface covered in small-medium granules
	spined	surface covered in spines
	plates	bony units layered on the outer body wall

molluscs

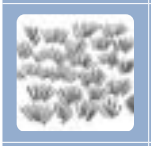
	fine ribs	shell surface finely ribbed, hard

sponges

	bubbly or nodulose	wall characterised by out-pocketings and nodules
	cavernous	filled with cavities or hollow spaces, porous
	conulose	surface bearing peaks raised by underlying fibre or spicule skeleton
	fistules	bearing hollow cones or turrets which can be blind (inhalant) or open (exhalent)
	fuzzy	fine pile formed from short projecting spicules (usually about 1-2 mm long), velvety, downy, hispid
	papillae	bearing short finger-shaped projections, some blind (inhalant) or open (exhalent) or both
	sieve-plate	colander-like plate with visible groups of perforations, specific to glass sponge *Symplectella rowi*
	sieve-pores	bearing button- or mushroom-shaped clusters of inhalant pores in a sieve-like structure; areolate porefields

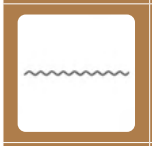
SUBSTRATE

	living organism	living or growing on the external surface of an animal (epizoic) or seaweed (epiphytic)
	mud	very fine muddy and silty sediments derived from terrigenous rocks, soils and clays
	sand	small coarse grains of worn silica, rock, and shell
	coarse gravel	non-mixed stone rubble
	rubble	shell, stone, and pebble rubble

	rock	hard substrate such as mudstone, sandstone, basalt, compressed carbonates
	coralline turf	living on coralline algae as a substrate
	artificial substratum	anything man-made such as mooring blocks, mussel lines, wharf piles
	algal beds	living on mixed marine plants as a substrate
	submerged dead tree	trees that have fallen hundreds of metres from vertical valley sides to become submerged in the fiord, providing substrate for many marine invertebrates

HABITAT

	marine	exclusively marine environments
	littoral	the part of the sea that is closest to shore extending from high water mark
	intertidal	exposed shoreline zone between high and low tides, including rock flats, pools, overhangs, crevices, organisms exposed to wave action, temperature extremes, full illumination, and desiccation
	estuarine	estuarine, brackish or mangrove environments
	rocky shore	shoreline covered with rocks and boulders
	rockpool	indentation in rock filled with water, intertidal
	subtidal	zone below the low tide, including rock flats, slopes, walls, crevices, overhangs, boulder fields, organisms exposed to wave surge and currents, and subdued illumination
	cryptic	hidden under rocks or in cracks/ crevices
	burrowing	burrow in sand / mud
	exposed water	exposed habitats with wind and wave action
	shallow coastal waters	shallow waters around the coastline near land
	algal beds	coralline algae, seagrass or algal beds
	temperate seagrass beds	meadows of marine plants growing on a sandy substrate

	seabed	composed of a variety of sedimentary substrates including coarse gravels, shell hash and sands to finer sand, mud, and silts, organisms susceptible to inundation and scouring from wave surge and currents, and subdued illumination
	covered rock	sand and rubble spread over underlying hard substrate, organisms attached to basement rock susceptible to inundation and scouring from wave surge and currents, and subdued illumination
	bank	seabed raised into a bank of compacted rubbles and other carbonate materials including shell, kina and sealace hash, organisms exposed to wave surge and currents, and subdued illumination
	wall	underwater cliffs and slopes, organisms exposed to wave surge and currents, and subdued illumination
	indents	underwater caves, shelves and overhangs, organisms may experience wave surge, subdued illumination, or near darkness
	sheltered water	sheltered water habitats, little wind or wave action
	sheltered bay and harbours	bays and harbours, wind and water currents transport organisms into them where they can remain stuck or stranded
	semi sheltered coast	organisms are protected to a certain extent from exposure to wind and waves
	semi open coast	organisms are moderately exposed to wind and waves
	open coast	organisms are exposed to wind and waves
	continental shelf	the area of seabed around a large land mass where the sea is relatively shallow compared with the open ocean
	seamount	submarine mountain

