
# splendid sponges

a guide to the intertidal sponges of New Zealand

Version 1, 2017

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with Blayne Herr

NIWA
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# about this guide

Sponges are the most common marine invertebrates that inhabit the New Zealand coastline and harbours, from the intertidal zone down to the continental shelf, deep ocean trenches, and abyssal plains. They are a magnificent and very diverse group of sea creatures. We hope that you will enjoy reading about them here and use this guide to help identify these splendid creatures in the wild.

SPLENDID SPONGES - A GUIDE TO THE INTERTIDAL SPONGES OF NEW ZEALAND is a fully illustrated working guide to the most commonly encountered sponges in intertidal habitats around the country, starting with Auckland, and adding more from other locations, over time. It is designed for New Zealanders like you who live near the sea, dive and snorkel, explore our coasts, make a living from it, and for those who educate and are charged with kaitiakitanga, conservation and management of our marine realm. This guide is part of a series of guides on New Zealand's marine life that NIWA's Coasts and Oceans group is presently developing.

The guide starts with a simple introduction to living sponges and how to identify them, followed by a colour index and a species index, followed by detailed individual species pages and additional supporting information. The taxonomic names in this guide are the result of specimen-based identifications by Dr Michelle Kelly and budding spongologist Nicola Rush. As new species are discovered and described, new species pages will be added and an updated version of this guide will be made available.

Each sponge species page illustrates and describes features that enable you to differentiate the species from one other. Species are illustrated with high quality images of the animals 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. Outlying island groups, banks, platforms and plateaus are shown on the maps as a two-letter code: Ak = Auckland Islands; An = Antipodes Islands; Bo = Bounty Islands and platform; Ca = Campbell Islands and platform; Ch = Chatham Islands and Chatham Rise; Cp = Challenger Plateau; Ke = Kermadec Islands and the Southern Kermadec Ridge; Pb = Puysegur Bank; Sn = Snares Islands and platform. Information is provided in descriptive text and quick reference icons that convey information without words. Icons are fully explained at the end of this document and a glossary explains unfamiliar terms.

**Nicola Rush** is a marine ecology technician working out of NIWA's Auckland office. She has an interest in intertidal reef ecology, specifically sponge life, and enjoys foraging around rock pools on the weekends with her kids.

For any ID advice on sponges you find, please email your photos to either Nicola at *nicola.rush@niwa.co.nz* or Dr Kelly at *michelle.kelly@niwa.co.nz*

**Dr Michelle Kelly** is a professional sponge taxonomist working in the areas of taxonomy, systematics, marine biodiversity, and seamount ecology.

http://www.niwa.co.nz/coasts-and-oceans/marine-identification-guides-and-fact-sheets

*Remember to check the websites for updated versions!*

# a typical species page layout

**taxonomic name of species**

**taxonomic authority**
person(s) who first described this species

**common name of species**

**species classification**
see species index for arrangement

**depth range**
common depth range around New Zealand

**information**
details on external and internal characters and habitat

**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

**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

**life history icon**
highlighting geographic distribution

**scale bar**
indicating relative size of organism in the main image

**quick id icons**
highlighting shape, surface detail, habitat, and environment

**scale of abundance**

**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*

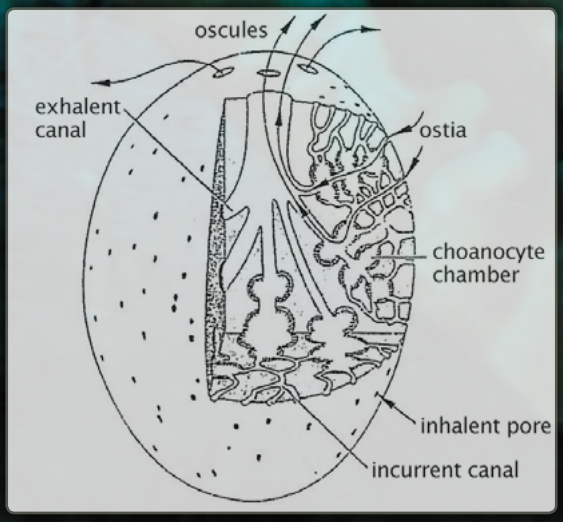
# about sponges

Sponges are the most common marine invertebrates around the New Zealand coastline. They are found everywhere, from intertidal rock pools to subtidal rocky reefs, from silty harbours to continental shelf seamounts, from volcanic ridges and hydrothermal vents, to the deep abyssal plains, rises, and plateaus of the south. Most species encrust hard rocky substrate, but many are embedded in sandy muddy sediments with a root-like structure. Several species are also known to encrust other sponges or crabs!

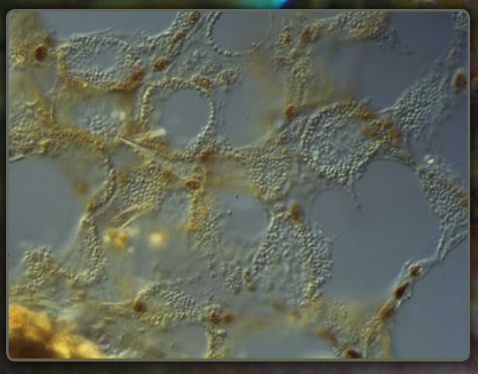
seamount sponges

giant masking crab and sponge friend

Sponges feed by filtering water using specialised cells called choanocytes. Choanocytes use their tail-like flagella to collectively propel a one-directional water current through the sponge body; water enters through small inhalant pores on the surface (ostia) and exits through several large exhalent holes (oscules). Food is captured in a fringe surrounding the base of the choanocyte flagella, and is passed back through the cell body to other cells that distribute it around the sponge. Excretory products exit in the water current as it leaves the body. Sponges do not have specific tissues, instead they have a large range of cells that have the role of feeding, digestion, secretion, excretion, reproduction and defence. Most sponges produce a skeleton of fibre made from a special collagen called spongin, which may or may not contain sand grains or spicules. Spicules are siliceous elements made by the sponge that come in an amazing array of forms and are usually used to identify the species. Some sponges have only spicules and no spongin, and some have no skeleton at all.




general sponge body plan

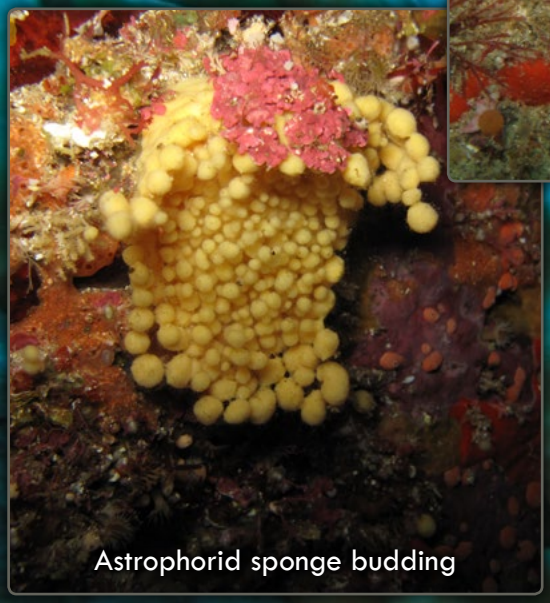


choanocyte feeding cells in chambers

Sponges reproduce by the production of eggs from archeocyte cells. These are special universal cells that can transform into all other cell types in the sponge body. Sperm is made from the choanocytes which have ready-made tails. Some sponges exude their eggs in a mucus sheet on the outside of their body (ovipary), which are fertilised by male sponges that release sperm 'smoke' in the water. Other sponges take the sperm in, fertilise the eggs internally and incubate either larvae or tiny sponges inside their bodies (vivipary). Some sponges also reproduce asexually by budding new sponges from their body.

*Tethya burtoni* budding

*Tethya bergquistae* budding



Astrophorid sponge budding

immature sponges in *Tethya fastigata*

Although sponges are often regarded as simple or primitive, they are actually very talented; the first evidence for an immune system in animals became evident from early experiments with sponges. Because sponges do not move around they can also produce chemicals to defend themselves from other organisms that want to eat or settle on them – it's warfare out in the ocean! The great news for humans is that many of these chemicals have potent anticancer, anti-inflammatory, antibacterial, antidepressant, antifouling and pesticide activity.

Perhaps the most amazing discovery in sponges this century is that some are carnivorous, not filter-feeders like the rest of the group. Carnivorous sponges feed on tiny shrimp down in the deep sea where normal sponge food is scarce. Many live as deep as several kilometres under the ocean, and New Zealand waters appear to be a centre of diversity for these odd sponges.

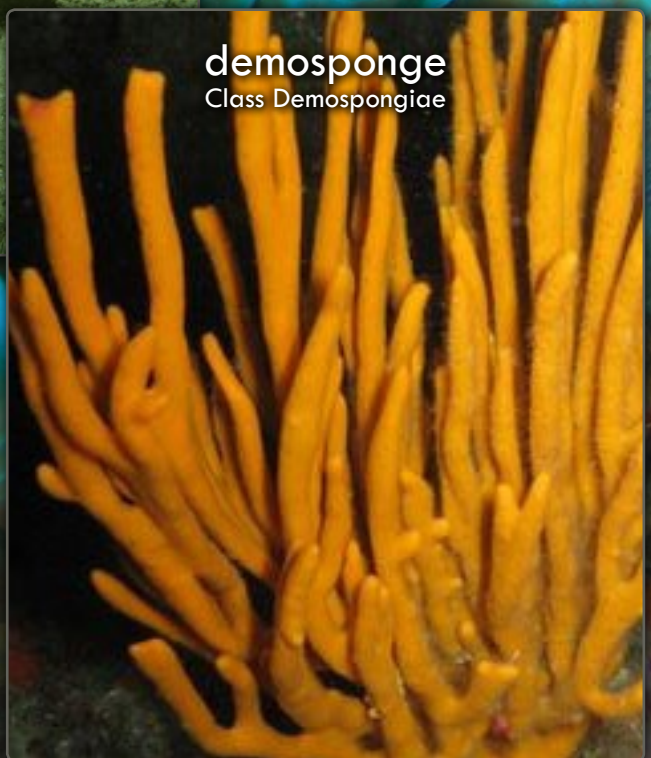

## sponge classification

There are three major groups of sponges, some of which have **calcium carbonate** spicules (Class Calcarea), and some of which have **silica** spicules (Class Hexactinellida and Class Demospongiae).

Calcareous sponges are fairly uncommon in New Zealand, with only one or two common species known. They are often small fragile sponges and have pale pretty colours. They do not possess a spongin skeleton.

Glass sponges are usually found in very deep water and are unique amongst sponges in that they do not have cells with membranes as in the other two groups and their spicules are based on a hexagonal (six-rayed) design.

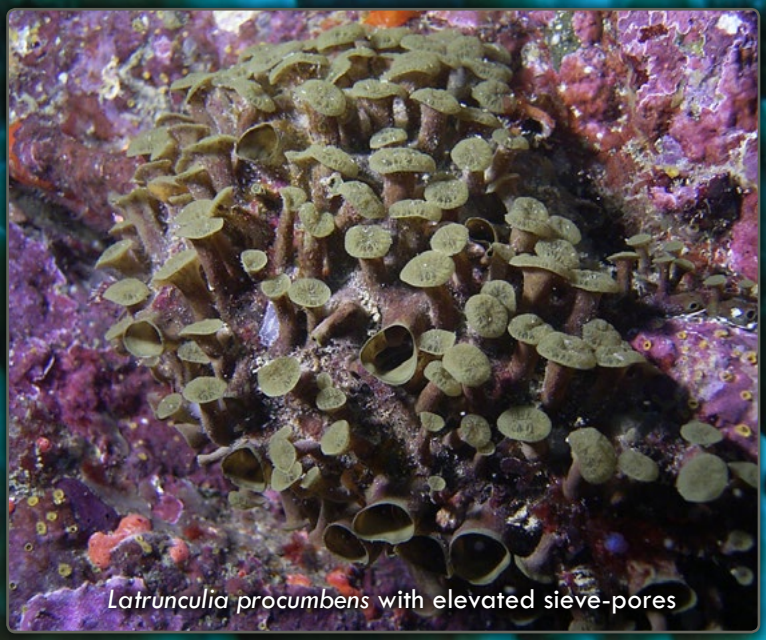
Demosponges are by far the most common and diverse sponges and the ones that you are most likely to meet while snorkelling or diving.

# how to identify a sponge

Several general characters provide the first clues to the identity of a sponge: **overall shape** (determined by the form of the skeleton), **surface features** (whether smooth, spiky, bumpy, hairy, with sieve-pores, etc), **texture** (whether fragile, crumbly, elastic, fleshy, stony, woody, etc), **colour** (highly variable and often differentiated between surface and interior) and **where the sponge is found** (whether intertidal, subtidal, on seamounts, on the abyssal plain, under sea-ice, etc).

