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A guide to common **deepsea invertebrates** in New Zealand waters

Third edition

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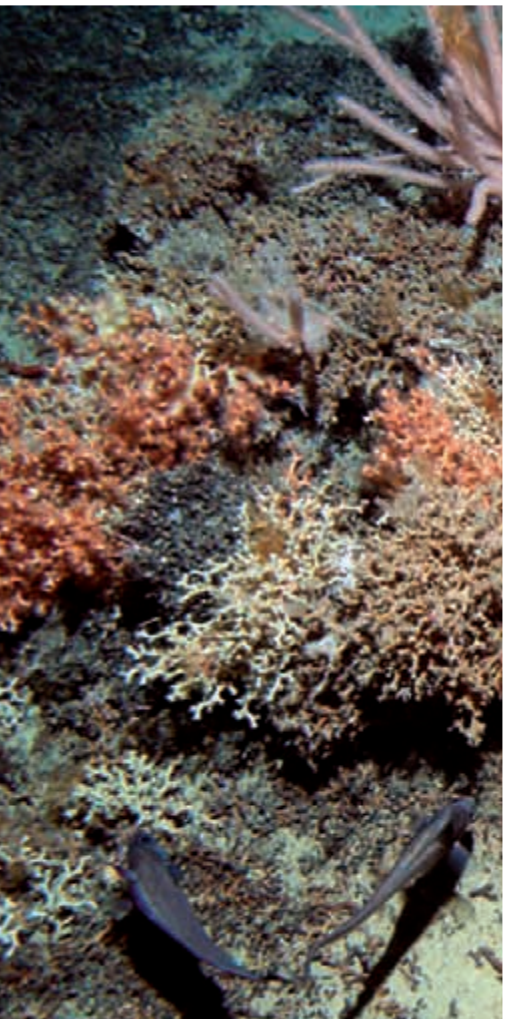

A guide to common deepsea invertebrates in New Zealand waters

Third edition

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PREFACE

Worldwide, fisheries managers are addressing concerns about the effects of fishing, not only on fish stocks, but also on other species caught incidentally during fishing, particularly those that live on the sea floor. Although these organisms are not part of New Zealand's Quota Management System, catch records of all species are recorded whenever possible by Ministry of Fisheries observers and scientists during commercial fishing trips and research surveys. Since 2004, the Ministry of Fisheries has published pictorial field identification guides for deepsea invertebrates, offshore crabs, and bryozoans. In addition three guides to fishes have been produced for common species caught by surface fishing, common species caught by bottom and midwater fishing, and less common species caught by bottom and midwater fishing[1]. The guides enable fishers, observers and researchers to recognise our marine species more readily, and to improve the quality of catch records of these species.

We are pleased to announce the publication of the third edition of the Guide to Common Deepsea Invertebrates, which updates and expands the 2007 guide (which in turn amalgamated and updated the original (2004) deepsea invertebrate and offshore crab guides). The Guide to Common Deepsea Invertebrates in New Zealand Waters (Third Edition) updates identification information for over 35 taxa (the term taxa includes both species and organisms identified to a higher taxonomic level) and incorporates a further 33 taxa. Identification sheets are provided for 236 invertebrate taxa, each with a colour image and a description of the key diagnostic features. Taxonomic experts have had direct input to each section to provide up-to-date knowledge. Most of the taxa in the guide are commonly encountered when trawling in water depths of more than 200 m.

The updated guide continues to build on the knowledge and expertise gained by marine scientists during the last 30 years of research in New Zealand waters. With more accurate identification, trends in the capture and distribution of incidental bycatch can be better monitored.

The recently completed ten year global research programme Census of Marine Life found that "The number of [ID] guides was significantly and positively correlated with the state of knowledge and species richness in a given country" (Costello et al 2010)[2] . Thus, the ongoing development of accessible identification guides is an important step towards the goal of a maintaining a healthy aquatic environment.

Pamela Mace
Chief Scientist
Ministry of Fisheries, October 2011

[1]The Department of Conservation has also commissioned a Deepwater Coral Guide that is available at: http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/fishing/coral-id-guide-updated.pdf

[2]Costello MJ, Coll M, Danovaro R, Halpin P, Ojaveer H, et al. (2010) A Census of Marine Biodiversity Knowledge, Resources, and Future Challenges. PLoS ONE 5(8): e12110. doi:10.1371/journal.pone.0012110

PURPOSE OF THE GUIDE

In New Zealand, invertebrates caught on or close to the seabed (termed 'benthic' in this guide) are identified and weighed by observers or researchers on board commercial and research trawlers. Because identification can be difficult, recording of the invertebrate catch while at sea has been variable, and specimens of many species have had to be retained for later examination by experts ashore.

This guide will enable observers and researchers to more readily identify the more common organisms while at sea, thereby streamlining the process of recording bycatch species. Over 180 benthic invertebrate taxa caught in New Zealand waters are included in the guide (Table 1). The guide provides images of each taxon, written descriptions of the main diagnostic features and details that will assist users to distinguish specimens from similar or closely related organisms. Although the descriptions provided have been checked by taxonomic experts, the guide does not replace formal taxonomic texts.

STRUCTURE OF THE GUIDE

The first section 'Phyla at a glance and group codes' provides a general anatomical description of each phylum and provides representative images of typical phylum species (pages 9–18). This will assist users to distinguish the phyla, as well as their classes and orders, and to place organisms in the correct higher taxon. The phyla description section is followed by a reference table (Table 1) which lists all taxa included in the guide. The group codes are used when identification to a low level is not possible.

Phyla in Table 1 and the identification sheets are arranged in conventional phylogenetic order, from structurally and anatomically less advanced groups (sponges), to the more advanced (echinoderms and tunicates). Each phylum is colour coded.

The identification sheets assume some prior biological knowledge. General notes on some morphological components used for identifying species within a taxon are provided where necessary. Each sheet contains the following information:

- Standard taxonomic hierarchy of the organism
- Scientific and common name
- 3-letter Ministry of Fisheries code
- Illustration (line drawing or photograph)
- Distinguishing features
- Colour
- Size
- Distribution
- Depth
- Similar species
- References

INSTRUCTIONS FOR COLLECTION AT SEA

The intention of the guide is to assist in the identification of the common deepsea benthic fauna in the New Zealand region. **If you are not confident that you can identify the organism to species, genus, or family level, (i.e. guide sheet level), then we encourage the use of the codes provided in the** Phyla At A Glance **section (pages 9–18), and retain the specimen for identification ashore.**

Specimens should be retained under the following circumstances:

- identification beyond phylum level is uncertain
- the specimen has been caught outside the given depth range or distribution
- they have been specifically requested by the Ministry of Fisheries

If samples or subsamples are retained, they should be preserved according to the facilities and materials available, and the following instructions should be followed.

Handling instructions: observers

- Place the benthic sample or a representative sub-sample of the organism in a plastic bag, separating the groups/species (particularly the sponges).
- On a waterproof label write in pencil: Area, trip number, station number or tow/set, Observer Benthic Materials MFish Sample ID (to match the ID on the form), and MFish Species Code and put **inside** the bag. If a sub-sample is being collected please write subsample on the Benthic Materials Form and provide the estimated total weight of the organism(s)
- Freeze immediately. If the organism is fragile (e.g., a coral, crab or prawn), freeze animal in bag with enough seawater that the animal is covered. Dead shells are not to be recorded on catch forms, but specimens can be retained for taxonomists if requested.

Please follow the Transport Instructions in the MFish Observer Manual, and send by frozen freight to: Collections Manager, NIWA, 301 Evans Bay Pde, Greta Pt, Kilbirnie, Wellington.

Note: Check the Observer Manual for instructions regarding specific project requests for samples by DOC or MFish. In some projects, the destination of samples may be different from the address given above.

Handling instructions: researchers

Freeze benthic organisms (as above), or, if chemicals are available, carry out instructions for the relevant animal groups as described below. Use plastic containers large enough to avoid crowding the specimen, at least 5:1 volume of liquid. If large numbers of an organism are requested, freeze in bulk.

Different fixation and preservation methods are used depending on the purpose, e.g., samples for DNA analysis must be frozen or preserved in ethanol. For taxonomic work, initially use 5-10% buffered formalin as a fixative (10% formalin = 4% formaldehyde solution) or 95+ % ethanol (EtOH) as a direct preservative. Use a liquid volume at least 5-10 times that of the animal because water released from the body and tissues of the animal will dilute the fixative or preservative. For large specimens, use a syringe or knife to help fixative or preservative penetrate the tissue. Material for DNA studies should be frozen or preserved and stored in 95+ % ethanol. Specimens fixed in formalin are mostly unusable for DNA studies.

- Cnidaria
  Scleractinians, seafans, black corals, hydrocorals, sea pens, soft corals – fix and preserve in 75% ethanol. For large amounts, freeze all and/or a sub-sample, e.g., if there are 30 kg of stony branching corals (CBR) keep one carton. If organism appears dead still record code and weight on catch forms; dead specimens can be retained for taxonomists. Coral that appears rubble like but comprises both dead and alive pieces would ideally be recorded using the most appropriate code (by species if possible, otherwise using an MFish group code such as SIA, CBR or CUP).
  Anemones – place anemone in a bucket of seawater, add 2-3 menthol crystals. Keep in bucket for 24 hrs. Once anemone is relaxed, remove from seawater and fix in 10% formalin (it is essential to inject the body cavity) and store in 75% ethanol or 10% formalin. More than one specimen can go in a bucket, keeping each specimen in a separate bag with holes to enable fixing.

- Annelida
  Bristle worms, sea worms – fix in 10% formalin and store in 75% ethanol
- Mollusca
  Shelled forms, including chitons – freeze
  Sea slugs – fix in 10% formalin and store in 5% ethanol
  Octopus and squid – fix in 10% formalin (essential to inject body cavity!) and store in 75% ethanol
- Arthropoda
  Prawns, lobsters, barnacles, isopods, amphipods, sea spiders – fix and store in 75% ethanol (replace after a couple of days)
- Echinodermata
  Sea-stars, brittle stars, sea urchins, sea cucumbers, feather stars, sea lilies – preserve in 75% ethanol
- Tunicata
  Ascidians or sea squirts – Colonial: relax in seawater with a pinch of menthol crystals, then fix in 10% formalin, – Solitary: fix in 10% formalin

PROTECTED SPECIES: see page 58.

ACKNOWLEDGMENTS

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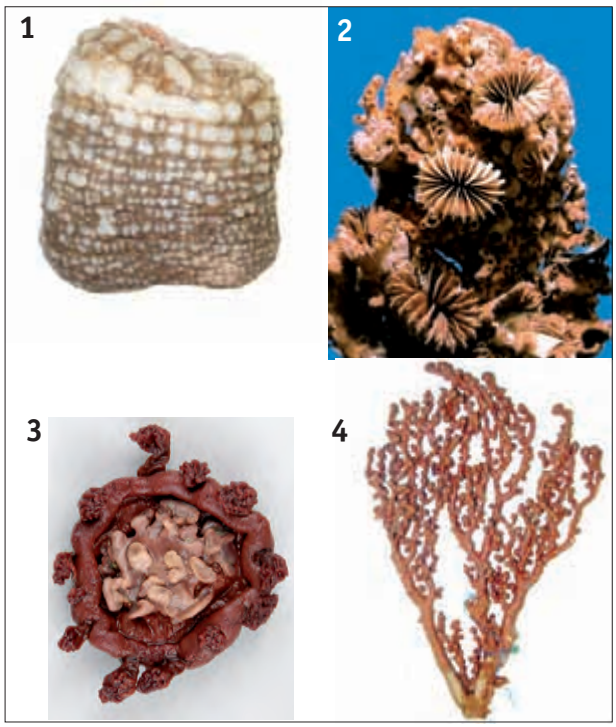
Phyla at a glance and group codes

PHYLUM	Porifera
COMMON NAME	Sponges (ONG)
CLASSES	Demospongiae (DSO), Hexactinellida (GLS), Calcareous

Sessile (attached) growth forms spongy or stony to the touch, some with obvious glass splinter-like spicules. Can be encrusting, tubular, trumpet- or fan-shaped, massive mounds, spherical, stalked, or branching, ranging in size from tiny (5–10 cm) to huge (several metres long). Many are like fibre-glass strands. The sponge body has no obvious animal features and is often mistaken for a plant. It is typically composed of a skeleton of siliceous (occasionally calcareous) spicules (glass-like fragments) that may be embedded in hard collagen (spongin) fibres.



PHYLUM	Cnidaria
COMMON NAME	Corals (COU), anemones (ANT)
CLASS	Anthozoa

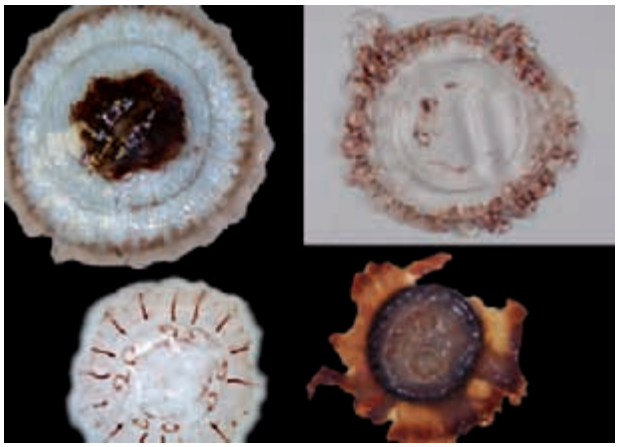
Large solitary polyps, and almost always attached. Soft forms include anemones ANT (1). Corals are a very diverse group. Stony corals (2) (SIA) have a calcareous skeleton that has radii (vertical plates radiating from the center); there are solitary and colonial species. Octocorals have polyps with 8 pinnate (feathery) tentacles. Some species are encrusting (stoloniferous), soft (SOC) (3) and mounded (e.g., Alcyoniidae), others are quill-like and embedded in sand or mud as a feathery stem (sea pens PTU), or erect and branching and very hard (gorgonians GOC) (4).

COMMON NAME	Hydroids (HDF) & Hydrocorals (COR)
CLASS	Hydrozoa

Small to moderate-sized coral-like forms, mostly colonial and generally attached, consisting of runners (attached to shells and rocks) with erect single or branching stems bearing tiny polyps. Some calcified hydroids e.g. hydrocorals of the family Stylasteridae, with microscopic polyps (right hand photo) resemble stony corals.

COMMON NAME	Jellyfish (JFI)
CLASS	Scyphozoa

Large medusae, comprising a jelly-like disk (umbrella) with the mouth and tentacles underneath. Most are free-swimming.

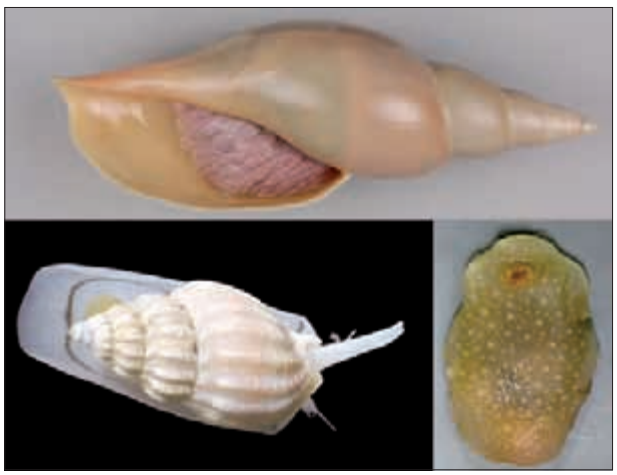


PHYLUM	Annelida
COMMON NAME	Bristle worms, sea worms (POL)
CLASS	Polychaeta

The body is segmented and each segment bears a pair of paddle-like appendages with bristles, hence polychaeta (many bristles). At the head end there may be tiny eyes, sensory antennae, and tentacles that can be short and stubby or very long or fan-like. May live in burrows or tubes, or be free-living.

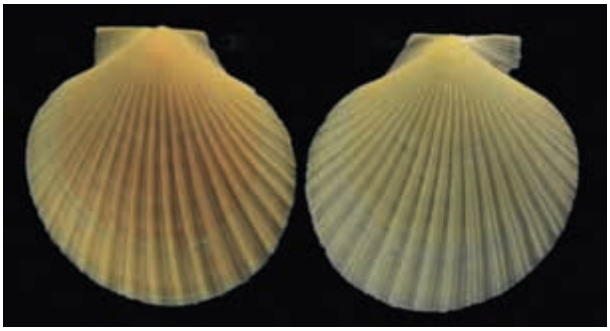
PHYLUM	Mollusca
COMMON NAME	Snails, sea slugs (GAS)
CLASS	Gastropoda

Soft-bodied creatures with a broad, flat creeping sole or foot, generally protected with a well developed shell of one piece (often coiled, top & left image). The shell may be completely lacking or small and concealed within the body (sea slugs, right).



COMMON NAME	Chitons (CHT)
CLASS	Polyplacophora

Characteristically the shell is divided into 8 overlapping plates. Bilaterally symmetrical with an ovoid body with no eyes or tentacles on the tiny head.



COMMON NAME	Mussels, clams, oysters (BIV)
CLASS	Bivalvia

Laterally compressed with two shells, hinged dorsally, that completely enclose the body in most species. Burrowing bivalve species have a tongue-like foot and long muscular suction tubes or siphons.

COMMON NAME	Tusk shells (SPH)
CLASS	Scaphopoda

Deepwater molluscs with a distinctive tapering shell that has a hole at each end. The shell is cylindrical and shaped like an elephant's tusk. Some species grow up to 60 mm in length.

COMMON NAME	Squid (SQX), octopus (OCP)
CLASS	Cephalopoda

Squids (top) have an elongate, torpedo-like body with, 8 arms and 2 tentacles. Arms have 2 or more rows of stalked suckers with rings and/or hooks running the entire length; tentacles have 2 or more rows of suckers and/or hooks at the distal end. Octopuses (bottom) have a short globular sac-like body and 8 arms (no tentacles) with unstalked suckers along their length.

PHYLUM	Arthropoda
COMMON NAME	Sea spiders (PYC)
CLASS	Pycnogonida

Pycnogonids resemble spiders. The body is much reduced with 8–12 legs. The head has an obvious proboscis (feeding tube) with adjacent appendages, a pair of which is used by males to carry egg masses.

COMMON NAME	Krill (EUP)
CLASS	Malacostraca
ORDER	Euphausiacea

Shrimp-like plankton about 3 cm long. A shell-like carapace extends behind the head and forward as a rostrum, below which is a pair of stalked compound eyes. Unlike true shrimps, the sides of the carapace do not tightly enclose the gills.

COMMON NAME	Sea slaters (ISO)
CLASS	Malacostraca
ORDER	Isopoda

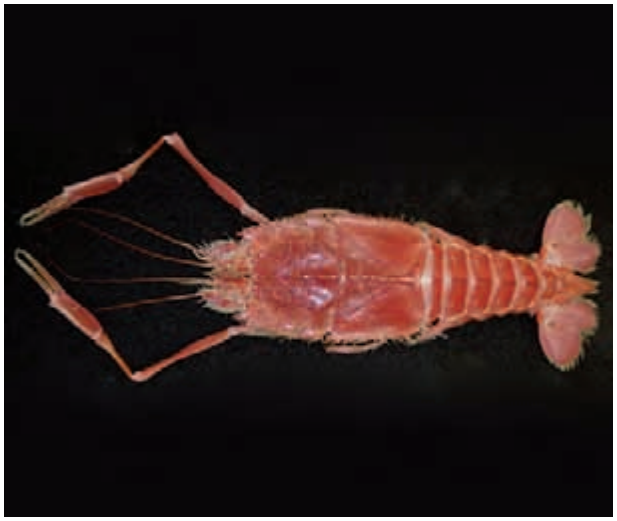
Flattened body with a shield-shaped head and no carapace. Most legs appear similar in shape and size. There are many parasitic forms (e.g., fish lice). Small to 2–5 cm long, although a few species are much larger.

COMMON NAME	Sand hoppers (APH)
CLASS	Malacostraca
ORDER	Amphipoda

Body laterally compressed (compared with isopods) and antennae often relatively long, giving a shrimp-like appearance. There is no carapace. Generally 1 cm long or less (a few species are larger).

COMMON NAME	Shrimps, prawns (NAT)
CLASS	Malacostraca
ORDER	Decapoda

Carapace well developed, often with a long rostrum. Five pairs of legs, of which any of the first 2 or 3 pairs may be large and chelate (clawed). Shrimps and prawns are often called natant decapods, (i.e. able to swim).



COMMON NAME	Deep-sea blind lobsters (PLY)
CLASS	Malacostraca
ORDER	Decapoda

All legs, or the first four pairs, have pincers; these are long and slender on the first pair and small and short on the rest. Elongate, flat-topped cephalothorax (fused head and thorax), bordered with sharp spines. Rostrum (projection, often spinelike, at front of head) small, often with two spines. Eyes represented by pigment-free points at the front of carapace.

COMMON NAME	Rock lobster (CRA), Packhorse rock lobster (PHC)
CLASS	Malacostraca
ORDER	Decapoda

Rostrum small. Frontal horns over eyes. Large spiny antennae (sensory organs at front of head) and spiny carapace (hard covering over head and thorax). Pincers on females only — small and on last pair of legs. Photo is of packhorse lobster.

COMMON NAME	Slipper (shovel-nosed) lobsters (SLL)
CLASS	Malacostraca
ORDER	Decapoda

Rostrum very reduced. Second antennae modified to a hinged series of five, flat plates. Pincers on females only — small and on last pair of legs. Carapace flattened and often with strong spines on margins. Eyes are small.

COMMON NAME	Clawed lobsters, scampi (SCI)
CLASS	Malacostraca
ORDER	Decapoda

Cylindrical carapace with well developed rostrum. First 3 pairs of legs clawed; first pair in the form of heavy chelipeds (legs with chelae or pincers).

COMMON NAME	True crab (true crabs) (CRB)
CLASS	Malacostraca
ORDER	Decapoda

Abdomen (segment behind or under thorax) reduced and tightly flexed beneath thorax (middle part of body behind head). First legs in form of heavy chelipeds (having large claws); third legs never chelate. Eyes on the outside of second antennae.

COMMON NAME	King crab (lithodid crabs) (KIC)
CLASS	Malacostraca
ORDER	Decapoda

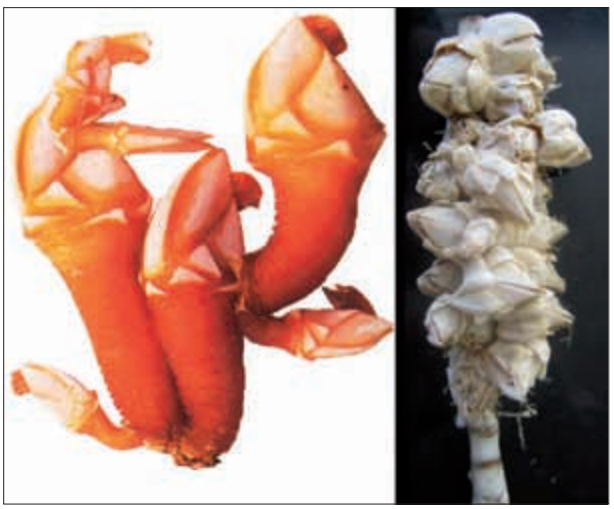
Abdomen asymmetrical (in females only) and flexed under thorax. First legs in the form of heavy chelipeds (claws); third legs never chelate. Appear to have only four pairs of legs because the fifth legs are much reduced and turned under the body. Eyes between antennae.

COMMON NAME	Hermit crab (hermit crabs) (PAG)
CLASS	Malacostraca
ORDER	Decapoda

Abdomen asymmetrical and housed within a gastropod shell or anemone or folded beneath the carapace. First pair of legs are chelipeds.

COMMON NAME	Barnacles (BRN)
CLASS	Maxillopoda
ORDER	Thoracica

There are stalked (goose barnacles), left photo, and non-stalked (acorn barnacles), right photo. The mantle surface (soft outer wall) of any barnacle bears at least 5 major plates, which are pulled together for protection.



PHYLUM	Sipuncula
COMMON NAME	Peanut worms (SIP)

Unsegmented and rigid worm-like body divided into a narrow anterior section containing the mouth, surrounded by a fringe of tentacles, and a large posterior trunk. Gut is U-shaped, and the anus opens as a tiny pore in the anterior part of the body.

PHYLUM	Echiura
COMMON NAME	Spoon worms (EHI)

Unsegmented and soft, sausage-shaped body, with a scoop-like process (proboscis) at the head end; proboscis may be rather flattened and cannot be retracted into the trunk. The anus is at the posterior end of the body.

PHYLUM	Priapulida
COMMON NAME	Penis worms (PDL)

Elongate, with a retractable proboscis and extended trunk region. The proboscis is wider and ornamented with rib-like papillae (small protuberances) and minute thorn-like spines. The trunk is covered with small spines or tubercles and is externally (not internally) segmented. There are 1 or 2 branched tail-like processes.

PHYLUM	Bryozoa
COMMON NAME	Moss animals, sea mats, lace corals (COZ)

A very diverse group, forming colonies of tiny box- or tube-like individual zooids. Colonies may be a few centimetres in height or diameter, being erect and bushy, flat and encrusting, large and lacy, or coral-like. Individual zooids rarely exceed 1 mm in length.

PHYLUM	Brachiopoda
COMMON NAME	Lamp shells (BPD)

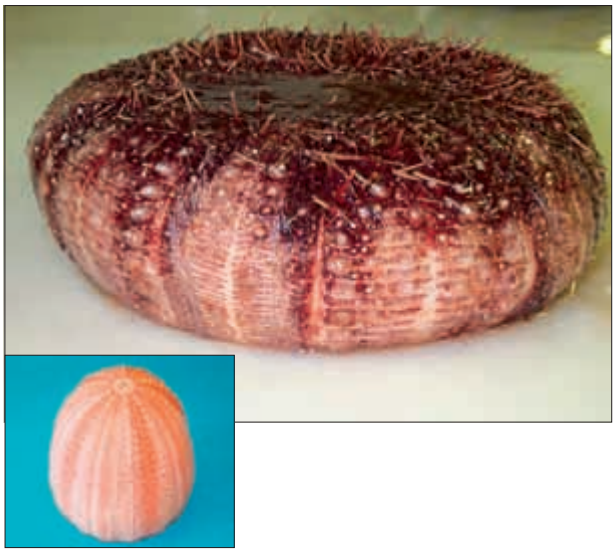
Resemble bivalve molluscs, but the valves enclose the body dorsally and ventrally rather than laterally (from the side). Ventral valve typically larger than the dorsal, unlike most clams which have two equal valves. Each valve is bilaterally symmetrical and may be ornamented with concentric (with a common center) growth lines and a fluted or spiny surface. Attached species have a short stalk emerging from the hinge area of the valves.

PHYLUM	Echinodermata
COMMON NAME	Sea stars (ASR)
CLASS	Asteroidea

Star-shaped, free-moving echinoderms with prominent rays or arms projecting from a central area and usually covered with calcareous plates and spines. Arm usually wider at the base, merges into the disc (in contrast to ophiuroids). At least 5, and often many more, arms and in some species these may be so short that the body appears pentagonal.

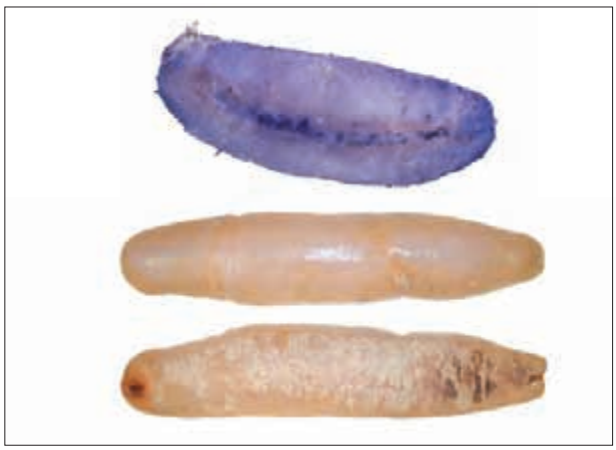
COMMON NAME	Brittle stars, basket stars (OPH)
CLASS	Euryalida

Extremely long, slender flexible arms, clearly differentiated from the central disc. The arms are much branched in basket stars.



COMMON NAME	Sea urchins (ECN)
CLASS	Echinoidea

Body called a test, covered with spines and without arms. Circular or oval and the test often spherical. Irregular echinoids, such as the sand dollars and heart urchins, are flattened and have much smaller and far more numerous spines.



COMMON NAME	Sea cucumbers (HTH)
CLASS	Holothuroidea

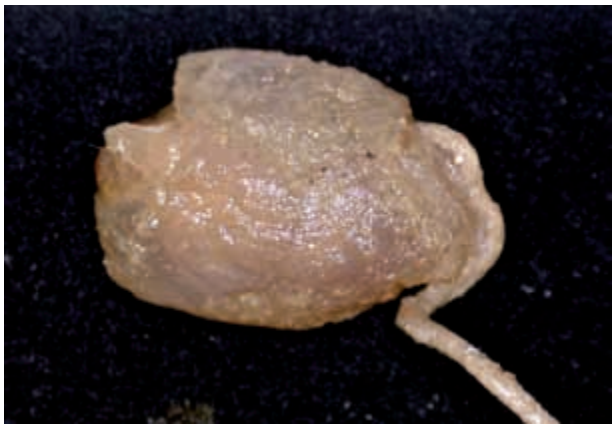
Elongated cylindrical body with a circle of tentacles around the mouth. There is no obvious calcareous skeleton (unlike sea urchins). Instead, microscopic calcareous elements called spicules are embedded in the skin; a few species have spicules in dense numbers and can be very firm.

COMMON NAME	Feather stars and sea lilies (CRN)
CLASS	Crinoidea

Free-living or attached by a stalk with root-like processes to the substratum. Arms are pinnately branched (feather-like). In contrast to other echinoderms, the mouth faces upwards.

PHYLUM	Tunicata
COMMON NAME	Tunicates, sea squirts (ASC)
CLASS	Ascidiacea

Attached, colonial or solitary. One end is attached to the substratum and the other contains two openings that may be extended as separate siphons. Body feels gelatinous or leathery and has a basket shape. Colonial forms can resemble sponges (or even encrusting bryozoans); tunicate individuals can be recognised by their small siphonal openings.



COMMON NAME	Salps (SAL)
CLASS	Thaliacea

Salps may be solitary or colonial, are gelatinous, transparent, free-swimming and planktonic. Siphons are at opposite ends of body (cf. tunicates).

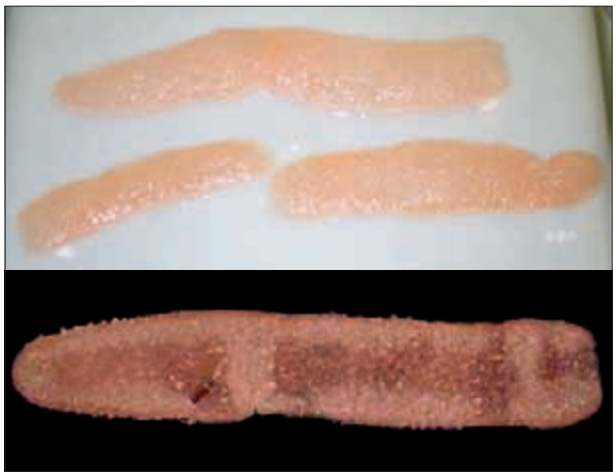


Table 1: Full list of taxa in guide

Table 1: Summary of the 204 taxa included in this guide. Phyla are arranged in conventional phylogenetic order and then within phyla, the table is sorted alphabetically by class/order (suborder for natant decapods), then family, then species name.
s, species; g, genus; f, family; f+, several families; c, class; o, order; n, natant decapods.

	Class or Order	Family	Common Name	Scientific name	Mfish code	Page
PORIFERA (sponges)	Demospongiae (c)	Ancorinidae	Knobbly sandpaper sponge (s)	*Ecionemia novaezelandiae*	ANZ	32
	Demospongiae (c)	Ancorinidae	Golden brown crater sponge (s)	*Penares* sp.	PNR	33
	Demospongiae (c)	Ancorinidae	Pink ice egg sponge (s)	*Rhabdastrella* sp.	RHA	34
	Demospongiae (c)	Ancorinidae	Orange fat finger sponge (s)	*Stelletta* sp.	SLT	35
	Demospongiae (c)	Geodiidae	Curling stone sponge (s)	*Geodia regina*	GRE	36
	Demospongiae (c)	Geodiidae	Ostrich egg sponge (s)	*Geodia vestigifera*	GVE	37
	Demospongiae (c)	Geodiidae	Rocky dumpling sponge (s)	*Pachymatisma* sp.	PAZ	38
	Demospongiae (c)	Pachastrellidae	Fibreglass cup sponge (s)	*Poecillastra laminaris*	PLN	39
	Demospongiae (c)	Pachastrellidae	Yoyo sponge (s)	*Thenea novaezelandiae*	THN	40
	Demospongiae (c)	Irciniidae	Rubber sponge (s)	*Psammocinia* sp.	PHW	41
	Demospongiae (c)	Suberitidae	Fleshy club sponge (s)	*Suberites affinis*	SUA	42
	Demospongiae (c)	Callyspongiidae	Airy finger sponge (s)	*Callyspongia* sp.	CRM	43
	Demospongiae (c)	Corallistidae	Smooth white cup sponge (s)	*Corallistes fulvodesmus*	CFU	44
	Demospongiae (c)	Scleritodermiidae	Pimpled ear sponge (s)	*Aciculites pulchra*	APU	45
	Demospongiae (c)	Coelosphaeridae	Floppy chocolate plate sponge (s)	*Lissodendoryx bifacialis*	LBI	46
	Demospongiae (c)	Crellidae	Orange frond sponge (s)	*Crella incrustans*	CIC	47
	Demospongiae (c)	Hymedesmiidae	Grey fibrous massive sponge (s)	*Phorbas* sp.	PHB	48
	Demospongiae (c)	Tetillidae	Bristle ball sponge (s)	*Tetilla australe*	TTL	49
	Demospongiae (c)	Tetillidae	Furry oval sponge (s)	*Tetilla leptoderma*	TLD	50
	Hexactinellida (c)		Glass sponges (c)	Hexactinellida	GLS	51
	Hexactinellida (c)	Farreidae	Lacey honeycomb sponges (g)	*Farrea* spp.	FAR	52
	Hexactinellida (c)	Euplectellidae	Basket-weave horn sponge (s)	*Euplectella regalis*	ERE	53
	Hexactinellida (c)	Rossellidae	Floppy tubular sponge (s)	*Hyalascus* sp.	HYA	54
CNIDARIA (anemones, corals, jellyfish, hydroids)	Actiniaria (o)	Actiniidae	Deepsea anemones (g+)	*Bolocera* spp.	BOC	59
	Actiniaria (o)	Actinostolidae	Smooth deepsea anemones (f)	Actinostolidae	ACS	60
	Actiniaria (o)	Hormathiidae	Warty deepsea anemones (f)	Hormathiidae	HMT	61
	Actiniaria (o)	Liponematidae	Deepsea anemones (g)	*Liponema* spp.	LIP	62
	Alcyonacea (o)	Alcyoniidae	Gigantic coral (s)	*Anthomastus (Bathyalcyon) robustus*	ARO	63
	Alcyonacea (o)	Clavulariidae	Long polyp soft corals (g)	*Telesto* spp.	TLO	64
	Antipatharia (o)		Black corals (o)	Antipatharia	COB	65
	Antipatharia (o)	Leiopathidae	Black coral (g)	*Leiopathes secunda*	LSE	66
	Corallimorpharia (o)	Corallimorphidae	Coral-like anemones (f)	Corallimorphidae	CLM	67
	Gorgonacea (o)	Coralliidae	Precious corals (g+)	*Corallium* spp.	CLL	68
	Gorgonacea/ Calcaxonia (o)	Chrysogorgiidae	Golden corals (g+)	*Chrysogorgia* spp.	CHR	69
	Gorgonacea/ Calcaxonia (o)	Isididae	Bamboo corals (f)	Isididae	ISI	70
	Gorgonacea/ Calcaxonia (o)	Isididae	Bushy bamboo coral (g)	*Acanella* spp.	ACN	71
	Gorgonacea/ Calcaxonia (o)	Isididae	Branching bamboo coral (g)	*Keratoisis* spp.	BOO	72
	Gorgonacea/ Calcaxonia (o)	Isididae	Bamboo coral (g+)	*Lepidisis* spp.	LLE	73

Gorgonacea/ Calcaxonia (o)	Isididae	Worm-commensal bamboo coral (g)	*Minuisis* spp.	MIN	74
Gorgonacea (o)	Paragorgiidae	Bubblegum coral (s)	*Paragorgia arborea*	PAB	75
Gorgonacea (o)	Plexauridae	Plexaurid sea fans (f)	Plexauridae	PLE	76
Gorgonacea (o)	Primnoidae	Primnoid sea fans (f)	Primnoidae	PRI	77
Gorgonacea (o)	Primnoidae	Primnoa sea fans (g)	*Primnoa* spp.	PMN	78
Gorgonacea (o)	Primnoidae	Bottlebrush coral (g)	*Thouarella* spp.	THO	79
Hydroida (o)	Stylasteridae	White hydrocoral (s)	*Calyptopora reticulata*	CRE	80
Hydroida (o)	Stylasteridae	Red hydrocorals (g)	*Errina* spp.	ERR	81
Hydroida (o)	Stylasteridae	Spiny white hydrocorals (g)	*Lepidotheca* spp.	LPT	82
Pennatulacea (o)	Pteroeididae	Siboga sea pen (s)	*Gyrophyllum sibogae*	GYS	83
Pennatulacea (o)	Pennatulidae	Purple sea pen (g)	*Pennatula* spp.	PNN	84
Scleractinia (o)	Caryophylliidae	Carnation cup coral (g)	*Caryophyllia* spp.	CAY	85
Scleractinia (o)	Caryophylliidae	Crested cup coral (s)	*Desmophyllum dianthus*	DDI	86
Scleractinia (o)	Caryophylliidae	Bushy hard coral (s)	*Goniocorella dumosa*	GDU	87
Scleractinia (o)	Caryophylliidae	Deepwater branching coral (g+)	*Solenosmilia variabilis*	SVA	88
Scleractinia (o)	Caryophyliidae	Solitary bowl coral (s)	*Stephanocyathus platypus*	STP	89
Scleractinia (o)	Dendrophylliidae	Deepwater branching coral (g+)	*Enallopsammia rostrata*	ERO	90
Scleractinia (o)	Flabellidae	Flabellum cup corals (g)	*Flabellum* spp.	COF	91
Scleractinia (o)	Oculinidae	Madrepora coral (g)	*Madrepora oculata*	MOC	92
Scleractinia (o)	Oculinidae	Deepwater branching coral (g+)	*Oculina virgosa*	OVI	93
Zoantharia (o)		Zoanthids (f+)	Zoantharia	ZAH	94
Zoantharia (o)	Epizoanthidae	Zoanthid anemone (o)	*Epizoanthus* spp.	EPZ	95