general glossary

algal beds	areas of seafloor with coralline algae, sea-grass or multiple seaweed species
amorphous	without definable shape, often with a lobed surface
ampullae	a sac-like enlargement of a canal or duct
anastomose	tubes or branches joined by cross connections
anterior	towards the front
antipodean	naturally occurring in New Zealand and Australia, and may include seamounts and ridges to the north
apex	top of a structure (tube, mound); apical
apical	top of a structure (tube, mound); apex
arborescent	branches emanating from a basal stem, diverging, sometimes anastomosing; shrub-or tree-like
artificial substratum	anything man-made such as mooring blocks, mussel lines, wharf piles
asexual	form of reproduction achieved without male and female gametes, occurs when one organism splits into two or more new individuals
ball-shaped	spherical, globular
banded	stripes of different colours
bank	seabed raised into a bank of compacted rubble and other carbonate materials including shell, kina an coral and bryozoan hash, organisms exposed to wave surge and currents, and subdued illumination
benthic	pertaining to living on or in the seabed as opposed to floating or swimming in the ocean above
benthos	organisms that live on or in the seabed at the bottom of the sea
bifurcating	to divide into two parts or branches
bilobed	two lobes
biserial	in two rows
bladder-shaped	hollow with thin papery or cellophane-like walls; vesicular
blunt	not sharp, rounded ends
bowl-shaped	shallow bowl with a restricted base; turbinate
brain-shaped	hemispherical with brain-like corrugations
brittle	fragile but rigid, breaks apart easily
bumpy	bearing small rounded bumps
calcareous	body or skeletal components formed from molecules of calcium carbonate. In the case of seaweed, the thallus may be calcified
calyx	cup-shaped
candelabra	a large branched 'candlestick' with 'holders' arising from lateral branches
cartilaginous	having the texture of cartilage, firm and tough yet flexible
cement	cementing together sedimentary substrate (sand and shell) to provide support; agglutinating
club-shaped	solid erect cylinder, column-shaped, taller than wide, wider at top; clavate
colonial	multiple animals bound by a single structure
colony	group of individual animals living together and operating as a single unit
commensal	an association between two organisms in which one benefits and the other derives neither benefit nor harm
compressible	easily squeezed
concave	having a surface that curves inwards like the interior of a bowl
concentric	circles arranged with one inside the other
conules	sharply pointed structures rising from the surface; conulose
corky	tough, feels almost waxy to the touch
corrugated	bearing irregularly parallel ribs and grooves, deeply wrinkled
covered rock	sand and rubble spread over underlying hard substrate, organisms attached to basement rock; susceptible to inundation and scouring from wave surge and currents
cryptic	difficult to see in a habitat, or difficult to differentiate from other species
cryptogenic	species recorded from New Zealand whose original place of origin is uncertain, whether native, or introduced
cuneate	wedge-shaped
cup-shaped	bowl-shaped with a restricted or broad base; calyx, caliculate
cytoplasm	the material or protoplasm within a living cell, excluding the nucleus
decorative	features that enhance and add embellishments to an otherwise plain structure; ornamented
deep sea (benthic)	seabed in the deeper parts of the ocean not exposed to surface wave action, and where little or no light penetrates
deep sea (pelagic)	water above the seabed in the deeper parts of the ocean not generally exposed to surface wave action,

	and where light may or may not penetrate, can be contrasted with water that is near the coast, open
dendritic	branching, tree-like
diameter	distance across the widest point of a circle
diatom	a major group of microscopic unicellular algae, counted as part of the phytoplankton
dichotomous	of branching, where the axis is divided into two branches
digitate	finger-like
dorsal	upper surface of the animal
doughy	soft, easily depressed but does not return to shape, remains compressed
egg-shaped	body centrally thickened, usually with root-like tufts or rhizomes buried in sediment; ovate
elastic	returns to shape after compression or deformation, springy, flexible, resilient
endemic	biota native and restricted to New Zealand
environment	physical, chemical, ecological, behavioural, and other conditions experienced by an organism
epibenthic	pertaining to living on the seabed as opposed to floating or swimming in the ocean above
epibenthos	organisms that live on the surface of sediments and other substrates at the bottom of the sea
epilithic	growing directly on rock substrate
epiphytic	living or growing on the external surface of a seaweed
epizoic	living or growing on the external surface of an animal
eurybathic	can live at many depths
fan-shaped	thin, flattened in one plane with or without stem; flabellate, foliaceous
feathery	feather-like, supported on a thin stem; pinnate
filamentous	composed of filaments or fine threads
finger-shaped	finger-like, often arising from an encrusting or restricted base; digitate
firm	requires some pressure to compress
flagelliform	long, slender, and flexible, like a whip
fleshy	feels like skin or cheese; dense, slightly stretchy, collagenous, rubbery
foliose	folded and frilled lamellae or blades
fragile	easily torn, squashed, broken
friable	easily crumbled
fuzzy	fine pile formed from short projecting spicules (usually about one to two mm long); velvety, downy, hispid
gametes	male and female cells involved in sexual reproduction
ganglion	a structure containing a number of nerve cell bodies, typically linked by synapses, and often forming a swelling on a nerve fibre
gelatinous	jelly-like, slippery, jiggly, wobbly
globular	ball-shaped, rounded
gonad	reproductive gland
granular	surface covered in small to medium sized rounded or square granules, giving a sand-papery texture due to calcareous or siliceous minerals in or on (echinoderms) the surface of the organism (sponges, ascidians)
habit	the way an organism grows on the substrate
habitat	the environment and local situation in which an organism lives
hand-shaped	fan with indented margins, like an open hand; palmate
hard	solid to the touch, not compressible, rigid
hirsute	hairy
honeycomb	surface with ridges in a honeycomb pattern
indents	underwater caves, shelves and overhangs, organisms that live there may experience wave surge, subdued illumination, or near darkness
interstices	the gaps and spaces between things e.g., rocks, sand-grains or seaweed holdfasts
intertidal	exposed shoreline zone between high and low tides, including rock flats, pools, overhangs, crevices, organisms exposed to wave action, temperature extremes, full illumination, and desiccation
introduced	species first described beyond New Zealand waters, now occurring in New Zealand and other locations; invasive, adventive
jiggly	wobbles almost like jelly when touched; resilient, gelatinous
lamella	thin plate
lateral	side of an animal
leathery	thick, tough, flexible, slightly elastic
limp	feels soft and yields to pressure, remains compressed when squeezed, flaccid
loaf-shaped	rounded elongate, hemispherical
lobe	raised surface mound
lobed	bearing large rounded projections, lobate