However, it is the **arrangement or architecture of the internal sponge skeleton** (the nature and pattern of the skeleton) that provides definitive clues to the classification (order, family, genus and species) of the sponge. The sponge skeleton is very diverse and may consist of **organic** and **inorganic** components. The organic skeleton consists of a special sponge collagen (spongin) that can form **fibres** (clear, pithed, or cored with spicules or sand), or bands of elastic fibrils, or filaments. The nature and appearance of the fibres are diagnostic at the taxonomic level of order, family, and genus. The **inorganic** skeleton may consist of large **spicules** called **megascleres** that, with or without fibre support, form the structural framework of the sponge. Small, highly ornamental spicules called **microscleres** complement the megascleres, often lining the sponge surface or internal canals. It is important to remember that several large groups of sponges do not have spicules, and that some sponges use sand and broken spicules from the sediment to create an inorganic mineral skeleton.

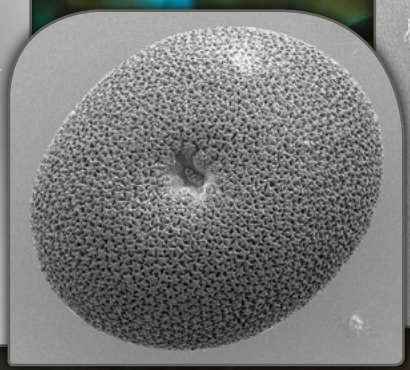


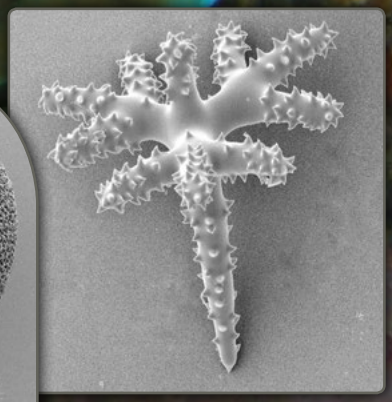
*Latrunculia procumbens* with elevated sieve-pores

*Pararhaphoxya sinclairi*
with a tree-like skeleton

The **spicule complement** (the type of spicules are found in the sponge), **spicule dimensions** (typically, the length of the spicules) and the **skeleton arrangement** (the arrangement of the spicules in the sponge, whether embedded in fibre, or free in the sponge body and whether restricted to the surface or interior, etc) gives us the most important clues to classification and identification of sponges. Megascleres may be up to several mm long, while microscleres range in size from about 20 to 120 microns and are not visible to the unaided eye.

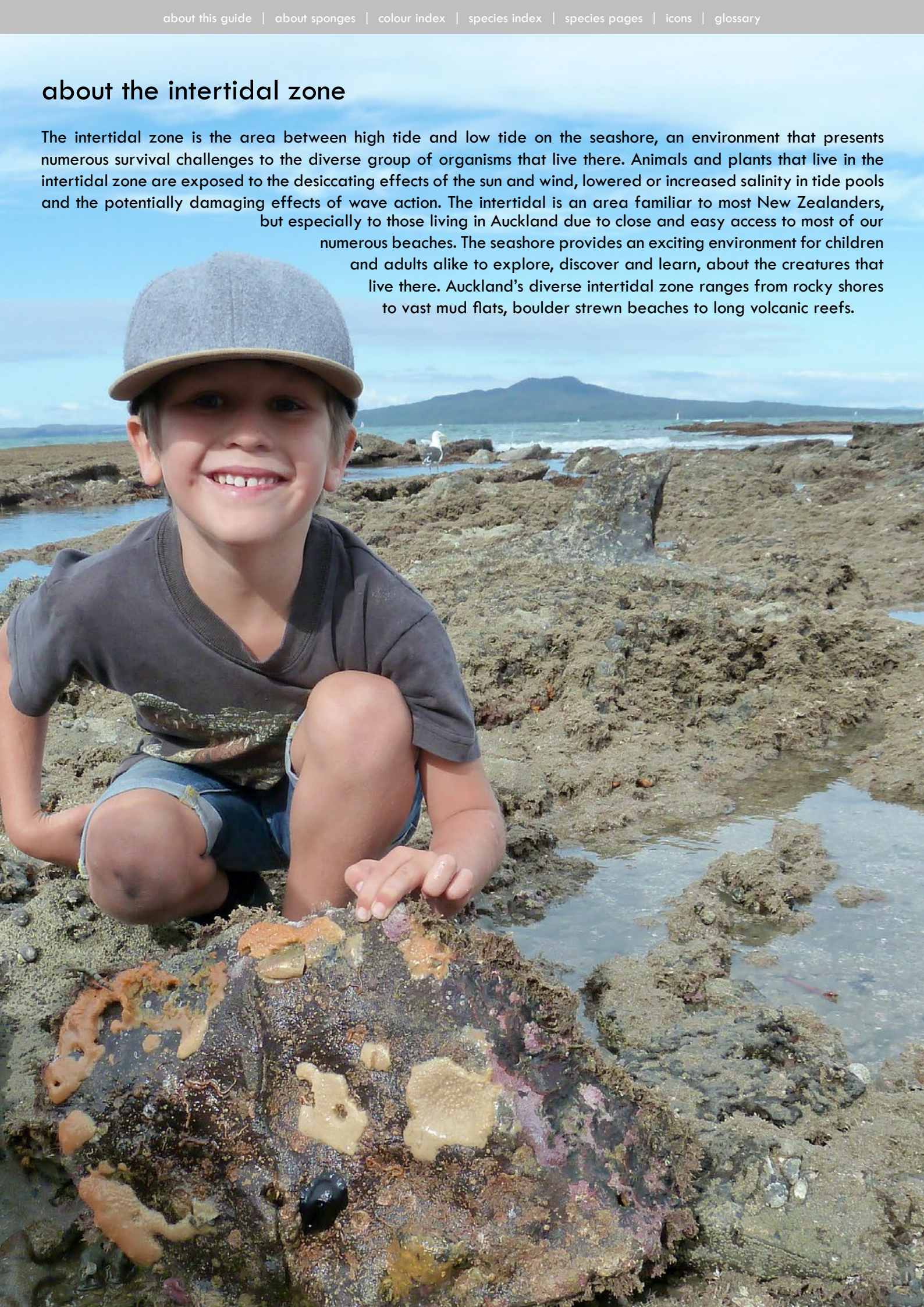
microscleres





# about the intertidal zone

The intertidal zone is the area between high tide and low tide on the seashore, an environment that presents numerous survival challenges to the diverse group of organisms that live there. Animals and plants that live in the intertidal zone are exposed to the desiccating effects of the sun and wind, lowered or increased salinity in tide pools and the potentially damaging effects of wave action. The intertidal is an area familiar to most New Zealanders, but especially to those living in Auckland due to close and easy access to most of our numerous beaches. The seashore provides an exciting environment for children and adults alike to explore, discover and learn, about the creatures that live there. Auckland's diverse intertidal zone ranges from rocky shores to vast mud flats, boulder strewn beaches to long volcanic reefs.



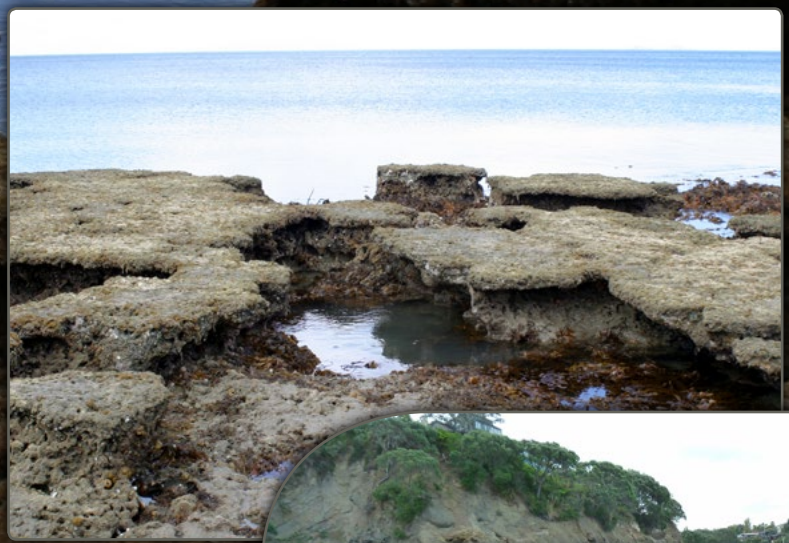
# habitats within the intertidal zone

## rockpools

An intertidal rockpool is an indentation, crevice or gut in a rock platform or rocky shore filled with seawater that remains throughout the tidal cycle. Rockpools are fascinating microcosms in which a variety of creatures live, including seaweeds, shells, slugs, shrimps, crabs, barnacles, chitons, seasquirts, sponges and fish.

## intertidal platform

Intertidal shore platforms are common around Auckland coastlines where mudstones and sandstones form multi-level, horizontal, wave-cut terraces and flats indented with surge channels and rock pools. These platforms may support rich seaweed cover or in places may be strewn with sand or mud. A rich diversity of sea creatures inhabit the vertical sides of the surge channels and rockpools.



## rocky shore

A rocky shore is typically composed of hard substrate such as mudstone, sandstone, basalt or granite that extends from the land above into the water in headlands and rocky outcrops. The intertidal zone on these shores are usually richly diverse and filled with sea creatures including bands of different seaweeds (red, green, brown), limpets, barnacles, chitons, gastropod shells, sponges, seasquirts, sealaces, crabs and other crustaceans.

## muddy shore

Quiet harbour shorelines are often covered in muddy sediments that accumulate around boulders and roots of mangrove trees and seedlings. Rocks, roots and other hard substrate in these habitats are often covered with oysters and limpets, gastropod shells and worms. Oyster shells and rocks make great habitats for sponges to grow.

# boulder gravel shore

Boulders and gravel accumulate on intertidal platforms adjacent to rocky shores and present a highly mobile and often barren habitat. If boulders are big enough not to be disturbed by wave action, their undersides are often covered in a myriad of encrusting creatures including sponges, bryozoans, sea squirts and thin encrusting coralline algae.


15

*Plakina cf. monolopha*


25

*Timea aurantiaca*


30

*Haliclona brøndstedi*


20

*Ciocalypta polymastia*


22

*Hymeniacidon cf. perlevis*


21

*Halichondria moorei*


28

*Crella incrustans*


17

*Polymastia aurantium*


24

*Tethya burtoni*


26

*Cliona cf. celata*


23

*Tethya bergquistae*


19

*Aaptos tenta*


18

*Polymastia fusca*


27

*Raspailia arbuscula*


29

*Tetrapocillon novaezelandiae*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*Ircinia novaezelandiae*


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*Stelletta sandalinum*


31

*Haliclona venustina*

# species index

# species index

PHYLUM Porifera

CLASS Demospongiae

# *Plakina* cf. *monolopha* Shulze, 1880

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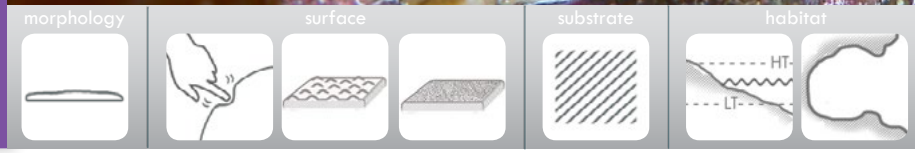



Very thinly encrusting sponge, 1–2 mm thick, spreading up to 12 cm square in large patches over rocky substrate. Sponge is only loosely attached to rock with elastic, rolled, raised margins. The entire structure is slightly billowy. Texture is crumbly, soft, fragile, fleshy to slightly granular to the touch. Surface is very characteristically punctured or lacy with oscule pits, up to about 0.5 mm wide and deep. Colour in life ochre yellow to tan.

Found in the sheltered intertidal clinging to the underside of rocks and ledges, often in the splash zone, and in the mid to low tidal region. It has been reported from the Hauraki Gulf (Rangitoto Island, Ladies Bay, Narow Neck), and Akaroa Habour in the South Island. Species of *Plakina* are often difficult to differentiate as they have few spicule types. They are rare in New Zealand waters.

*Plakina* cf. *monolopha* was first described from the Gulf of Naples in the Western Mediterranean and is today restricted to the North Atlantic Ocean and Mediterranean Sea. Originally this species was considered to be an introduction to New Zealand waters, but today we consider it highly unlikely that the specimens are conspecific with the North Atlantic *P. monolopha*. Until a careful taxonomic comparison can be made, the sponge will continue to be cross referenced to the European species species, as *Plakina* cf. *monolopha*.