ANNELIDA (bristle worms, leeches)

Amphinomida (o)	Amphinomidae	Fire worm (s)	*Chloeia inermis*	CIM	101
Eunicida (o)	Eunicidae	Eunice sea-worm (s)	*Eunice* (undescribed)	EUN	102
Eunicida (o)	Onuphidae	Quill worm (g)	*Hyalinoecia tubicola*	HTU	103
Phyllodocida (o)	Aphroditidae	Sea mice (f)	*Aphrodita* spp.	ADT	104
Phyllodocida (o)	Polynoidae	Thermiphione scale-worm (g)	*Thermiphione* (undescribed)	THE	105

MOLLUSCA (snails, sea slugs, chitons, bivalves, octopus, squid, tusk shells)

Bivalvia (c)	Limidae	Giant file shell (s)	*Acesta maui*	AMA	111
Bivalvia (c)	Limidae	Acesta (g)	*Acesta saginata*	ASG	112
Bivalvia (c)	Pectinidae	Queen scallop (s)	*Zygochlamys delicatula*	QSC	113
Bivalvia (c)	Pectinidae	Scallop (f)	*Delectopecten fosterianus*	DFO	114
Bivalvia (c)	Pectinidae	Scallop (f)	*Veprichlamys kiwaensis*	VKI	115
Bivalvia (c)	Euciroidae	Euciroa (g)	*Euciroa galatheae*	EGA	116
Cephalopoda (c)	Octopodidae	Deepwater octopii (f)	*Benthoctopus* spp.	BNO	117
Cephalopoda (c)	Octopodidae	Yellow octopus (s)	*Enteroctopus zealandicus*	EZE	118
Cephalopoda (c)	Octopodidae	Deepwater octopus (s+)	*Graneledone* spp.	DWO	119
Cephalopoda (c)	Octopodidae	Octopus (g)	*Octopus* spp.	OCO	120
Cephalopoda (c)	Octopodidae	Common octopus (s)	*Pinnoctopus cordiformis*	OCT	121
Cephalopoda (c)	Opisthoteuthididae	Umbrella octopus (s)	*Opisthoteuthis* spp.	OPI	122
Cephalopoda (c)	Architeuthidae	Giant squid (g)	*Architeuthis* spp.	GSQ	124
Cephalopoda (c)	Chiroteuthidae	Chiroteuthid squid (f)	*Chiroteuthis veryani*	CVE	125
Cephalopoda (c)	Cranchiidae	Glass squid (f)	Cranchiidae	CHQ	126
Cephalopoda (c)	Histioteuthidae	Violet squid (g)	*Histioteuthis* spp.	VSQ	127
Cephalopoda (c)	Lepidoteuthidae	Scaled squid (s)	*Lepidoteuthis grimaldii*	LGR	128
Cephalopoda (c)	Loliginidae	Broad squid (s)	*Sepioteuthis australis*	BSQ	129
Cephalopoda (c)	Lycoteuthidae	Crowned firefly squid (s)	*Lycoteuthis lorigera*	LSQ	130

MOLLUSCA (snails, sea slugs, chitons, bivalves, octopus, squid, tusk shells)

Cephalopoda (c)	Mastigoteuthidae	Whip-lash squids (g)	*Mastigoteuthis* spp.	MSQ	131
Cephalopoda (c)	Octopoteuthidae	Octopoteuthis squid (g)	*Octopoteuthis* spp.	OPO	132
Cephalopoda (c)	Octopoteuthidae	Dana octopus squid (s)	*Taningia danae*	TDQ	133
Cephalopoda (c)	Ommastrephidae	Gould's arrow squid (s)	*Nototodarus gouldi*	NOG	134
Cephalopoda (c)	Ommastrephidae	Sloan's arrow squid (s)	*Nototodarus sloanii*	NOS	135
Cephalopoda (c)	Ommastrephidae	Ommastrephid squid (g)	*Ommastrephes* spp.	OMM	136
Cephalopoda (c)	Ommastrephidae	Todarodes squid (g)	*Todarodes filippovae*	TSQ	137
Cephalopoda (c)	Onychoteuthidae	Warty squid (g)	*Onykia* (formerly *Moroteuthis*) *ingens*	MIQ	138
Cephalopoda (c)	Onychoteuthidae	Warty squid (g)	*Onykia* (formerly *Moroteuthis*) *robsoni*	MRQ	139
Cephalopoda (c)	Pholidoteuthidae	Large red scaly squid (s)	*Pholidoteuthis massyae*	PSQ	140
Cephalopoda (c)	Sepiadariidae	Bobtail squids (o)	*Sepioloidea* spp.	SSQ	141
Cephalopoda (c)	Sepiolidae	Bobtail squids (o)	*Heteroteuthis dagamensis*	HES	142
Cephalopoda (c)	Sepiolidae	Bobtail squids (o)	*Stoloteuthis* (sometimes *Iridoteuthis*) *maoria*	IRM	143
Gastropoda (c)	Capulidae	Cap limpet (s)	*Malluvium calcareum*	MCC	144
Gastropoda (c)	Ranellidae	Tritons (f)	*Fusitriton magellanicus*	FMA	145
Gastropoda (c)	Buccinidae	Whelk (f+)	*Aeneator recens*	AER	146
Gastropoda (c)	Buccinidae	Knobbed whelk (s)	*Austrofusus glans*	KWH	147
Gastropoda (c)	Buccinidae	Whelk (f+)	*Penion chathamensis*	PCH	148
Gastropoda (c)	Turbinellidae	Pagoda shell (s)	*Coluzea mariae*	CMR	149
Gastropoda (c)	Turridae	Turrid (f)	*Comitas onokeana vivens*	COV	150
Gastropoda (c)	Volutidae	Volute (f)	*Alcithoe larochei*	ALL	151
Gastropoda (c)	Volutidae	Volute (f)	*Alcithoe wilsonae*	AWI	152
Gastropoda (c)	Volutidae	Golden volute (s)	*Provocator mirabilis*	GVO	153
Gastropoda (c)	Nudibranchia (o)	Sea slug, Nudibranch (o)	Nudibranchia	NUD	154
Gastropoda (c)	Calliostomatidae	Maurea (s)	*Calliostoma selectum*	CSS	155
Gastropoda (c)	Calliostomatidae	Top shell (f+)	*Calliostoma turnerarum*	CTN	156
Polyplacophora (c)	Polyplacophora (c)	Chiton (c)	Amphineura	CHT	157

ARTHROPODA (Isopods, amphipods, mysids, prawns, lobsters, crabs, barnacles, sea spiders)

Amphipoda (o)	Eurytheneidae	Amphipod (o)	*Eurythenes gryllus*	EUG	165
Decapoda (o)	Atelecyclidae	Pteropeltarion crab (s)	*Pteropeltarion novaezelandiae*	PNO	166
Decapoda (o)	Atelecyclidae	Frilled crab (s)	*Trichopeltarion fantasticum*	TFA	167
Decapoda (o)	Chirostylidae	Squat lobsters (f+)	*Gastroptychus* spp.	GAT	168
Decapoda (o)	Chirostylidae	Squat lobsters (f+)	*Uroptychus* spp.	URP	169
Decapoda (o)	Galatheidae	Squat lobsters (g)	*Munida* spp.	MNI	170
Decapoda (o)	Geryonidae	Red crab (s)	*Chaceon bicolor*	CHC	171
Decapoda (o)	Goneplacidae	Two-spined crab (s)	*Pycnooplax victoriensis*	CVI	172
Decapoda (o)	Goneplacidae	Policeman crab (s)	*Neommatocarcinus huttoni*	NHU	173
Decapoda (o)	Homolidae	Antlered crab (s)	*Dagnaudus petterdi*	DAP	174
Decapoda (o)	Homolidae	Carrier crab (s)	*Homola orientalis*	HOO	175
Decapoda (o)	Homolidae	Yaldwyn's crab (s)	*Yaldwynopsis spinimana*	YSP	176
Decapoda (o)	Inachindae	Dell's spider crab (s)	*Platymaia maoria*	PTM	177
Decapoda (o)	Inachindae	Deep-sea spider crab (s)	*Vitjazmaia latidactyla*	VIT	178
Decapoda (o)	Lithodidae	New Zealand king crab (s)	*Lithodes aotearoa*	LAO	179
Decapoda (o)	Lithodidae	Robertson's king crab (s)	*Lithodes robertsoni*	LRO	180
Decapoda (o)	Lithodidae	Brodie's king crab (s)	*Neolithodes brodiei*	NEB	181
Decapoda (o)	Lithodidae	Warty king crab (s)	*Paralomis dawsoni*	PDA	182
Decapoda (o)	Lithodidae	Prickly king crab (s)	*Paralomis zealandica*	PZE	183

Decapoda (o)	Majidae	Giant spider crab (s)	*Jacquinotia edwardsii*	GSC	184
Decapoda (o)	Majidae	Giant masking crab (s)	*Leptomithrax australis*	SSC	185
Decapoda (o)	Majidae	Garrick's masking crab (s)	*Leptomithrax garricki*	GMC	186
Decapoda (o)	Majidae	Long-handed masking crab (s)	*Leptomithrax longimanus*	LHC	187
Decapoda (o)	Majidae	Long-legged masking crab (s)	*Leptomithrax longipes*	LLC	188
Decapoda (o)	Majidae	Spiny masking crab (s)	*Teratomaia richardsoni*	SMK	189
Decapoda (o)	Nephropidae	Scampi (f)	*Metanephrops challengeri*	SCI	190
Decapoda (o)	Paguridae	Hermit crab (f+)	*Diacanthurus rubricatus*	DIR	191
Decapoda (o)	Palinuridae	Deepwater rock lobster (s)	*Projasus parkeri*	PPA	192
Decapoda (o)	Parapaguridae	Hermit crab (f+)	*Sympagurus dimorphus*	SDM	193
Decapoda (o)	Polychelidae	Deepsea blind lobster (s)	*Polycheles* spp.	PLY	194
Decapoda (o)	Portunidae	Dwarf swimming crab (s)	*Liocarcinus corrugatus*	LCO	195
Decapoda (o)	Portunidae	Hairy red swimming crab (s)	*Nectocarcinus antarcticus*	NCA	196
Decapoda (o)	Portunidae	Smooth red swimming crab (s)	*Nectocarcinus bennetti*	NCB	197
Decapoda (o)	Portunidae	Paddle crab (s+)	*Ovalipes catharus*	PAD	198
Decapoda (o)	Portunidae	Swimming crab (f)	*Ovalipes molleri*	OVM	199
Decapoda (o)	Scyllaridae	Prawn killer (s+)	*Ibacus alticrenatus*	PRK	200
Isopoda (o)	Aegidae	Fish biter (s)	*Aega monophthalma*	AMO	201
Isopoda (o)	Cymothoidae	Gill biter or tongue biter (f)	*Elthusa neocytta*	ENE	202
Isopoda (o)	Cymothoidae	Gill biter (s)	*Elthusa propinqua*	ELP	203
Isopoda (o)	Serolidae	Spiny serolid isopod (s)	*Brucerolis* spp.	ACU	204
Lophogastrida (o)	Gnathophausiidae	Giant red mysid (s)	*Neognathophausia ingens*	NEI	205
Decapoda (o)	Aristaeidae	Royal red prawn (s)	*Aristaeomorpha foliacea*	AFO	206
Decapoda (o)	Aristaeidae	Scarlet prawn (s)	*Aristaeopsis edwardsiana*	PED	207
Decapoda (o)	Aristaeidae	Gamba prawns (f)	*Austropenaeus nitidus*	ANI	208
Decapoda (o)	Campylonotidae	Sabre prawn (s)	*Campylonotus rathbunae*	CAM	209
Decapoda (o)	Glyphocrangonidae	Goblin prawn (g)	*Glyphocrangon* spp.	GLO	210
Decapoda (o)	Nematocarcinidae	Omega prawn (s)	*Lipkius holthuisi*	LHO	211
Decapoda (o)	Nematocarcinidae	Spider prawn (f)	*Nematocarcinus* spp.	NEC	212
Decapoda (o)	Oplophoridae	Subantarctic ruby prawn (s)	*Acanthephyra* spp.	ACA	213
Decapoda (o)	Oplophoridae	Scarlet prawn (s)	*Notostomus auriculatus*	NAU	214
Decapoda (o)	Oplophoridae	Deepwater prawns (s+)	*Oplophorus* spp.	OPP	215
Decapoda (o)	Pandalidae	Golden prawn (s)	*Plesionika martia*	PLM	216
Decapoda (o)	Pasiphaeidae	Deepwater prawn (s+)	*Pasiphaea aff. tarda*	PTA	217
Decapoda (o)	Penaeidae	Funchalia prawn (g)	*Funchalia* spp.	FUN	218
Decapoda (o)	Sergestidae	Sergestid prawn (f)	*Sergestes* spp.	SER	219
Decapoda (o)	Solenoceridae	Jack-knife prawn (s)	*Haliporoides sibogae*	HSI	220
Pantopoda (o)	Colossendeidae	Giant sea spiders (g)	*Colossendeis* spp.	PYC	221
Thoracica (o)	Scalpellidae	Stalked barnacle (f+)	Scalpellidae	SBN	222

BRYOZOA

Cheilostomata (o)	Phidoloporidae	Erect cheilostome bryozoan (s)	*Hippellozoon novaezelandiae*	HNO	227
Cyclostomata (o)		Erect cyclostome bryozoans (s+)	Cyclostomata	ECB	228

ECHINODERMATA

Asteroidea (c)	Brisingidae, Hymenodiscidae, Novodiniidae, Freyellidae	Armless stars (f+)	Brisingidae, Hymenodiscidae, Novodiniidae, Freyellidae	BRG	233
Asteroidea (c)	Asteriidae	Three-and-three stars (g)	*Allostichaster* spp.	ALH	234
Asteroidea (c)	Asteriidae	Cat's-foot star (s)	*Cosmasterias dyscrita*	CDY	235
Asteroidea (c)	Asteriidae	Sea-star (c)	*Pseudechinaster rubens*	PRU	236

Asteroidea (c)	Asteriidae	Cross-fish (s)	*Sclerasterias mollis*	SMO	237
Asteroidea (c)	Zoroasteridae	Rat-tail stars (g)	*Zoroaster* spp.	ZOR	238
Asteroidea (c)	Benthopectinidae	Sea-star (c)	*Benthopecten spp*	BES	239
Asteroidea (c)	Benthopectinidae	Sea-star (c)	*Cheiraster monopedicellaris*	CMP	240
Asteroidea (c)	Astropectinidae	Sea-star (c)	*Astromesites primigenius*	APM	241
Asteroidea (c)	Astropectinidae	Magnificent sea-star (s)	*Dipsacaster magnificus*	DMG	242
Asteroidea (c)	Astropectinidae	Abyssal star (s)	*Plutonaster knoxi*	PKN	243
Asteroidea (c)	Astropectinidae	Sea-star (c)	*Proserpinaster neozelanicus*	PNE	244
Asteroidea (c)	Astropectinidae	Geometric star (s)	*Psilaster acuminatus*	PSI	245
Asteroidea (c)	Radiasteridae	Sea-star (c)	*Radiaster gracilis*	RGR	246
Asteroidea (c)	Echinasteridae	Sea-star (c)	*Henricia compacta*	HEC	247
Asteroidea (c)	Goniasteridae	Pentagon star (s+)	*Ceramaster patagonicus*	CPA	248
Asteroidea (c)	Goniasteridae	Trojan star (s+)	*Hippasteria phrygiana*	HTR	249
Asteroidea (c)	Goniasteridae	Rock star (s)	*Lithosoma novaezelandiae*	LNV	250
Asteroidea (c)	Goniasteridae	Sladen's star (s)	*Mediaster sladeni*	MSL	251
Asteroidea (c)	Goniasteridae	Sea-star (c)	*Pillsburiaster aoteanus*	PAO	252
Asteroidea (c)	Odontasteridae	Pentagonal tooth-star (s)	*Odontaster benhami*	ODT	253
Asteroidea (c)	Pterasteridae	Sea-star (c)	*Diplopteraster* sp.	DPP	254
Asteroidea (c)	Pterasteridae	Sea-star (c)	*Hymenaster carnosus*	HYC	255
Asteroidea (c)	Solasteridae	Sun-star (f)	*Crossaster multispinus*	CJA	256
Asteroidea (c)	Solasteridae	Chubby sun-star (s)	*Solaster torulatus*	SOT	257
Crinoidea (c)		Feather stars (o)	Comatulida	CMT	258
Crinoidea (c)		Sea lilies with cirri (o)	Isocrinida	CRN	259
Crinoidea (c)		Sea lilies without cirri (o+)	Millericrinida, Cyrtocrinida	CRN	260
Echinoidea (c)	Cidaridae	Parasol urchin (s)	*Goniocidaris parasol*	GPA	261
Echinoidea (c)	Cidaridae	Umbrella urchin (s)	*Goniocidaris umbraculum*	GOU	262
Echinoidea (c)	Cidaridae	Cidaroid urchin (o)	*Ogmocidaris benhami*	OBE	263
Echinoidea (c)	Cidaridae	Cidaroid urchin (o)	*Stereocidaris* spp.	STC	264
Echinoidea (c)	Histocidaridae	Cidaroid urchin (o)	*Histocidaris* spp.	HIS	265
Echinoidea (c)	Histocidaridae	Cidaroid urchin (o)	*Poriocidaris purpurata*	PCD	266
Echinoidea (c)	Laganidae	Sand dollar (o)	*Peronella hinemoae*	PHI	267
Echinoidea (c)	Echinidae	Deepsea urchin (s)	*Dermechinus horridus*	DHO	268
Echinoidea (c)	Echinidae	Deepsea kina (s)	*Gracilechinus multidentatus*	GRM	269
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CNIDARIA
Phylum
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ECHINODERMATA
Phylum
TUNICATA

ID Sheets

Phylum PORIFERA

Sponges

Michelle Kelly
with input from Di Tracey

Phylum

PORIFERA

Sponges

There is a general perception that sponges are primitive animals because of their 'simple' body plan; they are multicellular, with specialised cells doing the job of tissues and organs in 'higher' animals. With the discovery of an immune system in sponges (the ability to recognise and differentiate 'self' from 'non-self') in the early 1900s, and the discovery of biologically active chemicals in sponges in the 1950s, a greater understanding of the cellular processes in higher organisms has emerged, and confirmation that sponges are 'smart' not simple! Sponges also frequently dominate shallow and deep sea environments (down to abyssal and hadal depths of several kilometres!), from the tropics to the poles, and they were dominant reef organisms in the past; their fossil record dates back to about 600 million years ago.

As the name Porifera implies, sponges are 'pore-bearers.' With the exception of glass sponges, most sponges are composed of three major cellular layers. The pinacoderm lines all external surfaces of the sponge body. The choanoderm, or feeding layer, is dominated by choanocytes (collared cells) that draw water, and hence nutrition, into the sponge via the aquiferous canal system. The pores (ostia) on the external surface of the sponge lead to the feeding chambers in the middle of the sponge, which then lead to one or two large exit pores (oscules) usually on the apex or sides of the sponge. The feeding cells have tail-like flagellae that whip in unison to draw a water current in through the aquiferous system. Any food particles that come in on the current are trapped by the feeding cells and then passed back to the mesohyl that lies between the pinacoderm and choanoderm and performs the various other functions of sponge life, including reproduction, nutrition, respiration, storage, and provision of skeletal support. Sponges reproduce by the sequential or synchronous production of eggs and sperm. The sperm arise from the feeding cells (which already have 'tails' for motility) and the eggs come from archaeocyte cells in the sponge mesohyl. Sponges can also bud and fragment to produce genetically identical 'clones'.

There are three major types of sponges: the demosponges (Class Demospongiae), the glass sponges (Class Hexactinellida), and the calcareous sponges (Class Calcarea). These groups are differentiated firstly on the mineral composition of the inorganic skeletal components and cellular organisation of the sponge body. Despite recent advances in the use of biochemical and molecular data, sponge classification is still very much in a state of flux, and the taxonomic relationships of sponges remain somewhat controversial, especially at the higher levels of Class and Order.

Class Demospongiae

Sponges in the largest class, the Demospongiae, have a skeletal network of opaline (siliceous) spicules, frequently supplemented or entirely replaced by spongin protein fibres. These sponges are extremely diverse, ranging from tiny delicate hydroid-like feathers to large round solid ball-shaped masses, with textures that range from stony (lithistid sponges) to woody (hadromerid and astrophorid sponges) to fleshy (poecilosclerid and dictyoceratid sponges) to fibrous and airy (haplosclerid sponges). The dominant colours are variations of carotinoid pigments (brown, orange, yellow, mustard, red, and black), but may also be green, blue and purple.

Class Hexactinellida

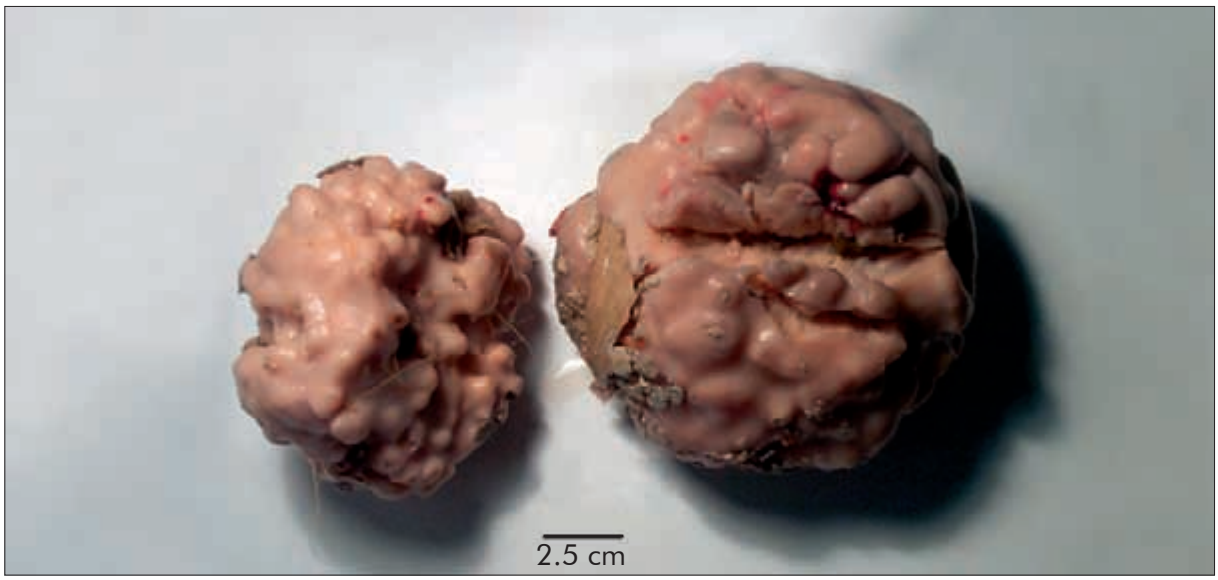
The Hexactinellida (glass sponges) are uniquely constructed of six-rayed opaline (siliceous) spicules and a non-cellular (syncytial) organisation, with extensive regions of multinucleate cytoplasm. These unusual sponges are characterised by their siliceous rather than fleshy nature; they often look and feel like baskets of woven strands of glass, mushy sacking, or gorgonian corals, and are rarely coloured, being typically whitish grey with occasionally a faint pink or beige tinge. They are most common in the deep sea attached by their hard stony base to hard substrate on seamounts, or rooted in fine mud with a basal mass of very hair-like spicules.

Class Calcarea

Calcareous sponges have calcitic (calcareous) spicules and are usually quite small and fragile. They are most obvious in relatively shallow tropical waters, and shallow protected temperate environments. Several distinctive species occur on coastal rocky reefs and harbours in New Zealand waters. They will not be considered further within this guide.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Astrophorida (sandpaper sponges)
Family Ancorinidae

Ecionemia novaezelandiae (Knobbly sandpaper sponge) (ANZ)



Distinguishing features: Roughly spherical sponge with a restricted base and slightly flattened, frequently depressed top where the oscules sit, covered in large irregular flat-topped nodules; the texture is solid, heavy, firm and barely compressible; the surface feels like sandpaper to the touch.

Colour: Beige to peachy tan.

Size: Diameter from 7 to 10 cm.

Distribution: Chatham Rise, Gisborne Canyon, Bay of Plenty, southern Hikurangi Margin, Three Kings Islands.

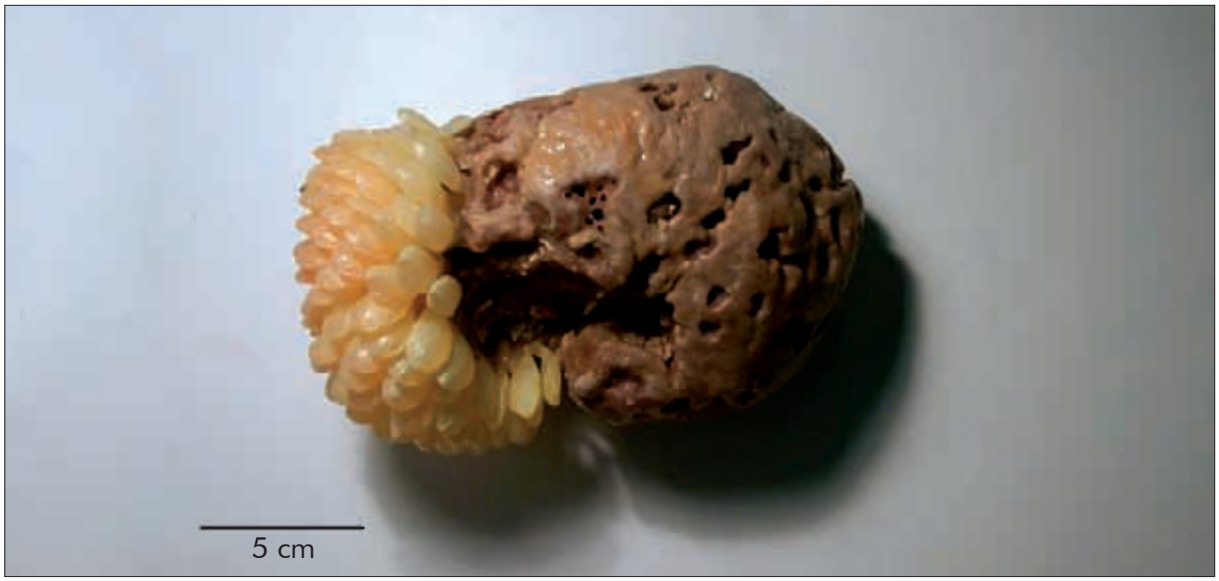
Depth: 55 to 850 m.

Similar species: *Stelletta* sp., which has long nodules resembling fat fingers.

References: Dendy, A. (1924). Porifera. Part I. Non-antarctic sponges. *Natural History Report. British Antarctic ("Terra Nova") Expedition, 1910, Zoology* 6(3): 269–392, pls 1–15.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Astrophorida (sandpaper sponges)
Family Ancorinidae

Penares sp. (Golden brown crater sponge) (PNR)



Distinguishing features: Spherical to football-shaped sponge with a smooth, waxy surface indented all over with groups of oscules; texture compressible; often free-living.

Colour: Golden to mustard brown.

Size: Diameter up to 15 cm.

Distribution: Chatham Rise.

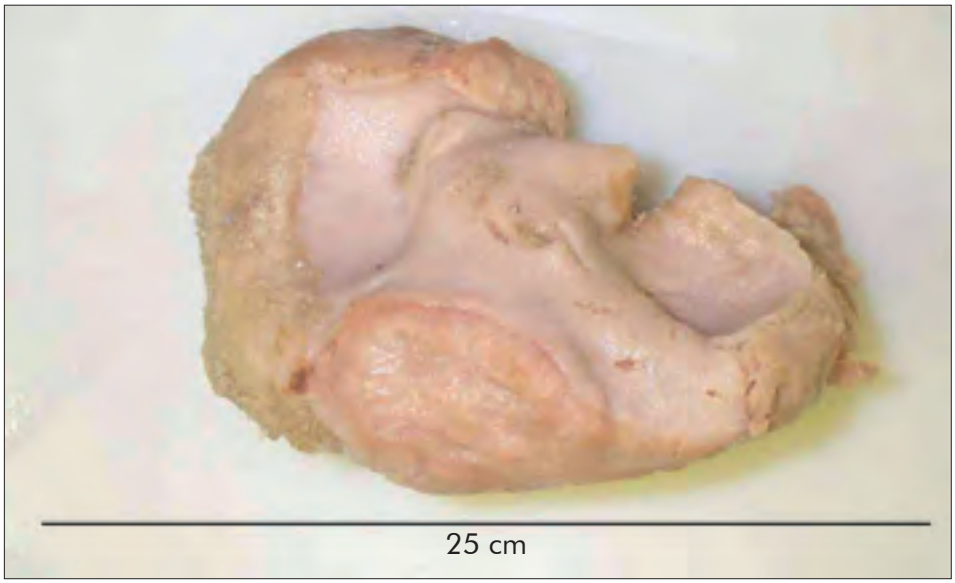
Depth: 245 to 356 m.

Similar species: *Pachymatisma* sp . (rocky dumpling sponge), but this species has a stony outer rind, and the oscule depressions are larger, knobbled, and on the apex of the sponge. *Ecionemia novaezelandiae* in which some specimens have a broad oscular depression on the top of the sponge.

References: Bergquist, P.R. (1968). The Marine Fauna of New Zealand: Porifera, Demospongiae, Part 1 (Tetractinomorpha and Lithistida). *New Zealand Oceanographic Institute Memoir* 37: 1–98.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Astrophorida (sandpaper sponges)
Family Ancorinidae

Rhabdastrella sp. (Pink ice egg sponge) (RHA)



Distinguishing features: Large potato-like mass, tough, almost stony, crunchy texture; surface smooth and undulating.

Colour: Creamy pink.

Size: Diameter from 3 to 30 cm.

Distribution: Southern Plateau (Stewart-Snares).

Depth: 300 to 600 m.

Similar species: None.

References: Bergquist, P.R. (1968). The Marine Fauna of New Zealand: Porifera, Demospongiae, Part 1 (Tetractinomorpha and Lithistida). *New Zealand Oceanographic Institute Memoir 37*: 1–98.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Astrophorida (sandpaper sponges)
Family Ancorinidae

Stelletta sp. (Orange fat finger sponge) (SLT)

Distinguishing features: Fat-fingered bulbous sponge with oscules at the tip of each finger; surface smooth and slightly sandpapery to the touch.

Colour: Pale orange. As the sponge dies and pigments oxidise patches of blackish purple appear on the tips of branches. The sponge eventually becomes fully liquorice brown-black on exposure to air.

Size: Total height up to 15 cm.

Distribution: Chatham Rise, Kermadec Ridge, Challenger Plateau.

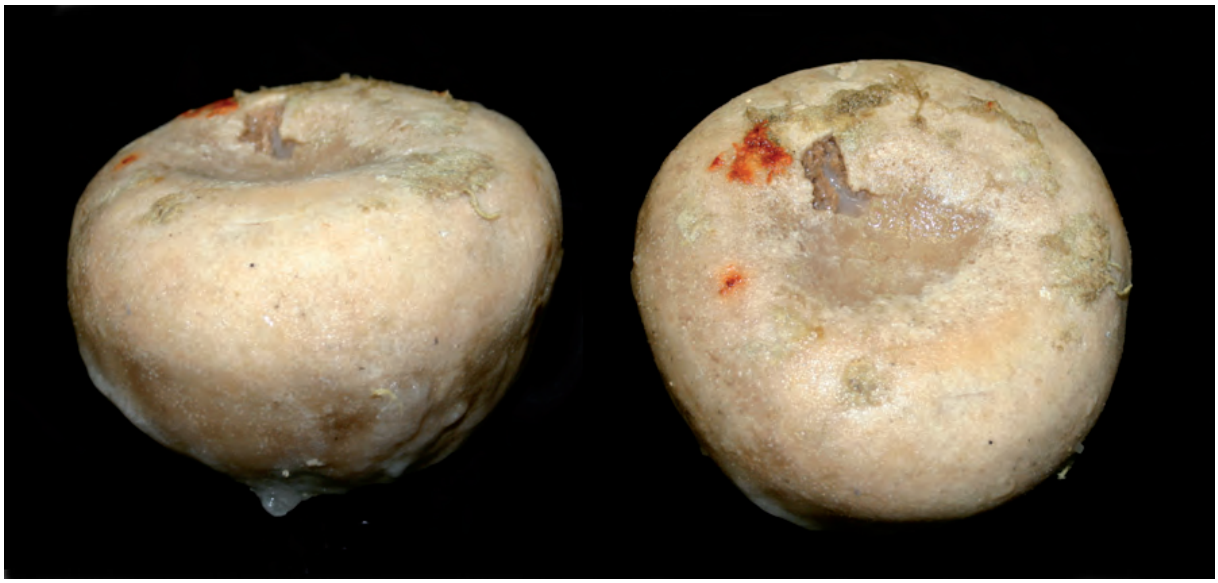
Depth: 316 to 526 m.

Similar species: *None*

References: Bergquist, P.R. (1968). The Marine Fauna of New Zealand: Porifera, Demospongiae, Part 1 (Tetractinomorpha and Lithistida). New Zealand Oceanographic Institute Memoir 37: 1–98.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Astrophorida (sandpaper sponges)
Family Geodiidae

Geodia regina (Curling stone sponge) (GRE)



Distinguishing features: Spherical to curling stone-shaped sponge, with a slightly dished apex and gradually narrowing base. Sponge has a tough outer 'shell' that when cracked reveals the softer, seemingly detached interior pulp. Surface smooth and featureless, slightly sandpapery to the touch.

Colour: Cream outer shell, orange tan interior.

Size: Diameter up to 20 cm.

Distribution: Stewart Is. region, outer Hauraki Gulf, Three Kings Islands, southern Hikurangi Margin, Pandora Bank, Bay of Plenty, Pukaki Rise, Chatham Rise, Macquarie Ridge.

Depth: 198 to 680 m.

Similar species: *Geodia vestigifera*, but this species is convoluted and tuberose. *Pachymatisma* sp. (rocky dumpling sponge), but this species has a distinctive knobbly depression on top of the sponge, and the sides are also quite knobbly.

References: Dendy, A. (1924). Porifera. Part I. Non-antarctic sponges. Natural History Report. *British Antarctic ("Terra Nova") Expedition, 1910, Zoology 6*(3): 269–392, pls 1–15.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Astrophorida (sandpaper sponges)
Family Geodiidae

Geodia vestigifera (Ostrich egg sponge) (GVE)

Distinguishing features: Convoluted mass with hard outer shell and softer inside; groups of exhalant oscules on surface; sometimes like a tuber, or stick-like.

Colour: Tan with mottled patches of pink or brown.

Size: Diameter from 1 to 20 cm. 1-5 cm (stick morphology), 20 cm (massive morphology).

Distribution: Northeastern New Zealand seamounts and coastal waters, Chatham Rise, Challenger Plateau, Kermadec Ridge, Bay of Plenty.

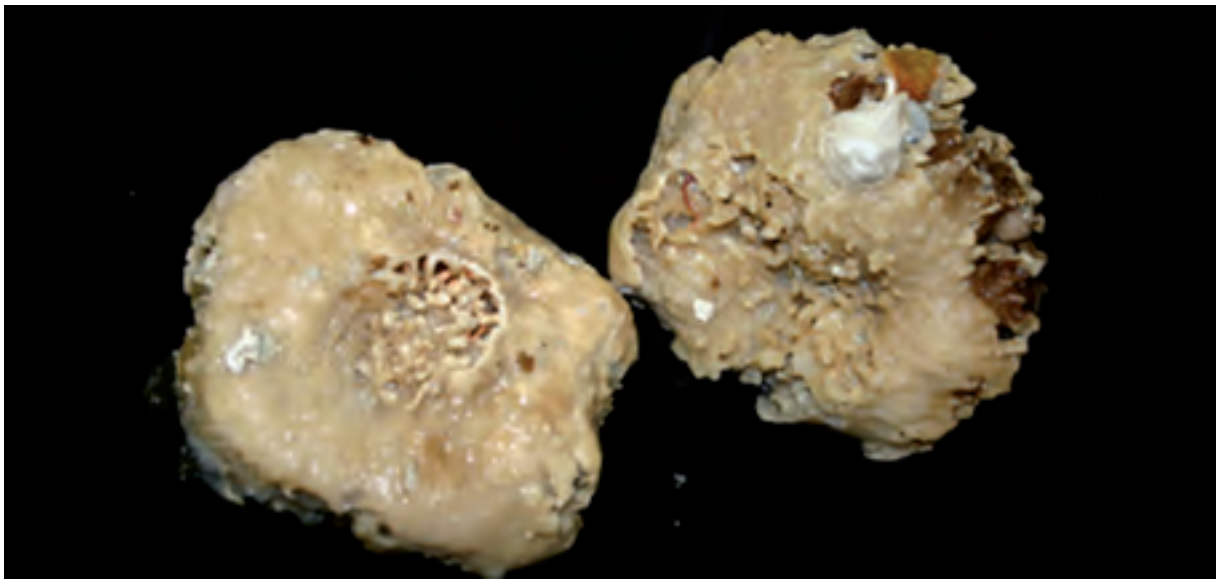
Depth: 10 to 1090 m.

Similar species: *Geodia regina*, but this species resembles a smooth, solid, flattened ball.

References: Dendy, A. (1924). Porifera. Part I. Non-antarctic sponges. Natural History Report. British Antarctic ("Terra Nova") Expedition, 1910, *Zoology 6(3)*: 269–392, pls 1–15.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Astrophorida (sandpaper sponges)
Family Geodiidae

Pachymatisma sp. (Rocky dumpling sponge) (PAZ)



Distinguishing features: Bulbous dumpling or pudding-shaped sponge, with a tough outer rind and softer interior. Oscules gathered in a characteristic knobbly honeycomb-like sieve-pore area on the apex of the sponge, sections of the flanks of the sponge are also honeycombed; often free-living.

Colour: Pale gold to mustard.

Size: Diameter up to 15 cm.

Distribution: Chatham Rise, Auckland Island, Puysegur Trench.

Depth: 357 to 831 m.

Similar species: *Penares* sp. (golden brown crater sponge), but this species is softer and has a waxy surface. *Geodia regina*, but this species is completely smooth. *Ecionemia novaezelandiae*, in which some specimens have a broad oscular depression on the top of the sponge.