lollipop-shaped	spherical or disc-shaped body supported on a long, thin stem; pedunculate, stipitate
margins	edge of a surface
meandering	wandering along and above substratum attached at intervals; repent, ramify
membranous	thin, translucent, flimsy, like a membrane
morphology	the form and shape of an organism
mottled	variable, blotchy, patterning of several colours
mud	very fine silty sediments derived from terrigenous rocks, soils and clays
naked	surface unadorned by spines or granules, usually smooth
native	biota naturally occurring in New Zealand, and may occur naturally elsewhere
opaque	impenetrable by light
oral	related to the mouth of an animal
ornamented	an otherwise plain structure that is altered or adorned by embellishment; decorative
palmate	fan with indented margins, like an open hand
peduncle	a narrow part of the body upon which the larger part or the whole body of an organism is attached
plate-shaped	thick fan flattened in one plane (plate-like), margin often folded (foliose), may be ear-shaped, lamellate
plumose	having many fine filaments or branches which give a feathery appearance
posterior	towards the rear of the organism
prostrate	growing along the ground
protected status	species listed in Appendix II of CITES, the Convention on International Trade in Endangered Species
punctate	surface perforated with tiny holes; punctured
radius	distance between the edge and centre of a circle
ramify	forming branches or offshoots along or above substrate; meandering
ramose	having branches; branched
range extension	since first described in New Zealand, this species has been recorded elsewhere
refuge	safe place to hide from predators
repent	wandering along and above substratum attached at intervals; meandering, ramify
reticulate	internal fibre skeleton forms a cavernous two or three dimensional network
rock	hard substrate such as mudstone, sandstone, basalt, compressed carbonates
rockpool	excavation in rock, filled with water, in the intertidal zone
rough	irregularly pitted and ridged surface, often tough; rugose
rubbery	feels dense, springy, elastic, and resilient to the touch, collagenous; fleshy
rubble	shell, stone, and pebble rubble
sand	small coarse grains of worn silica, rock, and shell
sandpaper-like	feels scratchy or slightly abrasive like sandpaper to the touch; granular
seabed	composed of a variety of sedimentary substrata including coarse gravels, shell hash and sands to finer sand, mud, and silts; associated organisms are susceptible to inundation and scouring from wave surge and currents, and subdued illumination
sessile	attached directly by its base without a stalk or peduncle
setae	bristle like structures
setose	bristly
shrub-like	bushy with irregular branches and short stem; arborescent
siliceous	made of or containing silica
sinuous	snake-like, wavy
slippery	smooth, slimy
smooth	even, hairless, silky, can be slightly undulating
soft	soft to the touch, easily compressible
Southwest Pacific	region containing New Zealand, Australia, New Caledonia and other southern islands of Oceania
spongy	cavernous and springy
stellate	star-shaped
sticky	tacky, not easily removed
stipe	a stalk or stem, especially the stem of a seaweed
stipitate	supported on a stipe or stem
stolon	tissue that extends from body, for attachment, or to produce a terminal bud
stony	incompressible like a stone; rigid
substrate	an underlying substance or layer, rock, sand
subtidal	zone below the low tide, including rock flats, slopes, walls, crevices, overhangs, boulder fields; associated organisms are exposed to wave surge, currents and subdued illumination
symbiosis (symbiotic)	found in close physical association with other organisms such as sponges, molluscs, crabs, typically to the

	advantage of both; a mutually beneficial relationship in which two different species live together
thick encrusting	spreading over the substratum, generally more than about 2 cm thick
thin encrusting	spreading over the substratum, generally less than about 2 cm thick
tough	requires considerable pressure to compress, difficult to tear
translucent	lets light through body wall or surface of organism, but not enough to perceive distinct details through it
transparent	body wall can be gelatinous, appearing see-through, internal details visible
transverse	across the short axis of the body wall
tree-shaped	branches emanating from a basal stem, diverging, sometimes anastomosing; arborescent
trilobed	three lobes
tube cluster	cluster of hollow erect cylinders with a common base
tube-shaped	hollow, erect cylinder, may get wider at the apex
turbinate	shallow bowl with a restricted base
twiggy	delicate twig-shaped skeleton with short branches
ventral	lower surface or underside of the animal that sits on the seabed
viviparous	bearing live young that are fully formed when they emerge from the parent
wall	underwater cliff or slope; associated organisms are exposed to wave surge, currents and subdued illumination
warty	bearing small flattened bumps; tubercles
whip-shaped	erect and tapering, usually with a condensed axis; flagelliform
widespread	species recorded globally
wrinkled	having slight folds or grooves, often in parallel groups
zooplankton	tiny floating marine animals
zooxanthellae	a single-celled symbiotic algae
zygote	a cell that is formed when female and male gametes combine