Battershill, C.N., Bergquist, P.R., Cook, S.de C. (2010) Phylum Porifera, Pp. 58–135. In: Cook, S. de C. (Ed.) New Zealand Coastal Marine Invertebrates 1. Canterbury University Press, Christchurch, 640 p.

Bergquist, P.R. (1968) The Marine Fauna of New Zealand: Porifera: Demospongiae. Part 1. Tetractinomorpha & Lithistida. New Zealand Oceanographic Institute Memoir 37: 1–105.

# *Stelletta sandalinum* Brøndsted, 1924

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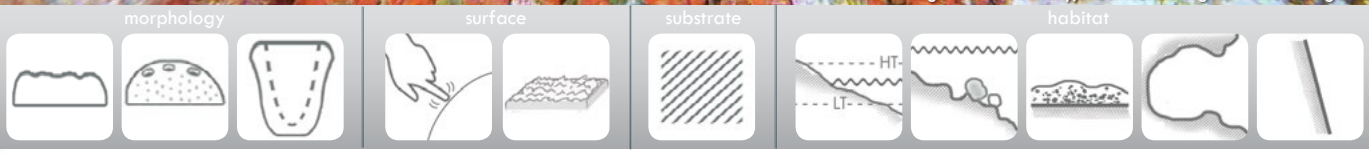
main image: Floor Anthony, Seafriends.org.nz Inset image: Mike Page, NIWA





Shallow subtidal to intertidal specmens flattened, hispid cushion-shaped, about 15–20 cm long and up to 5 cm high. Deep subtidal specimens large, irregular vase-shaped to lamellate, with a distinctive punctate surface about 20 cm high and wide. Surface is rough and often encrusted with filamentous algae and other invertebrates. Oscules not visible. Texture is tough, incompressible, rough to the touch and very hispid in places. External colour in life white to light grey, and dark grey tinges when exposed to full illumination.

Uncommon, found in the intertidal and shallow subtidal regions of offshore islands along the east coast of the North Island, growing under ledges, in caves, and on the sides of canyon walls. Reported from Doubtful Sound, Fiordland.


Bergquist, P.R. (1968) The Marine Fauna of New Zealand: Porifera, Demospongiae, Part 1 (Tetractinomorpha and Lithistida). *New Zealand Oceanographic Institute Memoir 37*: 1–106.

Pritchard, K., Ward, V., Battershill, C., Bergquist, P.R. (1984) *Stelletta sandalinum*, p. 116 in Marine sponges: Forty-six sponges of northern New Zealand. *Leigh Laboratory Bulletin* 14: 149 p.

# *Polymastia aurantium* Kelly-Borges & Bergquist, 1997

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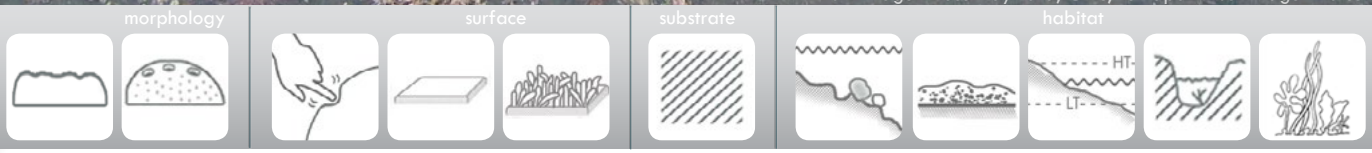
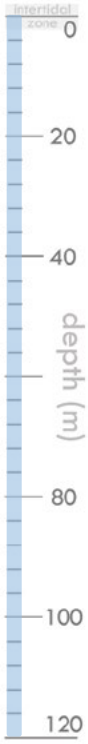
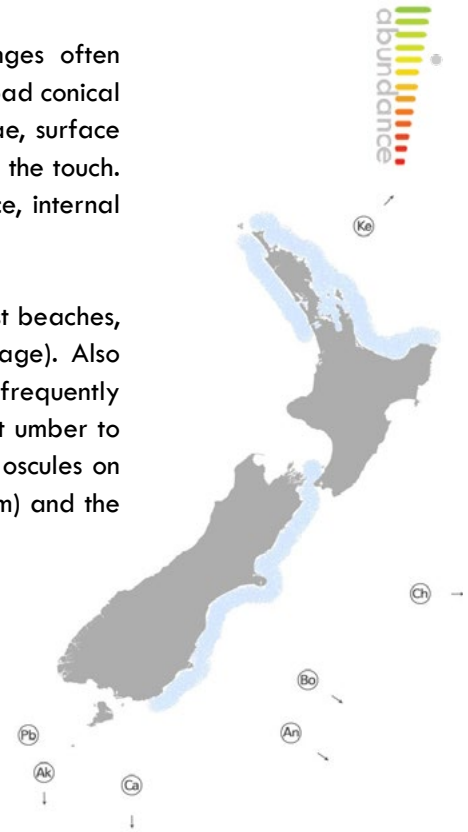
main image: Bruce Hayward, GNS, Te Papa inset image: Malcolm Francis, NIWA




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 exposed surge channels on exposed west coast beaches, and silty papa rock platforms (mudstone) in the Manukau Harbour (main image). Also common in shallow inshore rocky reefs on Northland coasts where they are frequently confused with *Polymastia pepo*, a much larger sponge that has a distinctly burnt umber to dark reddish orange colouration, a very thick surface band of colour, multiple oscules on single papillae, and a restricted distribution. Also reported from Kaikoura (20 m) and the east coast of the South Island down to 120 m.




Kelly-Borges, M., Bergquist, P.R. (1997) Revision of south-west Pacific Polymastiidae (Porifera, Demospongia, 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 fusca* Bergquist, 1961

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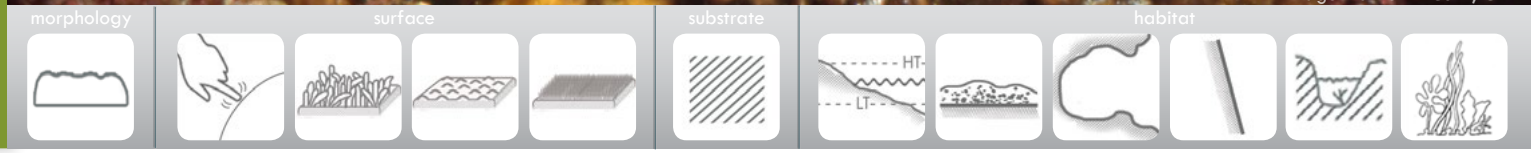



Thick encrusting sponge, circular to oval in profile, up to 20 cm long, typically 5–20 mm thick. Surface covered with densely packed conical papillae up to 15 mm high, oscules situated on ends of exhalent papillae. Texture extremely firm, rubbery, slightly hispid between papillae, which are granular, cork-like to the touch. External colour in life deep chocolate brown, internal colour mustard.

The species is found typically on shaded surfaces in the lowest intertidal, on walls and under overhangs in rock pools, and in the shallow subtidal in algal beds down to about 20 m where it is uncommon and frequently confused with *Polymastia massalis*. It is found on the west and eastern coastlines of Northland from Cape Reinga (6 m), including Muriwai, Manukau Harbour, Hauraki Gulf and Mercury Bay.


Bergquist, P.R. (1968) The Marine Fauna of New Zealand: Porifera, Demospongiae, Part 1 (Tetractinomorpha and Lithistida). *New Zealand Oceanographic Institute Memoir* 37: 1–106.

Kelly-Borges, M., Bergquist, P.R. (1997) Revision of south-west Pacific Polymastiidae (Porifera, Demospongia, 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.

# *Aaptos tenta* Kelly-Borges & Bergquist, 1994

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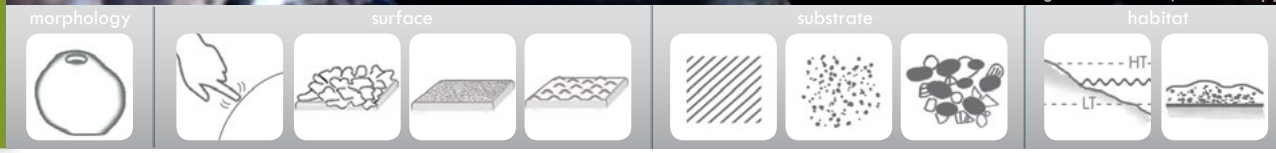
Class Demospongiae Order Suberitida Family Suberitidae

Previously known incorrectly as *Aaptos aaptos*


main and lower inset image: Nicola Rush, NIWA upper inset image Dr Guy Penny





Solitary or basally confluent groups of irregularly globular to subspherical sponges, typically up to 8 cm diameter and 6 cm high, attached to hard substrate by short thick flanges. Surface, smooth with rounded bumps or tubercules when submerged, spiky when exposed. Compound oscules are located apically in depressions over surface, but are also scattered individually. Texture firm but slightly elastic when wiggled side-to-side, surface fleshy, and slightly granular to the touch. External colour dull pinkish brown to hazel, internally mustard. Large buds are produced asexually and remain attached to the parent sponge, expanding into adults.

Typically occurs as solitary or basally confluent groups of sponges, forming broad mats exposed at low tide, often extremely locally abundant on rock platforms on sheltered coasts and harbours on the west (Manukau) and east (Waitemata) coasts of Northland. Also found subtidally but less common north of Taranaki. Known from Rangitoto Channel down to 4 m and on offshore Islands down to about 20 m.


Kelly-Borges, M., Bergquist, P.R. (1994) A redescription of Aaptos aaptos with descriptions of new species of Aaptos (Hadromerida: Suberitidae) from northern New Zealand. Journal of Zoology, London, 234, 301–323.

Bergquist, P.R. (1968) The Marine Fauna of New Zealand: Porifera, Demospongiae, Part 1 (Tetractinomorpha and Lithistida). New Zealand Oceanographic Institute Memoir, 37, 1–106.

# *Ciocalypta polymastia* (Lendenfeld, 1888)

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Class Demospongiae Order Subertitida Family Halichondriidae

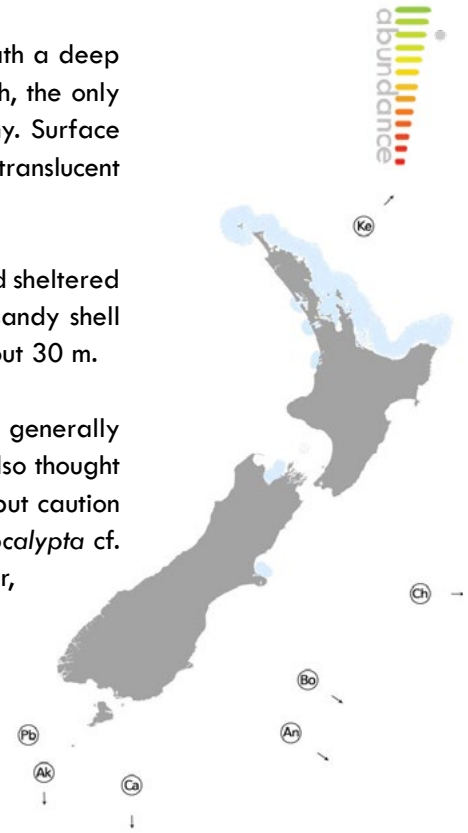

main image: Bruce Hayward, GNS inset image: Irene van der Ven, NIWA

morphology | surface | substrate | habitat


Massive base forming a large thick encrustation, 10–15 cm wide, hidden beneath a deep layer of muddy sand, giving rise to rounded finger-like projections, 1–3 cm high, the only part visible above the substrate. Texture is firm and compressible, slightly fleshy. Surface smooth, felty, grooved and either straight or slightly twisted. Colour in life is pale translucent creamy yellow.

Typically common in the intertidal zone in muddy sandy areas such as harbours and sheltered bays on the west and east coasts of the North Island, but also reported from sandy shell hash around the base of rocky reefs and in channels in the subtidal down to about 30 m.

*Ciocalypta polymastia* was first described from the east coast of Australia; it is generally accepted that the Australian and New Zealand specimens are conspecific. It is also thought that the New Zealand intertidal and subtidal specimens are the same species, but caution is advised as C. *polymastia* is very similar to the exclusively subtidal species *Ciocalypta* cf. *penicillus*. This species is differentiated from C. *polymastia* on possession of longer, thinner, tapering fistules, and a darker, dull yellow colouration.




Bergquist, P.R. (1970) The Marine Fauna of New Zealand: Porifera: Demospongiae. Part 2 (Axinellida and Halichondrida). New Zealand Oceanographic Institute Memoir 51: 1–85.

Battershill, C.N., Bergquist, P.R., Cook, S.de C. (2010) Phylum Porifera, Pp. 58–135. In: Cook, S. de C. (Ed.) New Zealand Coastal Marine Invertebrates 1. Canterbury University Press, Christchurch, 640 p.