References: Uriz, M. J. (2002). Family Geodiidae Gray, 1867. In: Hooper, J. N. A.; Soest, R. W. M. van ed. *Systema Porifera: a guide to the classification of sponges* New York. Kluwer Academic/ Plenum Publishers, Pp. 134–140.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Astrophorida (sandpaper sponges)
Family Pachastrellidae

Poecillastra laminaris (Fibreglass cup sponge) (PLN)

Distinguishing features: Shallow cup-like sponge, or large ragged fan with rippled edges, siliceous, non-elastic, but relatively flexible, very hairy.

Colour: Cream to white, tinged with brown.

Size: Diameter from 5 to 10 cm.

Distribution: Christable Seamount, Cavalli Seamounts, Chatham Rise, Pukaki Rise, Macquarie Ridge, Challenger Plateau, Three Kings Islands, Bay of Plenty.

Depth: 119 to 1123 m.

Similar species: None.

References: Lévi, C.; Lévi, P. (1983). Eponges Tetractinellides et Lithistides bathyales de Nouvelle Calédonie. *Bulletin Muséum National d'Histoire Naturelle, Paris (4)5 (A,1)*: 101–168.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Astrophorida (sandpaper sponges)
Family Pachastrellidae

Thenea novaezelandiae (Yoyo sponge) (THN)

Distinguishing features: Semispherical sponge with a distinctive thick yoyo or mushroom shape, with a rounded summit and base separated by a transverse recess running around the mid section of the sponge body (the recess is a specialised aquiferous system); small root-like structures project from the ventral surface of the sponge; body compact, spongy, and siliceous.

Colour: Grey to off-white.

Size: Diameter from 3 to 5 cm.

Distribution: Northwest Chatham Rise, Stewart Island region, Bay of Plenty, southern Hikurangi Margin, Campbell Plateau.

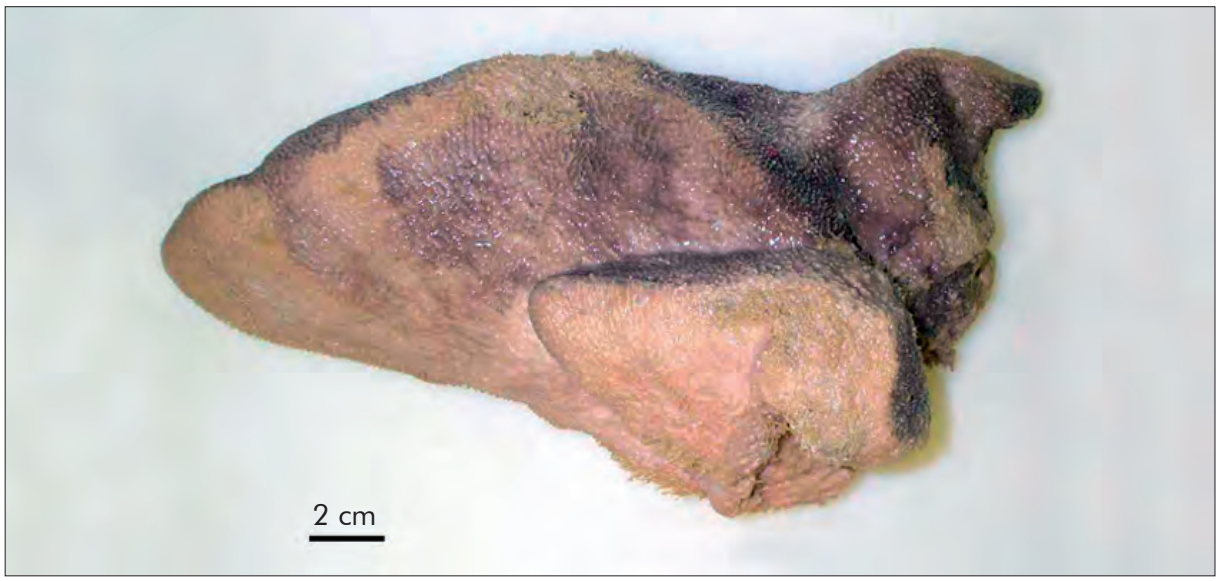
Depth: 612 to 1000 m.

Similar species: None.

References: Bergquist, P. R. (1961). Demospongiae (Porifera) of the Chatham Islands and Chatham Rise, collected by the Chatham Islands 1954 Expedition. *New Zealand Department of Scientific and Industrial Research Bulletin 139, Biological Results of the Chatham Islands 1954 Expedition, 1961, Part 5*: 169–206.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Dictyoceratida (rubber sponges)
Family Irciniidae

Psammocinia sp. (Rubber sponge) (PHW)



Distinguishing features: Club-shaped with expanded lobes, slightly flat on top; top (illuminated) surfaces tinged with maroon; compressible; fine conules on surface.

Colour: Dark tan with maroon tinges on upper surfaces.

Size: Typical diameter 30 cm.

Distribution: Southeastern Subantarctic region.

Depth: 300 to 600 m.

Similar species: *Psammocinia hawere* Cook & Bergquist, 1998; *Psammocinia charadrodes* Cook & Bergquist, 1998; *Ircinia akaroa* Cook & Bergquist, 1999.

References: Cook, S. de C.; Bergquist, P.R. (1998). Revision of the genus *Psammocinia* (Porifera: Demospongiae: Dictyoceratida), with six new species from New Zealand. *New Zealand Journal of Marine and Freshwater Research 32*: 399–426.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Hadromerida (woody sponges)
Family Suberitidae

Suberites affinis (Fleshy club sponge) (SUA)

Distinguishing features: Very smooth club-shaped sponge with a large circular opening on the apex; soft, fleshy, slippery to the touch; often attached to the Golden Volutes Provocator mirabilis and Alcithoe larochei, or the base is anchored in sediment.

Colour: Cream to pale yellow, mottled with brown.

Size: Length up to 20 cm.

Distribution: Southern Plateau (Campbell Plateau, Pukaki Rise) and Chatham Rise; west coast of South Island.

Depth: 317 to 676 m.

Similar species: *Suberites australiensis* Bergquist, 1968.

References: Brøndsted, H. V. (1924). Papers from Dr Th. Mortensen's Pacific Expedition 1914–16. XV. Sponges from the Auckland and Campbell Islands. *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening I Kjobenhaven 75*: 117–167.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Haplosclerida (air sponges)
Family Callyspongiidae

Callyspongia sp. (Airy finger sponge) (CRM)

Distinguishing features: Flattened fingers of thick, golden fibres; looks dead (not fleshy); elastic and flexible when wet; airy, compressible.

Colour: Golden yellow-brown.

Size: Typical diameter 30 cm.

Distribution: Southern New Zealand region.

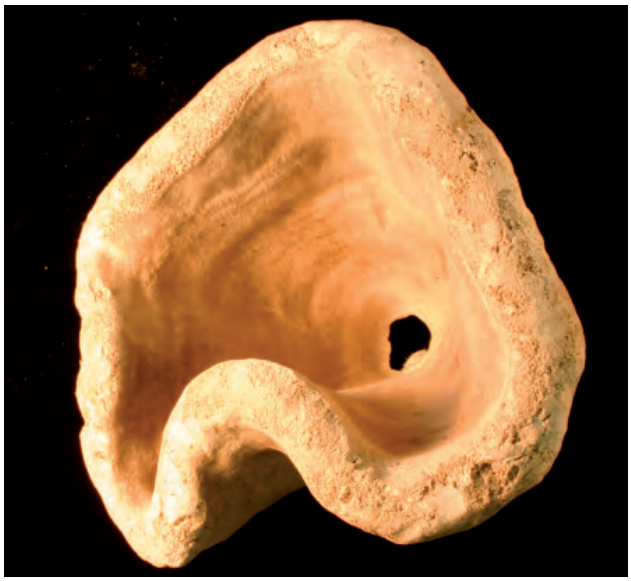
Depth: 300 to 600 m.

Similar species: *Callyspongia ramosa* (Gray, 1843) *sensu* Bergquist & Warne (1980).

References: 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.* 77 p.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order 'Lithistid' Demospongiae (rock sponges)
Family Corallistidae

Corallistes fulvodesmus (Smooth white cup sponge) (CFU)



Distinguishing features: Shallow smooth cup with a narrow short stalk for attachment, stony texture, inflexible, surface like sandpaper.

Colour: Creamy white to tan occasionally.

Size: Typical diameter 30 cm.

Distribution: New Caledonia, Norfolk Ridge Seamounts, northeastern New Zealand seamounts.

Depth: 400 to 1700 m.

Similar species: *Aciculites pulchra Dendy*, 1924 is similar but is ear-shaped when young and a convoluted cup as an adult. The surface of *A. pulchra* has tiny pimples and is usually maroon red.

References: Lévi, C.; Lévi, P. (1983). Eponges Tetractinellides et Lithistides bathyales de Nouvelle Calédonie. *Bulletin Muséum National d'Histoire Naturelle, Paris (4)5 (A,1)*: 101–168.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order 'Lithistid ' Demospongiae (rock sponges)
Family Scleritodermiidae

Aciculites pulchra (Pimpled ear sponge) (APU)

Distinguishing features: Ear-shaped plate with a curved edge as a juvenile, forming a large convoluted bowl-like structure as an adult; concave surface covered in regularly spaced "pimples"; texture stony and rigid.

Colour: Cream to tan throughout, but may be deep maroon on the upper or illuminated surfaces.

Size: Typical diameter 40 cm.

Distribution: New Caledonia, Norfolk Ridge seamounts, northeastern New Zealand seamounts.

Depth: 100 to 1100 m.

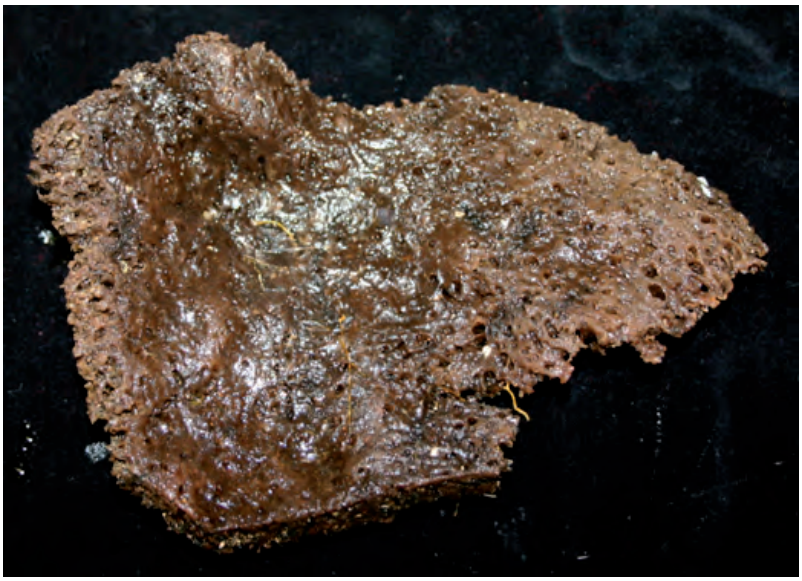
Similar species: *Neoschrammeniella fulvodesmus* (Lévi and Lévi, 1983), *Pleroma turbinatum* Sollas, 1888.

References: Dendy, A. (1924). Porifera. Part I. Non-Antarctic sponges. Natural History Report. British Antarctic ("Terra Nova") Expedition, 1910, *Zoology* 6(3): 269–392, pls 1–15.

Kelly, M. (2007). The Marine Fauna of New Zealand: Porifera: 'Lithistid' Demospongiae (Rock sponges). *NIWA Biodiversity Memoir 121*. 100 p.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Poecilosclerida (Bright sponges)
Family Coelosphaeridae

Lissodendoryx bifacialis (Floppy chocolate plate sponge) (LBI)



Distinguishing features: Medium-sized, thick, relatively soft, fibrous chocolate brown plate; one side with an undulating shiny surface, the other side perforated with holes about 1-3 mm diameter. Large, thick, floppy, fibrous plate or fan, one side with a shiny undulating surface (inhalent), the other perforated with oscules (exhalent) 1-3 mm in diameter and up to 10 mm deep. Frequently fragmented and easily tearable.

Colour: Deep chocolate brown to liquorice.

Size: Diameter up to 30 cm.

Distribution: Chatham Rise, Macquarie Ridge.

Depth: 317 to 827 m.

Similar species: *None.*

References: Lévi, C., Lévi, P. (1983). Démosponges bathyales récoltées par le N/O 'Vauban' au sud de la Nouvelle-Calédonie. *Bulletin Muséum national d'Histoire naturelle, Paris* (4)5 (A,4): 931–997.

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.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Poecilosclerida (bright sponges)
Family Crellidae

Crella incrustans (Orange frond sponge) (CIC)

Distinguishing features: Mass of flattened fronds or finger-like branches; rubbery, fibrous, flexible; slightly translucent.

Colour: Bright orange.

Size: Typical diameter 30 cm.

Distribution: New Zealand region.

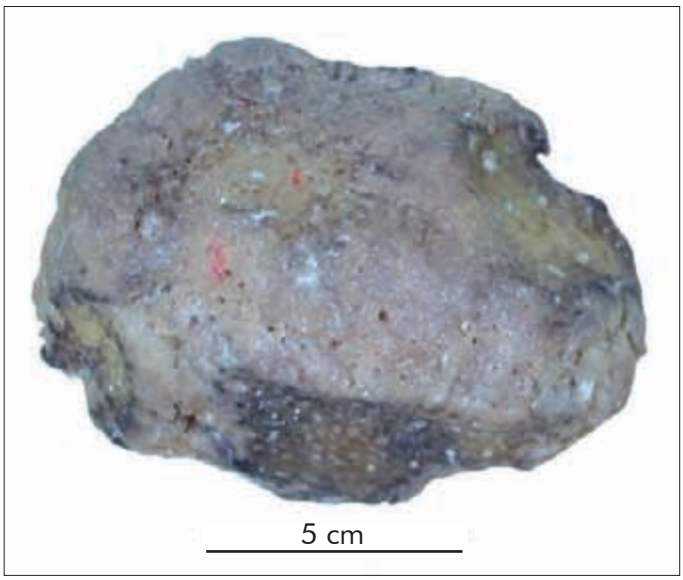
Depth: 300 to 600 m.

Similar species: None.

References: 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 p.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Poecilosclerida (bright sponges)
Family Hymedesmiidae

Phorbas sp. (Grey fibrous massive sponge) (PHB)



Distinguishing features: Bulky fibrous mass with flattened lateral planes; surface relatively smooth and featureless, but with characteristic opaque whitish sections into which sand has been incorporated; texture soft, cotton-like.

Colour: Grey to off-white with opaque whitish fibres.

Size: Diameter from 10 to 15 cm.

Distribution: Chatham Rise, Pukaki Rise, Campbell Plateau.

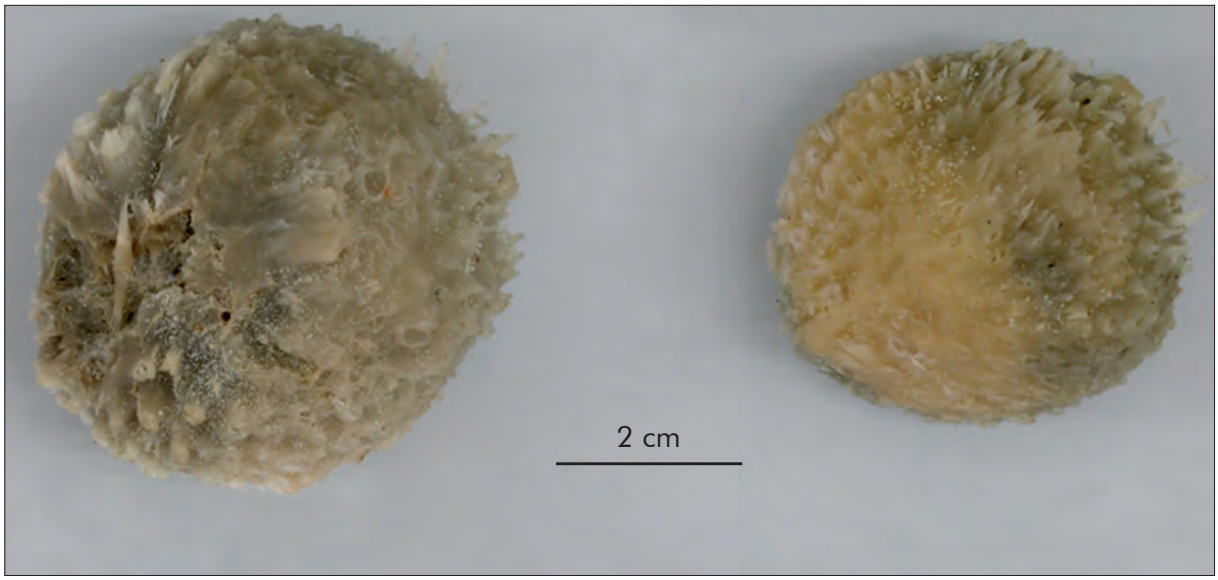
Depth: 400 to 522 m.

Similar species: None.

References: 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.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Poecilosclerida (bright sponges)
Family Tetillidae

Tetilla australe (Bristle ball sponge) (TTL)



Distinguishing features: Spherical to slightly oval sponge with sharp hollow bristles on the surface; texture firm and cartilaginous.

Colour: Greyish cream to pale peach.

Size: Diameter from 2 to 5 cm.

Distribution: Campbell Plateau, Spirits Bay, Northland, Bay of Islands.

Depth: 25 to 676 m.

Similar species: *Tetilla leptoderma* which is egg-shaped, and more furry in texture.

References: Bergquist, P.R. (1968). The Marine Fauna of New Zealand: Porifera, Demospongiae, Part 1 (Tetractinomorpha and Lithistida). *New Zealand Oceanographic Institute Memoir* 37: 1–98.

Phylum Porifera
Class Demospongiae (siliceous sponges)
Order Spirophorida (spiral sponges)
Family Tetillidae

Tetilla leptoderma (Furry oval sponge) (TLD)

Distinguishing features: Elongated egg shaped sponge with no visible point of attachment, surface furrowed and furry, somewhat shaggy, soft to the touch; several openings are located at the top of the sponge between bristles and furry protrusions; texture firm but compressible.

Colour: Cream to pale tan.

Size: Length from 5 to 10 cm.

Distribution: Chatham Rise, Stewart Island region

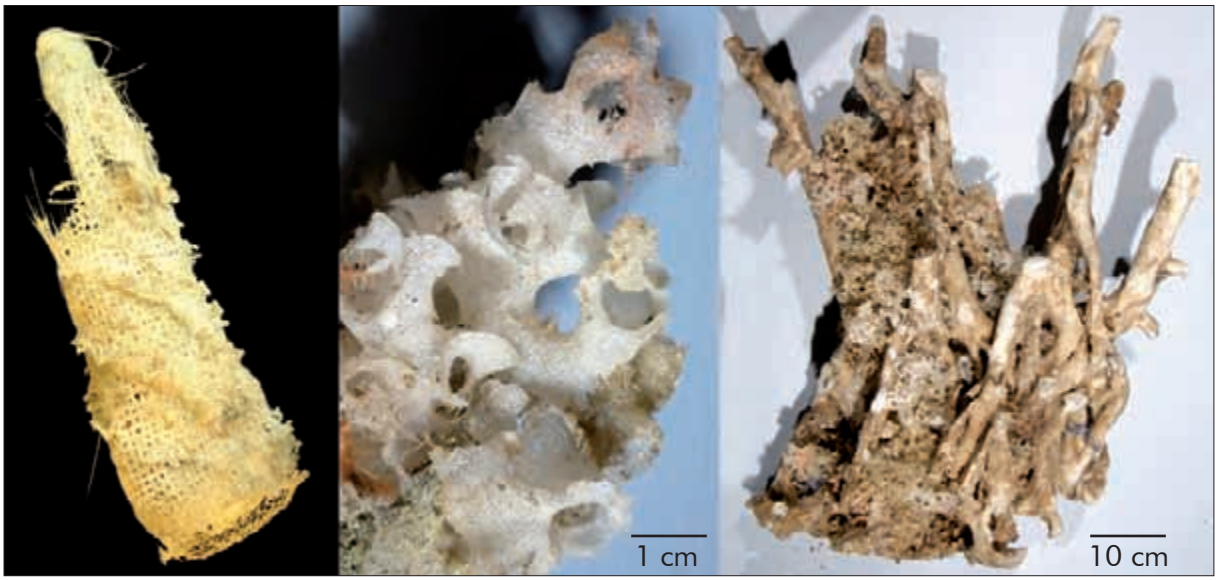
Depth: 576 to 919 m.

Similar species: *Tetilla australe* Bergquist, 1968 which is spherical with a bristly, not shaggy surface.

References: Sollas, W. J. (1886). Preliminary account of the tetraxinellid sponges dredged by H. M. S. 'Challenger', 1872–1876. Part I. The Choristida. *Scientific Proceedings of the Royal Dublin Society (new series)* 5: 177–199.

Phylum Porifera
Class Hexactinellida (glass sponges)
Order
Family

(Glass sponges) (GLS)



Distinguishing features: Glass sponges are extremely diverse in shape and size, but all have a non-fleshy, fibreglass or fibrous, sacking-like texture. The most common specimens sampled are delicate lacy honeycombs, broken solid or hollow stems, mushy sacking, matts of glass hair and sediment. The surfaces are usually shaggy and fibrous (sack-like), or sometimes spiny with tough fibreglass-like strands poking through the surface. Glass sponges show a very diverse range, including: • hollow glass tubes with feathery extensions • ropey strands of glass topped with mushy fibrous sack-like body • rigid lacy honeycombs • long solid coral-like rigid stems topped with a delicate fibrous tulip-like body • stringy horns and frilly tubes made of woven glass fibres • rigid pitted coral-like plates • long solid rods of tubes and honeycomb • soft mushy sacking trumpets • solid polystyrene-like balls with tufts of fine glass hair. Hexactinellid sponges are often fragmented on collection and are difficult to identify as a result. Spicule analysis is essential for species determination.

Colour: Typically icy white, creamy white, pale peach, pale blue. Also grey, beige.

Size: Standard length up to 60 cm.

Distribution: Widely distributed in the New Zealand deepsea region on hard and soft seafloor.

Depth: 60 to >1000 m.

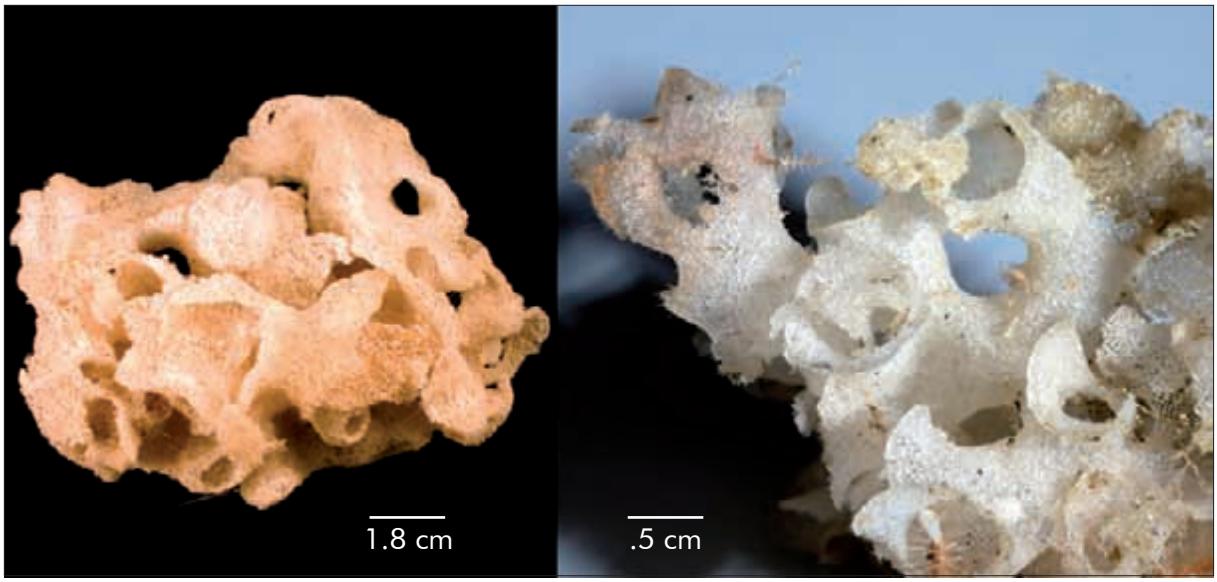
Similar species: *Some rock sponges such as Corallistes fulvodesmus and Aciculites pulchra*

References: Reiswig, H. M.; Kelly, M. (2011). The Marine Fauna of New Zealand: Hexasterophoran Glass Sponges of New Zealand (Porifera: Hexactinellida: Hexasterophora): Orders Hexactinosida, Aulocalycoida and Lychniscosida NIWA Biodiversity Memoir 124. 176 p.

Reiswig, H. M. (2002). Class Hexactinellida Schmidt, 1870. *In*: Hooper, J. N. A.; Soest, R. W. M. van ed. Systema Porifera: a guide to the classification of sponges New York. Kluwer Academic/ Plenum Publishers, Pp. 1201–1202.

Phylum Porifera
Class Hexactinellida (glass sponges)
Order Hexactinosida (lacey honeycomb sponges)
Family Farreidae

Farrea sp. (Lacey honeycomb sponge) (FAR)



Distinguishing features: Very brittle lace-like honeycombs of white tubes with elevated openings along the side of the tube; can be very delicate, some quite firm.

Colour: White to cream; dark brown if dead for a while.

Size: Diameter from 1 to 5 cm. Typical diameter 5 cm, but one species up to 50 cm.

Distribution: Northeastern New Zealand seamounts, Kermadec Ridge, Chatham Rise, Bollons Seamount, around New Zealand.

Depth: 770 to 1070 m.

Similar species:

References: Reiswig, H. M. (2002). Family Farreidae Gray, 1872 Zittel, 1877. *In*: Hooper, J. N. A.; Soest, R. W. M. van ed. Systema Porifera: a guide to the classification of sponges. New York. Kluwer Academic/Plenum Publishers, Pp. 1332–1340.

Reiswig, H.M., Kelly, M. (2011). The Marine Fauna of New Zealand (Porifera: Hexactinellida: Hexasterophora): Orders Hexactinosida, Aulocalycoida and Lychniscosida. NIWA Biodiversity Memoir 124: 176 p.

Phylum Porifera
Class Hexactinellida (glass sponges)
Order Lyssacinosida (glass horn sponges)
Family Euplectellidae

Euplectella regalis (Basket-weave horn sponge) (ERE)

Distinguishing features: Horn-like tubular body, circular in cross-section, broadest at the upper end, gradually narrowing towards a slightly bulbous basal tuft of fine hair-like spicules; wall resembles a basket-weave of hair-like spicules and is beset with frilled irregular ridges that run obliquely around the tubular body. The apex of the sponge is a lattice-like sieve-plate surrounded by an undulating cuff.

Colour: Creamy white.

Size: Length up to 50 cm.

Distribution: Northwest and northeast Chatham Rise.

Depth: 885 to 1116 m.

Similar species: *Euplectella imperialis* Ijima, 1894

References: Schulze, F. E. (1900). Hexactinelliden des Indischen Oceanes. III Theil. Abhandlungen der Preussischen Akademie de Wissenschaften . Berlin 1900: 46 pp., + Pls I-VII.

Tabachnick, K. R. (2002). Family Euplectellidae Gray, 1867. *In*: Hooper, J. N. A.; Soest, R. W. M. van ed. Systema Porifera: a guide to the classification of sponges. New York. Kluwer Academic/ Plenum Publishers, Pp. 1388–1434.

Phylum Porifera
Class Hexactinellida (glass sponges)
Order Lyssacinosida (tubular sponges)
Family Rossellidae

Hyalascus sp. (Floppy tubular sponge) (HYA)

Distinguishing features: Soft, floppy, collapsible sponge. Tubular to trumpet-shaped with a thin wrinkled irregular wall. Texture in life like that of thick soggy paper, close-up looks like fibreglass matt; tears easily.

Colour: Tan to cream.

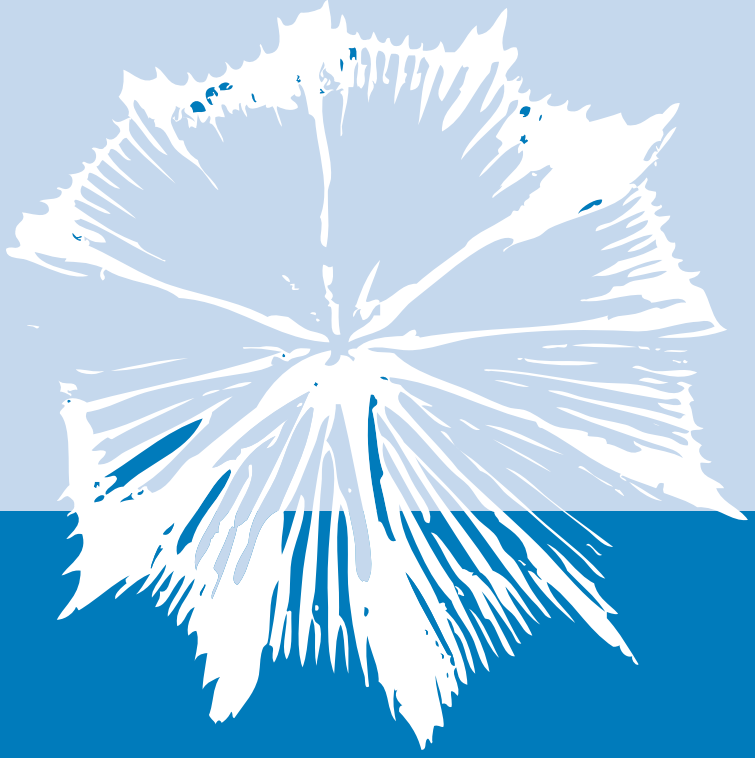
Size: Length up to 1500 cm. Diameter up to 30 cm at broadest.

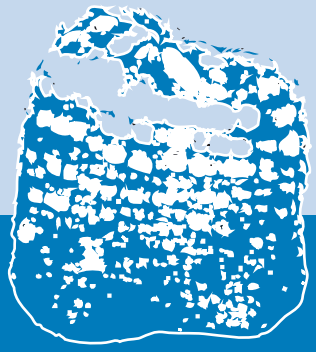
Distribution: Northeastern New Zealand seamounts, Chatham Rise, Campbell Plateau (North of Campbell Island).

Depth: 300 to 600 m.

Similar species: None.

References: Tabachnick, K. R. (2002). Family Rossellidae Schulze, 1885. *In*: Hooper, J.N.A.; Soest, R.W.M. van (eds). Systema Porifera: a guide to the classification of sponges. New York. Kluwer Academic/Plenum Publishers, Pp. 1441–1505.

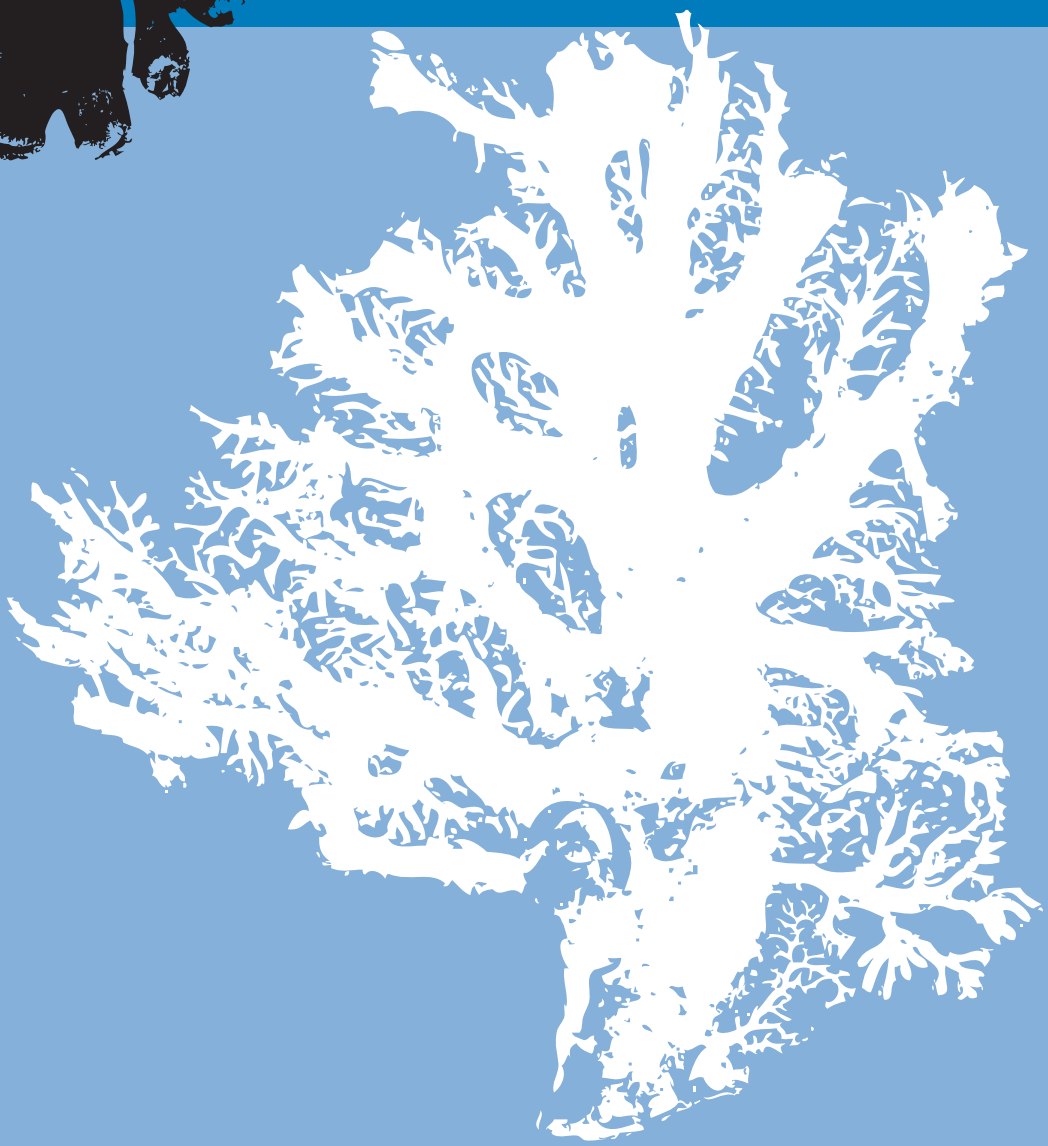




Phylum CNIDARIA

Anemones, corals, jellyfish, hydroids

Steve Cairns, Daphne Fautin, Dennis Gordon, Beth Horvath, Dennis Opresko, Juan Sanchez, Frederic Sinniger, Di Tracey



Phylum

CNIDARIA

Anemones, corals, jellyfish, and hydroids

Class Anthozoa — Corals, anemones, and kin

Anthozoans are the largest group of Cnidaria, with about 6000 living species worldwide. All are marine, and there is no medusa phase. The mouth opens into a stomach cavity that is partitioned by mesenteries (membranes) that expand the inner absorptive surface. There are two subclasses: the Octocorallia (Alcyonaria), which have eight mesenteries and tentacles, and the Hexacorallia (Zoantharia) with tentacles and mesenteries in multiples of six.

Corals are distinguished from their soft-bodied relatives like sea anemones, jellyfish, and hydroids by being calcified, i.e., incorporating calcium carbonate (lime) into their bodies to create a skeleton. Several kinds of cnidarians do this, and they can superficially resemble each other if they have a similar shape. The main kinds of calcified cnidarians in New Zealand waters are hydrocorals, gorgonians (octocorals), and stony corals.

Subclass Octocorallia

This subclass used to be divided into a number of orders, all but one colonial, in which the polyps are united by cords or sheets of tissue (coenenchyme). Octocorals, so-called because polyps have an 8-fold symmetry (8 tentacles and internal body partitions), can be relatively soft (sea pens and soft corals like dead-men's fingers) or, as in gorgonians, have an erect axis of calcareous spicules or of hardened protein impregnated with lime. In bamboo corals and some other gorgonians the axis may be jointed. Octocorals also lack the distinctive vertical radial partitions that characterise stony corals.

In the New Zealand EEZ, 243 octocoral species (187 undescribed) are known, divided among 103 genera in 28 families. These include 45 species of order Alcyonacea (spreading runnerlike corals and soft octocorals), 167 species of order Gorgonacea (now known as order Alcyonacea) (gorgonians including the bubblegum corals), and 31 species of sea pens, order Pennatulacea. The diversity of three families of deepwater calcified gorgonians (Isididae – bamboo corals, Primnoidae – bottlebrush corals, and Chrysogorgiidae – golden corals) is probably the highest in the world for a single country.

The stature of large gorgonian colonies is made possible by the enhanced development of skeletal material. In holaxonians, the axis is horny or woodlike, owing to the presence of a scleroprotein called gorgonin, and may be further strengthened by impregnation of calcium carbonate, but there are no sclerites in the axis. In bamboo corals (family Isididae) the axis is conspicuously jointed, with solid calcium carbonate between the joints. In isidids as well as in other highly calcified gorgonians such as Primnoidae and Chrysogorgiidae, the axes may give evidence of distinct growth rings in cross section.

Subclass Hexacorallia

Hexacorals may be solitary or colonial, soft or hard, the latter having rigid calcified skeletons. Soft hexacorals make up the orders Ceriantharia (tube anemones), Actiniaria (sea anemones), Corallimorpharia (coral-like anemones), and Zoanthidea (zoanthid anemones). Hard hexacorals make up the orders Scleractinia (stony corals) and Antipatharia (black corals). In the stony (or true) corals, calcification extends into the mesenteries, creating rigid septa that remain in the dead coral skeletons.

Order Ceriantharia

Tube anemones are solitary tube-dwelling hexacorals living in muddy bottoms. They are not a diverse group and the sole New Zealand species has not been characterised taxonomically.

Order Actiniaria (sea anemones)

New Zealand has a high diversity of soft hexacorals, especially of sea anemones (actinians). The deep-sea anemone fauna is widely distributed but poorly described. Sea anemones have 6 tentacles or multiples of 6 with nettle cells that sting and capture small or large prey. Some species are anchored in soft sediment, attached to rocks by their base, or can move slowly over the seabed. Many habitually grow on other creatures, including sponges, corals, and shells. Many species are distinguished by attributes of the nematocysts and muscles, so if there is more than one species of a genus in an area, the genus name is often the only name available.

Order Zoantharia (Zoanthidea)

Order Zoantharia (Zoanthidea) Twelve species are listed for the New Zealand region. Zoanthids are anemone-like hexacorals with a colonial lifestyle. One of them is Epizoanthus, which settles on shells occupied by hermit crabs. As it grows it envelopes the shell. Zoanthids are often found associated with several species of sponges, hydroids, octocorals, and molluscs. A striking yellow species of *Parazoanthus* (*Epizoanthus karenae*) is frequently encountered on Fiordland black coral. Some zoanthids are able to generate their own skeleton.