taxon-specific glossary

ASCIDIANS

ampullae	blind terminal expansion of the epidermal vessels, often flask-shaped in the Botryllidae
apertures	openings of the body to the exterior for exchange of water, inhalant 'mouth' (branchial) aperture, exhalent (atrial) aperture
circular systems	zooid apertures form rings around common cloacal apertures
cloacal aperture	in compound ascidians, several zooids may share a single, common cloacal aperture through which water exits, but each zooid has its own branchial aperture through which water enters
colonial	multiple animals bound by a single test
gill sac	organ used for both the exchange of gasses (breathing) and collection of food
grape clusters	bunched vase-shaped individuals joined basally
hairy	hairs projecting from the body of solitary ascidians, often holding sand grains, hirsute
honeycomb	test surface with ridges in a honeycomb pattern
lobed cluster	closely packed flat-topped lobes joined by basal mat
medusa	many single bodies on long stalks arising from a narrow basal mat
no systems	zooids open separately forming paired openings on low humps in the test
parallel systems	zooid oral apertures in parallel lines along subdermal canals
radial systems	zooid apertures line subdermal canals radiating and branching away from common cloacal apertures
raised lobes	common cloacal apertures raised at the terminal end of lobes
sand in test	sandy sediment incorporated into test of colonial ascidians, feels granular
sausage-shaped	long tubular sausage-shaped colonies
solitary	one animal bound by a single test
solitary mound	low, laterally elongate, oval shaped, solitary ascidian with two siphons, separated by about ½ body length
solitary oblong	vertically elongated solitary ascidian body with two siphons at the anterior end
solitary rounded	rounded solitary ascidian body, siphons often close together at the anterior end
solitary saddle	solitary ascidian with widely-spaced siphons separated by a low saddle
solitary stalked	solitary ascidian with oval bulbous body and two siphons on a long narrow stem
solitary stalked vase	elongated solitary ascidian body with a short narrow stem, siphons closely spaced at anterior end
spicules	star-shaped carbonate granules visible in and on the test
spined	surface covered with prickly bundles of very long spicules projecting from surface of the organism
stalked grouped	stalked with club-shaped heads attached to a common basal mat
stalked simple	single stalked bodies
subdermal canal	canal that connects zooids together around a common aperture (exhalent)
tentacle	tentacles surround the inhalant (branchial) aperture; they can be simple or branched and are important characters at the genus level
test	protein coating surrounding the body, tough and leathery in some solitary species, or a gelatinous matrix surrounding zooids in colonial species
testis follicle	sacs that contain sperm; these are usually cream-coloured and the ovary is orange, containing eggs
wrinkled siphons	siphons raised above the body wall, wrinkled and often warty
zooids	small individual sea squirts of the same species living communally in a common test, often forming systems to pump water, or opening individually to the exteriorlateral side of an animal

BRACHIOPODS

foramen	the hole at the posterior where the pedicle (attachment stalk) emerges
labiate	the foramen has an anteriorly directed lip
loop	the internal, calcitic support-structure for the lophophore in brachiopods. The loop occurs in a very wide range of forms and is the most important taxonomically diagnostic feature in brachiopods
lophophore	this is the long and coiled filter-feeding and gas exchange organ of three major groups of animal, the Brachiopoda, Bryozoa and Phoronida
sulcus	a lengthwise groove on the dorsal valve of a brachiopod that widens and deepens as the animal grows

BRYOZOANS

areole bryozoan	an opening found in the margin of ascophoran cheilostome bryozoans leading to an areolar pore, which is a communication pore between different tissue layers of the bryozoan
ascopore	a median frontal pore which serves as the inlet to the ascus, a water-filled flexible sac found in some cheilostome bryozoans as part of the hydrostatic circulatory system
avicularia	a modified non-feeding zooid with an operculum that has been modified into a beak-like snapping mandible
axil	the upper angle formed by a branch and the structure that bears it
cryptocyst	one of the two basic wall morphologies of bryozoans consisting of wholly interior walls, leaving a superficial body cavity uniting contiguous zooids
fenestrate	having perforations, apertures, or transparent areas
frontal surface	pertaining to the exposed or orifice-bearing side of a zooid or colony
gonozooid	zooid involved in the reproduction of a bryozoan
gymnocyst	a simple type of body wall morphology that adds exterior walls to the ends of interior walls
internode	the sections bearing autozooids, joined by connecting tubes which are uncalcified or poorly calcified
interzooid	apparent space between zooids enclosed by calcified interior walls
kenozooid	a non-feeding zooid that strengthens the colony and fills in space
lophophore	the feeding organ of a bryozoan, a ring of tentacles
ooecium	one of the special zooids or cells of Bryozoa, destined to receive and develop ova; an ovicell
operculum	a generally uncalcified lamina (or flap), hinged, or pivoting over the zooid
ovicell	the globular brood chamber in some Bryozoa
peristome	parts surrounding the mouth of various invertebrates such as the echinoderms and bryozoans
reticulate thickening	secondary body wall which is net-like or has a lacy framework of thickened calcified skeleton
scutum	a flattened structure on the frontal wall
vibracula	modified avicularia with very long bristles on the back side of bryozoan colony branches
zooids	small individuals of the same species living communally in a common test, often forming systems to pump water, or opening individually to the exterior