# *Halichondria moorei* Bergquist, 1961

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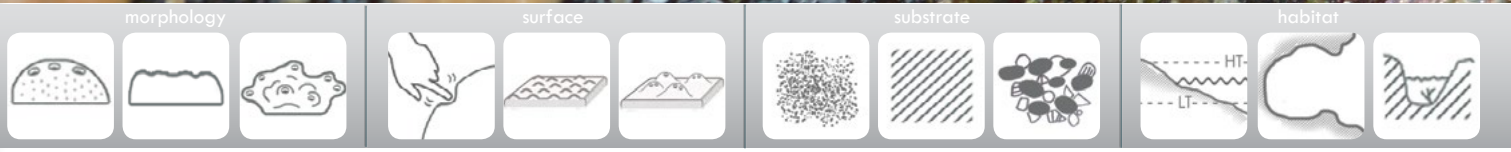
Class Demospongiae Order Suberitida Family Halichondriidae



A massive, thickly encrusting sponge, up to 35 cm long and 15 cm wide, with a wrinkled, bumpy, pimpled surface. Oscules conspicuous, up to 3 cm diameter, membranous, flush with the surface. Texture firm but fleshy, easily torn and is easily removed from substrate. Colour in life is salmon-pink to a dull orange. The interior is dull golden orange.

*Halichondria moorei* is very common in the intertidal beneath boulders, between cracks or around the edges of pools covered with water and sand. Specimens have been found all over the Auckland isthmus, but mostly on the east coast and in the inner Hauraki Gulf. Also known from Whangarei to Cape Rodney and the Bay of Plenty near Mt Maunganui. Reported to occur down to 10 m.


## It could also be

*Hymeniacidon* cf. *perlevis*

Bergquist, P.R. (1970) The Marine Fauna of New Zealand: Porifera: Demospongiae. Part 2 (Axinellida and Halichondrida). New Zealand Oceanographic Institute Memoir 51: 1–85.

Battershill, C.N., Bergquist, P.R., Cook, S.de C. (2010) Phylum Porifera, Pp. 58–135. In: Cook, S. de C. (Ed.) New Zealand Coastal Marine Invertebrates 1. Canterbury University Press, Christchurch, 640 p.

# *Hymeniacidon* cf. *perlevis* (Montagu, 1814)

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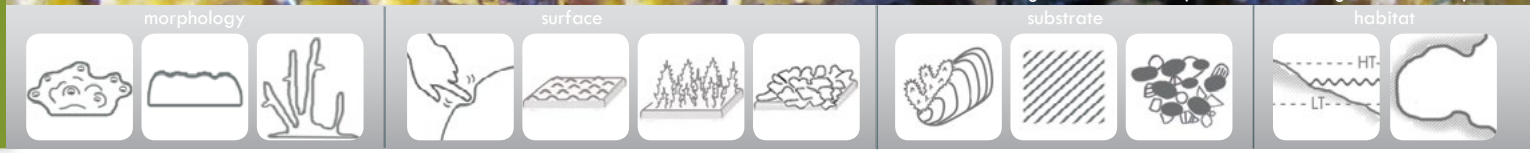
Class Demospongiae Order Suberitida Family Halichondriidae


main image: Dennis Gordon, NIWA inset image: Nicola Rush, NIWA





A thin or thickly encrusting intertidal sponge with variable habit, depending on habitat and environment. In exposed intertidal locations the sponge may be spreading and smooth, in more sheltered locations the sponge thickens and the surface is rough with pimple-like projections, separated by translucent aquiferous canals. In very sheltered environments erect, stringy processes arise from a basal mat. Up to about 12 cm long and 10 cm wide, the thickness varies from 2–20 mm. Texture is compressible, soft and fleshy. Surface is uneven and rough in places, or regularly pimpled. Oscules are located on low broad cones, usually opening off to one side and rolled inwards. Colour in life pale yellow to mustard to deep golden yellow both in the interior and exterior. *Hymeniacidon* cf. *perlevis* is very common in the intertidal zone in harbours, encrusting under rock ledges, between cracks in rock faces and around rock pools intermingled with tubeworms. It is most common on the northeastern coastline of the North Island, from North Cape to the Hauraki Gulf, including some west coast locations around Auckland. It has been recorded in the ports of Whangarei, Nelson, and Porirua harbour. Like species of *Haliclona*, species of *Hymeniacidon* are also difficult to differentiate as they have only one spicule type, and are quite plastic in their overall shape, depending on habitat. However, spicule length, habitat and location are good indicators of species. *Hymeniacidon perlevis* was first described from European waters and is today found around the United Kingdon and the North Sea. We consider it highly unlikely that the New Zealand specimens are conspecific with the North Atlantic species *H. perlevis*, but until a taxonomic comparison can be made the sponge will continue to be cross referenced to *H.* cf. *perlevis*.


## It could also be

*Halichondria moorei*

Bergquist, P.R. (1970) The Marine Fauna of New Zealand: Porifera: Demospongiae. Part 2 (Axinellida and Halichondrida). New Zealand Oceanographic Institute Memoir 51: 1–85.

Battershill, C.N., Bergquist, P.R., Cook, S.de C. (2010) Phylum Porifera, Pp. 58–135. In: Cook, S. de C. (Ed.) New Zealand Coastal Marine Invertebrates 1. Canterbury University Press, Christchurch, 640 p.

# *Tethya bergquistae* Hooper, 1994

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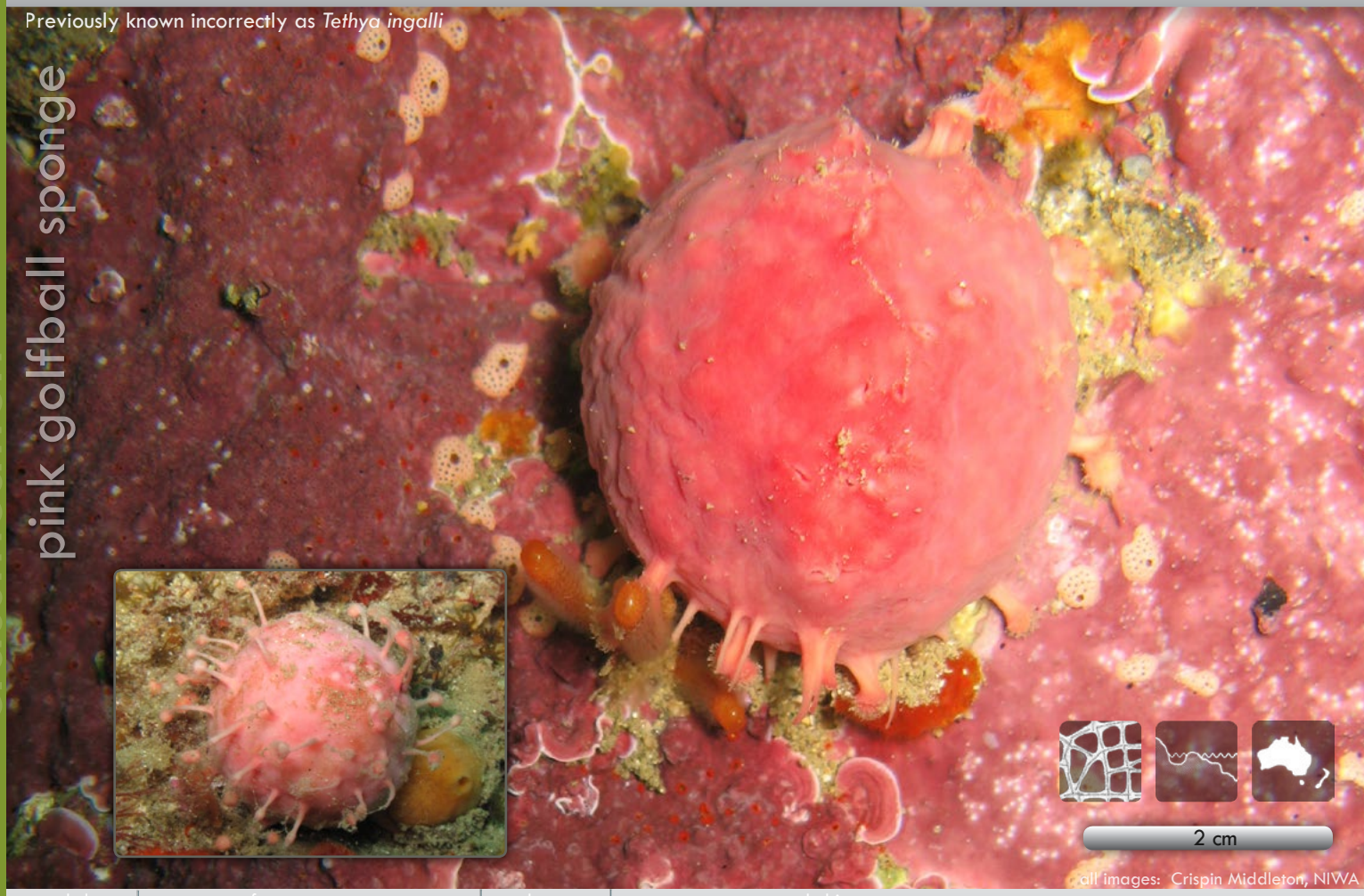
Previously known incorrectly as *Tethya ingalli*

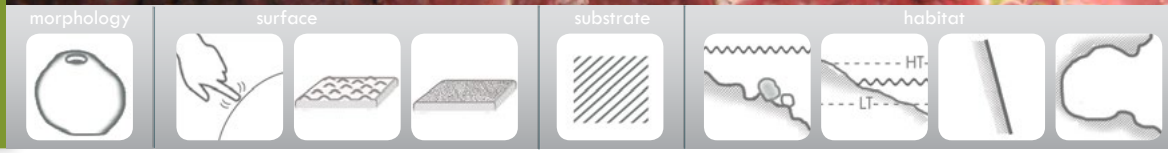
Class Demospongiae Order Tethyida Family Tethyidae

classification

pink golfball sponge




all images: Crispin Middleton, NIWA





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.


Bergquist, P. R., Kelly-Borges, M. (1991) *Tethya australis*, p. 48 in 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) *Tethya ingalli*, p. 84 in Marine sponges: Forty-six sponges of northern New Zealand. *Leigh Laboratory Bulletin* 14: 149 p.

# *Tethya burtoni* Sarà & Sarà, 2004

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Previously known incorrectly as *Tethya aurantium*

## orange golfball sponge




main image: Crispin Middleton, NIWA inset image: Nicola Rush, NIWA

morphology | surface | substrate | habitat


Spherical sponge up to 6 cm diameter, attached to substrate by flat basal stolons. Surface irregularly bumpy with polygon-shaped warts separated by deep furrows which contain the inhalant pores. One or more clusters of oscules are found on the apex of the sponge. Texture inflated and soft in life, with surface warts visible, barely compressible when contracted, corky, rough to the touch. External colour bright orange, internal colour brown orange.

Extremely common on many coastline and harbour environments around New Zealand, from the intertidal to the shallow subtidal around 20 m. Occurs as a solitary sponge but also in large groups connected by flat stolons. Prefers shaded overhangs in the intertidal and is exposed at low tide. Recorded from Three Kings Islands south on both coasts down to Taranaki on the west coast and Bay of Plenty on the east coast, Wellington and the northern tip of the South Island.


Bergquist, P. R., Kelly-Borges, M. (1991) *Tethya aurantium*, p. 43 in 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) *Tethya aurantium*, p. 82 in Marine sponges: Forty-six sponges of northern New Zealand. *Leigh Laboratory Bulletin* 14: 149 p.