Order Antipatharia (black corals)

About 58 black coral species are known in New Zealand waters. Black corals are distinguished by their erect, often bushy, habit of growth and hard proteinaceous skeleton that bears tiny polyps. Although the depth and geographic distribution of the Antipatharia have not been analysed in detail, it

appears that most species live in the deep sea and on seamounts at between 200 and 1000 metres depth. All New Zealand black coral species are strictly protected, (see box).

Order Corallimorpharia

Some seven species and subspecies are known in the New Zealand EEZ. The commonest is the colourful jewel anemone, *Corynactis australis*, found in low-tidal rock pools and shallow depths. The species looks like a spreading colonial sea anemone. Each tentacle is tipped with a characteristic white knob that is densely and minutely studded with nettle cells. Other corallimorpharian species occur in deep water.

Order Scleractinia (stony corals)

New Zealand has a diverse fauna of 127 stony coral species, 110 of which are azooxanthellate, (i.e., lacking symbiotic algae) comprising over 16% of known azooxanthellate species. Azooxanthellates/ahermatypes are sometimes called 'deepwater corals' or 'solitary corals' and are usually small and slower growing, and do not form reefs like their zooxanthellate reef counterparts.

Stony corals are calcified hexacorals, i.e., having body parts in multiples of 6. Coral polyps may be thought of as skeleton-forming anemones. The internal membranes (mesenteries) that partition the bodies of sea anemones are calcified in corals so that, when all soft tissues are removed, the polyp skeleton is seen to have distinctive vertical radii (septa), often divided into cycles of major and minor ones.

An entire coral, called a corallum, may consist of a single individual or a colony of many individuals. The skeleton (corallite) of an individual polyp has a cup-shaped opening (calyce) that is typically round or oval as in New Zealand's cold-water corals, but in tropical corals neighbouring corallites can be fused and conjoined, resulting in large compound calyces.

Class Scyphozoa — jellyfish

The Scyphozoa is a small group of cnidarians numbering only about 250 living species worldwide. Notwithstanding the low species diversity, this minor group has caused some major problems recently around the world and in New Zealand. Understanding of jellyfish bloom dynamics remains incomplete, but large financial losses resulting from jellyfish invasions continue to be reported.

Scyphozoans are entirely marine, with a reduced or absent polyp phase and generally a large and conspicuous medusa phase. Unlike those of hydrozoans and anthozoans, scyphozoan polyps are more or less unattached to one another and do not share nutrients with other colony members. Medusa formation is by a form of budding, called strobilation, with the polyp typically remaining to continue budding and even to strobilate again. Scyphozoans are present from the shallowest intertidal to at least benthopelagic depths. There are three orders — Coronatae, easily distinguished by the presence of a coronal groove on the outer umbrella surface; Semaeostomae, typically with long, flowing oral arms and marginal tentacles; and Rhizostomeae, which lack true marginal tentacles as well as a central mouth, instead having numerous tiny mouths on the edges of the oral arms. Stalked jellyfish (upside-down jellyfish) and box jellies are now regarded as separate classes (Staurozoa and Cubozoa).

Class Hydrozoa — hydroids and their medusae

Hydrocorals (stylasterids) all belong to the order Hydroida family Stylasteridae. Hydroids are generally small and non-calcified, so hydrocorals are unusual in this respect. Like other hydroids, hydrocorals have tiny polyps. Some of these function like stomachs (gastrozooids) while the non-feeding polyps are tentacle-like and used for food-capture (dactylozooids) or for reproducing (gonozooids). New Zealand hydrocorals are erect and branching, and may be white or red.

Their skeletons are distinguished from those of stony corals by being generally much smaller and less robust, and minutely porous and pitted with small holes for the various polyps. These holes (openings) lack the distinctive vertical radial partitions that characterise stony corals.

Hydrozoans are remarkably varied. They may be solitary or colonial, with polyp and medusa phases, or either phase may be lacking altogether.

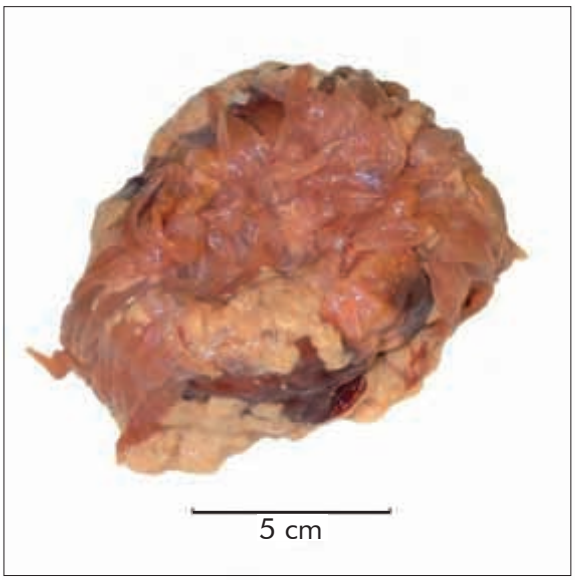
PROTECTED SPECIES

Previously the protected coral species listed in the Wildlife Act (1953) included all black corals (Order Antipatharia) and the red hydrocoral *Errina* spp. (which belongs to the Family Stylasteridae). During 2010, an amendment of Schedule 7A of the Wildlife Act widened the range of corals afforded protection to include "all deepwater hard corals (all species in the orders Antipatharia, Gorgonacea, Scleractinia, and Family Stylasteridae)".

Note: While order Gorgonacea is now known as order Alcyonacea and our guide sheets reflect this revision, the Wildlife Act 2010 amendment uses the former name Gorgonacea for gorgonian corals, (Author Di Tracey pers comm).

Phylum Cnidaria
Class Anthozoa
Order Actiniaria (anemones)
Family Actiniidae

Bolocera spp. (Deepsea anemones) (BOC)



Distinguishing features: A flat spherical body form with several tentacles visible around edge. Currently identified to genus level only.

Colour: Red, brown.

Size: Up to 20 cm.

Distribution: This genus is widely distributed around the world, but poorly described.

Depth: 200 to 1500 m.

Similar species: *Liponema* spp.

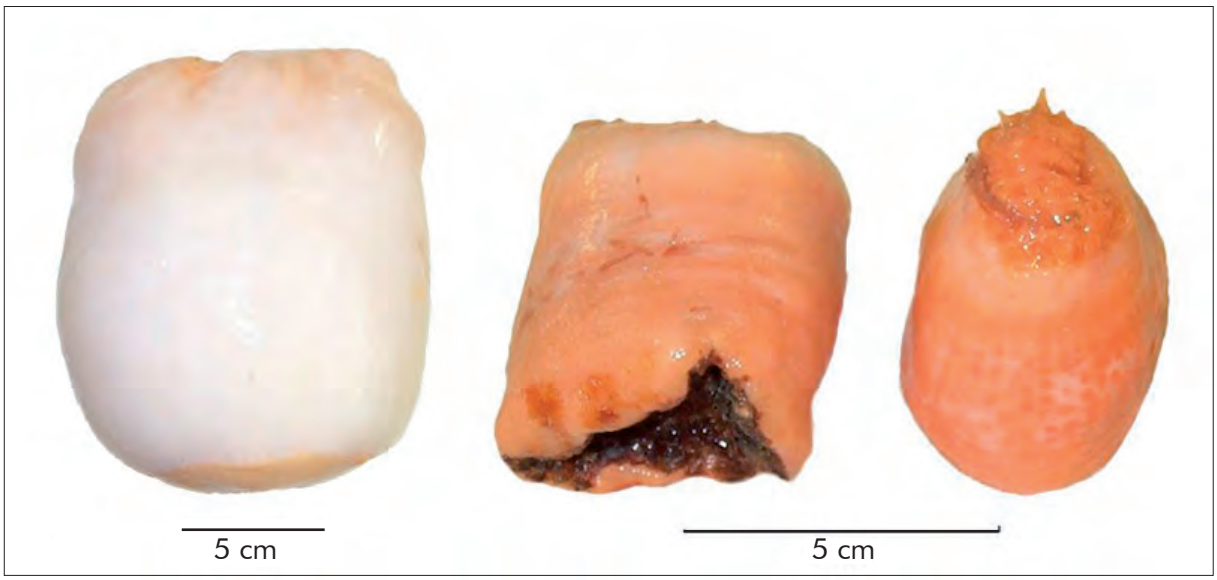
References: Dunn, D. F. (1983). Some Antarctic and Sub-Antarctic sea anemones. (Coelenterata: Ptychodactiaria and Actiniaria). *Biology of the Antarctic Seas XIV Antarctic Research Series 39(1)*: 1–67.

Fautin, D. G. (1984). More Antarctic and Sub-Antarctic sea anemones. (Coelenterata: Corallimorpharia and Actiniaria). *Biology of the Antarctic Seas XVI Antarctic Research Series 41(1)*: 1–42.

Phylum Cnidaria
Class Anthozoa
Order Actiniaria (anemones)
Family Actinostolidae (smooth deepsea anemones)

(Smooth deepsea anemones) (ACS)

CNIDARIA



Distinguishing features: A smooth, cylindrical body form, with thickened walls and often with a reddish brown base. Tentacles mostly or completely hidden. Currently identified to family level only.

Colour: White, creamy white, or brown.

Size: Up to 20 cm.

Distribution: The family has worldwide distribution, but is poorly described.

Depth: 200 to 1500 m.

Similar species: Members of the family Actinostolidae (smooth deepsea anemones).

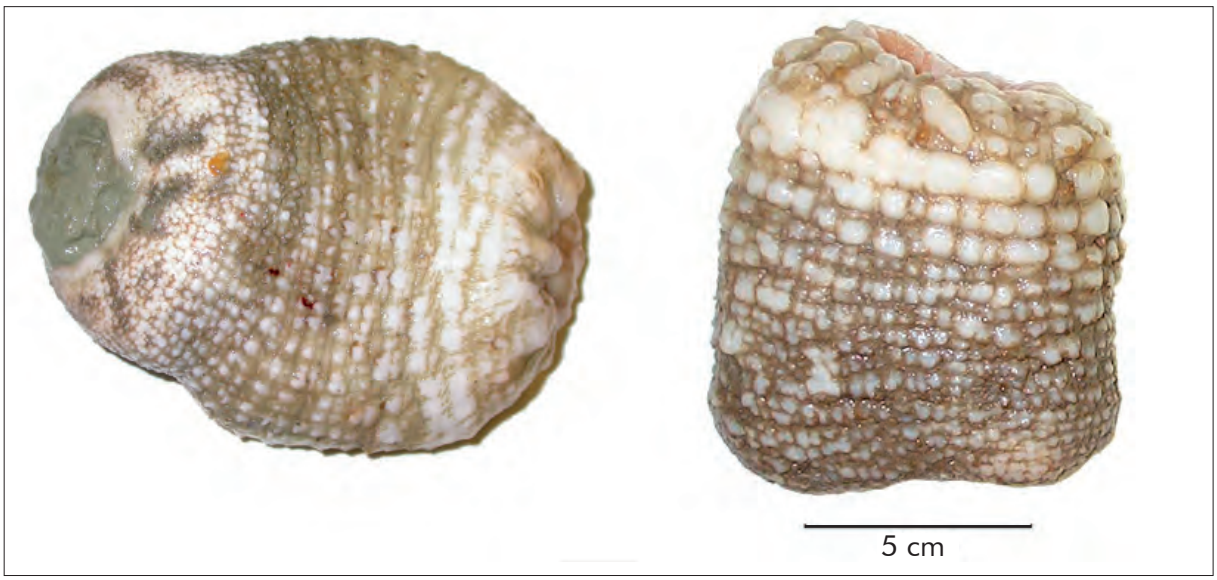
References: Dunn, D. F. (1983). Some Antarctic and Sub-Antarctic sea anemones. (Coelenterata: Ptychodactiaria and Actiniaria). *Biology of the Antarctic Seas XIV Antarctic Research Series 39(1)*. 67 p.

Fautin, D. G. (1984). More Antarctic and Subantarctic sea anemones. (Coelenterata: Corallimorpharia and Actiniaria). *Biology of the Antarctic Seas XVI Antarctic Research Series 41(1)*: 1–42.

Cairns, S. D. et al. (2009). Phylum Cnidaria-corals, medusae, and hydroids. *In*: Gordon, D. P. (ed.), The inventory of biodiversity. Volume 1. Kingdom Animalia - Radiata, Lophotrochozoa, and Deuterostomia. Canterbury University Press.

Phylum Cnidaria
Class Anthozoa
Order Actiniaria (anemones)
Family Hormathiidae

(Warty deepsea anemone) (HMT)



Distinguishing features: An irregularly shaped body made up of longitudinal and circumferential furrows which give a warty appearance. Tentacles mostly or completely hidden. Currently identified to family level only.

Colour: White, creamy white, or brown.

Size: Up to 20 cm.

Distribution: The family has worldwide distribution, but is poorly described.

Depth: 200 to 1500 m.

Similar species: Members of the family Actinostolidae (smooth deepsea anemones).

References: Dunn, D. F. (1983). *Some Antarctic* and Sub-Antarctic sea anemones. (Coelenterata: Ptychodactiaria and Actiniaria). *Biology of the Antarctic Seas XIV Antarctic Research Series 39(1)*: 1–67.

Fautin, D. G. (1984). More Antarctic and Subantarctic sea anemones. (Coelenterata: Corallimorpharia and Actiniaria). *Biology of the Antarctic Seas XVI Antarctic Research Series 41(1)*: 1–42.

Phylum Cnidaria
Class Anthozoa
Order Actiniaria (anemones)
Family Liponematidae

Liponema spp. (Deepsea anemones) (LIP)

Distinguishing features: A firm, squat spherical body form. Several short, white and rust coloured radially arranged tentacles visible. Currently identified to genus level only.

Colour: Cream and rust red.

Size: Up to 20 cm.

Distribution: This genus is widely distributed around the world, but poorly described.

Depth: 200 to 1500 m.

Similar species: *Bolocera* spp.

References: Dunn, D. F. (1983). Some Antarctic and Sub-Antarctic sea anemones. (Coelenterata: Ptychodactiaria and Actiniaria). *Biology of the Antarctic Seas XIV Antarctic Research Series 39(1)*: 1–67.

Fautin, D. G. (1984.) More Antarctic and Subantarctic sea anemones. (Coelenterata: Corallimorpharia and Actiniaria). *Biology of the Antarctic Seas XVI Antarctic Research Series 41(1)*: 1–42.

Phylum Cnidaria
Class Anthozoa
Order Alcyonacea (soft corals)
Family Alcyoniidae

Anthomastus (Bathyalcyon) robustus (Gigantic coral) (ARO)

Distinguishing features: Comprises a single very large and fleshy polyp (autozooid) positioned on a conic semi hard-calyx with numerous apertures for the tiny reproductive polyps (siphonozooids). Elliptical encrusting base usually strongly attached to hard substrate or debris.

Colour: Bright red.

Size: Up to 15 cm.

Distribution: Uncommon, located on Bay of Plenty seamounts.

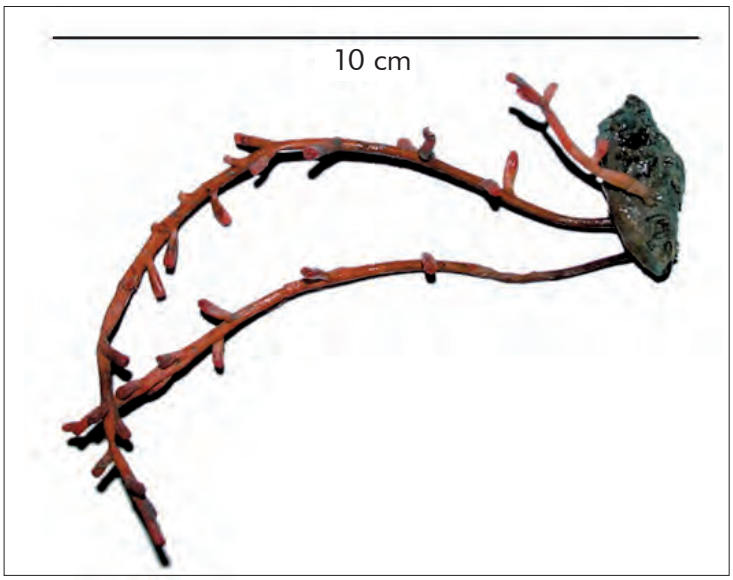
Depth: 200 m.

Similar species: Other *Anthomastus* species have smaller multiple feeding polyps and a mushroom-like shape.

References: Bayer, F.M. (1993). Taxonomic status of the octocoral genus *Bathyalcyon* (Alcyoniidae: Anthomastinae) with descriptions of a new subspecies from the Gulf of Mexico and a new species of *Anthomastus* from Antarctic waters. *Precious Corals & Octocorals Research 1*: 3–13.

Phylum Cnidaria
Class Anthozoa
Order Alcyonacea (soft corals)
Family Clavulariidae

Telesto spp. (Long polyp soft corals) (TLO)



Distinguishing features: Semi rigid, long axial polyps with shorter lateral polyps, occasional branching and budding giving rise to several axial polyps. Polyp wall exhibiting longitudinal branching rows.

Colour: Red, pink, or beige.

Size: Up to 20 cm.

Distribution: Widely distributed both in the New Zealand region and worldwide.

Depth: 5 to 1000 m.

Similar species: *Coelogorgia* spp. and *Telestula* spp. Microscopic examination of sclerites is required for a reliable identification.

References: Bayer, F.M. (1981). On some genera of stoloniferous octocorals (Coelenterata: Anthozoa) with descriptions of new taxa. *Proceedings of the Biological Society of Washington 94(3)*: 878–901.

Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

Phylum Cnidaria
Class Anthozoa
Order Antipatharia (black corals)
Family Antipathidae, Myriopathidae, Aphanipathidae, Stylopathidae, Schizopathidae, Cladopathidae

(Black corals) (COB)

Distinguishing features: Erect, unbranched, bushy, fan-shaped, bottle brush, or pinnulate habit of growth, with a hardened proteinaceous and spiny skeleton that bears tiny polyps usually not more that 6 mm wide and having only six simple tentacles. The skeleton can be naturally lustrous, or rendered so after polishing.

Colour: In life, generally white owing to the external layer of "skin" and polyps although the living material in some species can be yellow or green, orange and red. The skeleton may be brown or black.

Size: Up to 5 m.

Distribution: Antipatharia are found in deep water throughout the EEZ. *Antipathella fiordensis*, previously known as *Antipathes fiordensis*, is endemic to New Zealand's fiords.

Depth: 200 to 1000 m. In New Zealand fiords found in very shallow waters (<10 m).

Similar species: There are numerous genera among the 58 species. Some gorgonians are similar, but these tend to lack the fine spines of black corals.

References: Grange, K.R. (1985). Distribution, standing crop, population structure, and growth rates of black coral in the southern fiords of New Zealand. *New Zealand Journal of Marine and Freshwater Research 19*: 467–475.

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.

Opresko, D.M. (2001). Revision of the Antipatharia (Cnidaria: Anthozoa). Part 1. *Establishment of a new family, Myriopathidae. Zoologische Mededelingen Leiden 75*: 343–370.

PROTECTED

Phylum Cnidaria
Class Anthozoa
Order Antipatharia
Family Leiopathidae

Leiopathes secunda (Leiopathes black coral) (LSE)

CNIDARIA

Distinguishing features: Large, mostly fan-shaped colony; main branches usually appearing somewhat crooked in shape; small branchlets curved and often arising on the outer convex side of the next lower order branchlet. End branchlets short and thin. Thickest branches appearing polished and smooth.

Colour: Orange when alive; whitish after preservation in alcohol. Underlining skeleton black, sometimes visible on living colonies in places where the soft tissue has been lost.

Size: Up to 2 m or more.

Distribution: In New Zealand waters known primarily from off the east and west coasts of the North Island.

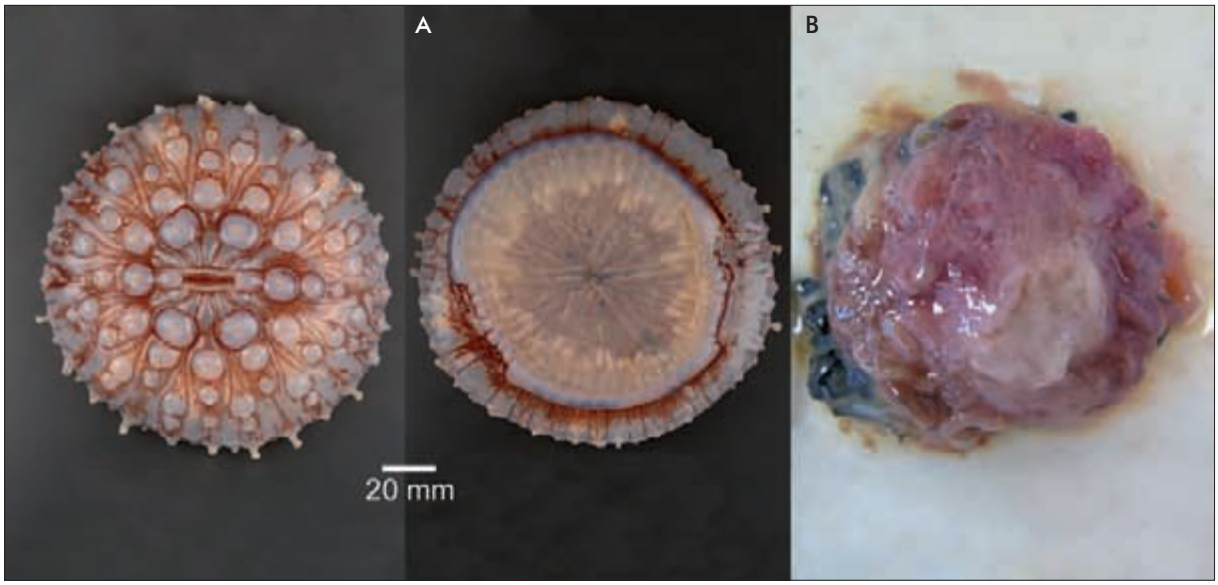
Depth: Primarily from depths of 600 to 1000m.

Similar species: Two other species of *Leiopathes* are known from the area; *Leiopathes acanthophora*, and *Leiopathes bullosa*. In *L. acanthophora* the smallest branchlets are generally straighter, longer and not as regularly arranged as those in *L. secunda*. *Leiopathes bullosa* has a branching pattern somewhat intermediate between that of *L. secunda* and *L. acanthophora*; however, it differs from the other two species primarily in the shape of the skeletal spines, which are more spherical.

References: Opresko, D.M. (1998). Three new species of *Leiopathes* (Cnidaria: Anthozoa: Antipatharia) from Southern Australia. *Records South Australian Museum 31*:99–111.

Phylum Cnidaria
Class Anthozoa
Order Corallimorpharia (coral-like anemones)
Family Corallimorphidae

(Coral-like anemones) (CLM)



Distinguishing features: Corallimorpharians are solitary animals morphologically intermediate between members of hexacorallian orders Actiniaria (sea anemones) and Scleractinia (stony corals). The consistency of the animal can be stiff and cartilaginous (A) or soft with copious mucus (B). The mouth is central and slit-like, tentacles are simple, and may be arrayed radially and in cycles. In members of family Corallimorphidae, each tentacle typically terminates in a bulbous sphere in which nematocysts are dense. The oral and pedal discs are circular and roughly similar in diameter; the oral disc can be flat to strongly domed; the column more or less cylindrical. There are 3 species of *Corallimorphus* in the New Zealand region, including the new species *C. niwa* (A). *C. profundus* commonly occur in the Ross Sea region and are often in poor condition when sampled by longlines. (see Figure B, pedal view of a frozen then thawed *Corallimorphus* species).

Colour: Pink, cream, yellowish, some brownish and rust red in animals that retain pigmentation.

Size: Diameter 30 to 125 mm.

Distribution: New Zealand deepsea region and Ross Sea.

Depth: 947 to 1773 m in New Zealand waters. Globally 30 to 4429 m.

Similar species: Could be confused with sea anemones such as *Liponema* and *Bolocera*.

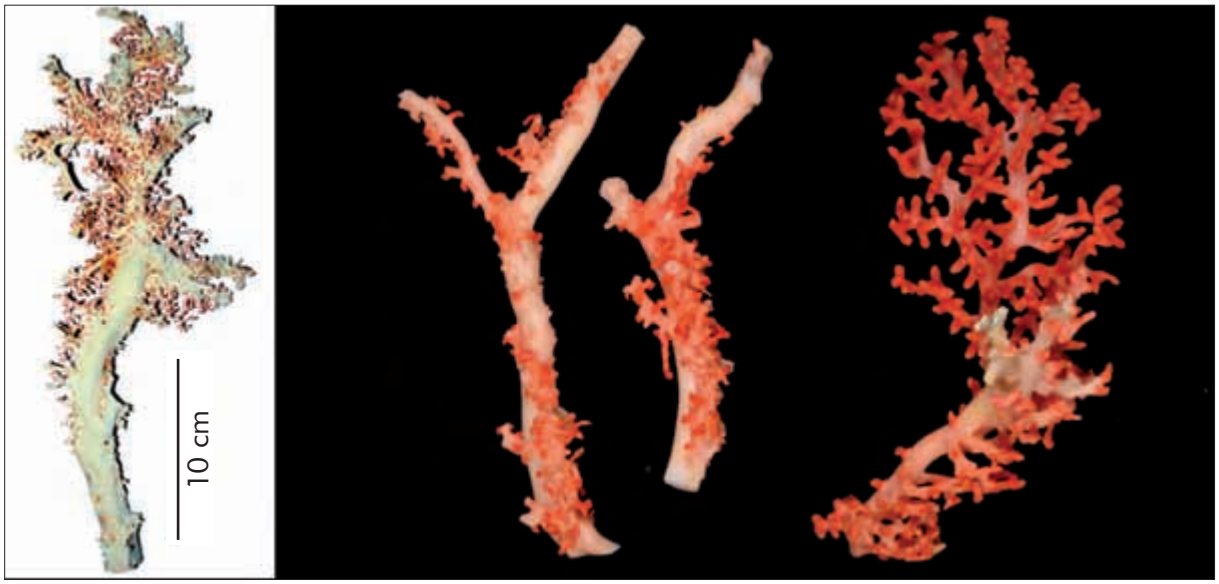
References: Fautin D.G. (2011) *Corallimorphus niwa* new species (Cnidaria: Anthozoa), New Zealand members of *Corallimorphus*, and redefinition of Corallimorphidae and its members. *Zootaxa 2775*: 37–49.

PROTECTED

CNIDARIA

Phylum Cnidaria
Class Anthozoa
Order Alcyonacea (formerly Gorgonacea (gorgonian corals))
Family Coralliidae

Corallium spp. (Precious corals) (CLL)



Distinguishing features: Densely branched coral, usually flattened, with a solid calcareous supporting axis and slender, short, terminal branches. Tiny polyps fully retractile in conical apertures sometimes forming bulb-like clusters. The branching is very like hydrocorals but the precious corals are very hard, and have a thin layer of tissue, usually of a different color than the hard part of the colony and no pores on their skeleton.

Colour: Pale yellow, pink, or red.

Size: Up to 50 cm.

Distribution: Worldwide (deepwater).

Depth: 100 to 1000 m.

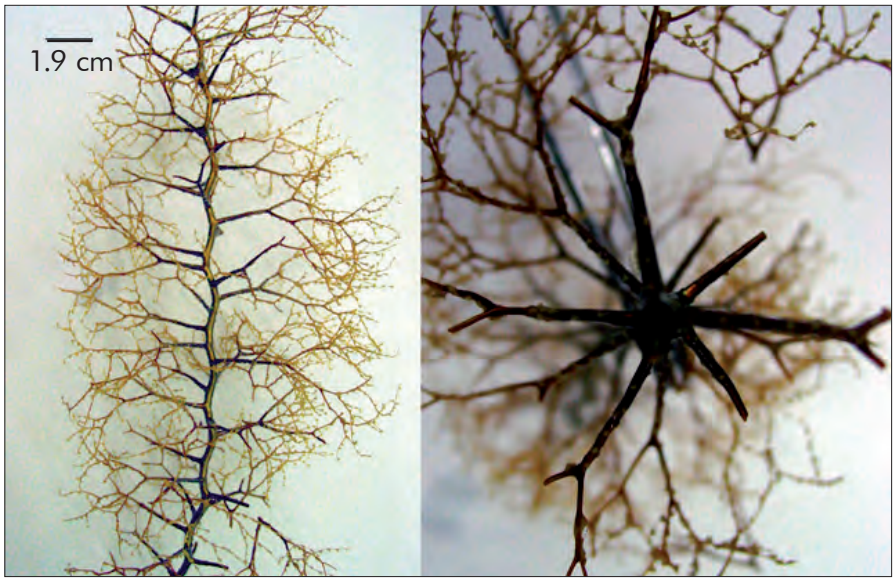
Similar species: Species of *Paracorallium* are indistinguishable from *Corallium* spp. Microscopic examination of sclerites is required for a reliable identification. Can be confused with hydrocorals but hydrocorals have pore-like apertures and no thin layer of tissue that can be scraped off the branch.

References: Bayer, F.M. (1996). Three new species of precious coral (Anthozoa: Gorgonacea, genus *Corallium*) from Pacific waters. *Proceedings of the Biological Society of Washington 109*: 205–228.

Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

Phylum Cnidaria
Class Anthozoa
Order Alcyonacea (formerly Gorgonacea (gorgonian corals))
Family Chrysogorgiidae

Chrysogorgia spp. (Golden corals) (CHR)



Distinguishing features: Dark, highly calcified colonies with bottlebrush branching arising from a regular single and ascending spiral around the main branch. Polyps large, relative to branch width, soft, few in number and well spaced from each other.

Colour: Black axis with brilliant metallic lustre, branchlets from amber to golden colour.

Size: Up to 1 m.

Distribution: Found worldwide. Widely distributed in New Zealand deepsea region.

Depth: 80 to 2000 m.

Similar species: There are several *Chrysogorgia* species in New Zealand waters ranging in appearance from bottlebrush to sea fan colonies. Fan shape colonies could resemble the apical part of *Metallogorgia* spp.

References: Cairns, S.D. (2001). Studies on western Atlantic Octocorallia (Coelenterata: Anthozoa). Part 1: The genus Chrysogorgia Duchassaing & Michelotti, 1864. *Proceedings of the Biological Society of Washington 114*: 746–787.

Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

PROTECTED

CNIDARIA

Phylum Cnidaria
Class Anthozoa
Order Alcyonacea (formerly Gorgonacea (gorgonian corals))
Family Isididae

(Bamboo corals) (ISI)

Distinguishing features: Bamboo-like coral, with a conspicuously jointed skeleton comprising white calcareous internodes alternating with horny dark gorgonin (hardened protein) nodes.

Colour: White with dark nodes, living tissue pale yellow to brown.

Size: Up to 3 m.

Distribution: Widely distributed in the New Zealand deepsea region on hard seafloor e.g. deep-sea seamounts and ridges.

Depth: 200 to 2000 m.

Similar species: The bamboo coral species can be difficult to identify. The genera *Keratoisis*, *Acanella*, and *Lepidisis* are very similar.

References: Grant, R. (1976). The marine fauna of New Zealand: Isididae (Octocorallia: Gorgonacea) from New Zealand and the Antarctic. *New Zealand Oceanographic Institute Memoir 66*: 1–56.

Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

Phylum Cnidaria
Class Anthozoa
Order Alcyonacea (formerly Gorgonacea (gorgonian corals))
Family Isididae

Acanella spp. (Bushy bamboo coral) (ACN)

Distinguishing features: Bushy bamboo-like coral, white calcareous nodes with horny (hardened protein) internodes, branching from the horny internodes usually two or three branches. Colony base branches as a root.

Colour: White with dark nodes, living tissue white to pale yellow.

Size: Up to 1 m.

Distribution: Widely distributed in New Zealand deep-sea region, on hard seafloor.

Depth: 200 to 2000 m.

Similar species: Other branching genera of Isididae have similar branching set-points in the nodes but they differ in other microscopic characters.

References: Grant, R. (1976). The marine fauna of New Zealand: Isididae (Octocorallia: Gorgonacea) from New Zealand and the Antarctic. New Zealand Oceanographic Memoir 66: 1–56.

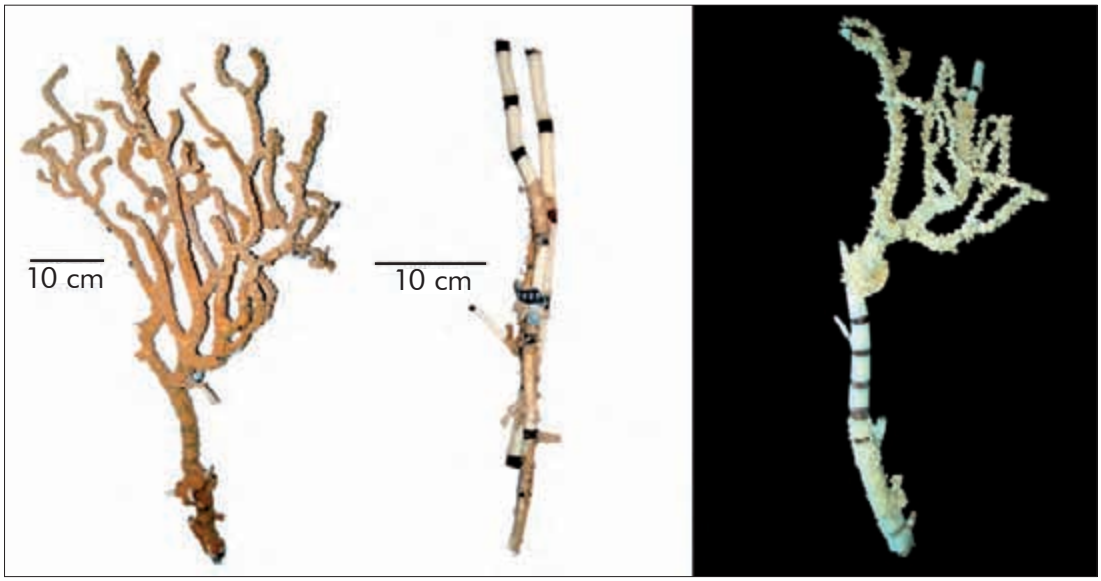
Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

PROTECTED

CNIDARIA

Phylum Cnidaria
Class Anthozoa
Order Alcyonacea (formerly Gorgonacea (gorgonian corals))
Family Isididae

Keratoisis spp. (Branching bamboo coral) (BOO)



Distinguishing features: Bamboo-like coral, with a conspicuously jointed skeleton comprising white calcareous internodes alternating with horny dark gorgonin (hardened protein) nodes. Branching from the calcareous nodes only. Bioluminescent on contact.

Colour: White with dark nodes, living tissue pale yellow to brown.

Size: Up to 3 m.

Distribution: Widely distributed in the New Zealand deep-sea region, on hard seafloor e.g. deep-sea seamounts and ridges.

Depth: Over 200 m.

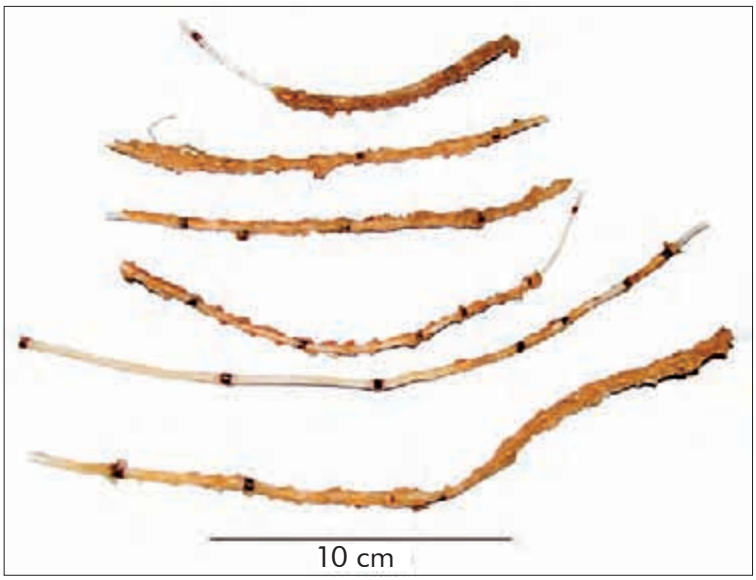
Similar species: The whip-like bamboo coral *Lepidisis* sp. is very similar in appearance but does not branch.

References: Grant, R. (1976). The marine fauna of New Zealand: Isididae (Octocorallia: Gorgonacea) from New Zealand and the Antarctic. *New Zealand Oceanographic Memoir 66*: 1–56.

Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

Phylum Cnidaria
Class Anthozoa
Order Alcyonacea (formerly Gorgonacea (gorgonian corals))
Family Isididae

Lepidisis spp. (Bamboo coral) (LLE)



Distinguishing features: Whip-like, bamboo-like coral, spiral growth. Has a conspicuously jointed skeleton comprising white calcareous internodes alternating with horny dark gorgonin (hardened protein) nodes. Bioluminescent on contact. The genus is under revision.

Colour: White with dark nodes, living tissue pale yellow.

Size: Up to 4 m.

Distribution: Widely distributed in the New Zealand deep-sea region, on hard seafloor e.g. deep-sea seamounts and ridges.

Depth: Over 200 m.

Similar species: Single and long branches of the branching bamboo coral *Keratoisis* spp. are similar in appearance to *Lepidisis* spp.

References: Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

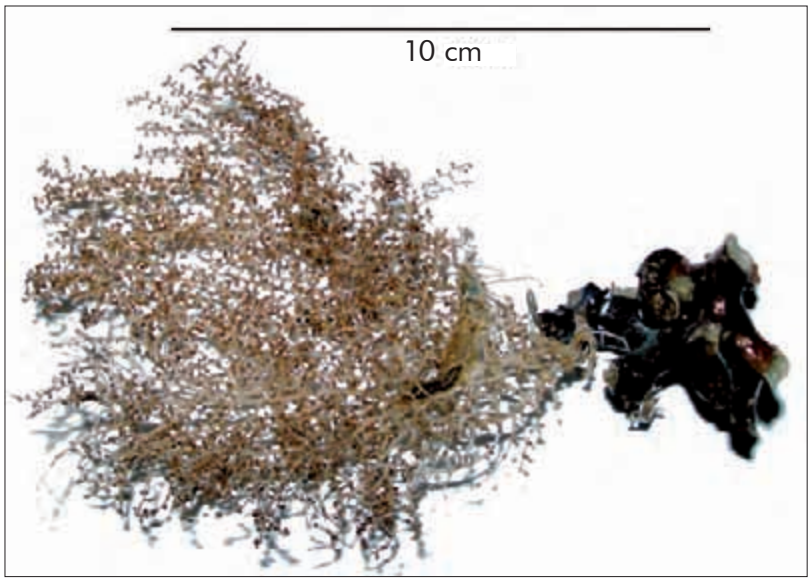
Muzik, K. (1978). A bioluminescent gorgonian, Lepidisis olapa , new species (Coelenterata: Octocorallia) from Hawaii. *Bulletin of Marine Science* 28: 735–741.