CNIDARIANS

acontia	stinging threads, strings or filaments expelled by the anemone containing a high concentration of nematocysts so may be used for defence
acrorhagi	outgrowths of the body wall found on the margin of the column in some anemones. May be rounded or even branching. Contains a strong concentration of nematocysts so may be used for extra defence
acrospheres	globular balls at the end of tentacles, found in Corallimorpharia, filled with nematocysts
bell	see *umbrella*
black coral	Antipatharians, or black corals, are recognised by their black chitinous internal skeleton enclosed by living polyps
capitate tentacles	tentacle structure where nematocysts are concentrated in a large terminal cluster
cilia	tiny hair-like structures used for propulsion or feeding
clinclides	small pores on the side of the column from which defensive stinging cells fire
cnidae	a cnidocyte (also known as a cnidoblast or nematocyte) is an explosive cell containing one giant secretory organelle called a cnidocyst (also known as a cnida (plural cnidae) or nematocyst) that can deliver a sting to other organisms
colloblasts	adhesive cells unique to phylum Ctenophora, containing no venom
column	term used for the main body wall of anemones
dactylozooid	a type of zooid found in colony-forming organisms used for the capture of prey or defence
ephyra	free-swimming larval medusa stage, a mini jellyfish just before it becomes an adult medusa; larval medusa
fission	reproductive strategy for anemones, splitting the body in half or into numerous parts
gastrozooid	a type of polyp found in colony-forming organisms used for feeding
gonophores	reproductive structures
gonozooid	a type of polyp found in colony-forming organisms used for reproduction
hydranths	polyp, consisting of hydranth body, tentacles, and hypostome

hydrorhiza	rootstock by which a hydroid is attached to the substratum
hypostome	region around mouth of polyp, mostly between mouth and first whorl of tentacles
labial tentacles	short tentacles around the mouth of tube anemones
lappets	flap-like extension of the bell margin
lips	lobe-like extension of the edge of the manubrium surrounding the mouth
manubrium	a projection from the underside of the bell which contains the stomach cavity, distally bearing the mouth and proximally leading to the radial canals
margin(al)	top edge of the column just below the root of the tentacles
marginal tentacles	longer tentacles that grow around the edge of the tube anemone
medusa	free floating, adult, sexual, pelagic stage in the lifecycle. Typically has a disc-shaped body (bell) with oral arms and tentacles
medusa budding	asexual budding of medusae which give rise to a new juvenile medusa individual. In hydroids, budding occurs on the colonial polyp
mesenteries	in the phylum Cnidaria and the class Anthozoa, the mesenteries are sheet-like partitions that extend from the body wall of the animal into its gastrovascular cavity.
nematocysts	stinging organ unique to the phylum Cnidaria; typically, a capsule containing stinging cells which penetrate tissue of prey to paralyse it, or used as defence
oozooid	the primary zooid, or polyp, that develops from an egg and reproduces by budding.
oral arm	a structure that hangs from the mouth on the underside of the bell, usually four in number and can be described as frilly and is generally thicker than a tentacle. Contains stinging cells and is used in food capture
oral disc	surface at the top of the anemone where the mouth is located and where the tentacles attach
papillae	small rounded lumps
pedal disc	bottom 'foot' of anemone that attaches it to the seafloor
pedalium	a fleshy muscular pad, one or more tentacles are attached to each pedalia
perisarc	horny substance covering stems and branches
planula larva	the free-swimming first larval stage of many types of jellyfish, before it settles and becomes a polyp
polyp	basic body shape of an anemone is a polyp, that is a cylindrical column topped with tentacles opening to a central body cavity
polyp (hydrozoans)	basic individual of hydroids, may be isolated or forming colonies, may be of different types and perform different functions, but generally has tentacles and a mouth
polyp (scyphozoans)	bud-like part of the lifecycle after the planula stage that attaches to a hard substrate
rachis	an axial structure from which the polyps leaves extend
rhopalium	a sense organ used for visual or light-sensing capabilities, and controls the pulsations of the bell and balance, plural rhopalia
sclerite	a hard chitinous or calcareous process or 'spicule' in Alcyonaria.
statocyst	a sense organ used to detect movement, orientation and equilibrium
strobilation	a form of cloning in scyphozoan jellyfish in which a polyp elongates and becomes segmented and each segment developing into an ephyra
tentacles	used to capture prey, by firing out nematocysts like a mini harpoon
umbrella	the main body of the medusa, or jellyfish, not including the manubrium or tentacles. It generally resembles the shape of a bell or an umbrella. The edge of the umbrella is called the bell or umbrella margin
verrucae	warts on the column of an anemone, can be slightly sticky with adherent sand grains or shell hash
zooid	an individual member of a colony forming organism such as a siphonophore, hydroid, salp or phyrosome. Each zooid has a particular function within the colony, e.g. zooids responsible for reproduction (gonozooid and phorozooids) and feeding (trophozooids)