# *Timea aurantiaca* Bergquist, 1968

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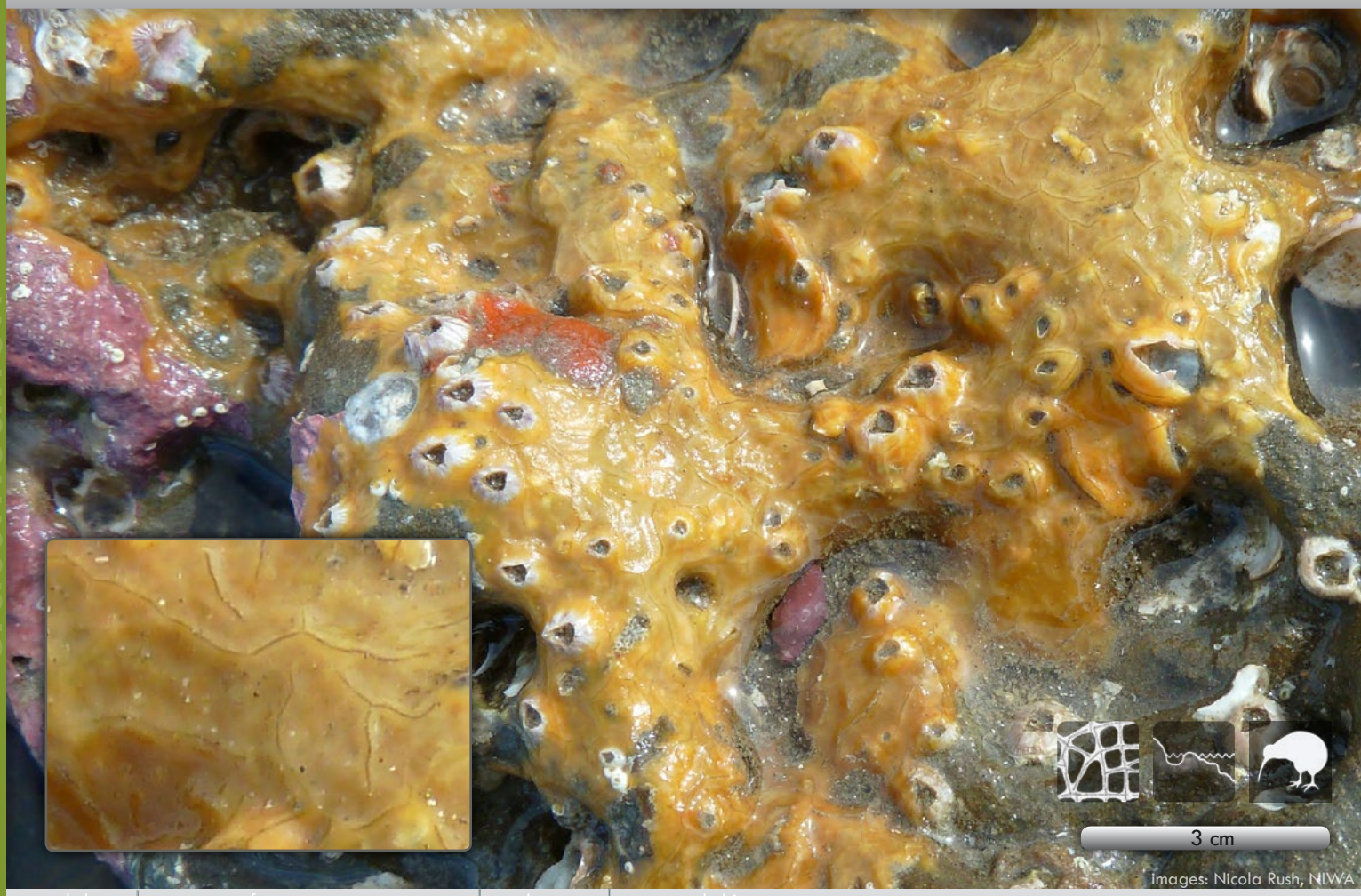




A thinly encrusting sponge that may form extensive mats up to 30 cm wide but the sponge is always less than 1 mm thick. Surface riddled with conspicuous, deep, subdermal canals that form solitary short, straight or meandering curved, slightly raised slits. Texture granular due to surface crust of roughened spherical spicules, slightly elastic. Colour in life mustard to yellowish orange. May be red. The diagnostic field character for *Timea aurantiaca* is the clearly visible subdermal slits which meander all over the surface of the sponge.

*Timea aurantiaca* is relatively common in shaded, mid to low tidal positions, encrusting the undersides of boulders and overhangs on the Rodney Coast at Goat Island Bay, in the Hauraki Gulf (Great Barrier Island, Narrow Neck, Milford) and at Whangapoua on the Coromandel coast.


## It could also be

*Cliona* cf. *celata*
*Plakina* cf. *monolopha*

Battershill, C.N., Bergquist, P.R., Cook, S.de C. (2010) Phylum Porifera, Pp. 58–135. In: Cook, S. de C. (Ed.) New Zealand Coastal Marine Invertebrates 1. Canterbury University Press, Christchurch, 640 p.

Bergquist, P.R. (1968) The Marine Fauna of New Zealand: Porifera, Demospongiae, Part 1 (Tetractinomorpha and Lithistida). New Zealand Oceanographic Institute Memoir 37: 1–106.

# *Cliona* cf. *celata* Grant, 1826

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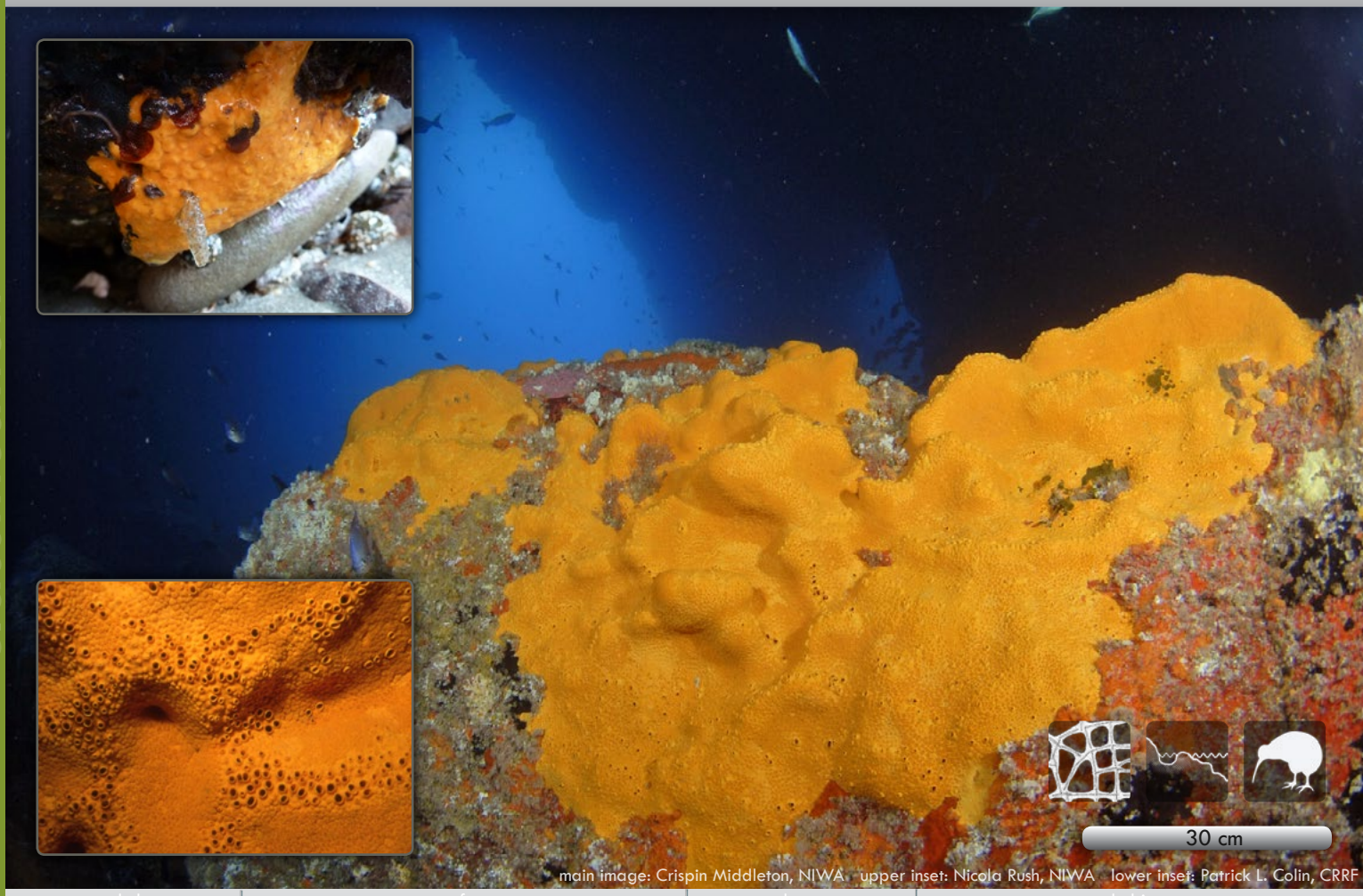
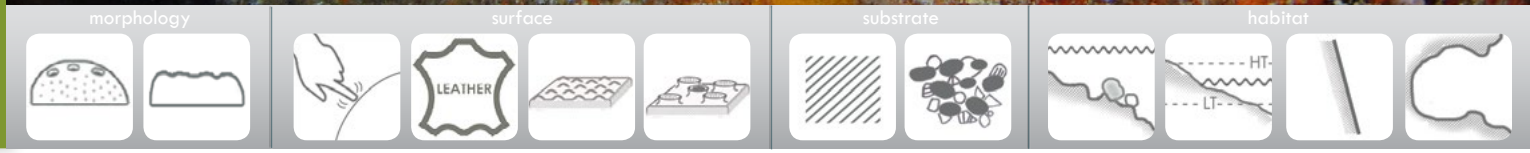



main image: Crispin Middleton, NIWA. upper inset: Nicola Rush, NIWA lower inset: Patrick L. Colin, CRRF





Thick encrusting to massive sponge with two distinct life stages: the alpha stage, in which only the inhalant and exhalent papillae are visible above the surface of the substrate and the gamma stage, where the sponge forms an encrusting mat or mound above and within the substrate. The mature gamma stage sponges can grow spectacularly large, up to 1 $m^2$. Surface covered in low botton-like areolate pores and swathes of oscules in rows along the tops of ridges or mounds. Texture firm, leathery to the touch. This species has two distinctive external colours: deep bright orange being the most common, and light clear yellow. Bores into calcareous substrate such as oyster shells and coralline algal crusts.

Commonly found on the roofs of caves in the intertidal, under overhangs and within indents. Found commonly enveloping boulders and flat rock surfaces in quiet harbour and other coastal environments. Very common along the northeastern coast of the North Island, from North Cape to the Hauraki Gulf, Wellington Harbour, Chatham Island, Banks Peninsula and Foveaux Strait down to about 30 m.

*Cliona celata* is a very common northern hemisphere species; the New Zealand specimens are remarkably similar in appearance but differ in spicule details and being predominantly orange rather than yellow. There is some doubt as to whether the alpha and gamma stages actually represent the same species, and indeed, whether the New Zealand specimens are conspecific with the northern hemisphere species.


Bergquist, P.R. (1968) The Marine Fauna of New Zealand: Porifera, Demospongiae, Part 1 (Tetractinomorpha and Lithistida). New Zealand Oceanographic Institute Memoir 37: 1–106.

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

# *Raspailia arbuscula* (Lendenfeld, 1888)

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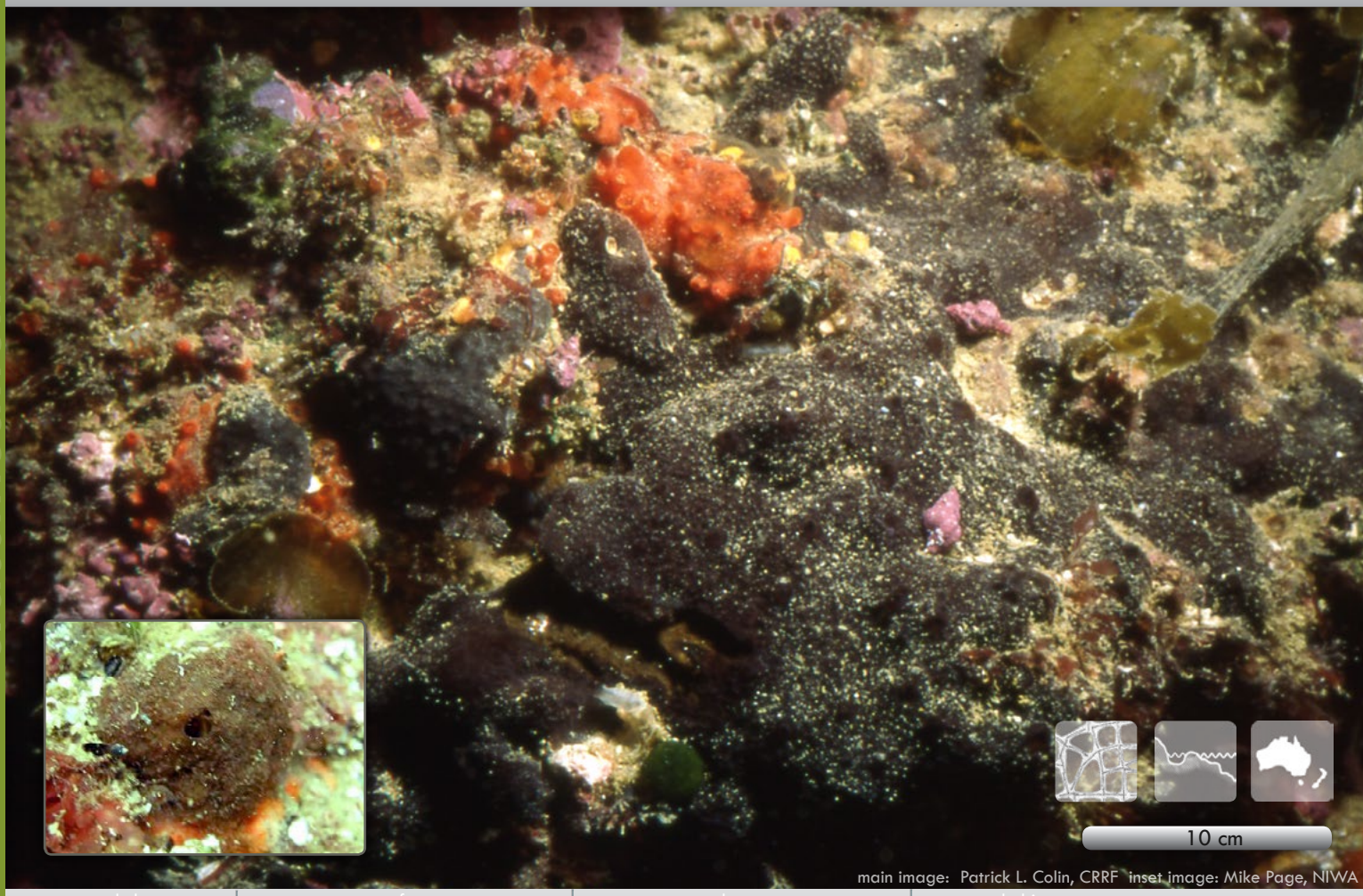
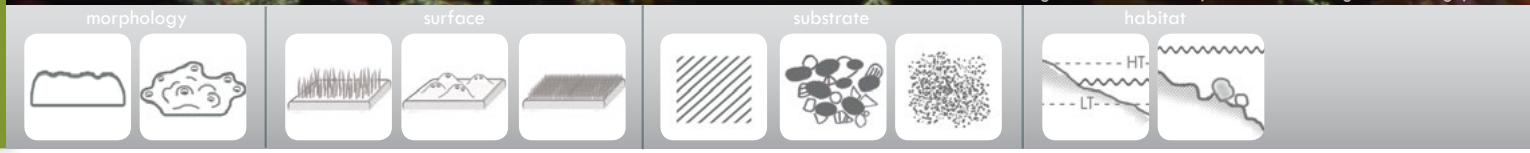