PROTECTED

CNIDARIA

Phylum Cnidaria
Class Anthozoa
Order Alcyonacea (formerly Gorgonacea (gorgonian corals))
Family Isididae

Minuisis spp. (Worm-commensal bamboo coral) (MIN)



Distinguishing features: Small bushy colonies of bamboo-like coral, with white nodes and tiny horny dark internodes, severely modified by commensal scale worms. Dense, long, dark, and granular polyps throughout the colonies.

Colour: White with dark polyps.

Size: Up to 15 m.

Distribution: New Zealand and the Norfolk ridge.

Depth: 200 to 2000 m.

Similar species: *Primnoisis* spp., *Sclerisis* spp., and *Echinisis* spp. form very similar colonies. Microscopic examination of sclerites is required for a reliable identification.

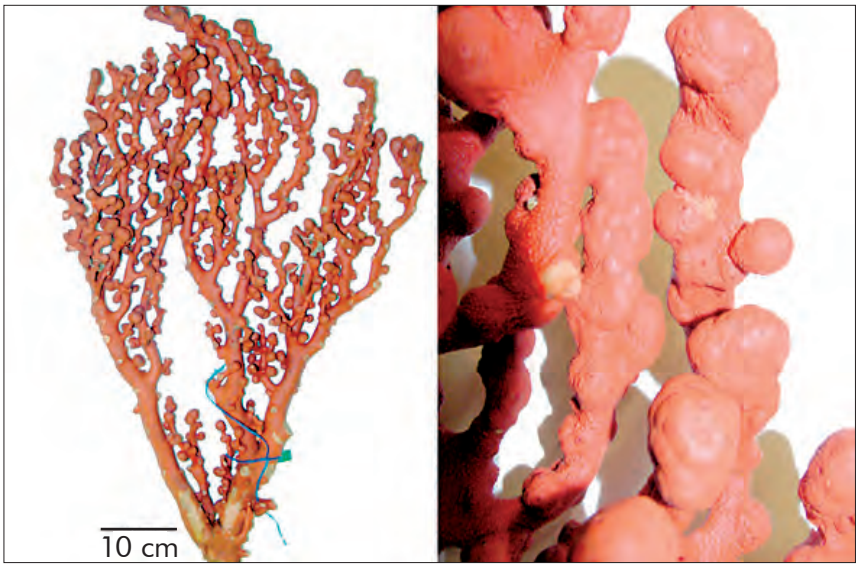
References: Grant, R. (1976). The marine fauna of New Zealand: Isididae (Octocorallia: Gorgonacea) from New Zealand and the Antarctic. New Zealand Oceanographic Memoir 66: 1–56.

Alderslade, P. (1998) Revisionary systematics in the gorgonian family Isididae, with descriptions of numerous new taxa (Coelenterata: Octocorallia). Records of the Western Australian Museum 55: 1–359.

Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

Phylum Cnidaria
Class Anthozoa
Order Alcyonacea (formerly Gorgonacea (gorgonian corals))
Family Paragorgiidae

Paragorgia arborea (Bubblegum coral) (PAB)



Distinguishing features: Robust tree-like colonies with bubble-like concentrations (bulbs) of polyps placed throughout the branches. Colonies up to several metres high (trunk ~ 20–30 cm in diameter). This could be the tallest sessile invertebrate ever found in deepwater. See page 58 for clarification of protected species status.

Colour: Reddish orange.

Size: Up to 5 m.

Distribution: Worldwide. Widely distributed in New Zealand deepsea region.

Depth: 200 to 800 m.

Similar species: There are six more species of *Paragorgia* in New Zealand (e.g., *Paragorgia wahine*) none of them attaining more than 50 cm height.

References: Grasshoff, M. (1979). Zur bipolaren Verbreitung der Oktokoralle *Paragorgia arborea* (Cnidaria: Anthozoa: Scleraxonia). *Senckenbergiana Maritima 11*: 115–137.

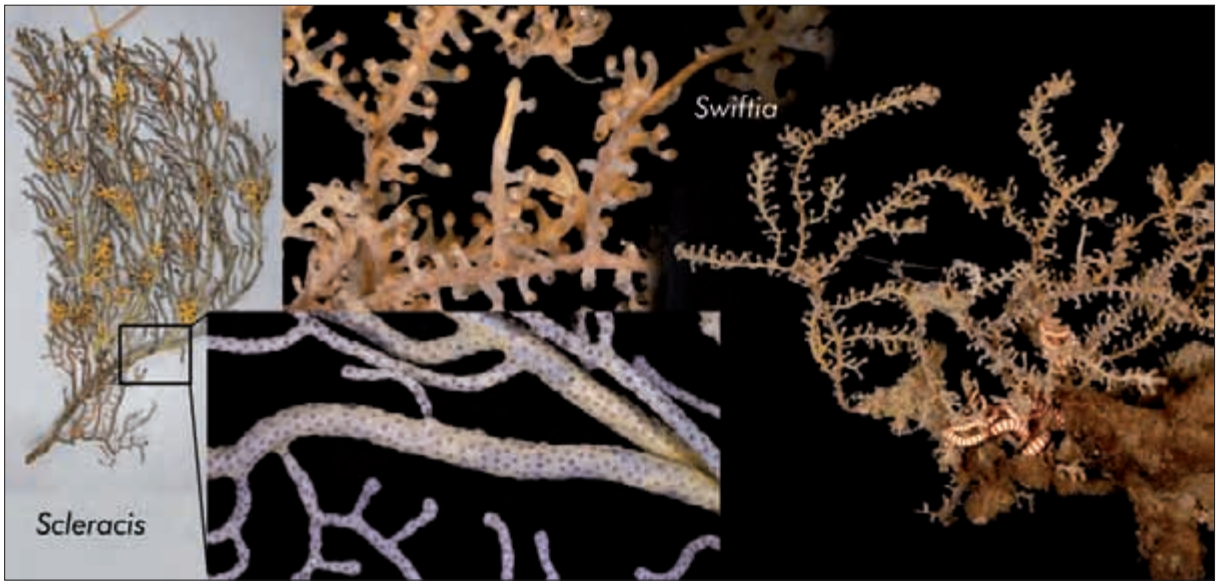
Sanchez, J. A. (2005). Systematics of the bubblegum corals (Cnidaria : Octocorallia : Paragorgiidae) with description of new species from New Zealand and the Eastern Pacific. *Zootaxa 1014*: 3–72.

PROTECTED

CNIDARIA

Phylum Cnidaria
Class Anthozoa
Order Alcyonacea (formerly Gorgonacea (gorgonian corals))
Family Plexauridae

(Plexaurid sea fans) (PLE)



Distinguishing features: Plexauridae are a poorly described group. They often form fan-like and flattened, simple branching colonies, with a definite stem or main branch that has a tubular chambered core and is characterised by having cups or calyces but no external calcareous scales. They are flexible and bend easily. Calyces are distributed on all sides of the branches and are fully retractile in an elevated conical aperture. Some calyces are small and dot-like e.g., *Scleracis*, others have calyces which are pronounced and cylindical with a distinct inflated appearance at the tips e.g., *Swiftia*. Other genera include *Trachymuricea*, *Placogorgia*, *Plexaurella*, *Villogorgia*, and *Muriceides*.

Colour: Red, purple, brown.

Size: Up to 1 m.

Distribution: Widely distributed in the New Zealand region.

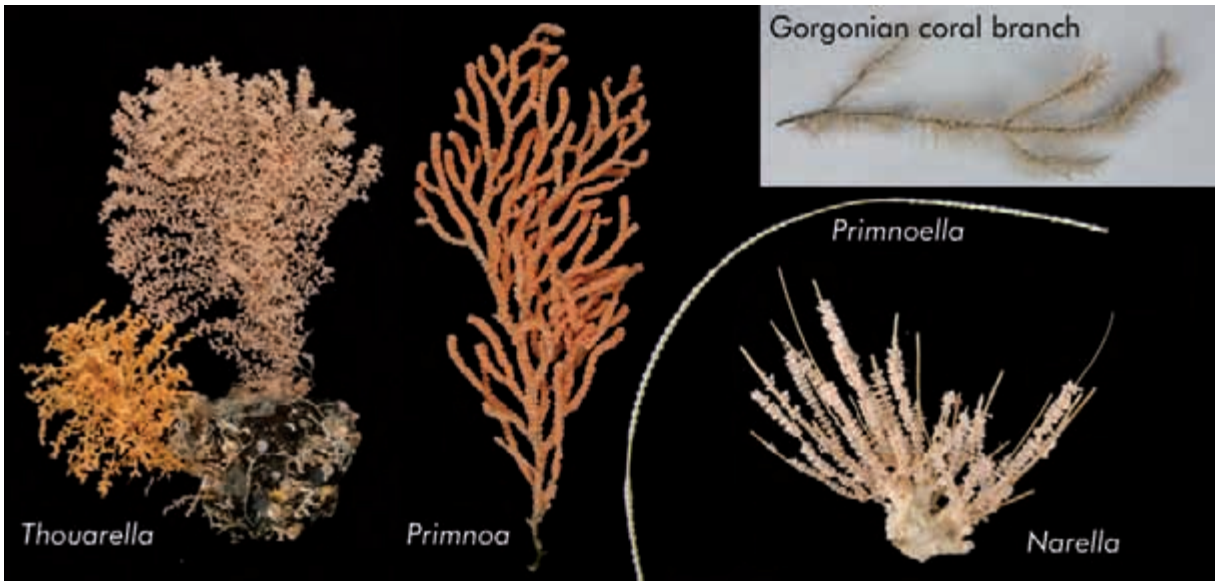
Depth: 47 to 2120 m.

Similar species: Primnoids are similar but their main branch is usually solid all the way through and is composed of concentric layers of calcium carbonate and gorgonin.

References: Bayer, F.M. (1956). Octocorallia. *In*: Moore, R.C. (ed.) Treatise of Invertebrate Paleontology. Part F Coelenterata. Pp. F166–F231. University of Kansas Press, Lawrence.

Phylum Cnidaria
Class Anthozoa
Order Alcyonacea (formerly Gorgonacea (gorgonian corals))
Family Primnoidae

(Primnoid sea fans) (PRI)



Distinguishing features: Primnoidae often form tree-like colonies, have a definite stem and solid axis, and the base is always attached. Branches are flexible and often heavily armoured with overlapping scales, e.g., *Primnoa*. Other branching modes include bottlebrush *Thouarella*, unbranched flagelliform *Primnoella*, and pinnate (feather-like) and often uni-planar forms. Branches of the pinnate form often alternating. A variety of polyp and calyx (cup) shapes and arrangements occur including irregular and individual, clustering in whorls, and upward or downward (e.g., rasta coral *Narella*) facing, that can be perpendicular to the branch, or slightly inclined distally. Some calyces bend and almost touch the branch in an appressed state, or lie flat and can be strongly wedded to the branch (adnate state).

Colour: White, yellow, pink, orange, grey, brown.

Size: Up to 2 m.

Distribution: Widely distributed in the New Zealand region.

Depth: 37 to 2407 m.

Similar species: Chrysogorgids, but they lack the external protective armoured scales. Unbranched Primnoids could be confused with the uni-linear golden coral *Radicipes* but *Radicipes* whirls and twists, does not branch, and polyps are on one side. Isidids (bamboo corals) covered in live polyps e.g., *Keratoisis*, but their calcareous nodes and gorgonian inter-nodes are distinctive. Small branchlets of both black corals and gorgonian corals can be confused (e.g., see gorgonian branch in top right image).

References: Cairns, S.D.; Bayer, F.M. (2009). A Generic Revision and Phylogenetic Analysis of the Primnoidae (Cnidaria: Octocorallia). *Smithsonian Contributions to Zoology 629*: 1–79.

PROTECTED

CNIDARIA

Phylum Cnidaria
Class Anthozoa
Order Alcyonacea (formerly Gorgonacea (gorgonian corals))
Family Primnoidae

Primnoa spp. (Primnoa sea fans) (PMN)

Distinguishing features: Branching mode dichotomous (repeated bifurcation or a dividing in two of the branches), and usually bushy. Polyps closely spaced, densely packed and thorny and randomly arranged (not in pairs or whorls), but usually facing downward. Polyps lobe-like and fleshy, each covered with 6 longitudinal rows of scales. The adaxial side is largely naked, the side on the face away from the branch, has well developed scales on the polyps (abaxial). Often samples are collected where the branches are naked.

Colour: Vivid orange, axis golden.

Size: Up to 2 m.

Distribution: Widely distributed in the New Zealand region.

Depth: 86 to 1680 m.

Similar species: Could be confused with branches of Paragorgidae bubblegum corals (Paragorgiidae).

References: Cairns, S.D.; Bayer, F.M. (2009). A Generic Revision and Phylogenetic Analysis of the Primnoidae (Cnidaria: Octocorallia). Smithsonian Contributions to Zoology, 629: 1–79.

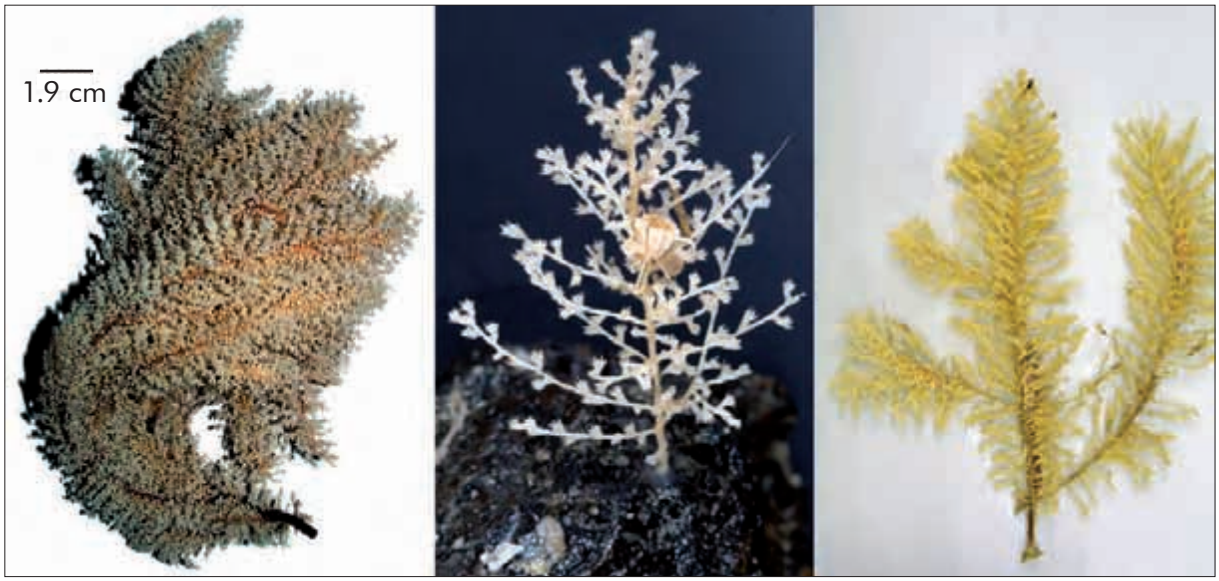
Bayer, F.M. (1952). Two new species of Arthrogorgia (Gorgonacea: Primnoidae) from the Aleutian Islands region. Proceedings of the Biological Society of Washington 65: 63–70.

Bayer, F.M. (1996). New Primnoidae gorgonians (Coelenterata: Octocorallia) from Antarctic waters. *Bulletin of Marine Science 58*: 511–530.

Tracey, D.; Mackay, E.; Gordon D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

Phylum Cnidaria
Class Anthozoa
Order Alcyonacea (formerly Gorgonacea (gorgonian corals))
Family Primnoidae

Thouarella spp. (Bottlebrush coral) (THO)



Distinguishing features: An abundantly branched bottlebrush form that has pinnately or feathery-like branched colonies in which numerous, crowded short slender branchlets arise all around the main stem, sometimes in an irregular fashion, or as spirals. Polyps and branches covered with tiny scales. In some species there can be relatively few main branches, from which branchlets originate in an irregular pinnate fashion. Polyps isolated, occurring on all sides of branchlets with a random or isolated arrangements, can appear crowded on main stems and on all sides of branchlets or arranged in pairs, or whorls on branchlets pointing upward.

Colour: Colony pink, yellow, pale yellow to cream, or light orange. Axis pale yellow to brown-black.

Size: Up to 50 cm.

Distribution: Found worldwide. Widely distributed in the New Zealand deep-sea region.

Depth: 100 to 1400 m.

Similar species: There are numerous species of *Thouarella* all with bottlebrush appearance, the size of the polyps is highly variable. Can be confused with *Tokoprymno* spp. but this genus has calyces arranged biserially, projecting perpendicularly from opposite edges of each branch.

References: Bayer, F.M. (1956). Octocorallia. *In*: Moore, R.C. (ed.) Treatise of Invertebrate Paleontology. Part F Coelenterata. Pp. F166–F231. University of Kansas Press, Lawrence.

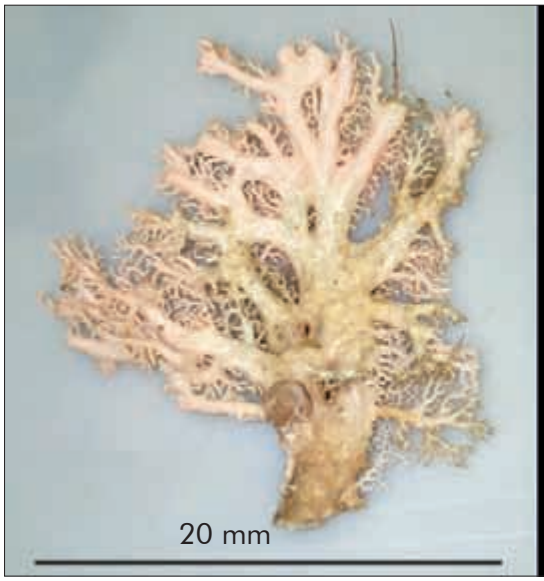
Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

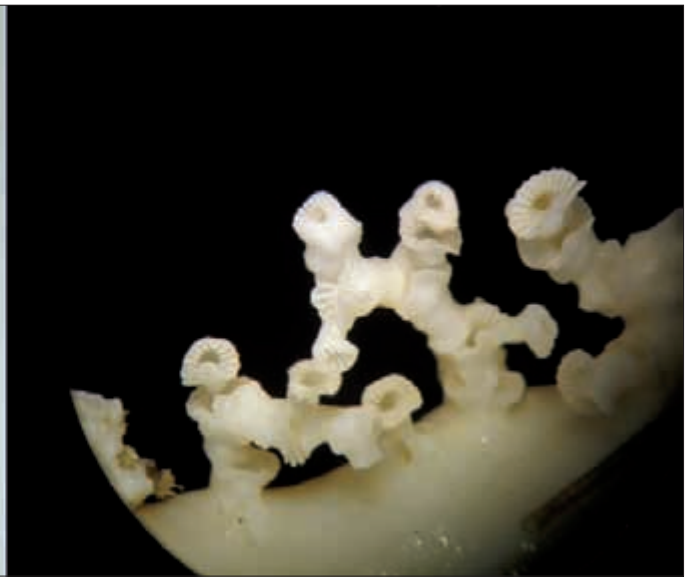
PROTECTED

Phylum Cnidaria
Class Hydrozoa
Order Anthoathecata (hydroids)
Family Stylasteridae

Calyptopora reticulata (White hydrocoral) (CRE)

CNIDARIA





Distinguishing features: Forms hard calcium carbonate skeletons with sinuous and robust main branches and many thin and intricate side branches. Branching occurs in one plane. Branches bear circular structures (termed ciclosystems) which are oriented towards only one side of the colony. Commensal polychaete worms are common on the hydrocoral surface, creating canals and branch deformities.

Colour: Bright white, pink or beige.

Size: Up to 60 mm.

Distribution: Widely distributed in the New Zealand region.

Depth: 600 to 1400 m.

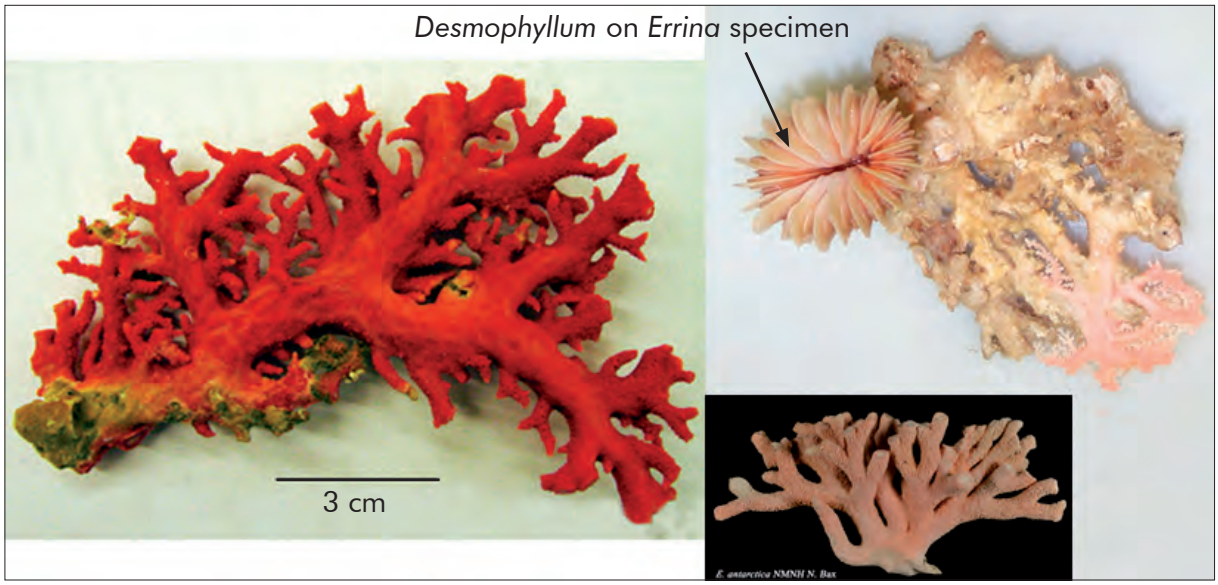
Similar species: Most stylasterids other than some such as *Errina* spp., are very similar and difficult to tell apart with the naked eye. *C. reticulata* is very similar to *Stylaster* spp., the latter, however, have visible bump-like reproductive ampullae towards one side of the colony that are not present in *Calyptopora* spp. Some large white colonies of the precious coral *Corallium* spp. can be confused with stylasterids. However, *Corallium* spp. have a distinctive thin, almost loose, layer of tissue that can be easily removed by scraping the branches, and are harder than stylasterids. *Corallium* spp. do not have the small side branches of *C. reticulata*. Some branching bryozoans can have similar shapes but are somewhat crystalline, have thinner branches, and are without robust main branches.

References: Cairns. S.D. (1991). The marine fauna of New Zealand: Stylasteridae (Cnidaria: Hydroida). *New Zealand Oceanographic Institute. Memoir 103*: 1–179.

Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

Phylum Cnidaria
Class Hydrozoa
Order Anthoathecata (hydroids)
Family Stylasteridae

Errina spp. (Red hydrocorals) (ERR)



Distinguishing features: Branching form, often large with polyps contained in visible pores usually adjacent to spine-like processes.

Colour: Pink to red, some species can be white.

Size: Up to 300 mm.

Distribution: The genus is found worldwide. There are many species endemic to New Zealand. Commonly found on the Subantarctic slope in the Campbell Plateau region, in Fiordland and in Antarctica (see bottom right image of *Errina antarctica*).

Depth: 10 to 1800 m.

Similar species: Most members of *Errina* appear similar to the naked eye. Microscopic examination is required for reliable identification. Note that some large white colonies of the precious coral *Corallium* spp. can be confused with stylasterids, including *Errina*. However, *Corallium* spp. have a distinctive thin, almost loose, layer of tissue that can be easily removed by scraping the branches, and are harder than stylasterids. Some branching bryozoans can have similar shapes but are somewhat crystalline, have thinner branches, and are without robust main branches.

References: Cairns, S.D. (1991). The marine fauna of New Zealand: Stylasteridae (Cnidaria: Hydroida). *New Zealand Oceanographic Institute Memoir 98*: 1–179.

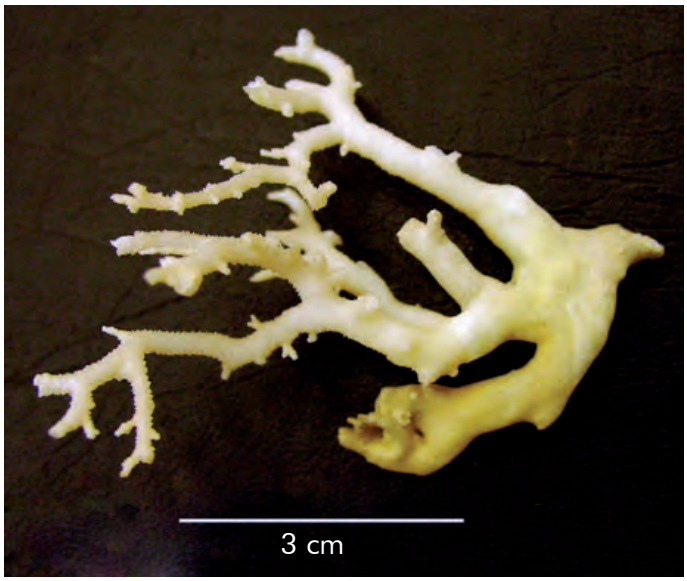
Tracey, D.; Mackay, E.; Gordon, D.;Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

PROTECTED

CNIDARIA

Phylum Cnidaria
Class Hydrozoa
Order Anthoathecata (hydroids)
Family Stylasteridae

Lepidotheca spp. (Spiny white hydrocorals) (LPT)



Distinguishing features: Robust branching hydrocorals comprising a skeleton of calcium carbonate with tiny feeding polyps and stinging polyps. Colony surface has a series of long spines.

Colour: White.

Size: Up to 60 mm.

Distribution: The genus is found worldwide. There are many species endemic to New Zealand.

Depth: 80 to 2010 m.

Similar species: Most members of the Family Stylasteridae appear similar to the naked eye (and can resemble some bryozoans and white colonies of *Corallium*). However, *Corallium* spp. have a distinctive thin, almost loose, layer of tissue that can be easily removed by scraping the branches, and are harder than stylasterids. Microscopic examination is required for reliable identification.

References: Cairns, S.D. (1991). The marine fauna of New Zealand: Stylasteridae (Cnidaria: Hydroida). *New Zealand Oceanographic Institute Memoir 98*: 1–179.

Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

Phylum Cnidaria
Class Anthozoa
Order Pennatulacea (sea pens)
Family Pteroeididae

Gyrophyllum sibogae (Siboga sea pen) (GYS)

Distinguishing features: This unusual sea pen is relatively short and robust with highly modified and very fleshy polyp leaves arranged on both sides of the colony axis.

Colour: Ochre to brown.

Size: Up to 15 cm.

Distribution: Widespread in New Zealand waters, where they are found erect on soft and muddy bottoms.

Depth: 500 to 1200 m.

Similar species: Other sea pens such as *Pennatula*, can also have short and robust colonies but they are never as fleshy and thick as *G. sibogae*.

References: Williams, G.C. (1995). Living genera of sea pens (Coelenterata: Octocorallia: Pennatulacea): illustrated key and synopses. *Zoological Journal of the Linnean Society 113*: 93–140.

Williams, G.C. (1995). The enigmatic sea pen genus *Gyrophyllum* – a phylogenetic reassessment and description of *G. sibogae* from Tasmanian waters (Coelenterata: Octocorallia). *Proceedings of the California Academy of Sciences 48 (15)*: 1–13.

Reyes F.; Arda A., Martin R., Fernandez R., Rueda A., Montalvo D., Gomez C., Jimenez C., Rodriguez J., Sanchez-Puelles J.M. (2004). New cytotoxic cembranes from the sea pen *Gyrophyllum sibogae*. *Journal of Natural Products 67(7)*: 1190–1192.

Phylum Cnidaria
Class Anthozoa
Order Pennatulacea (sea pens)
Family Pennatulidae

Pennatula spp. (Purple sea pen) (PNN)

Distinguishing features: Short sea pen with red to purple fan-like leaves of polyps. The polyps have needle-like ends. Sea pens are adapted to soft and muddy bottom, where they are found standing erect.

Colour: Beige to white stalk with red to purple polyp leaves.

Size: Up to 20 cm.

Distribution: Widespread in New Zealand waters, found erect on soft and muddy bottom.

Depth: 500 to 1200 m.

Similar species: Among the short sea pens, *Pennatula* is the only genus with complex and sharp leaves of polyps. Other sea pens are usually thick and fleshy (e.g., *Gyrophyllum*).

References: Williams, G.C. (1995). Living genera of sea pens (Coelenterata: Octocorallia: Pennatulacea): illustrated key and synopses. *Zoological Journal of the Linnean Society 113*: 93–140.

PROTECTED

Phylum Cnidaria
Class Anthozoa
Order Scleractinia (stony corals)
Family Caryophylliidae

Caryophyllia spp. (Carnation cup coral) (CAY)

CNIDARIA

Distinguishing features: Small solitary cup coral with two unique characteristics: a twisted conical base that ends with a cylinder-like flat top and septa arranged as concentric radial structures in the centre of the oral cavity. A spongy structure (the columella) forms a circle of twisted filaments.

Colour: White with slightly coloured (pink to orange) base.

Size: From 10 to 40 mm wide, up to 5 cm high.

Distribution: Cosmopolitan.

Depth: 700 to 900 m.

Similar species: The twisted conical base and the flat top with centered rings of radial septae make *Caryophyllia* spp. different to other cup corals such as *Desmophyllum*, *Flabellum* and *Stephanocyathus* that all have septa that extend from the coral edge to the center of the cup where a small oral cavity is present.

References: Cairns, S.D. (1995). The Marine fauna of New Zealand: Scleractinia (Cnidaria: Anthozoa). *New Zealand Oceanographic Institute Memoir 103*: 1–210.

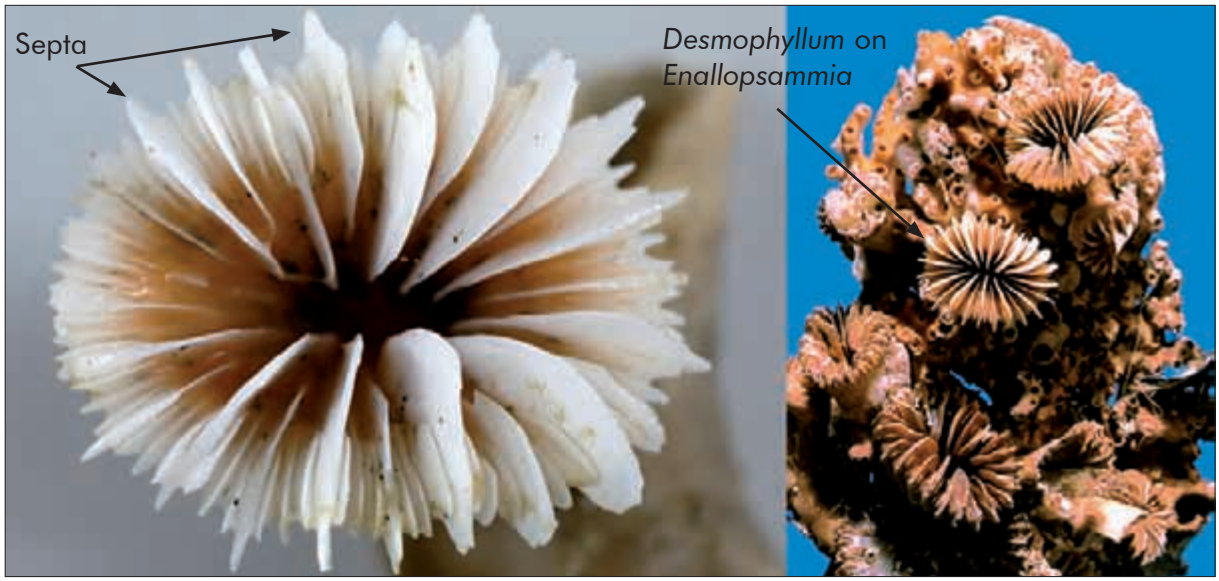
Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

PROTECTED

CNIDARIA

Phylum Cnidaria
Class Anthozoa
Order Scleractinia (stony corals)
Family Caryophylliidae

Desmophyllum dianthus (Crested cup coral) (DDI)



Distinguishing features: Solitary coral. Highly variable forms from cylindrical and serpentine to robust and massive. Radial structures (septa) are oriented from the centre of the cup to edge. Usually fixed to other corals or gorgonian bases and clumped with other individuals.

Colour: White, pale ochre tissue (if present).

Size: Up to 100 mm.

Distribution: Worldwide, except off continental Antarctica and the northern Pacific.

Depth: 35 to 2460 m.

Similar species: *Desmophyllum striatum* is the other valid species of the genus, but this species is only found in the western Atlantic.

References: Cairns, S.D. (1995). The marine fauna of New Zealand: Scleractinia (Cnidaria: Anthozoa). *New Zealand Oceanographic Institute Memoir 103*: 1–210.

Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

Phylum Cnidaria
Class Anthozoa
Order Scleractinia (stony corals)
Family Caryophylliidae

Goniocorella dumosa (Bushy hard coral) (GDU)

Distinguishing features: Forms large bushy colonies with complex branching. Each branch bearing a terminal coral polyp. Most of the branches bud at right-angles with branching occurring from the stem in an intricate way. A key feature is that the branches are reinforced by slender and smooth tubular bridges intersecting the branches. The bridges are long, circular in cross section, and are hollow.

Colour: Brown to ochre (when alive) with orange polyps.

Size: Up to 400 mm.

Distribution: Widely distributed in the New Zealand deepsea region and Indo-Pacific.

Depth: 300 to 1500 m.

Similar species: Similar to other colonial corals particularly *Solenosmilia variabilis*, but bridges are rare in *S. variabilis*. Also similar to *Enallopsamia rostrata* which can also form bushy colonies, but branches in a particular uniplanar way and it lacks the tubular bridges distinctive in *G. dumosa*.

References: Cairns, S.D. (1995). The marine fauna of New Zealand: Scleractinia (Cnidaria: Anthozoa). *New Zealand Oceanographic Institute Memoir 103*: 1–210.

Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

Tracey, D.; Rowden, A.; Mackay, K.; Compton, T. (2011). Habitat-forming coldwater corals show affinity for seamounts in the New Zealand region. *Marine Ecology Progress Series 430*: 1–22.

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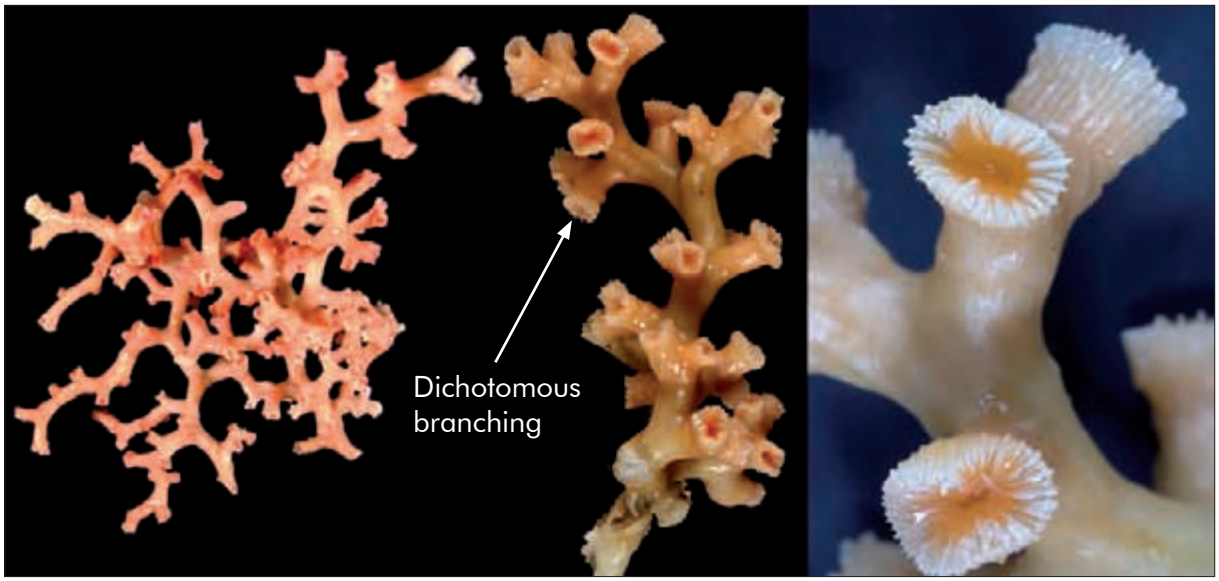
Phylum Cnidaria
Class Anthozoa
Order Scleractinia (stony corals)
Family Caryophylliidae

Solenosmilia variabilis (Deepwater branching coral) (SVA)

CNIDARIA



Distinguishing features: *S. variabilis* form large bushy colonies with equal, three-dimensional branching. A key identification feature is that dichotomous (divides in two or bifurcates) branching occurs from the calyces or polyps in multiple directions and in a "v" shape. May have coenemchymal adhesions or bridges prior to anastomosis (division), but the bridges are rare, solid, and usually elongate (not circular in cross-section).

Colour: Pink (when alive).

Size: Forms large reef-like structures. Colony fragments, fist size pieces, or large sections up to a metre or more taken in trawl.

Distribution: Cosmopolitan and widely distributed in the New Zealand deepsea region.

Depth: 265 to 1700 m.

Similar species: Similar to *Goniocorella* but *S. variabilis* is thicker with branches developing from the calyces and has no tubular bridges. Although also similar to *Madrepora oculata* the equal, intratentacular branching is very distinctive in *S. variabilis*.

References: Cairns, S.D. (1995). The marine fauna of New Zealand: Scleractinia (Cnidaria: Anthozoa). *New Zealand Oceanographic Institute Memoir 103*: 1–210.

Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

Tracey, D.; Rowden, A.; Mackay, K.; Compton, T. (2011). Habitat-forming coldwater corals show affinity for seamounts in the New Zealand region. *Marine Ecology Progress Series 430*: 1–22.

PROTECTED

Phylum Cnidaria
Class Anthozoa
Order Scleractinia (stony corals)
Family Caryophylliidae

Stephanocyathus platypus (Solitary bowl coral) (STP)

Distinguishing features: Circular to elliptical bowl-shaped solitary coral, star-like with 12 pointy and prominent septa. Very fleshy when specimen is alive. This genus is the largest circular solitary coral found in New Zealand waters.