DECAPODS

antennae	second pair of appendages protruding from the front of crustacean next to eyes, typically long and whip-like; has a sensory function
antennules	first pair of appendages protruding from front of crustacean, typically smaller than antennae
bilobed	two lobes
carapace	the shield or external shell covering the main body of many types of crustaceans
chelipeds	a leg that forms the pincer or claws. The first pair of legs in crabs
chromatophore	a pigmented cell
decorative	features that enhance and add embellishments to an otherwise plain structure, ornamented

dactyl	the segment of a crab leg that is most distal (farthest) from the body. In a clawed leg, it is the movable finger segment
integument	outer body wall or skin
paddle	the tip of the fifth walking leg, flattened into an oval or rounded leaf-like appendage, used for swimming as opposed to walking
rostrum	elongation of the front of the carapace (shell) between the eyes
setae	hair-like structures on the body and limbs of crustaceans
teeth	sharp or pointy protrusions arising from the shell or lateral margin of the shell
tubercles	rounded or lumpy protrusions arising from the carapace or margins of the carapace, may be granulated in texture

ECHINODERMS

aristotle's lantern	the intricate feeding apparatus (sometimes called 'jaws') unique to echinoids (sea urchins, sea eggs)
asteroid	scientific name for a sea star or starfish
basket star	popular name for a ophiuroid with branching arms
brittle arms	can bend horizontally, no vertical coiling, in brittle stars
brittle star	popular name for an ophiuroid
bursal slit	opening to the pouch or sac from whence juvenile ophiuroids or eggs are released
calyx	any echinoderm of the class Crinoidea, having a cup-shaped body with branched radiating arms
cirri	appendages used to anchor crinoids (feather stars and sea lilies) to the seafloor
cordate	heart-shaped
crinoid	scientific name for sea lilies and feather stars
crinoid arms	very brittle, feather like arms in multiples of five
deposit feeder	an animal that feeds on particles of organic matter present in surface sediments
disc	circular, distinctively flattened, biscuit-shaped
disc radius	arms may be long or short and the relationship between the sizes of the disc and the arms can be different between species
echinoid	scientific name for a sea urchin or sea egg
feather star	popular name for a form of crinoid lacking a stalk
food grooves	channels in the test of sand dollars used for transporting food particles to the mouth
granulated	surface covered in small to medium sized rounded or square granules, giving a sand-papery texture
holothuroid	scientific name for a sea cucumber, holothurian
integument	outer body wall or skin
madreporite	a sieve-like plate found on the disc of sea stars, involved in their water-vascular system
marginal plates	calcareous plates along the margins of the arms and body of a sea star
ophiuroid	scientific name for a brittle star, basket star or snake star
ossicle	a small mineral (calcium carbonate) element embedded in the body wall of an echinoderm
papillae	specialised dorsal tube feet lacking a suckered tip (holothurians); small bony scales that are attached to the jaw, mouth, disc, being free at one end (ophiuroids)
paxillae	small pillar-like projections with a cluster of spines on top on the surface of some echinoderms
peltate tentacles	shield-shaped tentacles around sea cucumber mouth
peristome	parts surrounding the mouth of echinoderms
petals	leaf-shaped concentrations of ambulacral pores on the tests of sand dollars and heart urchins
pinnules	small, segmented, food gathering appendages which give crinoids their feather-like appearance
plastron	in spatangoid echinoids, an enlarged area behind the mouth bearing locomotory spines
plates	bony units layered on the outer body wall of an echinoderm
pom pom	disc adornment resembling a fluffy ball
primary spines	long, large diameter sea urchin spines; may be a different colour to the secondary spines
rosette	arrangement of small spines or plates in a radiating circle pattern
sea cucumber	popular name for a holothurian, holothoid
sea egg	popular name for an echinoid
sea lily	popular name for a stalked crinoid
sea star	popular name for an asteroid
sea urchin	popular name for an echinoid
secondary spines	short, small diameter sea urchin spines; may be a different colour to the primary spines
snake arms	with arms coiling vertically, can wrap around coral branches

snake star	popular name for an ophiuroid with coiled arms
spined	surface covered with spines
starfish	popular name for an asteroid
tail	the thinner end of a sausage-shaped sea cucumber
tentacle scale	the bony plate covering the pore where the tentacle emerges (comes out) from the arm
test	calcium carbonate skeleton of a sea urchin, composed of twenty columns of individual plates
tube feet	flexible, fluid-filled, stalked tentacles, sometimes with suckers, protruding from body wall
tubercles	hard, sometimes warty, calcified lumps that sit embedded in or on the body surface, in sea urchins they incorporate the basal articulation of the spines