main image: Patrick L. Colin, CRRF inset image: Mike Page, NIWA





Thickly encrusting to massive sponge, forming patches about 30 cm wide, 2–3 cm thick, up to 6 cm. Surface is smooth and undulating, massive specimens have surface cone-like projections. Oscules, up to 2.5 mm diameter, are located on top of surface mounds. Texture firm, compressible, velvety to the touch. Surface colour in life brownish black with a silvery sheen from projecting spicules, internal colour dark olive.

Relatively common, encrusting in shaded positions such as under rock ledges in the intertidal, common on wharf piles, tolerant of muddy conditions. Also found on shaded canyon walls and on the sides of boulders on open rocky reefs, from 1–40 m. Known along the Rodney Coast south to the Waitemata Harbour and North Channel. Reported from Doubtful Sound and Chatham Rise.

First described from Port Jackson, Australia.

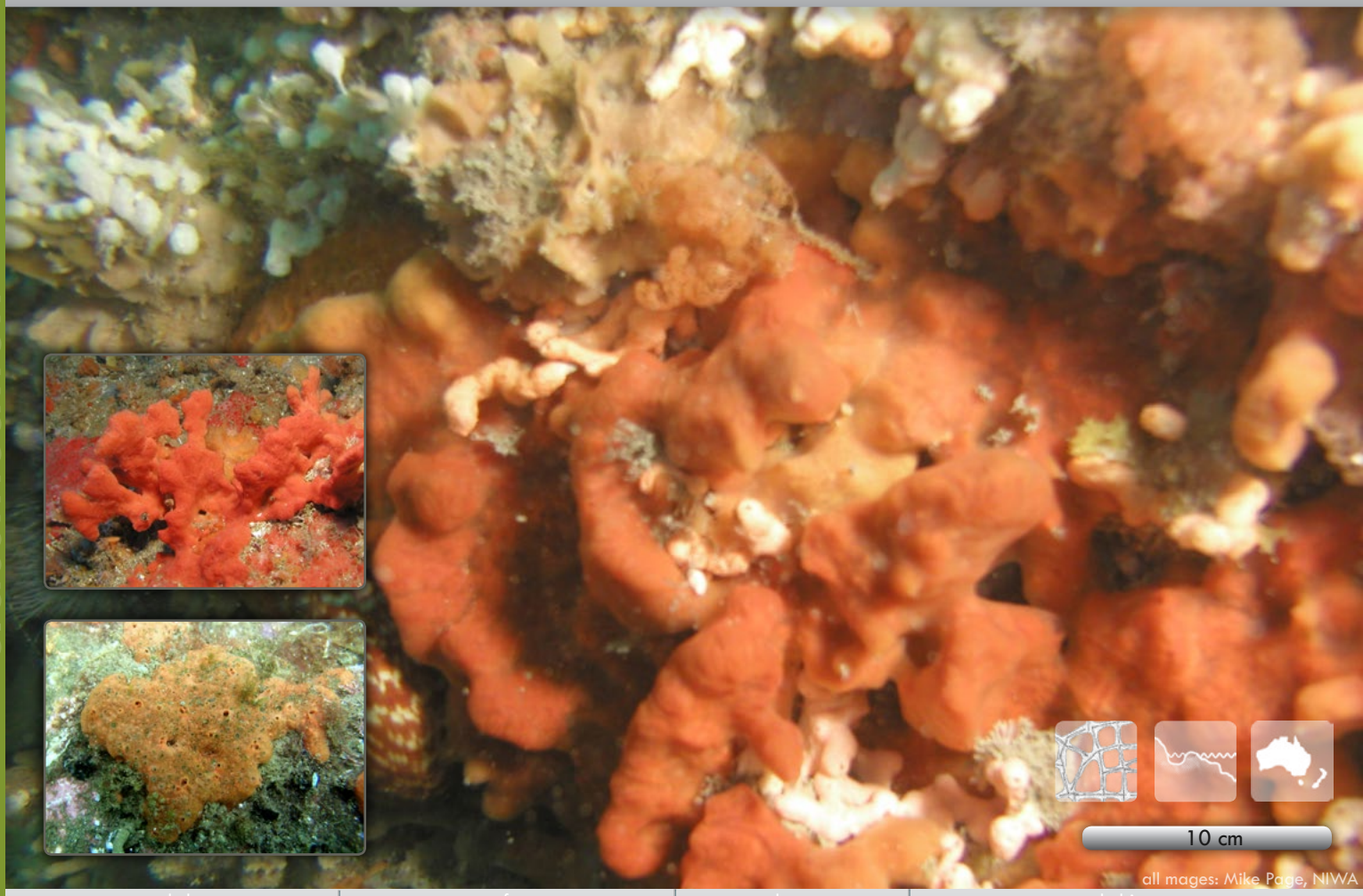

Bergquist, P.R. (1970) The Marine Fauna of New Zealand: Porifera: Demospongiae. Part 2 (Axinellida and Halichondrida). *New Zealand Oceanographic Institute Memoir* 51: 1–85.

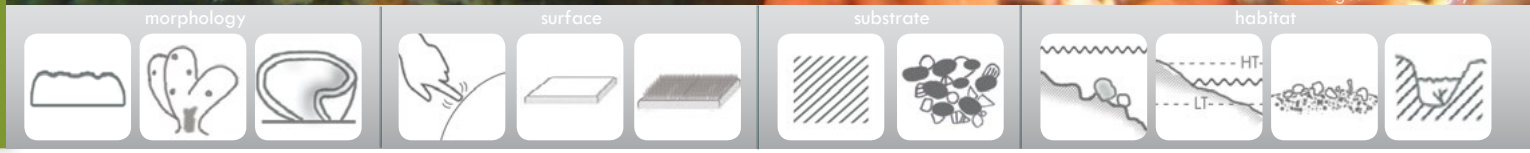
Pritchard, K., Ward, V., Battershill, C., Bergquist, P.R. (1984) *Raspailia agminata*, p. 72 in Marine sponges: Forty-six sponges of northern New Zealand. *Leigh Laboratory Bulletin* 14: 149 p.

# *Crella incrustans* (Carter, 1885)









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, 1–2 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.


Bergquist, P.R., Fromont, P.J. (1988) The Marine Fauna of New Zealand: Porifera: Demospongiae. Part 4. Poecilosclerida. *New Zealand Oceanographic Institute Memoir* 96: 1–197.

Pritchard, K., Ward, V., Battershill, C., Bergquist, P.R. (1984) *Crella incrustans*, p. 50 in Marine sponges: Forty-six sponges of northern New Zealand. *Leigh Laboratory Bulletin* 14: 149 p.

# *Tetrapocillon novaezealandiae* Brøndsted, 1924

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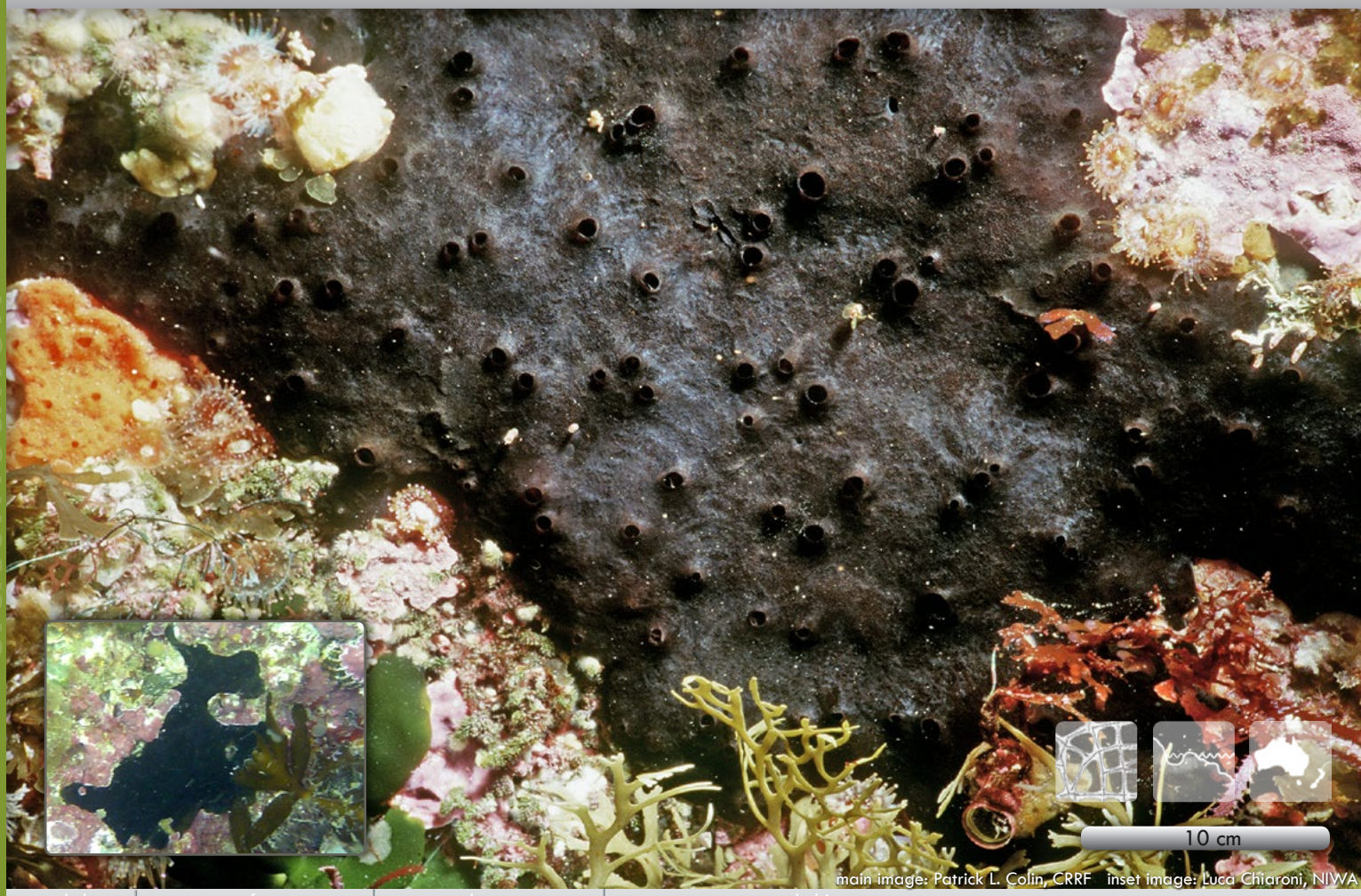
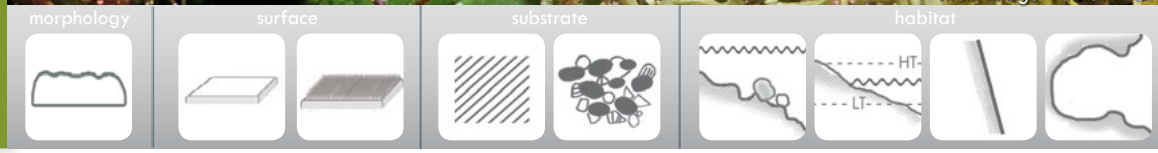



main image: Patrick L. Colin, CRRF inset image: Luca Chiaroni, NIWA





A relatively thickly encrusting to low mounded sponge that forms a spreading, slightly inflated mat underwater. Patches up to 70 cm wide, 5–15 mm thick, Tasmania specimens up to 40 mm thick. Surface follows the underlying substrate, oscules are very small, 4–6 mm diameter in life, moderately densely scattered over the surface and either lie flush with the surface or are slightly elevated. Texture quite firm and pliable on the surface, crumbly inside, surface noticeably velvety to the touch. External colour jet black to very dark green, internal colour dirty gold to orange-yellow. Thick dark-olive fluid emitted from sponge when handled.