Colour: Brown purplish when alive. Visible parts of the skeleton are bright white.

Size: Up to 9 cm in diameter.

Distribution: Widespread on Lord Howe Rise, eastern Chatham Rise, and Bounty Plateau.

Depth: 700 to 900 m.

Similar species: *Desmophyllum dianthus*, however, *S. platypus* is clearly star-like with pointy and prominent septa. The cup corals *Caryophyllia* spp. are smaller, more robust, and their oral cavity not concave as in S. platypus. There are other *Stephanocyathus* spp. in New Zealand waters but these not as large or as abundant as *S. platypus*.

References: Cairns, S. D. (1995). The marine fauna of New Zealand: Scleractinia (Cnidaria: Anthozoa). *New Zealand Oceanographic Institute. Memoir 103*: 1–139.

Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

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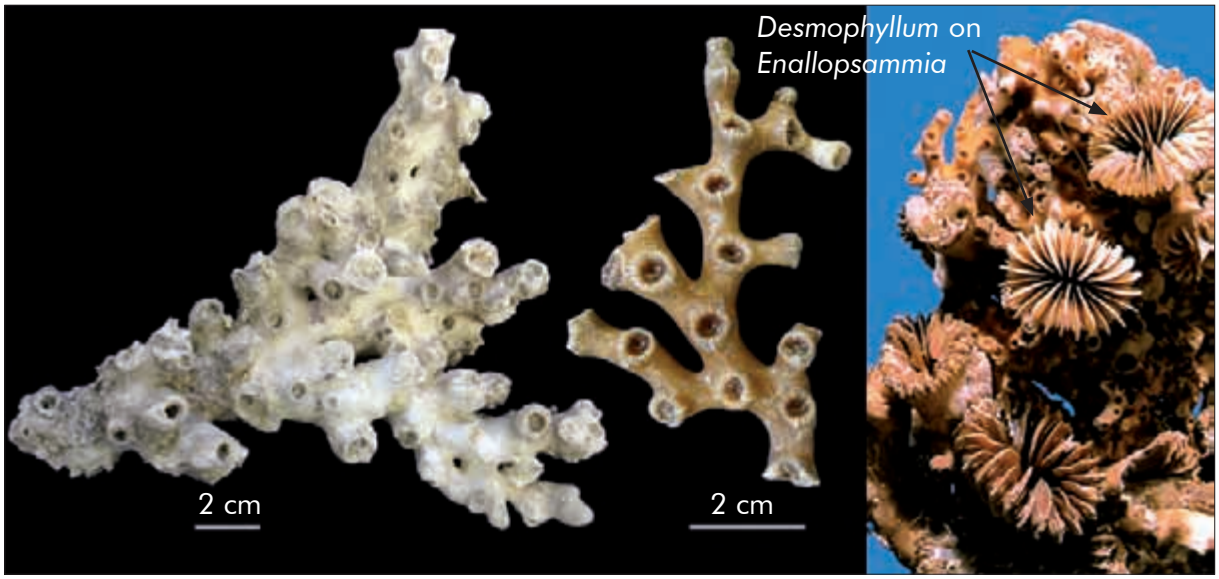
CNIDARIA

Phylum Cnidaria
Class Anthozoa
Order Scleractinia (stony corals)
Family Dendrophylliidae

Enallopsammia rostrata (Deepwater branching coral) (ERO)



Distinguishing features: Forms large uniplanar colonies with occasional branch anastomosis (i.e., branch fusion). Polyp calyces (opening of corallite in which polyp is situated) are visible, circular to elliptical, and confined to only one plane of the coral. Of the four branching corals described, *E. rostrata* has the largest polyps. The image to the right shows the crested cup coral *Desmophyllum* colonising *Enallopsammia*.

Colour: Red brown to ochre (when alive).

Size: Forms large reef-like structures. Colony fragments, fist size pieces, or large sections up to a metre or more taken in trawl.

Distribution: Found throughout the New Zealand region as well as worldwide.

Depth: 200 to 2150 m.

Similar species: Similar to other branching stony coral species particularly *Goniocorella dumosa*, but *E. rostrata* has uniplanar branching and no bridges among branches. *Solenosmilia variabilis* is similar but the branching pattern for this species is dichotomous (divides in two or bifurcates).

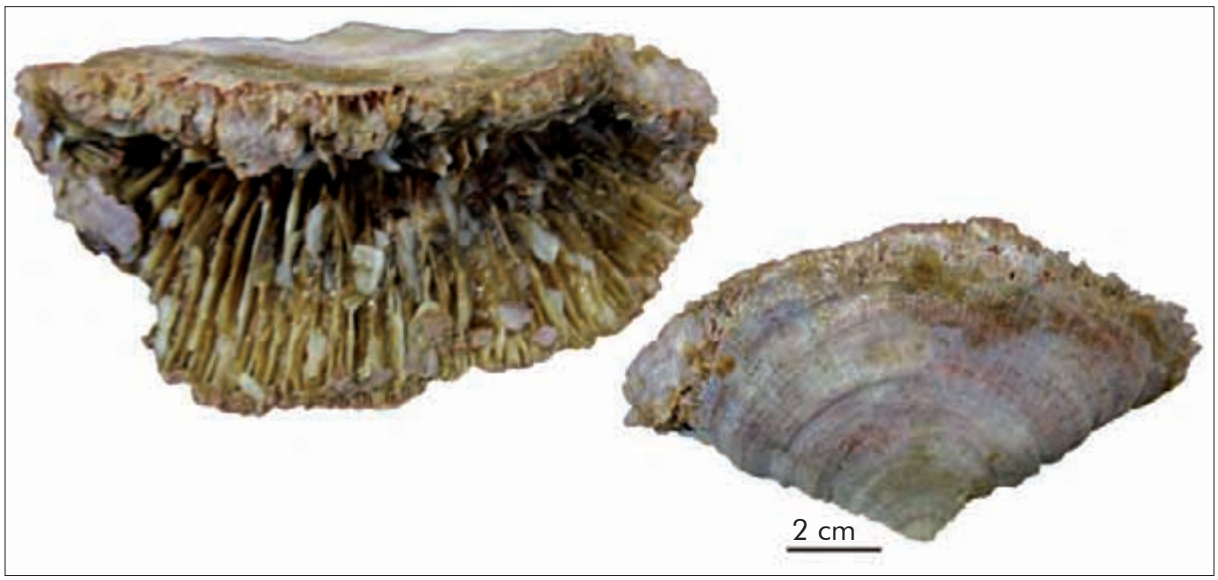
References: Cairns, S.D. (1995). The marine fauna of New Zealand: Scleractinia (Cnidaria: Anthozoa). *New Zealand Oceanographic Institute Memoir 103*: 1–210.

Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

Tracey, D.; Rowden, A.; Mackay, K.; Compton, T. (2011). Habitat-forming coldwater corals show affinity for seamounts in the New Zealand region. *Marine Ecology Progress Series 430*: 1–22.

Phylum Cnidaria
Class Anthozoa
Order Scleractinia (stony corals)
Family Flabellidae

Flabellum spp. (Flabellum cup corals) (COF)



Distinguishing features: Solitary corals, fixed or free, with bell-like or compressed form. Growth ridges evident along the external wall. Coral edges can be either continuous or jagged.

Colour: White, tissue pale ochre.

Size: Up to 50 mm.

Distribution: Worldwide. New Zealand has several endemic species.

Depth: 250 to 1500 m.

Similar species: *Rhizotrochus* spp. Microscopic examination is required for reliable identification to species level.

References: Cairns, S.D. (1995). The marine fauna of New Zealand: Scleractinia (Cnidaria: Anthozoa). *New Zealand Oceanographic Institute Memoir 103*: 1–210.

Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

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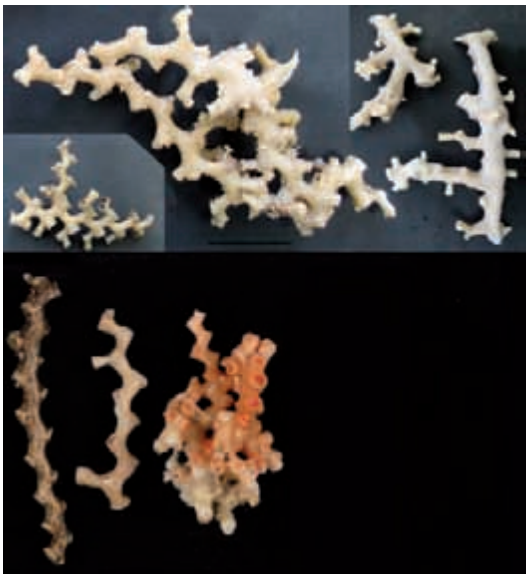
CNIDARIA

Phylum Cnidaria
Class Anthozoa
Order Scleractinia (stony corals)
Family Oculinidae

Madrepora oculata (Madrepora coral) (MOC)



Distinguishing features: Branching coral, has many forms, is usually bushy and is distinguished from other branching corals by having multiple small circular coral calyces (cups) or polyps. Branching occurs just below the calyx. There are 3 different morphs or shapes in New Zealand waters. One morph has calyces that alternate sympodially on each side of thick branches in a flute-like regular orientation. Diameter of polyps ranges from 1.9 to 2.2. mm. Often associated with commensal polychaetes.

Colour: White, with light brown living tissue.

Size: Forms large reef-like structures. Colony fragments, fist size pieces, or large sections up to a metre or more taken in trawl.

Distribution: Worldwide, except Antarctica. Widely distrubuted within New Zealand waters, commonly found on the Chatham Rise.

Depth: 90 to 2850 m.

Similar species: *Oculina virgosa* is a similar but more sparsely and irregularly branched species with larger cup diameter (2.5 to 4.5 mm), and found in northern parts of New Zealand only. Microscopic examination is required for reliable identification to species level.

References: Cairns, S.D. (1995). The marine fauna of New Zealand: Scleractinia (Cnidaria: Anthozoa). *New Zealand Oceanographic Institute Memoir 103*: 1–210.

Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

Tracey, D.; Rowden, A.; Mackay, K.; Compton, T. (2011). Habitat-forming coldwater corals show affinity for seamounts in the New Zealand region. *Marine Ecology Progress Series 430*: 1–22.

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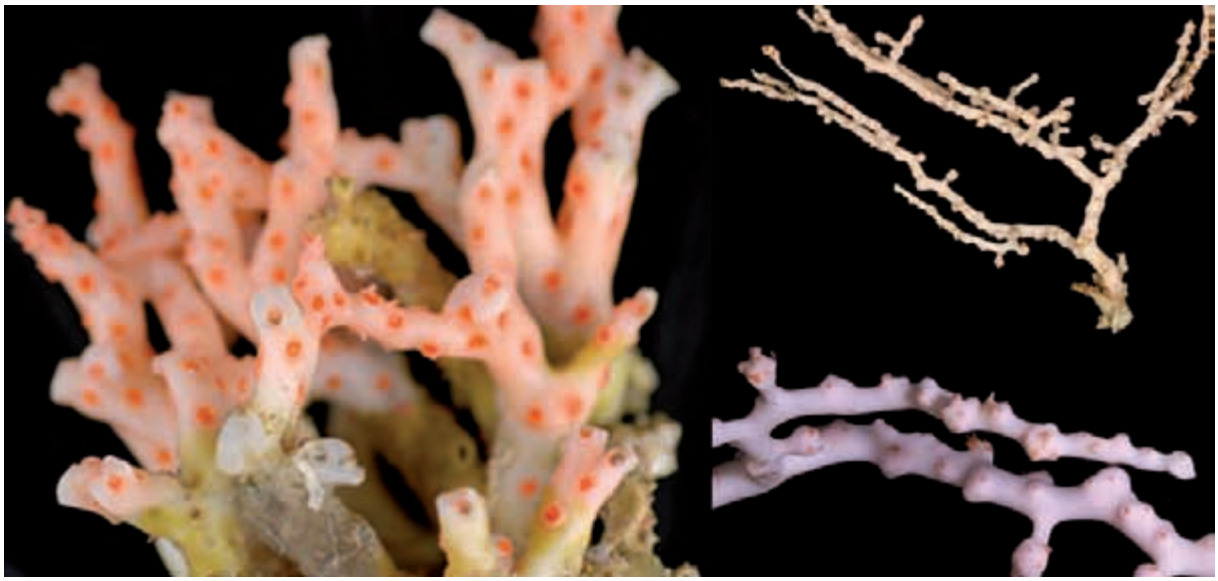
Phylum Cnidaria
Class Anthozoa
Order Scleractinia (stony corals)
Family Oculinidae

Oculina virgosa (Deepwater branching coral) (OVI)



CNIDARIA

Distinguishing features: Sparsely irregularly branched with terminal branches sympodially (in a regular fashion) arranged circular calyces. The branches are thin, calyx (cup) diameter large (2.5 to 4.5 mm).

Colour: Red when alive.

Size: Pinkish red with white skeleton when alive.

Distribution: Forms large reef-like structures. Colony fragments, fist size pieces, or large sections taken in trawl.

Depth: 30 to 800 m.

Similar species: *Madrepora oculata* is similar to *O. virgosa* , but *M. oculata* has thicker branches with alternate and well separated calyces. Microscopic examination is required for reliable identification to species level.

References: Cairns, S.D. (1995). The marine fauna of New Zealand: Scleractinia (Cnidaria: Anthozoa). *New Zealand Oceanographic Institute Memoir 103*: 1–210.

Tracey, D.; Mackay, E.; Gordon, D.; Sanchez, J.; Opresko, D. (2008). A Guide to Deepsea Coral. Report prepared for CSP Unit, Department of Conservation, DOC08309 Project (Objective 3). 15 p.

Tracey, D.; Rowden, A.; Mackay, K.; Compton, T. (2011). Habitat-forming coldwater corals show affinity for seamounts in the New Zealand region. *Marine Ecology Progress Series 430*: 1–22.

Phylum Cnidaria
Class Anthozoa (subclass Hexacorallia)
Order Zoantharia (Zoanthidea)
Family Epizoanthidae, Parazoanthidae, Zoanthidae, Sphenopidae

(Zoanthids) (ZAH)

Distinguishing features: This anemone-like order is taxonomically problematic. Zoanthids can be found on rocks and rubble, or growing attached to living coral branches, hermit crab shells (see *Epizoanthus* spp. EPZ), and on glass sponge stalks (top right image). Zoanthids are mostly colonial, with polyps linked either by a continuous coenenchyme or by stolons. They are often small and erect, sausage or knob-like in shape, with a central aperture (often looking like a simple depression). With the exception of *Savalia* and the undescribed gold parazoanthid (referred to as gold coral), they do not secrete a skeleton. Gold coral is usually gorgonian associated, and as its name applies, secretes a very hard scleroproteic golden skeleton. *Savalia* secretes a dark brown to black skeleton.

Colour: Whitish beige to orange, gold and brown. Colour in the deeper species is often influenced by sediment incrustations.

Size: 1 to 6 mm for the small anemone-like animals and up to 2 m for gold coral colonies.

Distribution: Widely distributed in the New Zealand region. The gold coral found in the New Zealand region may be the same morphologically as the Hawaiian gold coral.

Depth: 0 to 2250 m.

Similar species: Colonial zoanthids can be confused with small sea squirts, branching soft corals, or with large brooding polyps of certain gorgonian corals, e.g., the sea fans *Thouarella* or *Tokoprymno*. Gold corals with little live tissue can be confused with dead branches of gorgonian or black corals.

References: Cairns, S.D.; et al. (2009). Phylum Cnidaria – corals, medusae, and hydroids. In: Gordon, D.P. (ed.), The New Zealand Inventory of Biodiversity. Volume 1, Kingdom Animalia: Radiata, Lophotrochozoa, and Deuterostomia. Canterbury University Press, Christchurch.

Sinniger, F.; Reimer, J. D.; Pawlowski, J. (2008). Potential of DNA Sequences to Identify Zoanthids (Cnidaria: Zoantharia). *Zoological Science 25*: 1253–1260.

Phylum Cnidaria
Class Hexacorallia
Order Zoantharia (Zoanthidea) (zoanthid anemones)
Family Epizoanthidae

Epizoanthus spp. (Zoanthid anemone) (EPZ)

Distinguishing features: A relative of anemones and corals, this leathery anemone-like zoanthid hexacoral settles on shells occupied by hermit crabs. As it grows it envelopes the shell. The budding polyps radiate outwards, giving the colony a cog-like appearance. Tentacles and mesenteries are in multiples of six.

Colour: Purple to pink or brown

Size: 6 to 10 cm.

Distribution: Widely distributed in the New Zealand region.

Depth: 500 to 2000 m. Wide depth range.

Similar species: Twelve species of Zoanthids are described for the New Zealand region. The species shown in the image is most likely *Epizoanthus paguriphilus*.

References: Cairns, S.D.; Gershwin, L.; Brook, F.J.; Pugh, P.; Dawson, E.W.; Ocaña, O.; Vervoort, W.; Williams, G.; Watson, J.E.; Opresko, D.M.; Schuchert, P.; Campbell, H.J.; Wright, A.J.; Sánchez, J.A. (2009). Phylum Cnidaria – corals, medusae, and hydroids. *In*: Gordon, D.P. (ed.), The New Zealand Inventory of Biodiversity. Volume 1, Kingdom Animalia: Radiata, Lophotrochozoa, and Deuterostomia. Canterbury University Press, Christchurch.

Phylum ANNELIDA

Bristle worms, leeches

Geoff Read

Phylum
ANNELIDA
Bristle worms and leeches

Class Polychaeta

Polychaetes are segmented marine worms that have evolved a wide variety of forms in adaptation to many different lifestyles. They can occur in great abundance and are usually a major component of the deep sea benthos. Polychaetes are particularly common crawling and burrowing on or in bottom sediments, but also live in tubes attached to rock surfaces or within growths of sponges, corals, and hydroids. However, polychaetes are relatively small animals that are good at hiding themselves, and thus, with some exceptions, epifaunal worms caught up in trawl bycatch are mostly not easily seen unless carefully looked for.

Class Polychaeta also includes hydrothermal vent and cold seep tube-dwelling worms nourished solely by symbiotic bacteria, apparently unsegmented, and until recently regarded as part of a separate phylum called Pogonophora. Some species of this group occur in New Zealand waters. At least 800 polychaete species in 68 families occur in the New Zealand area, with about 50% of the formally described species endemic. Altogether worldwide there are about 13000 polychaetes known in 83 families.

Typically each polychaete worm segment has many chaetae (bristles)—hence the class name. The chaetae erupt in upper and lower groups from variably developed fleshy lateral lobes or 'feet' called parapodia. It is important to study chaetae when identifying worms as each family has characteristic types, with many of the chaetae intricately and distinctively sculptured. The polychaete head region in wandering agile species often bears eyes, unique chemosensory structures called nuchal organs, and pairs of antennae, palps, and cirri. These may also be present in related tube-dwelling forms, but typically the permanent tube-dwellers have additional feeding and respiratory appendages, such as the tentacular crowns of Sabellidae, whereas sediment-eating burrowing forms generally have much reduced head appendages. Food in many polychaetes is ingested with the aid of an eversible mouth bulb called the proboscis, and this may be armed with pincer-like jaws, particularly in predatory forms.

Polychaetes filter-feed, graze on organic debris, bulk-ingest sediment, or prey on other small animals. They are short-lived, mostly having annual or shorter life spans; their reproductive strategies include free spawning by separate sexes, hermaphroditism, and various degrees of brood care, and polychaete larvae are common in the plankton. Polychaetes are an important part of the deepsea food chain and their soft bodies provide nutritious food for fish and many other predators.

Class Clitellata

Clitellata is the current class name for leeches and oligochaetes as a group, formerly treated separately within Annelida as Classes Hirudinea (comprising all leech families) and Oligochaeta (comprising aquatic oligochaete families plus earthworms). No marine oligochaetes are large enough to be noticed in trawl bycatch, but ectoparasitic fish leeches up to a few centimetres long may occasionally be seen, either detached from their hosts or still affixed. Marine fish leeches belong to the family Piscicolidae; chaetae and lack the cutting jaws of terrestrial leeches, have anterior and posterior suckers and a fixed number of segments, and all are hermaphroditic. There are six species currently reported for New Zealand, but little is known about their ecology or preferred hosts. Additional undescribed species are likely to occur.

Phylum Annelida
Class Polychaeta (bristle worm)
Order Amphinomida
Family Amphinomidae

Chloeia inermis (Fire worm) (CIM)

Distinguishing features: Spindle-shaped with profuse, siliceous, spicule-like chaetae (body lateral view left inset). Head small, sunken, with a cockscomb-like pleated caruncle (right inset). Whip-like dorsal cirri from segment one. Dorsal stalked branched gill pairs from segment 5.

Colour: Believed to be pale. Dorsal cirri ends are a conspicuous purple in preserved specimens.

Size: Total length up to 90 mm.

Distribution: New Zealand wide, especially Chatham Rise and offshore northwest of the South Island.

Depth: 70 to 1050 m. Shelf and slope.

Similar species: Unique. Other bottom-dwelling amphinomids are much smaller and in different genera. Large amphinomids also may occur on floating objects colonised by goose barnacles.

References: Kudenov, J.D. (1993). Amphinomidae and Euphrosinidae (Annelida: Polychaeta) principally from Antarctica, the southern ocean, and subantarctic regions. *Antarctic Research Series 58*: 93–150.

Phylum Annelida
Class Polychaeta (bristle worm)
Order Eunicida
Family Eunicidae

Eunice (undescribed) (Eunice sea-worm) (EUN)

Distinguishing features: Head with 2 cushion-like palps, 5 head antennae, followed by another pair of antennae. Mouth with white plate-like mandibles below a series of toothed jaw plates. Small comb-like pink gills above each lateral 'foot' from 8th segment to end of body.

Colour: Light chocolate brown with paler underside.

Size: Total length up to 220 mm.

Distribution: Chatham Rise and Bay of Plenty region.

Depth: 200 to 250 m.

Similar species: There are a number of described and undescribed *Eunice* in New Zealand waters of various sizes, all superficially rather similar, but varying in body colour, gill development, and morphology of jaw elements and chaetae (bristles erupting on each segment).

References: Fauchald, K. (1992). A review of the genus *Eunice* (Polychaeta: Eunicidae) based upon type material. *Smithsonian Contributions to Zoology 523*. 422 p.

Phylum Annelida
Class Polychaeta (bristle worm)
Order Eunicida
Family Onuphidae

Hyalinoecia tubicola (Quill worm) (HTU)

Distinguishing features: Onuphid worms occupy a tapering quill-like horny tube with protective internal valves at either end (see mid left specimen inside tube). Tube is translucent and circular in cross-section. Worm is an active crawler, dragging tube "house" along.

Colour: Light brown tube and body.

Size: Total length up to 300 mm (tube length).

Distribution: Common on the surface of sediments of New Zealand continental slope.

Depth: 50 to 2800 m. 80% of records occur in the depth zone 100 to 600 m.

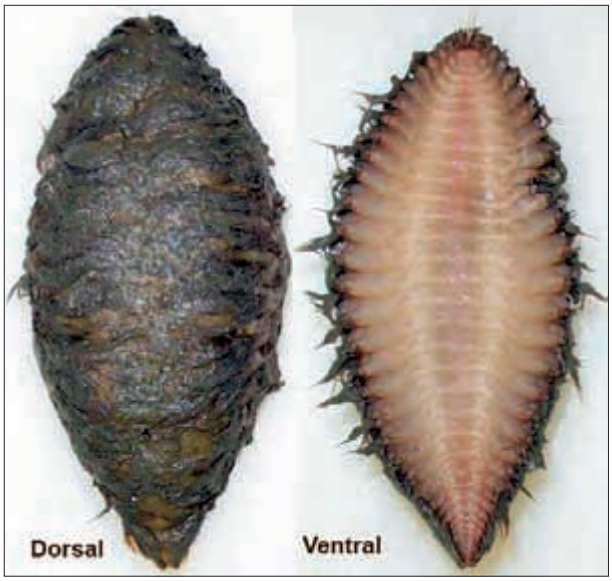
Similar species: *Hyalinoecia incubans*, a smaller species, is very similar. *Leptoecia oxyrhincha* is also smaller and occupies a similar, although flattened, "quill" tube. *H. tubicola* is "cosmopolitan," with the New Zealand form a treated as subspecies, *H. tubicola longibranchiata*, although further evaluation of its status is needed.

References: McIntosh, W.C. (1885). Report on the Annelida Polychaeta collected by H.M.S. 'Challenger' during the years 1873–76. *Report of the Scientific Results of the Exploring Voyage of H.M.S. Challenger 1873–76 12*. 554 p.

Read, G.B. ; Clark, H.E.S. (1999). Ingestion of quill-worms by the astropectinid sea-star *Proserpinaster neozelanicus* (Mortensen). *New Zealand Journal of Zoology 26*: 49–54.

Phylum Annelida
Class Polychaeta (bristle worm)
Order Phyllodocida
Family Aphroditidae

Aphrodita spp. (Sea mouse) (ADT)



Distinguishing features: Body oval in outline, dorsally covered by a matted felt of fine hair, and with intermingled bronze chaetae, as well as 15 pairs of elytra (scales). Ventrally without felt, with finely papillated surface. Facial tubercle present between paired palps on head. Thin median antenna present or absent.

Colour: Grey or brown.

Size: Up to 120 mm. About twice as long as wide.

Distribution: Widely distributed on the continental shelf, including the Chatham Rise, with some deep water records to the east of Mahia Peninsula.

Depth: 20 to 2700 m.

Similar species: There may be four or more *Aphrodita* species in New Zealand waters. Also there are several similar genera differing mainly in details of chaetal morphology and arrangement.

References: Hutchings, P.A.; McRae, J. (1993). The Aphroditidae (Polychaeta) from Australia, together with a redescription of the Aphroditidae collected during the Siboga expedition. *Records of the Australian Museum 45*: 279–363.

Phylum Annelida
Class Polychaeta (bristle worm)
Order Phyllodocida
Family Polynoidae

Thermiphione (undescribed) (Thermiphione scale-worm) (THE)

Distinguishing features: Scale-worm with thirteen pairs of overlapping tough dorsal scales, each with a polygonal surface pattern (inset top right). Dorsal surface under scales (absent in left lower specimen and head-closeup, right image) with near-midline papillae. Head without eyes or antennae, with pair of palps.

Colour: Golden dorsal scales. Body reportedly green in life.

Size: Total length up to 30 mm. About twice as long as wide.

Distribution: Eastern New Zealand on actively volcanic seamounts.

Depth: 230 to 730 m.

Similar species: No other member of genus recorded in New Zealand. However, many Polynoidae look superficially the same if dorsal scales are intact. If unsure use Polynoidae code PYN.

References: Hartmann–Schröder, G. (1992). Zur Polychaetenfauna in rezenten hydrothermalen Komplexmassivsulfiderzen ('Schwarze Raucher') am Ostpazifischen Rucken bei 21° 30′ S. *Helgoländer Meeresuntersuchungen 46*: 389–403.

Miura, T. (1994). Two new scale-worms (Polynoidae, Polychaeta) from the Lau Back-Arc and North Fiji Basins, south Pacific Ocean. *Proceedings of the Biological Society of Washington 107*: 532–543.

Phylum MOLLUSCA

Chitons, bivalves, sea snails, sea slugs, octopus, squid, tusk shell

Bruce Marshall, Steve O'Shea, Darren Stevens
with additional input for squid from Neil Bagley,
Peter McMillan, Reyn Naylor, Di Tracey, Kathrin Bolstad

Phylum

MOLLUSCA

Chitons, bivalves, sea snails, sea slugs, octopus, squid, tusk shells

The mollusca is the second most speciose animal phylum in the sea after Arthropoda. The phylum name is taken from the Latin (molluscus, soft), referring to the soft bodies of these creatures, but most species have some kind of protective shell and hence are called shellfish. Some, like sea slugs, have no shell at all. Most molluscs also have a strap-like ribbon of minute teeth — the radula — inside the mouth, but this characteristic Molluscan feature is lacking in clams (bivalves) and some deep-sea finned octopuses. A significant part of the body is muscular, like the adductor muscles and foot of clams and scallops, the head-foot of abalone, and the mantle and arms of squid and octopus, which makes molluscs an important food source.

New Zealand has 3666 marine molluscan species, of which more than a thousand await formal description. Most of these are minute "micromolluscs", however.

The majority of species are endemic to New Zealand, being found nowhere else in the world. The uniqueness of the New Zealand Mollusca is also exemplified by certain kinds that are biologically or ecologically remarkable. The chiton *Cryptoconchus porosus* has its shell plates wholly internal, a character displayed by only one other species in the world, and *Pseudotonicia cuneata* lives permanently within soft sediments — rare for a chiton. New Zealand's largest mesodesmatid clam, *Paphies ventricosa* (toheroa) is one of the largest in its family worldwide. The patellid limpet *Patella kermadecensis*, which can reach 150 millimetres or more in length and is endemic to the Kermadec Islands, is the only living representative of its family in the EEZ. New Zealand's calliostomatid snails include several that are larger than any others in the world. More than 8.5% of the world's estimated 750 chitons occur within the EEZ.

All seven classes of living Mollusca are found in New Zealand's marine environment, including the deep sea. They are:

Monoplacophora

This "living-fossil" group comprises tiny limpet-like species found on seamounts. There are 6 species, 0 undescribed.

Polyplacophora

Chitons have 8 shell plates, rarely concealed, and a scaly "girdle" around the perimeter of the body in most species. There are 65 species, 10 undescribed.

Aplacophora

In New Zealand, these are worm-like molluscs found in sandy mud. There is no shell. The tiny solenogasters have bristle-like spicules over almost the whole body, a groove on the underside of the body, and no gills. The more worm-like caudofoveates have a groove and fewer spicules but have gills. There are 10 species, 8 undescribed.

Bivalvia

Clams, mussels, oysters, scallops, etc. The shell is in two halves (valves) connected by a ligament and hinge and anterior and posterior adductor muscles. Gills are well-developed and there is no radula. There are 680 species, 231 undescribed.

Scaphopoda

Tusk shells. The body and head are reduced but there is a foot that is used for burrowing in soft sediments. The shell is open at both ends, with the narrow tip just above the sediment surface for respiration. There are 47 species, 36 undescribed.

Gastropoda

Sea snails and sea slugs. The shell is typically coiled but both coiling and a shell may be lacking in some species. The head-foot is well developed and muscular and the radula is mostly well developed but can be greatly modified in ways that are peculiar to particular genera and families. There are 2738 species, 1017 undescribed.

Cephalopoda

Squid and octopus. Unlike tropical nautilus, with its well-developed external shell, squid have an internal shell or support (pen) that is horny, whereas octopods generally lack any internal support. The only real difference between an octopus and a squid is that squid have cuticular rings or hooks arming their suckers, whereas an octopus has suckers that are simple suction discs. Squids have 8 arms and usually 2 tentacles; octopods have 8 arms. In addition to a radula, there are beak-like jaws. The key diagnostic feature for squids are the arms and tentacles but often these can be missing in trawl-caught specimens, particularly from squids with tentacular clubs (hooks). There are 123 species, 23 undescribed, or for which the systematic status has yet to be confirmed.

Phylum Mollusca
Class Bivalvia
Order Limoida
Family Limidae

Acesta maui (Giant file shell) (AMA)

Distinguishing features: Thin, rather fragile shell, externally with very fine longitudinal ridges near sides. Darker markings are due to the presence of a thin external skin, which is much softer than the shell and erodes away easily, especially in more dynamic environments. The external skin is typically best preserved in small to medium-sized specimens.

Colour: Shell white, typically with a patchy, dull brownish external skin.

Size: Total height up to 185 mm.

Distribution: Cook Strait, eastern South Island, Fiordland, Chatham Rise, and Auckland and Campbell Islands.

Depth: 270 to 1170 m.

Similar species: *Acesta saginata* Marshall, 2001 (next page).

References: Marshall, B.A. (2001). The genus *Acesta* H. & A. Adams, 1858 in the southwest Pacific (Mollusca: Bivalvia: Limidae). *In*, Bouchet, P.; Marshall, B.A. (eds), Tropical deep-sea benthos 22. *Memoires de la Muséum National d'Histoire Naturelle 185*: 97–109.

Phylum Mollusca
Class Bivalvia
Order Limoidea
Family Limidae

Acesta saginata (Lesser giant file shell) (ASG)

Distinguishing features: Large, thin, rather fragile shell, externally covered with fine longitudinal grooves.

Colour: White.

Size: Total height up to 116 mm.

Distribution: Seamounts off northern North Island, off Chatham Islands, and Macquarie Ridge.

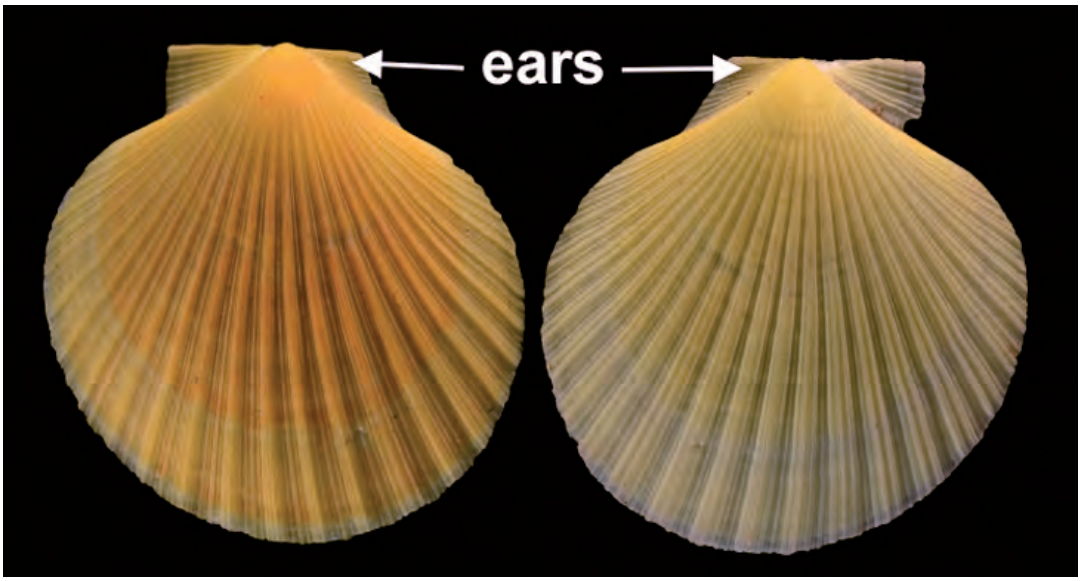
Depth: 1031 to 1650 m.

Similar species: *Acesta maui*.

References: Marshall, B.A. (2001). The genus *Acesta* H. & A. Adams, 1858 in the southwest Pacific (Mollusca: Bivalvia: Limidae). In Bouchet, P. and Marshall, B.A. (eds), Tropical deep-sea Benthos 22. *Memoires de la Muséum National d'Histoire Naturelle 185*: 97–109 (p. 103).

Phylum Mollusca
Class Bivalvia
Order Pectinoida
Family Pectinidae (scallops)

Zygochlamys delicatula (Queen scallop) (QSC)



Distinguishing features: Scallop or fan-shaped shell covered with longitudinal riblets, both valves (halves) inflated; ears on each valve of unequal size.

Colour: Yellow or red.

Size: Total height up to 97 mm.

Distribution: Eastern South Island, western Chatham Rise, Auckland, Bounty, and Campbell Islands, and Macquarie Island.

Depth: 60 to 549 m.

Similar species: *Veprichlamys kiwaensis*, *Talochlamys dichroa*, *T. zelandiae*, *Mesopeplum convexum*.

References: Beu, A. G. (1985). Pleistocene *Chlamys patagonica delicatula* (Bivalvia: Pectinidae) off southeastern Tasmania, and history of its species group in the Southern Ocean. *In*. Lindsay, J.M. (ed.). Stratigraphy, palaeontology, malacology. Papers in honour of Dr Nell Ludbrook. *Department of Mines and Energy, South Australia, Special Publication 5*. 1–11.

Jonkers, H.A. (2003). Late Cenozoic–Recent Pectinidae (Mollusca: Bivalvia) of the Southern Ocean and neighbouring regions. *Monographs of Marine Mollusca 5*. 91 p.

Phylum Mollusca
Class Bivalvia
Order Pectinoida
Family Pectinidae (scallops)

Delectopecten fosterianus (DFO)

Distinguishing features: Shell subcircular, fan-shaped, very thin, fragile and transparent, both valves (halves) inflated, ears on each valve of unequal size. Externally covered with thin, widely spaced, scaly, concentric threads (additional, much finer, more crowded radial threads can be clearly seen only under magnification).

Colour: Colourless and transparent.

Size: Total height up to 24 mm.

Distribution: Throughout the New Zealand EEZ living attached by threads to rocks, corals and glass sponges or hard substrata.

Depth: 376 to 1568 m.

Similar species:

References: Powell, A.W.B. (1979) New Zealand Mollusca. Marine, land and freshwater shells. Collins, Auckland p. 379.

Phylum Mollusca
Class Bivalvia
Order Pectinoida
Family Pectinidae (scallops)

Veprichlamys kiwaensis (VKI)

Distinguishing features: Scallop or fan-shaped shell covered with fine longitudinal riblets, both valves (halves) inflated; ears on each valve of unequal size. Longitudinal riblets smooth near eared-end of shell; roughened with small, sharp scales near opposite end when shell is more than about 15 mm high (additional, much finer, more crowded radial threads between main riblets can be seen only under magnification).

Colour: White or pinkish white, longitudinal riblets pink.

Size: Total height up to 31 mm.

Distribution: Through the New Zealand EEZ, living attached by threads to corals and glass sponges on hard ground.

Depth: 263 to 1130 m.

Similar species: *Zygochlamys delicatula*, *Talochlamys dichroa*, *T. gemmulata*, *T. zelandiae*.

References: Powell, A.W.B. (1979) New Zealand Mollusca. Marine, land and freshwater shells. Collins, Auckland p. 378.

Phylum Mollusca
Class Bivalvia
Order Pholadomyoida
Family Euciroidae

Euciroa galatheae (Euciroa bivalve) (EGA)

Distinguishing features: Shell more or less oval, swollen, sculptured with very fine radial ribs. Fresh uneroded specimens covered with a rough surface caused by densely crowded, minute granules.

Colour: Shell white or pale pink.

Size: Total height up to 63 mm.

Distribution: Eastern North and South Islands, Chatham Rise, and Auckland Islands.