MOLLUSCS

adductor muscle	muscle connecting one shell valve of a bivalve directly to the other valve
byssal notch	small gap between shell valves of a bivalve where the byssus emerges
byssus	bundle of silky fibres secreted individually by a gland at the base of the foot of a bivalve to attach it to, or secure it in, the substrate
cerata	finger-like processes on the back of heterobranch sea slugs that are the main sites of respiration for species lacking gills, and in aeolid nudibranchs, contain extensions of the digestive gland with groups of stinging cells at the tip
cirri	long, thin structures in animals similar to tentacles but generally lacking the tentacle's strength, flexibility, thickness and sensitivity; singular cirrus
columella	axial (central) pillar of gastropod shell around which the whorls are built, extending from apex to base; a portion of the columella is seen at the aperture of most gastropod shells; also known as peristome
ctenolium	a comb-like structure on the margins of the byssal notch in some bivalves (scallops) in which the threads of the byssus rest
epipodium	muscular lobe (or fringe of sensory tentacles and/or sometimes branching papillae) on foot of gastropod
gill, branched	refers to a type of gill which has side branches coming off the main axis
gill, unbranched	refers to a type of gill which has no side branches coming off the main axis
girdle	leathery belt surrounding shell valves in chitons
operculum	horny or shelly plate serving to close the aperture, wholly or partially, when the animal is retracted
oral tentacles	a pair of tentacles located either side of the mouth
pagoda-shaped	tower-shaped with the base broader than the top
pallial eyes	photoreceptive eyes, each having a lens, cornea and inverted retina, set on the outer mantle lobe of scallops
papillae	surface projections of numerous regular tall extensions like fingers, on cerata; adjective, papillate (sea slugs)
pedal retractor muscle	muscle attaching the foot to the interior of the shell interior permitting retraction of the foot
periostracum	a skin or horny covering on the exterior of many molluscan shells; usually thin and flat, but it can be developed into thick bristles in some species; produced by the animal as a protection against erosion or for camouflage
pseudofaeces	bundles of mucous-bound sediment formed by bivalves to prevent the mantle cavity from becoming clogged with silt, pseudofaeces are expelled through the exhalant water stream
rhinophore, lamellate	a type of ornamentation in which there is a series of closely arranged, alternating, horizontal leaflets on the posterior face of the upper half of the rhinophore (sea slugs); some authors use perfoliate to describe the same structure
rhinophores	pair of sensory processes on top of the head in heterobranch sea slugs
snout	protruding anterior portion of head containing the mouth through which the radula extends when feeding
tremata	series of graduated holes in final whorl of gastropod's shell for respiration, release of gametes and defecation
umbilicus	concavity or circular depression at axial base of spiral shell formed when the inner side of the whorls do not join
umbo	the first-formed embryonic shell of a bivalve, normally situated immediately above the hinge; plural umbones
viscera	all the soft organs within the body cavity

SEAWEEDS

agar	a compound produced from red seaweeds and used in food and to make the agar plates commonly used in laboratories
algal beds	areas of seafloor with coralline algae, sea-grass or multiple seaweed species
alginates	compounds found in the cell walls of brown algae and used as emulsifiers or stabilisers in various industries
blade	seaweed blades range from a single sheet-like structure through to finely divided 'leaves'
cystocarp	globular reproductive structures in red seaweeds
genicula	the uncalcified or flexible joints (genicula) in genticulate coralline algae
gametophyte	a phase in the life-cycle of those algae that undergo alternation of generations; the stage that produces gametes
haptera	finger-like outgrowths from the base of the stipe/stem that serve as attachment points to the substrate
midrib	a raised rib or strengthened vein-like area along the mid line of leaf-like blades
pinnate	having leaflets arranged on either side of the stem, typically in pairs opposite each other
rhizoids	a filamentous outgrowth on the underside of the thallus serving to anchor the plant
sporophyll	a modified blade for spore-bearing
stipe	the stem-like region between the holdfast and blade of a seaweed
stipitate	supported on a stipe or stem
stolon	a creeping horizontal stem or runner that takes root at points along its length to form new plants
tetrasporophyte	a type of sporophyte in red algae that produces tetraspores, the result of meiosis and part of the sexual life cycle in the red algae
thallus	the entire structure of a seaweed; generally comprised of a holdfast, stipe/stem and blade/s