Commonly found encrusting on shaded rock surfaces and boulders in intertidal and shallow subtidal waters down to about 20 m, on moderately exposed coastlines along the northeastern section of the North Island including the Hauraki Gulf, Coromandel Peninsula and offshore islands, and the Three Kings Islands.

The species was recorded from South Africa's Agulhas Bank in 1963 and more recently from Knysna Estuary, South Africa, and Tasmania in 2010.


Bergquist, P.R., Fromont, P.J. (1988) The Marine Fauna of New Zealand: Porifera: Demospongiae. Part 4. Poecilosclerida. *New Zealand Oceanographic Institute Memoir* 96: 1–197.

Pritchard, K., Ward, V., Battershill, C., Bergquist, P.R. (1984) *Tetrapocillon novaezealandiae*, p. 48 in Marine sponges: Forty-six sponges of northern New Zealand. *Leigh Laboratory Bulletin* 14: 149 p.

# *Haliclona brøndstedi* Bergquist & Warne 1980

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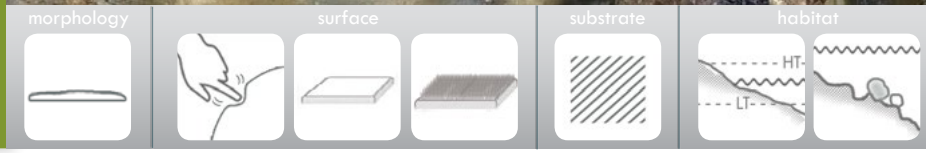



Thinly encrusting intertidal sponge capable of spreading up to about a square metre, but typically 20–30 cm square and 2–5 mm thick. Surface studded with a large number of oscules either flush at the surface or raised on low conical turrets which are around 1.5 mm high. Oscules are conspicuous, each with a smooth membranous lip. Surface generally smooth, even, undulating, membranous, slightly translucent, punctate from inhalant ostia, slightly fuzzy from projecting spicules. Texture very soft, crumbly. Colour in life fawn internally and externally.

Typically found under boulders, ledges and in indents in rock walls on the west coast of the North Island (Anawhata, Piha) and in the Manukau Harbour (Cornwallis, Mill Bay). Also reported from Whangarei Port, Mt Maunganui and around the Coromandel Peninsula.

*Haliclona* species are quite difficult to differentiate in the lab because they are generally thinly encrusting and have similar spicules. However, their morphology, surface details, texture and colouration in life provide enough details for the careful observer to distinguish species from species.


## It could also be

*Haliclona venustina*

Bergquist, P.R., Warne, K.P. (1980) The Marine Fauna of New Zealand: Porifera: Demospongiae. Part 3 (Haplosclerida and Nepheliospongida). New Zealand Oceanographic Institute Memoir 87: 1–77.

# *Haliclona venustina* (Bergquist, 1961)

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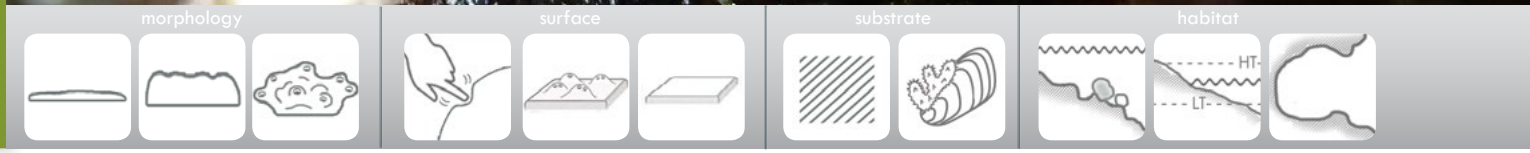
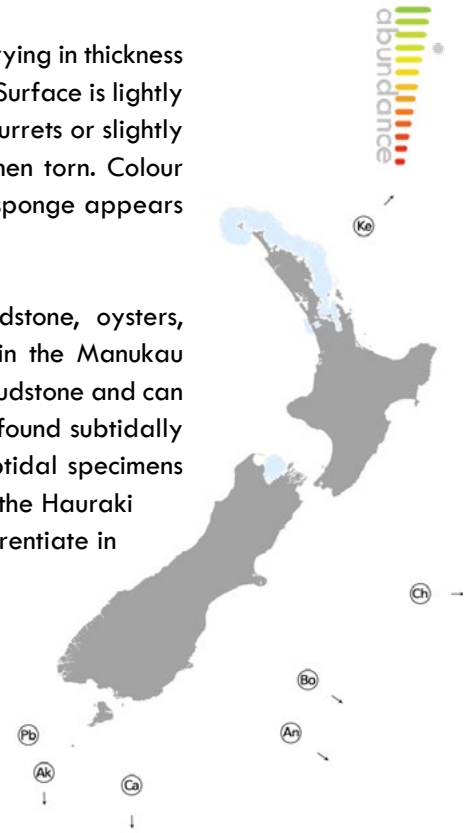
Class Demospongiae Order Haplosclerida Family Chalinidae



Encrusting sponge up to about 15 cm wide; intertidal specimens relatively thin, varying in thickness from 2–15 mm, subtidal specimens thick encrusting to massive, up to 30 cm thick. Surface is lightly punctured, slightly velvety, undulating. Oscules may be elevated on short, squat turrets or slightly raised from the surface. Texture is slightly elastic, but crumbly, slightly crisp when torn. Colour in life pinkish to grey mauve to dull yellow. When removed from the water this sponge appears shiny due to the reflection of the surface membrane and skeleton.

*Haliclona venustina* is a relatively common intertidal sponge encrusting mudstone, oysters, bryozoans and tubeworms around the Auckland isthmus, including Cornwallis in the Manukau Harbour and North Piha on the west coast of the North Island. It grows on Papa mudstone and can be found in rock pools and on oysters in the intertidal. This species has also be found subtidally down to about 20 m where it is usually massive with tall oscular chimneys. Subtidal specimens been recorded as far north as the Three Kings, Whangarei, the outer islands of the Hauraki Gulf and Tasman Bay, Marlborough. *Haliclona* species are quite difficult to differentiate in the lab because they are generally thinly encrusting and have similar spicules. However, their morphology, surface details, texture and colouration provide enough details for the careful observer to distinguish species from species.




## It could also be

*Haliclona brøndstedi*

Bergquist, P.R., Warne, K.P. (1980) The Marine Fauna of New Zealand: Porifera: Demospongiae. Part 3 (Haplosclerida and Nepheliospongida). New Zealand Oceanographic Institute Memoir 87: 1–77.

Battershill, C.N., Bergquist, P.R., Cook, S.de C. (2010) Phylum Porifera, Pp. 58–135. In: Cook, S. de C. (Ed.) New Zealand Coastal Marine Invertebrates 1. Canterbury University Press, Christchurch, 640 p.

# *Ircinia novaezealandiae* Bergquist, 1961

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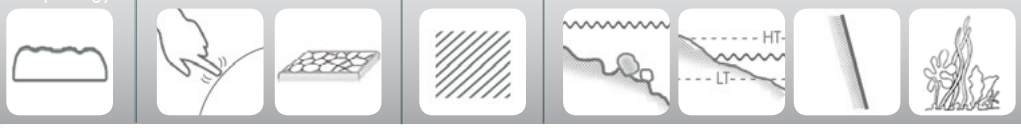
Class Demospongiae Order Dictyoceratida Family Irciniidae


morphology | surface | substrate | habitat





Thickly encrusting sponge about 10 cm wide and 2.5 cm high, forming a spreading mat attached to rock. Surface is irregular with a conulose honeycomb pattern. Oscules are small with a thin membranous rim and are sparsely scattered over the surface of the sponge. Texture firm but compressible, elastic, tough, surface smooth and rubbery. Colour in life dark grey to chocolate black, to creamy-grey interior.

This species is often difficult to see as the surface is usually encrusted with seaweeds, bryozoans and other sponges. Deeper specimens often incorporate the branches of dead corals and rubble. Known from the intertidal down to about 30 m on coastal reef slopes, canyon walls and algae-covered rock flats on the Rodney Coast (Leigh) and Hauraki Gulf (Noises, Kawau). Also known from Cavalli Seamount and several knolls in the Bay of Plenty, where it occurrs between 290 and 600 m. Also reported from Wellington.


Cook, S.dC., Bergquist, P.R. (1999) New species of dictyoceratid sponges from New Zealand: Genus *Ircinia* (Porifera: Demospongiae: Dictyoceratida). *New Zealand Journal of Marine and Freshwater Research* 33: 545–563.

Pritchard, K., Ward, V., Battershill, C., Bergquist, P.R. (1984) *Ircinia novaezealandiae*, p. 22 in Marine sponges: Forty-six sponges of northern New Zealand. *Leigh Laboratory Bulletin* 14: 149 p.

# icons

## body plan

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

## life history

| | | |
|---|---|---|
|  | native | naturally occuring around New Zealand, endemic |
|  | intertidal species | always found in the intertidal zone and may extend in the subtidal |

| | | |
|---|---|---|
|  | antipodean | naturally occuring around New Zealand and Australia only |

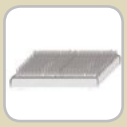
## morphology

| | | |
|---|---|---|
|  | amorphous | without definable shape, often with lobed surface, potato or tuber-shaped, massive |
|  | ball | spherical, globular |
|  | cup/vase | bowl-shaped with a restricted or broad base |
|  | fingers | finger-like, often arising from an encrusting or restricted base, digitate |
|  | loaf | rounded elongate, hemispherical |

| | | |
|---|---|---|
|  | plate | thick fan flattened in one plane, margin often folded, ear-shaped |
|  | strappy | tree-like, giving rise to flattened pliable branches much wider than they are thin, usually without a condensed axis |
|  | thick encrusting | spreading over substratum, more than about 20 mm thick |
|  | thin encrusting | spreading over substratum, less than about 5 mm thick |

# icons

## surface

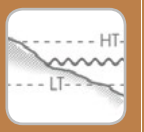
| | | |
|---|---|---|
|  | bumpy | bearing small, rounded bumps |
|  | fuzzy | fine pile formed from short projecting spicules (usually about 1–2 mm long), velvety, downy, hispid |
|  | granular | surface feels like fine sandpaper |
|  | hairy | coarse stubble or prickly bristles formed by long projecting spicules (typically 5–20 mm long), hirsute |
|  | honeycomb | surface with ridges in a honeycomb pattern |
|  | leathery | thick skin, tough, flexible, slightly elastic |
|  | lobed | bearing large rounded projections, lobate |
|  | papillae | bearing short finger-shaped projections, some blind (inhalant) or open (exhalent) or both |
|  | rough | Irregularly pitted and ridged surface, often tough |
|  | smooth | even, hairless, silky, can be slightly undulating |
|  | soft | soft to the touch, easily compressible, elastic |
|  | hard | hard to the touch, not compressible, rigid |
|  | shaggy | bearing ragged conulose brushes of underlying spicules or fibres |
|  | sieve-pores | bearing button- or mushroom-shaped clusters of inhalant pores in a sieve-like structure, areolate porefields |
|  | slits | subdermal canals visible on surface as deep slits |
|  | turrets | bearing hollow cones, turrets or fistules, which can be blind (inhalant) or open (exhalent) |
|  | warty | bearing small flattened bumps or tubercles |

## substrate

| | | |
|---|---|---|
|  | rock | hard substrate such as mudstone, sandstone, basalt, compressed carbonates |
|  | rubble | shell, stone, and pebble rubble |
|  | sand | small coarse grains of worn silica, rock, and shell |
|  | mud | very fine muddy and silty sediments derived from terrigenous rocks, soils and clays |
|  | living organism | living or growing on the external surface of an animal (epizoic) or seaweed, (epiphytic) |