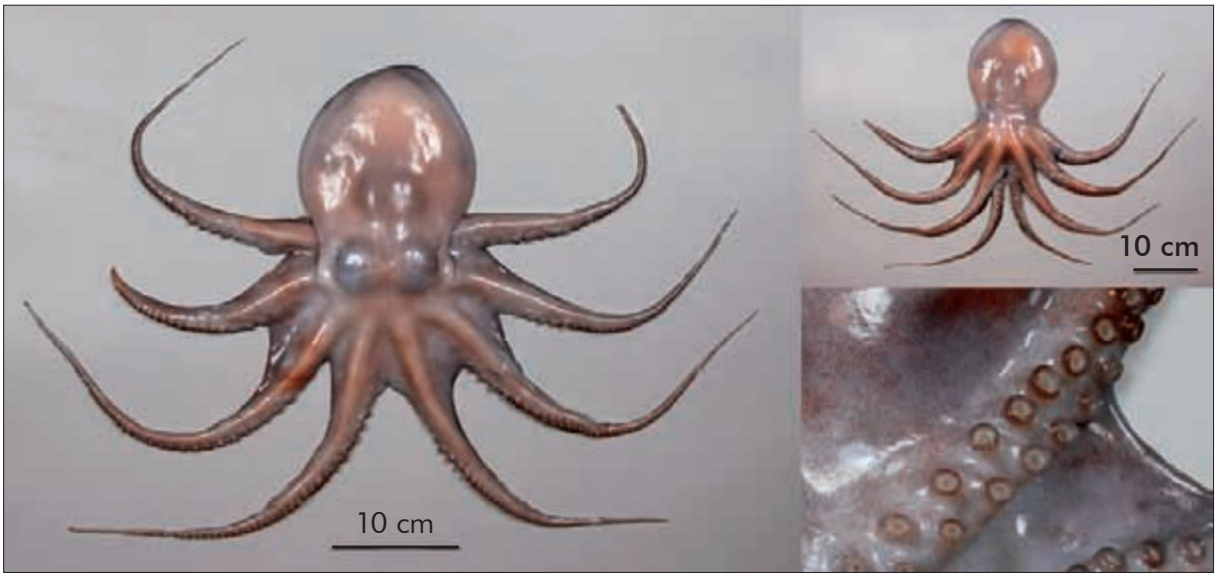
Depth: 400 to 620 m.

Similar species: Hitherto unrecorded species with heavier, more circular shell, occurs on Challenger Plateau and northern seamounts.

References: Powell, A.W.B. (1979). New Zealand Mollusca. Marine, land and freshwater shells. Collins, Auckland.

Phylum Mollusca
Class Cephalopoda
Order Octopoda (Octopods)
Family Octopodidae

Benthoctopus spp. (Deepwater octopus) (BNO)



Distinguishing features: Stocky-bodied octopus, with a large head and mantle, short arms, smooth skin, and suckers in two rows.

Colour: Dark red on undersurface of mantle, head, arms, and web, and light red on other surfaces.

Size: To about 50 cm total length.

Distribution: Challenger Plateau, Bay of Plenty, Wairarapa coast, south to Chatham Rise and Campbell Plateau.

Depth: 500 to 1750 m.

Similar species: Three *Benthoctopus* species occur in New Zealand waters: *B. clyderoperi*, *B. tangaroa*, and *B. tegginmathae*.

References: O'Shea, S. (1999). The marine fauna of New Zealand: Octopoda (Mollusca: Cephalopoda). *NIWA Biodiversity Memoir 112*. 280 p.

Spencer, H.G.; Willan, R.C.; Marshall, B.A.; Murray, T.J. (2011). Checklist of the Recent Mollusca described from the New Zealand Exclusive Economic Zone. http://toroa.otago.ac.nz/pubs/spencer/Molluscs/index.html

Phylum Mollusca
Class Cephalopoda
Order Octopoda (Octopods)
Family Octopodidae

Enteroctopus zealandicus (Yellow octopus) (EZE)

Distinguishing features: Large smooth-bodied octopus with broad, ovoid mantle, and arms subequal in length. All arm pairs have two series of suckers of similar, large size.

Colour: Yellow to orange.

Size: To about 140 cm total length.

Distribution: East coast South Island, Chatham Rise, Southern Plateau.

Depth: 50 to 600 m. Deep in northern; littoral in southern extent of range.

Similar species: The common octopus *Pinnoctopus cordiformis* is dark brown to red and has larger suckers on the dorsal arms progressively decreasing in diameter to ventral arms.

References: O'Shea, S. (1999). The marine fauna of New Zealand: Octopoda (Mollusca: Cephalopoda). *NIWA Biodiversity Memoir 112*. 280 p.

Spencer, H.G.; Willan, R.C.; Marshall, B.A.; Murray, T.J. (2011). Checklist of the Recent Mollusca described from the New Zealand Exclusive Economic Zone. http://toroa.otago.ac.nz/pubs/spencer/Molluscs/index.html

Phylum Mollusca
Class Cephalopoda
Order Octopoda (Octopods)
Family Octopodidae

Graneledone spp. (Deepwater warty octopus) (DWO)

Distinguishing features: Clusters of cartilage-like tubercles/warts on the head, mantle, and arms; single series of suckers down each arm. Ink sac absent.

Colour: Red, variable; maroon to dark red.

Size: To about 68 cm total length.

Distribution: Primarily east coast North Island, East Cape to Chatham Rise.

Depth: 450 to 1500 m.

Similar species: Two species (one with two subspecies) of Graneledone are known from the New Zealand EEZ:
– *Graneledone challengeri* (GCL): small cartilage-like tubercles on the dorsal surface (20 to 30 between eyes), found from the Kermadec Islands to the Chatham Rise.
– *Graneledone taniwha taniwha* (GTA): small to moderate-sized tubercles (12 to 15 between eyes) on the dorsal surface, found from off the Wairapa coast to the Auckland and Campbell Islands.
– *Graneledone taniwha kubodera* (GTA): small tubercles on the dorsal surface (11 to 14 between eyes), found on the Campbell Rise and Bounty Plateau.

References: O'Shea, S. (1999). The marine fauna of New Zealand: Octopoda (Mollusca: Cephalopoda). NIWA Biodiversity Memoir 112. 280 p.

Spencer, H.G.; Willan, R.C.; Marshall, B.A.; Murray, T.J. (2011). Checklist of the Recent Mollusca described from the New Zealand Exclusive Economic Zone. http://toroa.otago.ac.nz/pubs/spencer/Molluscs/index.html

Phylum Mollusca
Class Cephalopoda
Order Octopoda (Octopods)
Family Octopodidae

Octopus spp. (OCO)

Distinguishing features: Small to moderate sized with a small mantle and head, arms of similar length, suckers in two rows and not modified in females.

Colour: Light to dark brown or red.

Size: To about 14 to 68 cm total length, depending on species.

Distribution: Widespread throughout New Zealand.

Depth: 0 to about 600 m, depending on species.

Similar species: There are about 7 true *Octopus* species in New Zealand waters. The common octopus *Pinnoctopus cordiformis* (formerly *O. maorum*) is large-bodied, with the largest suckers on the dorsal arms. The yellow octopus *Enteroctopus zealandicus* is also large, yellow to orange, but the suckers on all arms are a similar size.

References: O'Shea, S. (1999). The marine fauna of New Zealand: Octopoda (Mollusca: Cephalopoda). *NIWA Biodiversity Memoir 112*. 280 p.

Phylum Mollusca
Class Cephalopoda
Order Octopoda (Octopods)
Family Octopodidae

Pinnoctopus cordiformis (Common octopus) (OCT)

Distinguishing features: Animal attains massive size; arms slender, tapering to delicate tips, each arm with two series of suckers. Suckers on dorsal arms largest, progressively decreasing in diameter from dorsal to ventral arms, with those of the ventral arm pair half the diameter of those on the dorsal arm pair.

Colour: Light to dark brown or red.

Size: To about 150 cm total length.

Distribution: North, South, Stewart, and Chatham Islands.

Depth: 5 to 400 m.

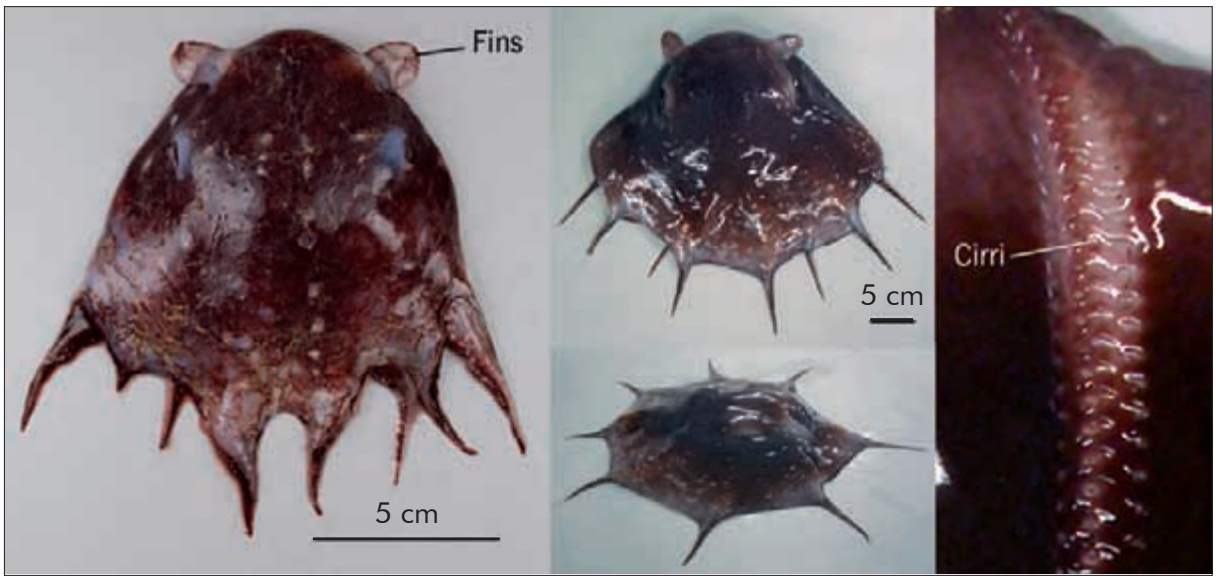
Similar species: *Pinnoctopus kermadecensis* is similar but usually only attains a total length of ~45 cm and it is restricted to intertidal areas of the Kermadec Islands. *Enteroctopus zealandicus* is yellow to orange and all arm pairs have similar sized suckers.

References: O'Shea, S. (1999). The marine fauna of New Zealand: Octopoda (Mollusca: Cephalopoda). *NIWA Biodiversity Memoir 112*. 280 p.

Spencer, H.G.; Willan, R.C.; Marshall, B.A.; Murray, T.J. (2011). Checklist of the Recent Mollusca described from the New Zealand Exclusive Economic Zone. http://toroa.otago.ac.nz/pubs/spencer/Molluscs/index.html

Phylum Mollusca
Class Cephalopoda
Order Octopoda (Octopods)
Family Opisthoteuthididae

Opisthoteuthis spp. (Umbrella octopus) (OPI)



Distinguishing features: Moderate-sized octopus with very compressed bell- or disc-shaped body. Fins small and flap-like. Arms long and deeply embedded in gelatinous web of the mantle tissue, with single series of suckers and long threadlike cirri. Spots may be visible over mantle.

Colour: Purplish red to pink.

Size: To about 36 cm total length.

Distribution: North and South Island (both east and west coasts), Chatham Rise, Campbell Plateau.

Depth: 360 to 1700 m.

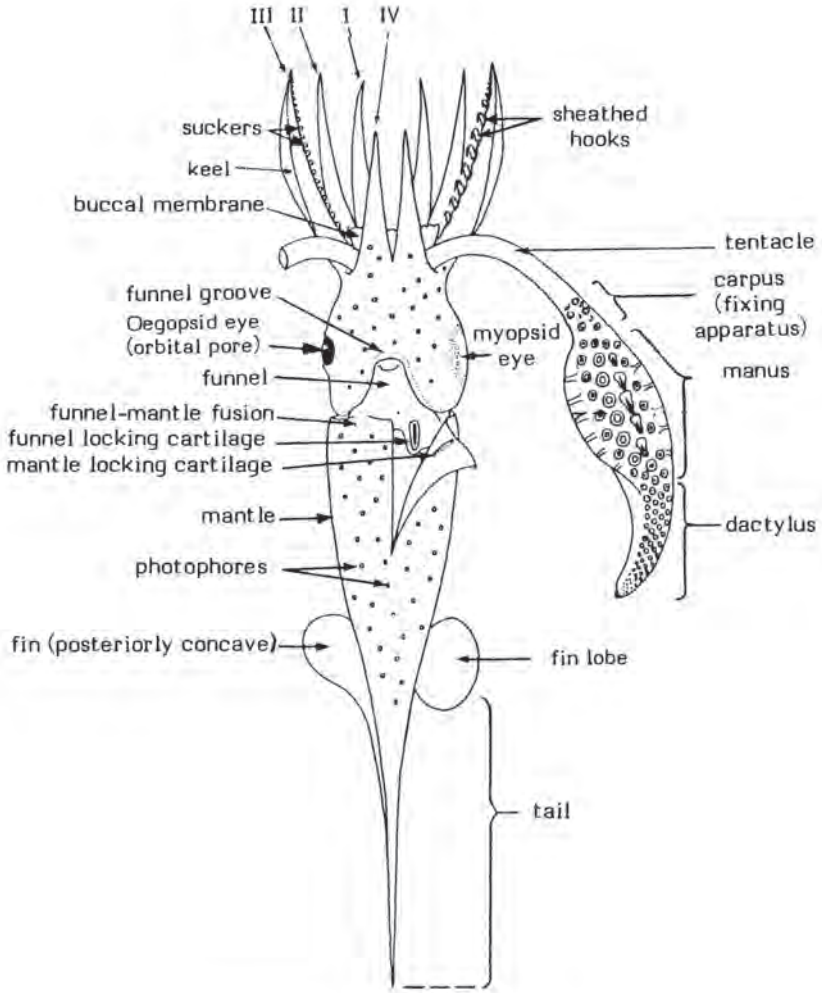
Similar species: Three species recognised in New Zealand waters: *Opisthoteuthis chathamensis*, *O. mero*, and *O. robsoni*.

References: O'Shea, S. (1999). The marine fauna of New Zealand: Octopoda (Mollusca: Cephalopoda). *NIWA Biodiversity Memoir 112*. 280 p.

Spencer, H.G.; Willan, R.C.; Marshall, B.A.; Murray, T.J. (2011). Checklist of the Recent Mollusca described from the New Zealand Exclusive Economic Zone. http://toroa.otago.ac.nz/pubs/spencer/Molluscs/index.html

Technical terms for squids (Teuthoidea)

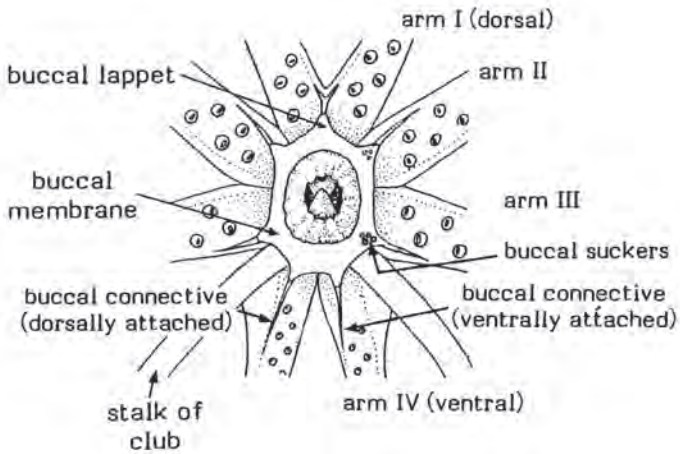
Reproduced from Roper, C.F.E.; Sweeny, M.J.; Nauen C.E. (1984). FAO Species catalogue: 3 Cephalopods of the world. 277p.



a composite diagram illustrating basic squid (teuthoid) features

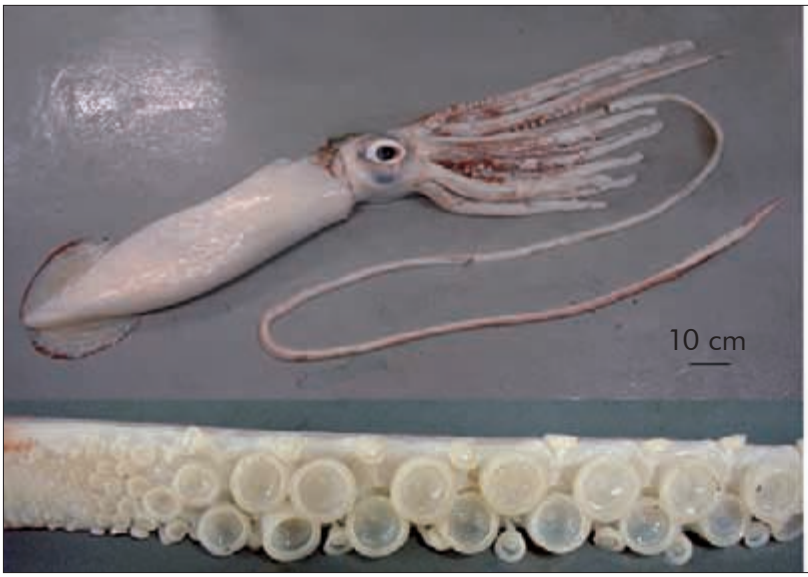
ventral view

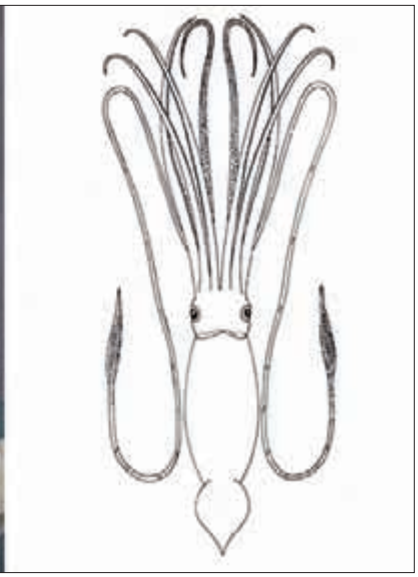
funnel locking-cartilage



Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Architeuthidae

Architeuthis spp. (Giant squid) (GSQ)





Distinguishing features: Very large (to 13 m overall length); 8 arms with 2 rows of small suckers, and 2 very long tentacles, expanded at their ends into paddle-like clubs with enlarged suckers. Small terminal fins. No hooks on arms or tentacles.

Colour: Light pink to red.

Size: To about 2.25 m mantle length. Overall length to about 13 m.

Distribution: Around New Zealand and worldwide.

Depth: About 200 to 1000 m; most frequently captured at about 500 m.

Similar species: *Taningia danae* is also very large but the arms and head combined are shorter than the mantle, and it has large hooks on each arm. *Mastigoteuthis cordiformis* is very large but it has very large ovoid fins down most of mantle. *Onykia* (formerly *Moroteuthis*) sp. is large but has diamond-shaped fins on top half of warty mantle, and hooks on the clubs of short tentacles.

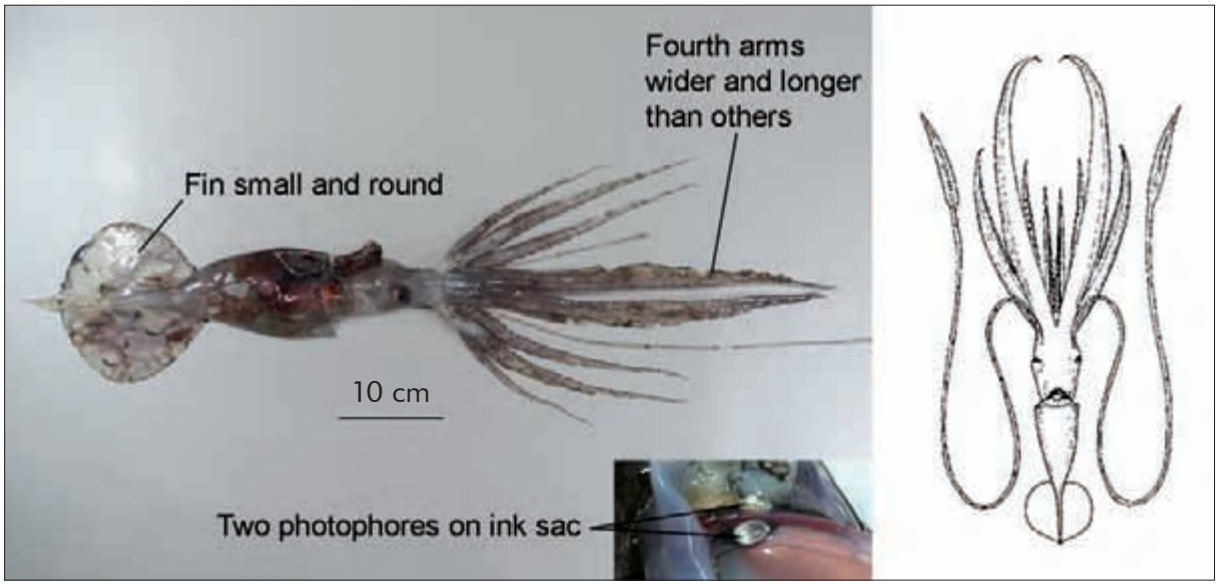
References: Jereb, P.; Roper, C.F.E. (2010). (eds) Cephalopods of the world. An annotated and illustrated catalogue of cephalopod species known to date. Volume 2. Myopsid and Oegopsid Squids. FAO Species Catalogue for Fishery Purposes. No. 4, Vol. 2. Rome, FAO. 2010. 605p.

O'Shea, S. (1977). Giant squid in New Zealand waters. *Seafood New Zealand.* 5 (10): 32–34.

Forch, E.C. (1998). The marine fauna of New Zealand: Cephalopoda: Oegopsida: Architeuthidae (giant squid). *NIWA Biodiversity Memoir 110.*

Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Chiroteuthidae

Chiroteuthis veryani (CVE)



Distinguishing features: Long slender body, gelatinous, fins circular, 4th arms much longer and thicker than other arms with a row of photophores along length. Tentacular club widened with suckers in 4 rows. Small photophores in rows on ventral side of eyeball and 2 photophores on the ink sac.

Colour: Red-purple to crimson.

Size: To about 20 cm mantle length.

Distribution: Circumglobal in Tropical to sub-Antarctic waters.

Depth: Mesopelagic to bathypelagic over deepwater.

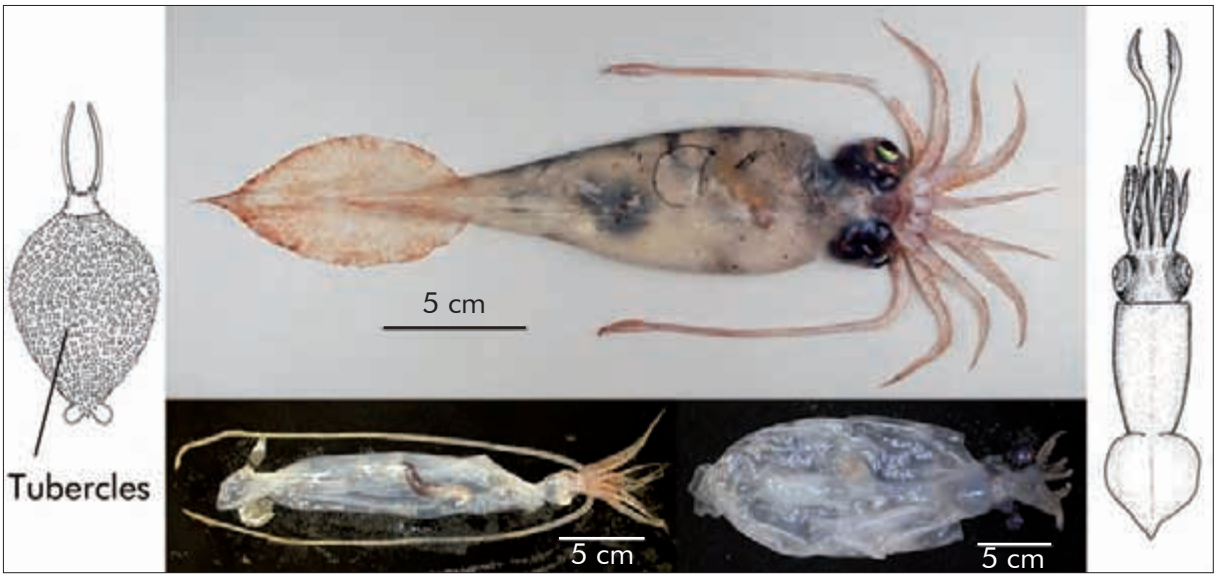
Similar species: *Chiroteuthis mega* is also reported from New Zealand waters but lacks photophores on the ink sac. *M astigoteuthis* spp. (MSQ) are broader, deep red (often appear black when trawl caught), have a larger fin (50-90% mantle length), and the tentacular club is not widened and bears numerous rows of tiny suckers.

References: Roper, C.F.E.; Young, R.E. (2011). *Chiroteuthis veranyi* (Ferussac, 1835). Version 22 November 2011 (under construction). http://tolweb.org/Chiroteuthis_veranyi/19479/2011.11.22 in The Tree of Life Web Project, http://tolweb.org/

Jereb, P.; Roper, C.F.E. (2010). (eds) Cephalopods of the world. An annotated and illustrated catalogue of cephalopod species known to date. Volume 2. Myopsid and Oegopsid Squids. FAO Species Catalogue for Fishery Purposes. No. 4, Vol. 2. Rome, FAO. 605p.

Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Cranchiidae

Cranchiidae (Glass squids) (CHQ)



Distinguishing features: A diverse family distinguished by the mantle being fused to the head at three points (dorsally in the neck region, and to each side of the funnel). Mantle tissue usually thin, transparent in smaller species, sometimes studded with small tubercles. Tentacle clubs usually with four series of suckers, but occasionally two series of hooks.

Colour: Most species transparent (juveniles) to translucent or red (adults).

Size: Most species less than 40 cm mantle length. Colossal squid to 2.5 metres.

Distribution: Widely distributed in New Zealand waters. The largest species, the colossal squid *Mesonychoteuthis hamiltoni*, is circumpolar in Antarctic waters.

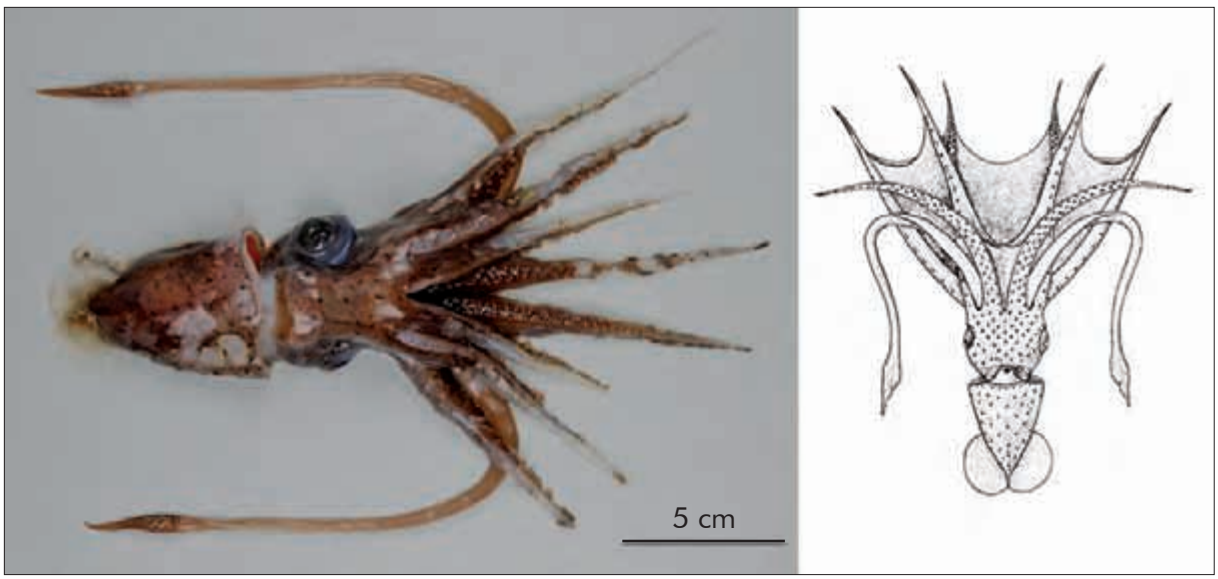
Depth: 200 to 1500 m.

Similar species: This is a diverse group of squid, and the systematics of most species occuring in New Zealand waters has not been adequately resolved.

References: Jereb, P.; Roper, C.F.E. (2010). (eds). Cephalopods of the world. An annotated and illustrated catalogue of cephalopod species known to date. Volume 2. Myopsid and Oegopsid Squids. FAO Species Catalogue for Fishery Purposes. No. 4, Vol. 2. Rome, FAO. 605p.

Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Histioteuthidae

Histioteuthis spp. (Violet squids) (VSQ)



Distinguishing features: Mantle and arms with numerous photophores that are usually large and distinct. Mantle very small relative to head. Left eye much larger than right.

Colour: Mantle, head and arms coloured dark red to violet.

Size: To about 30 cm mantle length.

Distribution: Widely distributed in deepwater around New Zealand.

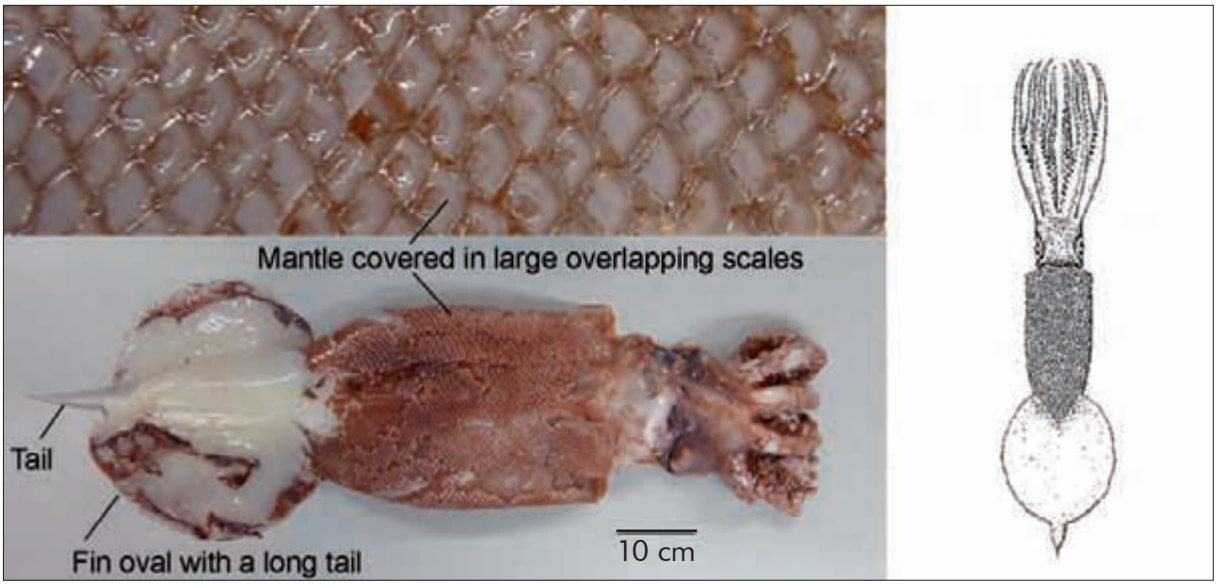
Depth: Adults recorded from 300 to 1400 m (juveniles in surface waters).

Similar species: 7 to 9 species of *Histioteuthis* in New Zealand waters. Distinguished from other families by presence of photophores on mantle and arms.

References: Voss, N.A.; Nesis, K.N.; Rodhouse, P.G. (1998). The cephalopod family Histioteuthidae (Oegopsida): systematics, distribution, and biogeography. *Smithsonian Contributions to Zoology 586*: 293–372.

Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Lepidoteuthidae

Lepidoteuthis grimaldii (Scaled squid) (LGR)



Distinguishing features: Muscular with large diamond-shaped, scale-like dermal cushions covering the mantle, and large oval fins not reaching the end of the mantle. Arm suckers typically have 7 to 9 fang-like teeth on the distal half of the inner ring. In mature males, the 8th sucker of arm 2 is very large and the sucker ring extends to form a prominent hook. Tentacles absent in adults.

Colour: Reddish-brown.

Size: To about 100 cm mantle length.

Distribution: Very rare. Tropical and subtropical regions of the Atlantic, Indian and Pacific Oceans.

Depth: Adults thought to be demersal in deepwater (to at least 1100 m).

Similar species: *Pholidoteuthis massyae* has small scale-like papillate tubercles and a diamond-shaped fin. *Onykia* (formerly *Moroteuthis*) *ingens* and *O. robsoni* have irregular fleshy warts on the mantle, hooks on the tentacle clubs, and sucker rings without teeth.

References: Jackson, G.D.; O'Shea, S. (2003). Unique hooks in the male scaled squid *Lepidoteuthis grimaldii*. *Journal of the Marine Biological Association of the United Kingdom 83*: 1099–1100.

Jereb, P.; Roper, C.F.E. (2010). (eds) Cephalopods of the world. An annotated and illustrated catalogue of cephalopod species known to date. Volume 2. Myopsid and Oegopsid Squids. FAO Species Catalogue for Fishery Purposes. No. 4, Vol. 2. Rome, FAO. 605p.

Young, R.E.; Vecchione, M. (2009). *Lepidoteuthis grimaldii* Joubin, 1895.(http://tolweb.org/Lepidoteuthis_grimaldii/19833/2009.09.11)

Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Loliginidae

Sepioteuthis australis (Broad squid) (BSQ)

Distinguishing features: Eyes enclosed by protective membrane (nearly unique among NZ squid). Fins broad and very long exceeding 90% of mantle length; fin width less than 50% fin length, maximum fin width about midpoint, fin margin weakly angular so that the outline of fins and mantle together is approximately diamond-shaped.

Colour: Pink to reddish-brown.

Size: To about 39 cm mantle length.

Distribution: Coastal, North Island to northern South Island and Australia.

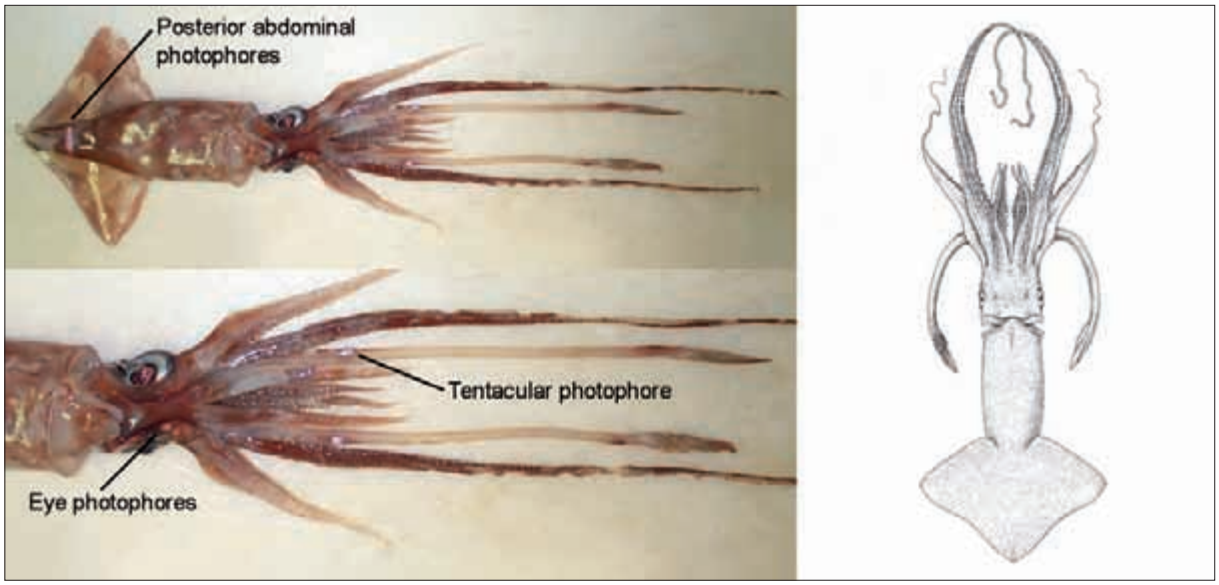
Depth: Coastal to about 100 metres.

Similar species: *Sepioteuthis lessoniana* has broader fins (width up to 75% of fin length, maximum fin width posterior to midpoint), and the fin margin is rounded, so that the outline of fins and mantle together is broadly oval.

References: Jereb, P.; Roper, C.F.E. (2010). (eds). Cephalopods of the world. An annotated and illustrated catalogue of cephalopod species known to date. Volume 2. Myopsid and Oegopsid Squids. FAO Species Catalogue for Fishery Purposes. No. 4, Vol. 2. Rome, FAO. 605p.

Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Lycoteuthidae

Lycoteuthis lorigera (Crowned firefly squid) (LSQ)



Distinguishing features: Cylindrical body, tapering towards wide diamond-shaped fins. 2nd arms greatly elongated in males. Numerous photophores including 5 below the eye, 3 near the end of the abdomen (posterior abdominal - fused together in males), and 2 (more in males) on the tentacular stalk.

Colour: Reddish-brown.

Size: To about 19 cm mantle length (males are larger than females).

Distribution: Recorded southward from southern North Island, widespread throughout the Southern Ocean.

Depth: Mesopelagic to demersal over seamounts and the continental slope. Near surface at night to 600 m during daylight.

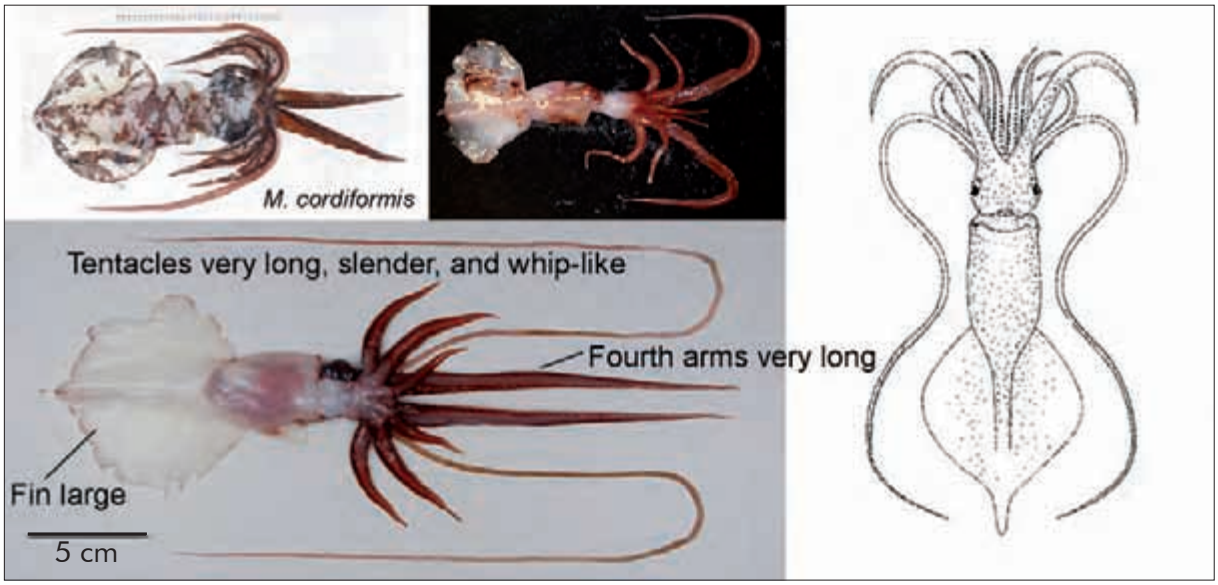
Similar species: *Lampadioteuthis megaleia* has 4 eye photophores and a stalked photophore at the base of each tentacle. *Nematolampus regalis* is known from only two males, taken from the Kermadec Islands, and has greatly elongated third arms (this may apply only to males), and 2nd arms with a single photophore.