SPONGES

archaeocytes	totipotent amoeboid cells found in sponges with varied functions depending on the species
areolate porefield	button- or mushroom-shaped clusters of inhalant pores in a sieve-like structure; sieve-pores
atrium	chamber or cavity in the middle of the sponge into which oscules open, communicating with the exterior via an apical opening
bark and pith fibre	fibre with compact laminated bark-like spongin surrounding a softer granular collagen pith in verongid sponges
basiphytous	method of attachment (of glass sponges) to hard substratum by a solid plate
bulb	single or conjoined bodies, each with a central exhalent cavity (atrium) into which oscules empty
calcareous sponge	sponge with spicules made of calcium carbonate ($CaCO_3$) in the form of calcite, often three-rayed; class Calcarea
choanocyte	sponge cell type used for feeding and propulsion of water current through sponge body
choanoderm	part of the interior of a sponge that contains choanocyte cells
conulose	bearing regular, sharp, stiff or soft peaks, raised by underlying fibre or spicule skeleton
cormus	globular calcareous clathrinid sponges with a large central atrium, with a solid external cortex and a choanosome formed by extensive folding of the choanoderm
demosponge	'common' sponges with silicon dioxide (SiO_2) spicules, and/or sand, and/or fibrillar collagen, and/or fibrous (spongin) collagen; class Demospongiae
dendritic fibre	fibrous skeleton resembling a branching tree in which the branches split but do not re-join
euplectelloid	glass sponge with a tubular body and apical sieve-plate; venus flower basket
exhalent	excurrent stream or water current from inside of sponge to outside through the oscules
fibrous	flexible strands of spongin protein forming the supporting skeletal network that may be cored with silica spicules or sand
fistulose	bearing hollow cone-shaped papillae which may be blind (inhalant) or open (exhalent); turrets
flabellate	flattened in one plane with or without stem; soft, flabby
foliaceous	leafy, with or without stem or stipe
glass sponge	sponge with silicon dioxide (SiO_2) spicules occurring as long fine hairs, free or woven into a fused scaffold, free spicules often six-rayed; class Hexactinellida
hairy	coarse stubble or prickly bristles formed by long projecting spicules (typically 5–20 mm long); hirsute, hispid
homogeneous fibre	fibre without a central pith and without conspicuous layers in cross-section
inhalant	incurrent stream or water current from external ostia to inside of sponge
lacy	tiny sand grains or spider-web like fibres form a network in or just below the skin (ectosome) of the sponge giving the surface a lace-like appearance

laminated fibre	fibre with conspicuous laminated (stratified) concentric layers in cross-section, without a central pith
lophophytous	method of attachment where sponges are anchored in soft or to hard substratum by means of protruding (anchoring) spicules with the body suspended above or partially embedded in substrate
lyssacine	glass sponge skeleton formed by the interlocking and weaving (not fusion) of giant diactines and other irregularly arranged silica spicules
megasclere	large spicules that form the structural framework of the sponge
microsclere	small spicules of intricate shape and ornamentation that line the sponge surface of aquiferous canals
network	internal fibre skeleton forms a cavernous two or three dimensional network; reticulate
oscules	large pores in the sponge wall where the inhaled water current exits
ostia	tiny pores in the sponge wall where the water is inhaled
papillae	bearing short finger-shaped projections, some blind (inhalant) or open (exhalent) or both; mammilate
porocalyce	specialised inhalant structure unique to Family Tetillidae (order Spirophorida)
radiate	silica spicules radiate towards the surface from deep within the choanosome, perpendicular to the surface
reticulate fibre	three-dimensional network of fibres; net-shaped
sieve-plate	a perforated lattice that covers the main or terminal osculum in euplectelloid sponges; sack-shaped
sieve-pores	button- or mushroom-shaped clusters of inhalant pores in a sieve-like structure; areolate porefield
shaggy	bearing ragged conulose peaks formed by underlying spicules or fibres
spicules	component of the mineral skeleton, typically composed of silica or calcium carbonate
spined	surface covered with bundles of very long spicules projecting from surface of the sponge; spiny
spiral	mineral skeleton spiralling radially from the centre of the sponge towards the surface
spongin	a form of collagen, fibrillar or fibrous, unique to sponges
strappy	tree-like, giving rise to flattened pliable branches much wider than they are thin, usually without a condensed axis
syncytia	characterized by cytoplasmic continuity, or a large mass of cytoplasm not separated into individual cells and containing many nuclei
tasselled	buds on the end of filaments in the genus *Tethya*
turrets	bearing hollow cone-shaped papillate which may be blind (inhalant) or open (exhalent); fistules
venus flower basket	glass sponge with a tubular body and apical sieve-plate; euplectilloid

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photographer credits

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further reading

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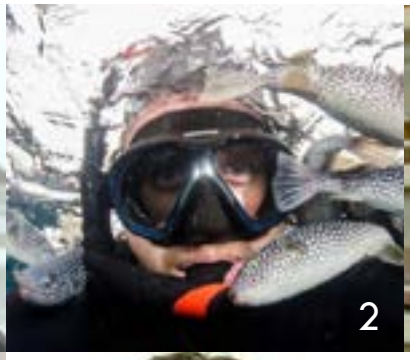
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