# icons

habitat

| | | |
|---|---|---|
|  | 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 |
|  | 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 |
|  | indents | underwater caves, shelves and overhangs, organisms may experience wave surge, subdued illumination, or near darkness |
|  | rockpool | indentation in rock filled with water, intertidal |
|  | wall | underwater cliffs and slopes, organisms exposed to wave surge and currents, and subdued illumination |

| | | |
|---|---|---|
|  | algal beds | coralline algae, seagrass or algal beds |
|  | 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 |
|  | 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 |
|  | 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 |

# glossary

| | |
|---|---|
| agglutinate | incorporates sand grains into the sponge body sticking them together as a mass |
| algal beds | areas of seafloor with coralline algae, sea-grass or multiple seaweed species |
| amorphous | without definable shape, often with lobed surface, potato or tuber-shaped, massive |
| anastomose | a cross connection between two tubes or branches |
| antipodean | naturally occurring around New Zealand and Australia only |
| apex | top of a structure (tube, mound), apical |
| apical | top of a structure (tube, mound), apex |
| arborescent | see 'shrubby', and 'tree' |
| areolate porefield | see 'sieve-pores' |
| artificial substratum | anything man-made such as mooring blocks, mussel lines, wharf piles |
| ball | spherical, globular |
| bank | seabed raised into a bank of compacted rubble and other carbonate materials including shell, kina and sea lace hash, organisms exposed to wave surge and currents, and subdued illumination |
| bark and pith fibre | fibre with compact laminated bark-like spongin surrounding a softer granular collagen pith in verongid sponges |
| 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 |
| bladder | hollow with thin papery or cellophane-like walls, vesicular |
| blunt | not sharp, rounded ends |
| bowl | shallow bowl with a restricted base, turbinate |
| brain-shaped | hemispherical with brain-like corrugations |
| brittle | fragile but rigid, breaks apart easily |
| bulb | single or conjoined, with a central exhalent cavity (atrium) into which oscules empty, bulbous |
| bumpy | bearing small rounded bumps |
| calcareous sponge | sponge with spicules made of calcium carbonate ($CaCO_3$) in the form of calcite, often three-rayed, Class Calcarea |
| caliculate | see 'cup' |
| calyx | see 'cup' |
| candelabra | a large branched 'candlestick' with 'holders' arising from lateral branches |
| cup | bowl-shaped with a restricted or broad base, calyx, caliculate |
| cartilaginous | having the texture of cartilage, firm and tough yet flexible |
| cement | cementing together sedimentary substrate (sand and shell) to provide support, agglutinating |
| 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 |
| clavate | see 'club-shaped' |
| club-shaped | solid erect cylinder, column-shaped, taller than wide, wider at top, clavate |
| commensal | an association between two organisms in which one benefits and the other derives neither benefit nor harm |
| common sponge | sponge with silicon dioxide ($SiO_2$) spicules, and/or sand, and/or fibrillar collagen, and/or fibrous (spongin) collagen, Class Demospongiae |
| compressible | easily squeezed |
| concave | having a surface that curves inwards like the interior of a circle or sphere |
| concentric | circles arranged with one inside the other |
| conules | sharply pointed structures rising from the surface, conulose |
| conulose | surface bearing peaks raised by underlying fibre or spicule skeleton |
| corky | tough, feels almost waxy to the touch |
| 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 in-between |
| corrugated | bearing irregularly parallel ribs and grooves |
| 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 |
| cryptic | difficult to see (habitat) or difficult to detect differentiate from other species |
| cryptogenic | species recorded from New Zealand whose original place of origin is uncertain, whether native, or introduced |
| 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, open-ocean zone |
| dendritic | branching, tree-like |
| dendritic fibre | fibrous skeleton resembling a branching tree in which the branch do not re-join (anastomose) |

| | |
|---|---|
| diameter | the distance across the widest point of a circle |
| dichotomous | branching, where the axis is divided into two branches |
| digitate | finger-like |
| doughy | soft, easily depressed but does not return to shape, remains compressed |
| egg | 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 | naturally occurring in New Zealand, but not elsewhere |
| environment | physical, chemical, ecological, behavioural and other conditions experienced by an organism |
| epiphytic | living or growing on the external surface of a seaweed |
| epizoic | living or growing on the external surface of an animal |
| exhalent | excurrent stream or water current from inside of sponge to outside through the oscules |
| fan | thin, flattened in one plane with or without stem, flabellate, foliaceous |
| feathery | feather-like, supported on a thin stem |
| fibrous | flexible strands of spongin protein forming the supporting skeletal network that may be cored with silica spicules or sand |
| fingers | finger-like, often arising from an encrusting or restricted base, digitate |
| firm | requires some pressure to compress |
| fistulose | see 'turrets' |
| flabellate | see 'fan' |
| flagella | a slender thread-like or whip-like appendage on many protozoa, bacteria, spermatozoa, that enables them to swim. In the case of sponge choanocytes the flagella enables the cell to propel a water current |
| flagelliform | like a flagella; see 'whip' and 'flagella' |
| fleshy | feels like skin or cheese, dense, slightly stretchy, collagenous |
| foliaceous | see 'fan' |
| fragile | easily torn, squashed, broken |
| friable | easily crumbled |
| fuzzy | fine pile formed from short projecting spicules (usually about 1–2 mm long), velvety, downy, hispid |
| gelatinous | jelly-like, slippery, jiggly, wobbly |
| 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 |
| globular | ball-shaped, rounded |
| granular | surface covered in small to medium sized rounded or square granules, giving a sandpapery texture due to calcareous or siliceous minerals in the surface of the sponge |
| habit | the way an organism grows on the substrate |
| habitat | the environment and local situation in which an organism lives |
| hairy | coarse stubble or prickly bristles formed by long projecting spicules (typically 5–20 mm long) |
| hand | thick fan flattened in one plane with indented margins, palmate |
| hard | solid to the touch, not compressible, rigid |
| hirsute | see 'hairy' |
| hispid | see 'hairy' |
| homogeneous fibre | fibre without a central pith and without conspicuous layers in cross-section |
| 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 |
| inhalant | incurrent stream or water current from external ostia to inside of sponge |
| 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 | invasive species first described from outside of New Zealand waters and is found in New Zealand and other locations |
| jiggly | wobbles almost like jelly when touched, resilient, gelatinous |
| 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 |
| lamellate | see 'plate' |
| laminated fibre | fibre with conspicuous laminated (stratified) concentric layers in cross-section, without a central pith |
| leathery | texture like thick, hard skin, tough, flexible, slightly elastic |
| limp | feels soft and yields to pressure, remains compressed when squeezed, flaccid |
| loaf | rounded elongate, hemispherical |
| lobe | raised surface mound |
| lobed | bearing large rounded projections, lobate |
| lollipop | spherical or flattened disc-shaped body supported on long thin stem, pedunculate, stipitate |
| lyssacine | glass sponge skeleton formed by the interlocking and weaving (not fusion) of giant diactines and other irregularly arranged silica spicules |
| mammilate | see 'papillae' |

| | |
|---|---|
| margins | edge of a surface |
| meandering | wandering along and above substratum attached at intervals, repent, ramify |
| megasclere | large spicules that form the structural framework of the sponge |
| membranous | thin, translucent, flimsy, like a membrane |
| microsclere | small spicules of intricate shape and ornamentation that line the sponge surface of aquiferous canals |
| morphology | form and structure, shape |
| mud | very fine and silty sediments derived from terrigenous rocks, soils and clays |
| native | naturally occurring around New Zealand, endemic |
| net | internal fibre skeleton forms a cavernous 2 or 3 dimensional network, reticulate |
| opaque | impenetrable by light |
| ornamented | an otherwise plain structure that is altered or adorned by embellishment, decorative |
| 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 |
| ovate | see 'egg' |
| palmate | shaped like an open hand |
| papillae | bearing short finger-shaped projections, some blind (inhalant) or open (exhalent) or both |
| pedunculate | see 'lollipop' |
| plate | 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 |
| porocalyce | specialised inhalant structure unique to Family Tetillidae (Order Spirophorida) |
| punctate | surface perforated with tiny holes, punctured |
| radiate | silica spicules radiate towards the surface from deep within the choanosome, perpendicular to the surface |
| 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 |
| repent | see 'meandering' |
| reticulate fibre | three-dimensional network of fibres |
| rock | hard substrate such as mudstone, sandstone, basalt, compressed carbonates |
| rockpool | indentation in rock, filled with water, intertidal zone |
| rough | irregularly pitted and ridged surface, often tough |
| rubbery | feels dense, springy, elastic, and resilient to the touch, collagenous |
| rubble | shell, stone, and pebble rubble |
| rugose | see 'rough', and 'bumpy" |
| sack | hollow body with thin papery walls and perforations |
| sand | small coarse grains of worn silica, rock, and shell |
| sandpapery | feels scratchy or slightly abrasive like sandpaper to the touch, granular |
| 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 |
| shaggy | bearing ragged conulose brushes of underlying spicules or fibres |
| shrubby | bushy with irregular branches and short stem, arborescent |
| 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 |
| siliceous | made of silica |
| slippery | feels slimy and slippery from mucus exudate |
| smooth | even, hairless, silky, can be slightly undulating |
| soft | soft to the touch, easily compressible |
| southwest Pacific | naturally occurring around New Zealand, Australia and other Pacific locations |
| spicule | component of the mineral skeleton, typically composed of silica or calcium carbonate |
| spiky | bearing regular, sharp, stiff or soft peaks, raised by underlying fibre or spicule skeleton, conulose |
| spined | surface covered with spines or prickly bundles of very long spicules projecting from surface of the sponge, spiny |
| spiral | radiate silica spicules diverge strictly radially, and sometimes spiral radially from the centre of the sponge towards the surface |
| spongin | a form of collagen, fibrillar or fibrous, unique to sponges |
| spongy | cavernous and springy |
| stipe | a stalk or stem, especially the stem of a seaweed or sponge |
| sticky | feels tacky |
| stipitate | see 'lollipop' |
| stolon | tissue that extends from body, for attachment, or to produce a terminal bud |
| stony | incompressible like a stone, rigid |
| strappy | tree-like, giving rise to flattened pliable branches much wider than they are thin, usually without a condensed axis |

| | |
|---|---|
| substrate | an underlying substance or layer, rock, sand |
| 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 |
| surface | patterning or ornamentation on the exterior of the sponge, often related to skeleton beneath |
| symbiotic | found in close physical association with other organisms such as sponges, molluscs, crabs, typically to the advantage of both |
| tasselled | buds on the end of filaments in the genus *Tethya* |
| thick encrusting | spreading over substratum, more than about 20 mm thick |
| thin encrusting | spreading over substratum, less than about 5 mm thick |
| tough | requires considerable pressure to compress sponge, difficult to tear, tough as old boots |
| tracts | groups of silica spicules emerge from the base of the sponge, sometimes diverging at the surface to form brushes |
| translucent | lets light through body wall or surface of organism, but not enough to perceive distinct details through it. |
| tree | stem giving rise to branches that divide, often with a condensed axis, arborescent |
| tube | hollow erect cylinder |
| tube cluster | cluster of hollow erect cylinders with a common base |
| tubercles | see 'warty' |
| turbinate | see 'bowl' |
| turrets | bearing hollow cones which can be blind (inhalant) or open (exhalent), fistules |
| twiggy | main skeleton tendril-like with short branches that do not re-join, dendritic |
| wall | underwater cliffs and slopes, organisms exposed to wave surge and currents, and subdued illumination |
| warty | bearing small flattened bumps or tubercles |
| whip | erect and tapering, usually with a condensed axis, flagelliform |
| widespread | species recorded globally |

# acknowledgements

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The majority of the photographs used in this guide were taken by Nicola Rush and her seven year old son, Lewis Murray. Images in the Introduction are used with permission: seamount sponges (from epibenthic sled, NIWA); giant masking crab and sponge friend (Debbie Freeman); general sponge body plan (redrawn from Bergquist, 1978, fig. 1.2d); *Tethya burtoni* budding (Crispin Middleton); astrophorid sponge budding (Crispin Middleton); young sponges in *Tethya fastigata* (Lori J. Bell, CRRF); *Tethya bergquista*e budding (Crispin Middleton); example of a calcareous sponge (Class Calcarea) from Port Pegasus, Stewart Island (Debbie Freeman); example of a glass sponge (Class Hexactinellida) from the continental shelf off the Bay of Islands (DTIS, NIWA); example of a demosponge (Class Demospongiae) from a rocky reef off Northland (Crispin Middleton); *Latrunculia procumbens* with elevated sieve-pores (Tony Breen, Tauranga); *Raspailia topsenti* with a tree-like skeleton (Patrick L. Colin).

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