References: Vecchione, M.; Young, R.E. 1999. *Lycoteuthis lorigera* (Steenstrup 1875). Version 01 January 1999. http://tolweb.org/Lycoteuthis_lorigera/19738/1999.01.01 in The Tree of Life Web Project, http://tolweb.org/

Jereb, P.; Roper, C.F.E. (2010). (eds) Cephalopods of the world. An annotated and illustrated catalogue of cephalopod species known to date. Volume 2. Myopsid and Oegopsid Squids. FAO Species Catalogue for Fishery Purposes. No. 4, Vol. 2. Rome, FAO. 605 p.

Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Mastigoteuthidae

Mastigoteuthis spp. (Whip-lash squids) (MSQ)



MOLLUSCA

Distinguishing features: Mantle weakly muscled; fins large to very large (50-90% mantle length), circular to oval in outline; 4th arms much longer and thicker than other arms. Tentacles long, whip-like, clubs not well differentiated; nearly entire tentacle covered in small suckers. No obvious photophores on the arms or tentacles.

Colour: Deep red (often appears black when trawl caught).

Size: To about 15-30 cm mantle length.

Distribution: Widespread in Tropical to Antarctic waters.

Depth: Mesopelagic to bathypelagic over deepwater.

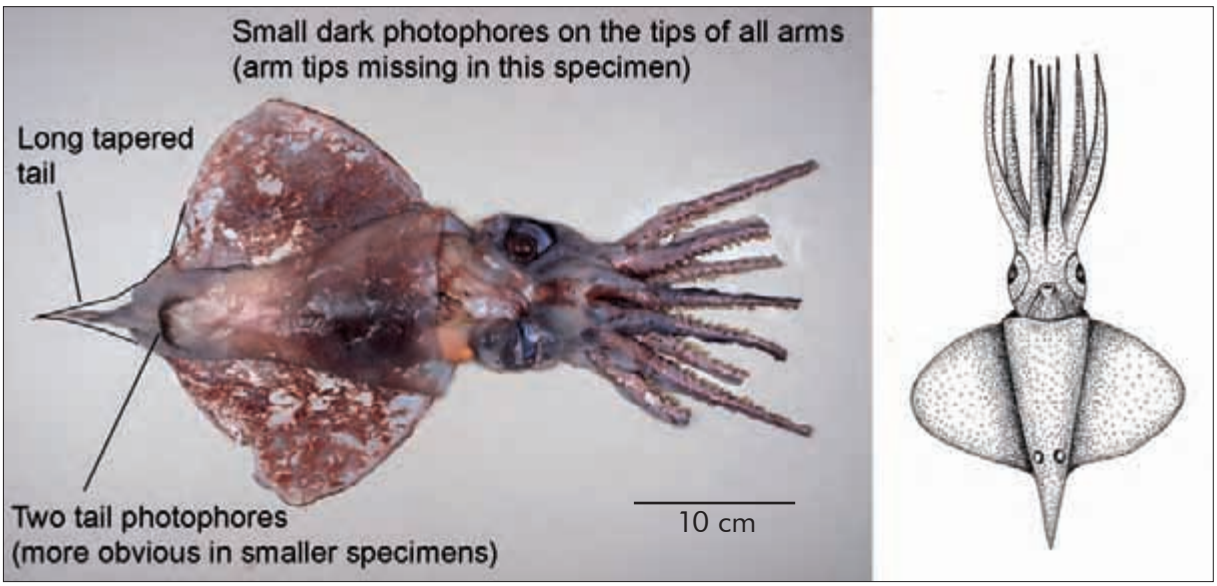
Similar species: A taxonomically confused family. Three *Mastigoteuthis* species reported from New Zealand waters: *M. agassizii*, *M. cordiformis* (which can grow to > 100 cm mantle length, and is placed in *Idioteuthis* by some researchers), and *M. magna*. A fourth species, *M. psychrophila* is Antarctic and may reach north as far as NZ. *Chiroteuthis* species are more slender, red-purple to crimson, have a smaller fin (usually less than 50% mantle length), numerous photophores, and an expanded tentacular club with suckers in 4 rows.

References: Jereb, P.; Roper, C.F.E. (2010). (eds). Cephalopods of the world. An annotated and illustrated catalogue of cephalopod species known to date. Volume 2. Myopsid and Oegopsid Squids. FAO Species Catalogue for Fishery Purposes. No. 4, Vol. 2. Rome, FAO. 605 p.

Vecchione, M.; Young, R.E.; Lindgren, A. (2007). *Mastigoteuthidae Verrill*, 1881. *Mastigoteuthis* Verrill, 1881. Whip-lash squid. Version 19 November 2007 (under construction). http://tolweb.org/Mastigoteuthis/19453/2007.11.19 in The Tree of Life Web Project, http://tolweb.org/

Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Octopoteuthidae

Octopoteuthis spp. (OPO)



Distinguishing features: Mantle broad and weakly muscled, fins large, broad, and muscular, running most of the length of the mantle. No tentacles (except in small juveniles). Arms short and thick with 2 rows of hooks, a small dark tip photophore on the tips of all arms. 1 or 2 large tail photophores.

Colour: Deep red or crimson.

Size: To about 30 to 50 cm mantle length, but usually less than 20 cm.

Distribution: Widely distributed in deepwater around New Zealand, and temparate and tropical waters of all oceans.

Depth: From near the surface to at least 2000 m. Juveniles are found near the surface while adults are found in deepwater but they ascend at night to feed in the upper layers.

Similar species: Two species of *Octopoteuthis* are known from New Zealand waters: *Octopoteuthis megaptera* - pictured above (OCM), and a rare unnamed species that grows much larger (use code OPO). *Taningia danae* (TDQ) has a very large photophore on the tip of each 2nd arm and grows to 150 cm mantle length.

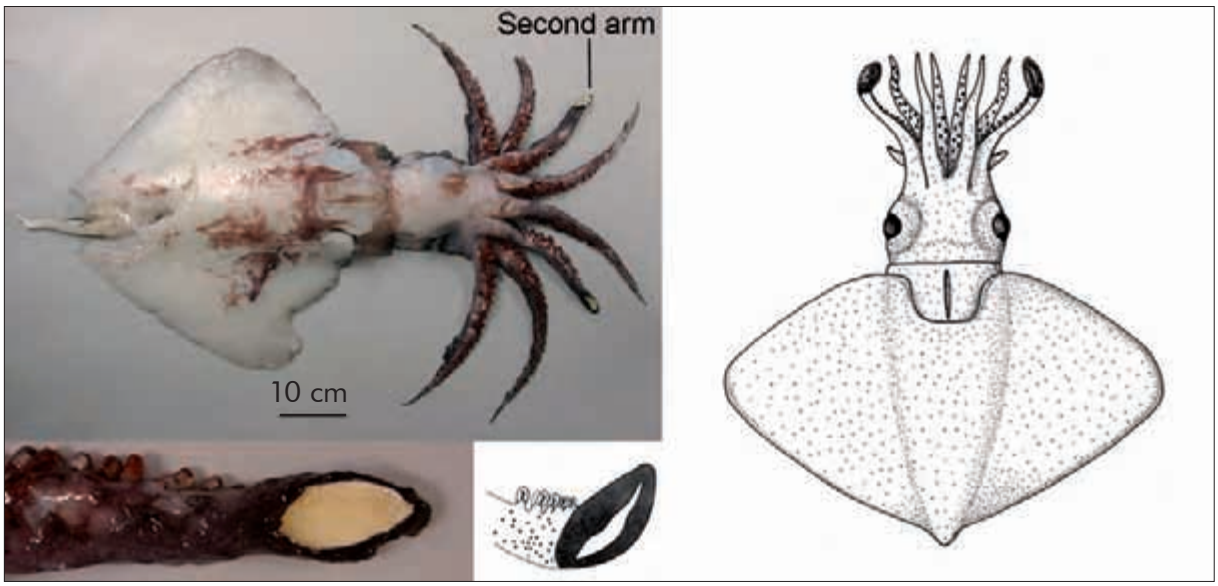
References: Nesis, K.N. (1982). Cephalopods of the World. T.F.H. Publications. 351 p.

Jereb, P.; Roper, C.F.E. (2010). (eds) Cephalopods of the world. An annotated and illustrated catalogue of cephalopod species known to date. Volume 2. Myopsid and Oegopsid Squids. FAO Species Catalogue for Fishery Purposes. No. 4, Vol. 2. Rome, FAO. 605p.

Young, R.E.; Vecchione, M. (2009). *Octopoteuthis* Ruppell 1844. Version 29 December 2009. http://tolweb.org/Octopoteuthis/19839/2009.12.29 in The Tree of Life Web Project, http://tolweb.org/

Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Octopoteuthidae

Taningia danae (Dana octopus squid) (TDQ)



Distinguishing features: Mantle broad and weakly muscled, fins large, broad, and muscular running most of the length of the mantle. No tentacles (except in small juveniles). Arms short and thick with 2 rows of hooks, a large broad creamy white photophore at the tip of each 2nd arm (may be covered by eyelid-like muscular lids). Other arms with no tip photophore. No tail photophores.

Colour: Deep red or crimson.

Size: To about 170 cm mantle length.

Distribution: Widespread in deepwater around New Zealand, and temperate and tropical waters of all oceans.

Depth: From near the surface to at least 1246 m. Juveniles are found near the surface while adults are found in deepwater but they ascend at night to feed in the upper layers.

Similar species: *Octopoteuthis* spp. have photophores on the tips of all arms and 1 or 2 large tail photophores; most species do not exceed 20 cm in mantle length, although one rare undescribed species can reach 50 cm mantle length.

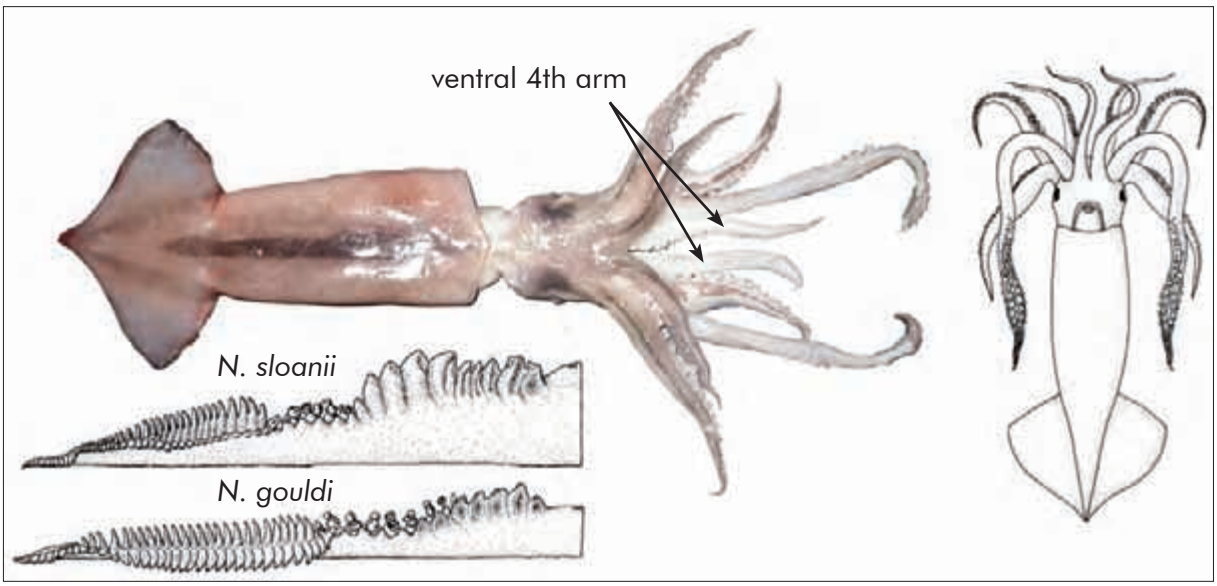
References: Nesis, K.N. (1982). Cephalopods of the World. T.F.H. Publications. 351 p.

Jereb, P.; Roper, C.F.E. (2010). (eds) Cephalopods of the world. An annotated and illustrated catalogue of cephalopod species known to date. Volume 2. Myopsid and Oegopsid Squids. FAO Species Catalogue for Fishery Purposes. No. 4, Vol. 2. Rome, FAO. 605p.

Vecchione, M.; Kubodera, T.; Young, R.E. (2010). Taningia Joubin 1931. Taningia danae Joubin 1931. Version 22 August 2010. http://tolweb.org/Taningia_danae/19840/2010.08.22 in The Tree of Life Web Project, http://tolweb.org/

Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Ommastrephidae

Nototodarus gouldi (Gould's arrow squid) (NOG)



Distinguishing features: Cylindrical body, tapering towards arrow-head shaped fins. 51 or fewer pairs of suckers on arm 1 (middle left arm in dorsal view, looking towards tentacles). 14 to 16 regularly spaced teeth on largest tentacular sucker ring. Has central pocket but lacks side pocket in funnel groove. In males, both 4th (ventral) arms are hectocotylised. Hectocotylised arms with 4 to 6 enlarged proximal tubercles.

Colour: Reddish-brown.

Size: To about 40 cm mantle length.

Distribution: Temperate to subtropical Australian waters, around New Zealand, north of the subtropical convergence.

Depth: Recorded from about 50 to 700 m, most commonly around 300 m.

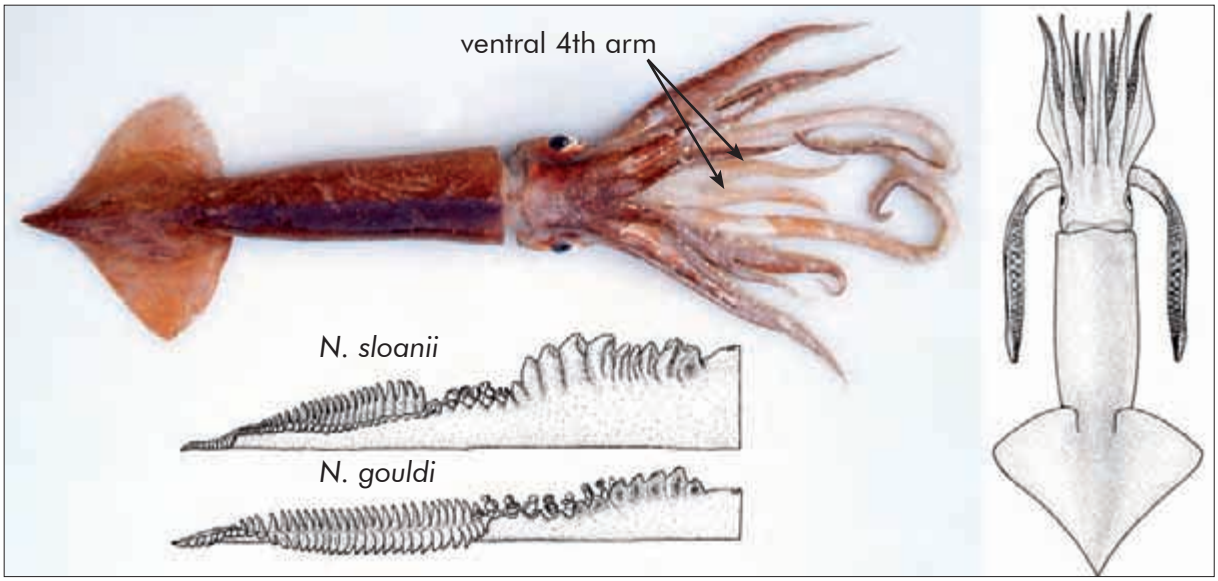
Similar species: *Nototodarus sloanii* is similar, but has 11 to 13 regularly spaced teeth on the largest tentacular sucker ring, 60 or more pairs of suckers on arm 1, and is usually found south of the subtropical convergence. Note both species can be found over Chatham Rise. Adult males can be distinguished by the structure of their hectocotylus (see figure above). Juvenile or female squid are difficult to separate to species. If uncertain use the code SQU.

References: Jereb, P.; Roper, C.F.E. (2010). (eds) Cephalopods of the world. An annotated and illustrated catalogue of cephalopod species known to date. Volume 2. Myopsid and Oegopsid Squids. FAO Species Catalogue for Fishery Purposes. No. 4, Vol. 2. Rome, FAO. 2010. 605p.

Smith, P.J.; Mattlin, R.H.; Roeleveld, M.A.; Okutani, T. (1987). Arrow squids of the genus Nototodarus in New Zealand waters: systematics, biology, and fisheries. *New Zealand Journal of Marine and Freshwater Research 21(2)*: 315–326.

Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Ommastrephidae

Nototodarus sloanii (Sloan's arrow squid) (NOS)



Distinguishing features: Cylindrical body, tapering towards arrow-head shaped fins. 60 or more pairs of suckers on arm 1 (middle left arm in dorsal view, looking towards tentacles). 11 to 13 regularly spaced teeth on largest tentacular sucker ring. Has central pocket but lacks side pocket in funnel groove. In males, both 4th (ventral) arms are hectocotylised. Hectocotylised arms with 9 to 11 enlarged proximal tubercles.

Colour: Reddish-brown.

Size: To about 40 cm mantle length.

Distribution: South of the subtropical convergence on the east coast of the South Island, and east to the Chatham Islands.

Depth: 30 to 800 m. Most commonly around 300 m.

Similar species: *Nototodarus gouldi* is similar, but has 14 to 16 regularly spaced teeth on the largest tentacular sucker ring, 51 or fewer pairs of suckers on arm 1, and is usually found north of the subtropical convergence. Note both species can be found over Chatham Rise. Adult males can be distinguished by the structure of their hectocotylus (see figure above). Juvenile or female squid are difficult to separate to species. If uncertain use the code SQU.

References: Jereb, P.; Roper, C.F.E. (2010). (eds) Cephalopods of the world. An annotated and illustrated catalogue of cephalopod species known to date. Volume 2. Myopsid and Oegopsid Squids. FAO Species Catalogue for Fishery Purposes. No. 4, Vol. 2. Rome, FAO. 2010. 605p.

Smith, P.J.; Mattlin, R.H.; Roeleveld, M.A.; Okutani, T. (1987). Arrow squids of the genus Nototodarus in New Zealand waters: systematics, biology, and fisheries. *New Zealand Journal of Marine and Freshwater Research 21(2)*: 315–326.

Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Ommastrephidae

Ommastrephes spp. (Ommastrephid squid) (OMM)

Distinguishing features: Mantle robust and not drawn out into a pointed tail. Has a central pocket and several side pockets in the funnel groove. One or two small, round, light organs near ink sac in some species, but without pinkish luminous stripe on ventral midline. *Ommastrephes bartrami* (RSQ) has a long golden or silvery stripe along the ventral midline. Males with one 4th (ventral) arm hectocotylised, but not both; hectocotylus with 4 pairs of proximal tubercles (suckers), and distal tubercles are not pronounced.

Colour: Reddish-brown.

Size: To about 30 cm mantle length in males, 40 cm in females.

Distribution: Worldwide in subtropical and temperate oceanic waters except the south-east Pacific, uncommon off the east coast of New Zealand.

Depth: From the surface to about 1400 m.

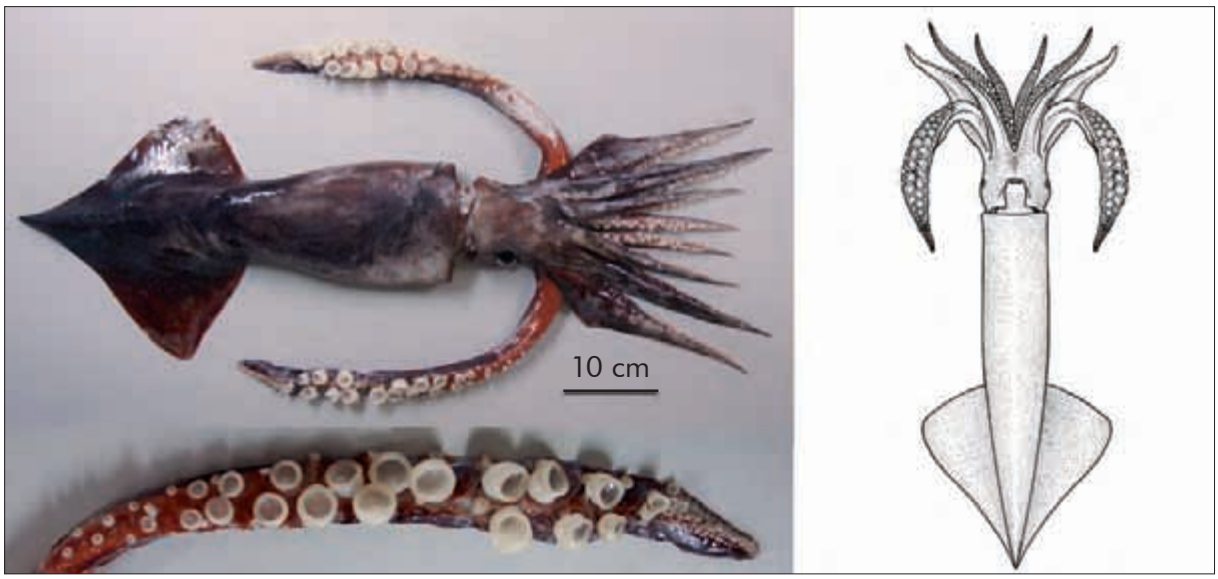
Similar species: *Todarodes* and large *Nototodarus* spp. are similar to *Ommastrephes* spp. but lack photophores near the ink sac and a central pocket in the funnel groove.

References: Dunning, M.; Brandt, S.B. (1985). Distribution and life history of deep-water squid of commercial interest from Australia. *Australian Journal of Marine and Freshwater Research 36*: 343–359.

Jereb, P.; Roper, C.F.E. (2010). (eds) Cephalopods of the world. An annotated and illustrated catalogue of cephalopod species known to date. Volume 2. Myopsid and Oegopsid Squids. FAO Species Catalogue for Fishery Purposes. No. 4, Vol. 2. Rome, FAO. 2010. 605p.

Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Ommastrephidae

Todarodes filippovae (Todarodes squid) (TSQ)



Distinguishing features: Long, narrow, muscular mantle. Tentacles very large and robust, with expanded clubs over most of their length. 12 to 14 transverse rows of four suckers on widest part of tentacle, each with 7 to 13 sharp teeth. Short arms with 10 sharp teeth on sucker rings. Photophores not present. In males, the 4th right arm is hectocotylised (modified).

Colour: Deep red or carmine.

Size: To about 50 cm mantle length, more commonly between 20 and 40 cm.

Distribution: Southern North Island south, circumpolar in the Southern Ocean.

Depth: About 300 to 1200 m.

Similar species: *Todarodes angolensis* is similar, but tentacles and clubs narrower; tentacle club with 14 to 18 transverse rows of four suckers, with the rings on suckers in the central portion of the club each having 13 to 16 sharp-pointed teeth.

References: Dunning, M.C.; Wormuth, J.H. (1998). The ommastrephid squid genus *Todarodes*: a review of systematics, distribution, and biology (Cephalopoda: Teuthoidea). *Smithsonian Contributions to Zoology 586*: 385–391.

Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Onychoteuthidae

Onykia (formerly *Moroteuthis*) *ingens* (Warty squid) (MIQ)

Distinguishing features: Mantle and dorsal head surface covered with irregular fleshy warts; strongly muscled. Fins diamond-shaped, broad, covering around 45% of the mantle length; tail not drawn out beyond fins. Two series of hooks on tentacle clubs; inner rings of arm suckers smooth (without teeth).

Colour: Light reddish-brown to pale orange.

Size: To about 55 cm mantle length.

Distribution: Widespread in New Zealand and sub-Antarctic waters.

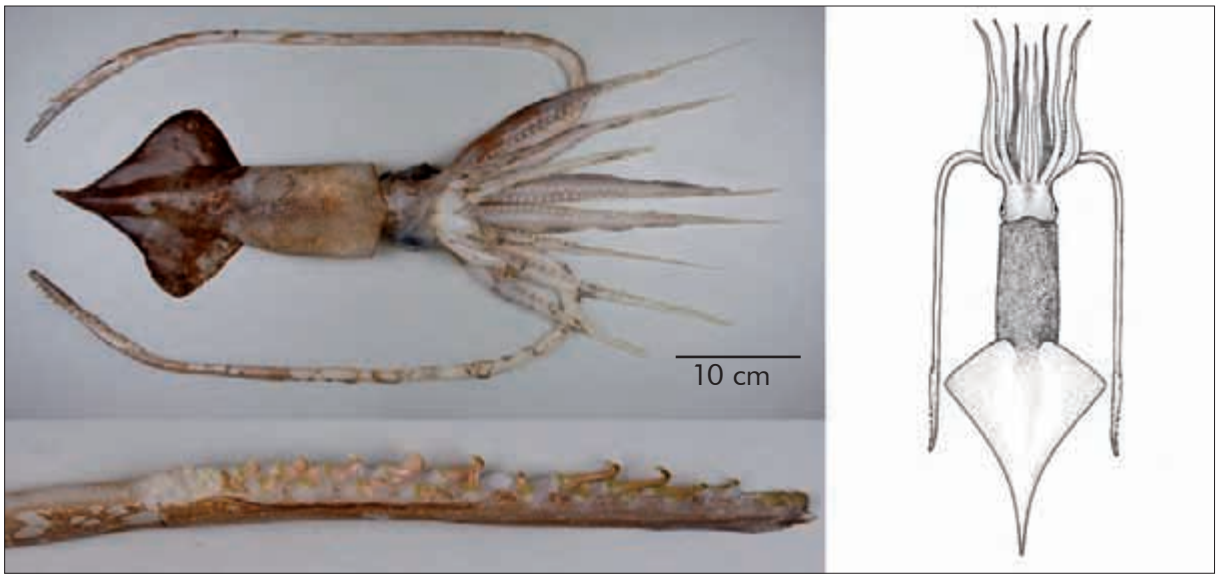
Depth: Most commonly between 250 and 900 m.

Similar species: Can be confused with *Onykia* (formerly *Moroteuthis*) *robsoni* but *O. robsoni* has arrowhead-shaped fins with a long tail, well-separated round warts on the mantle, smooth skin on the dorsal head surface, and grows to a larger size (to 90 cm ML). If unsure, use the generic code WSQ.

References: Bolstad, K.S.R. (2010). Systematics of the Onychoteuthidae Gray, 1847 (Cephalopoda: Oegopsida). *Zootaxa* 2696, 186 p.

Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Onychoteuthidae

Onykia (formerly *Moroteuthis*) *robsoni* (Warty squid) (MRQ)



Distinguishing features: Mantle surface covered with round, well-separated fleshy warts; surface of head smooth. Fins arrowhead-shaped, drawn out posteriorly into a long tail. Two series of hooks on tentacle clubs; inner rings of arm suckers smooth (without teeth).

Colour: Light reddish-brown to pale orange.

Size: To about 90 cm mantle length.

Distribution: Widespread in New Zealand and sub-Antarctic waters.

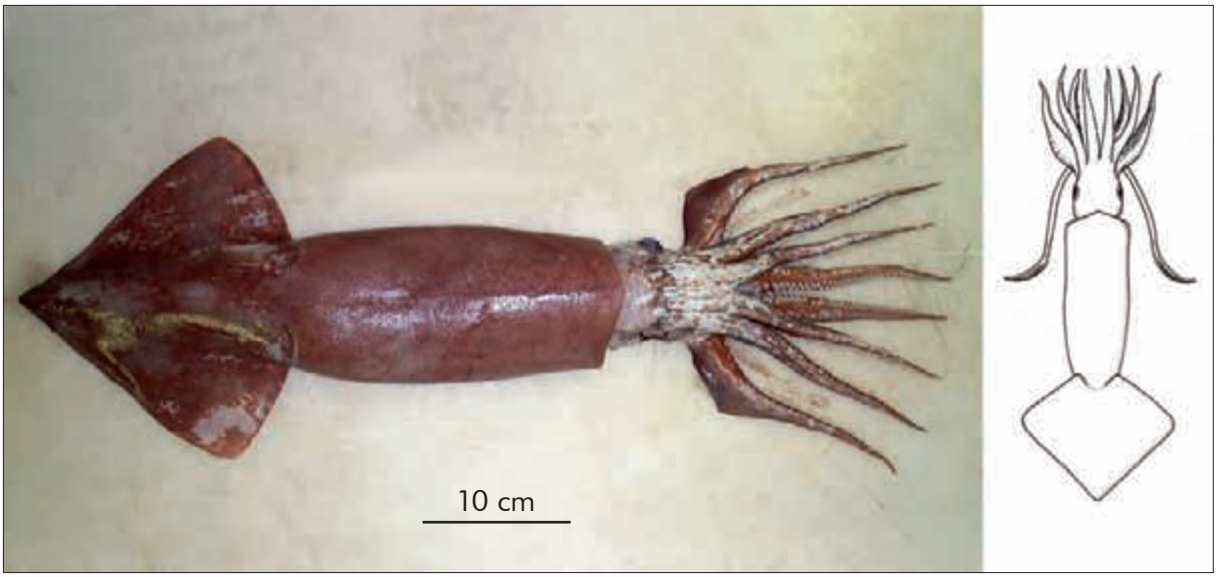
Depth: Most commonly between 700 and 1100 m.

Similar species: Can be confused with *Onykia* (formerly *Moroteuthis*) ingens but *O. ingens* has diamond-shaped fins (not drawn out into a tail), irregular warts on the mantle and dorsal head surface, and grows to about 55 cm mantle length. If unsure, use the generic code WSQ.

References: Bolstad, K.S.R. (2010). Systematics of the Onychoteuthidae Gray, 1847 (Cephalopoda: Oegopsida). Zootaxa 2696, 186 p.

Phylum Mollusca
Class Cephalopoda
Order Teuthoidea (Squids)
Family Pholidoteuthidae

Pholidoteuthis massyae (Large red scaly squid) (PSQ)



Distinguishing features: Mantle muscular, with small round or polygonal scale-like papillae/warts covering the mantle in adults (papillae are star-shaped in juveniles). Fin diamond-shaped, reaching the end of the mantle; outer skin often abraded away, leaving striking white musculature. Arm suckers have 10 to 15 sharp teeth on the distal half of the inner ring. Tentacle club with suckers only (no hooks).

Colour: Reddish-brown.

Size: To about 60 cm mantle length.

Distribution: Circumglobal in subtropical to cold temperate waters.

Depth: Recorded from about 50 to 450 m.

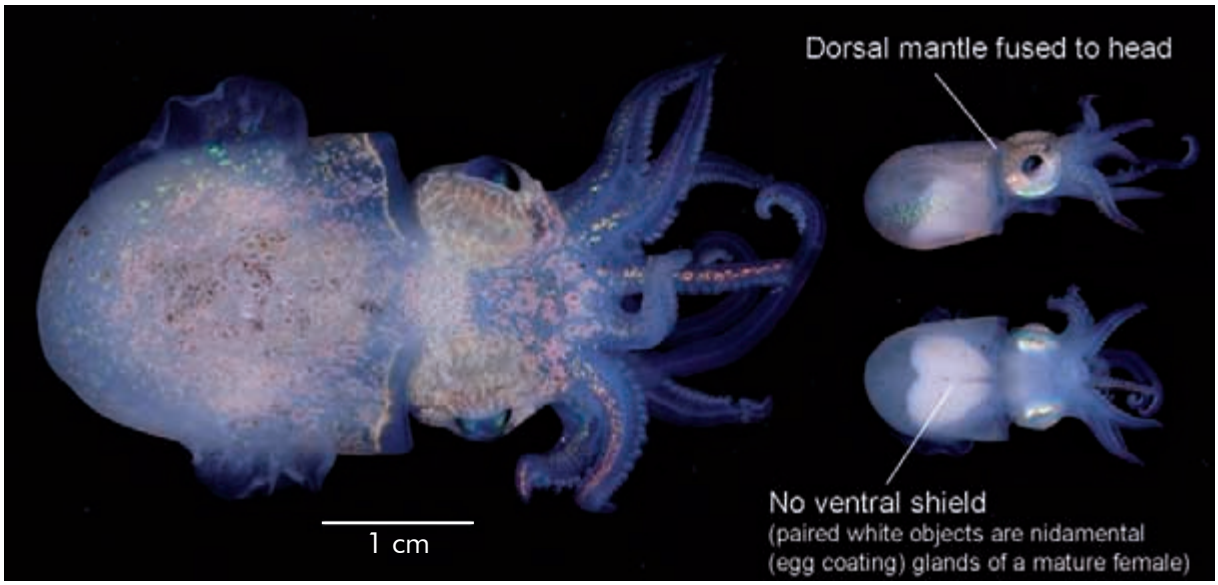
Similar species: *Lepidoteuthis grimaldii* has large diamond-shaped, scale-like dermal cushions, a large oval fin with a distinct tail, and lacks tentacles in sub-adults and adults. *Onykia* (formerly *Moroteuthis*) *ingens* and *O. robsoni* have irregular fleshy warts on the mantle, arm sucker rings without teeth, and two rows of hooks on the tentacle clubs.

References: O'Shea, S.; Jackson, G.; Bolstad, K.S. (2007). The nomenclatural status, ontogeny and morphology of Pholidoteuthis massyae (Pfeffer, 1912) new comb (Cephalopoda: Pholidoteuthidae). *Reviews in Fish Biology & Fisheries 17*: 425–435.

Vecchione, M.; Young, R.E. (2011). *Pholidoteuthis massyae* (Pfeffer, 1912). Version 20 March 2011 (under construction). http://tolweb.org/Pholidoteuthis_massyae/19854/2011.03.20 in The Tree of Life Web Project, http://tolweb.org/

Phylum Mollusca
Class Cephalopoda
Order Sepiolida (Bobtail squids)
Family Sepiadariidae

Sepioloidea spp. (Bobtail squid) (SSQ)



Distinguishing features: Mantle short, broad, rounded posteriorly, with large, well separated, ear-like fins extending most of mantle length. Mantle fused to head dorsally; no ventral shield or large photophore on ink sac.

Colour: Transparent, dorsal surface covered with numerous golden to red photophores.

Size: To about 7 cm mantle length.

Distribution: Widespread around New Zealand, and the South Pacific Ocean.

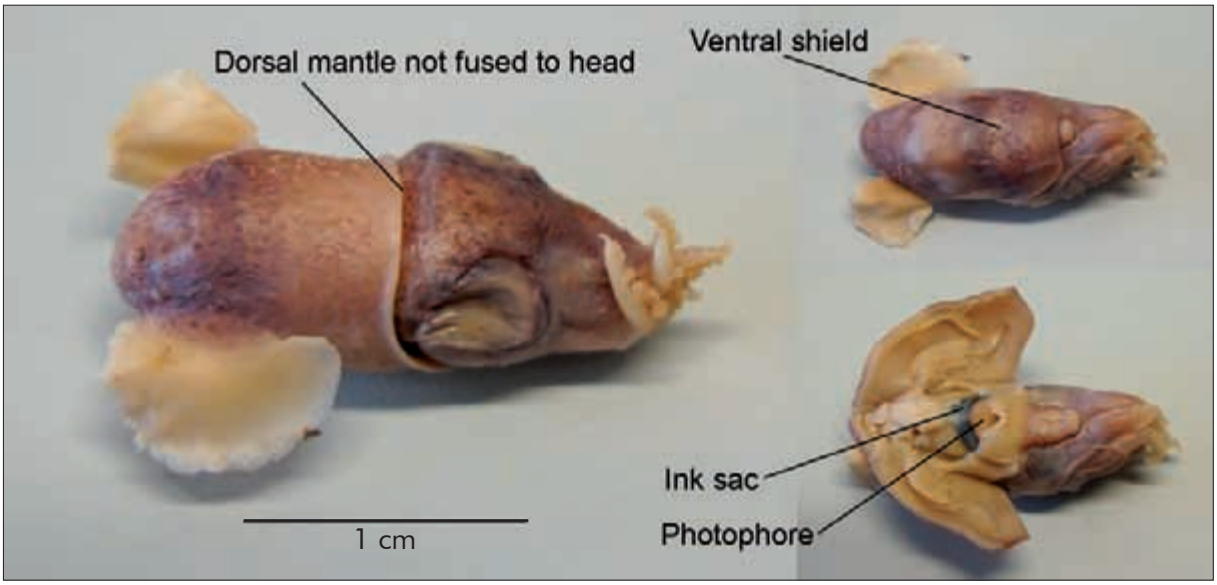
Depth: To about 500 m.

Similar species: There are 3 species of *Sepiolidea* in New Zealand waters. All are benthic and only *S. pacifica* (SQP), a small inshore species, is described. There are also 2 similar-looking pelagic bobtail squids, but both have a prominent ventral shield and a large photophore on the ink sac. In *Heteroteuthis dagamensis* (HES) the dorsal mantle is not fused to the head, while in *Stoloteuthis maoria* (IRM) the dorsal mantle is fused to the head. If uncertain about the identity of the pelagic species use the code SEQ (Sepiolid squid).

References: Young, R.E. (2010). Sepiadariidae Naef 1912. Version 15 August 2010 (under construction). http://tolweb.org/Sepiadariidae/19986/2010.08.15 in The Tree of Life Web Project, http://tolweb.org/

Phylum Mollusca
Class Cephalopoda
Order Sepiolida (Bobtail squids)
Family Sepiolidae

Heteroteuthis dagamensis (Bobtail squid) (HES)



Distinguishing features: Mantle short, broad, rounded posteriorly, with large, well separated, ear-like fins extending most of mantle length. Mantle not fused to head dorsally; ventral shield spans about 50% of ventral mantle surface; large photophore on ink sac. Males with several enormously enlarged suckers on 3rd arms.

Colour: Dorsal mantle and head golden to red, transparent or silvery ventrally, photophore luminescent.

Size: To about 2 cm mantle length.

Distribution: Widespread over deepwater around New Zealand, and throughout the Southern Ocean.

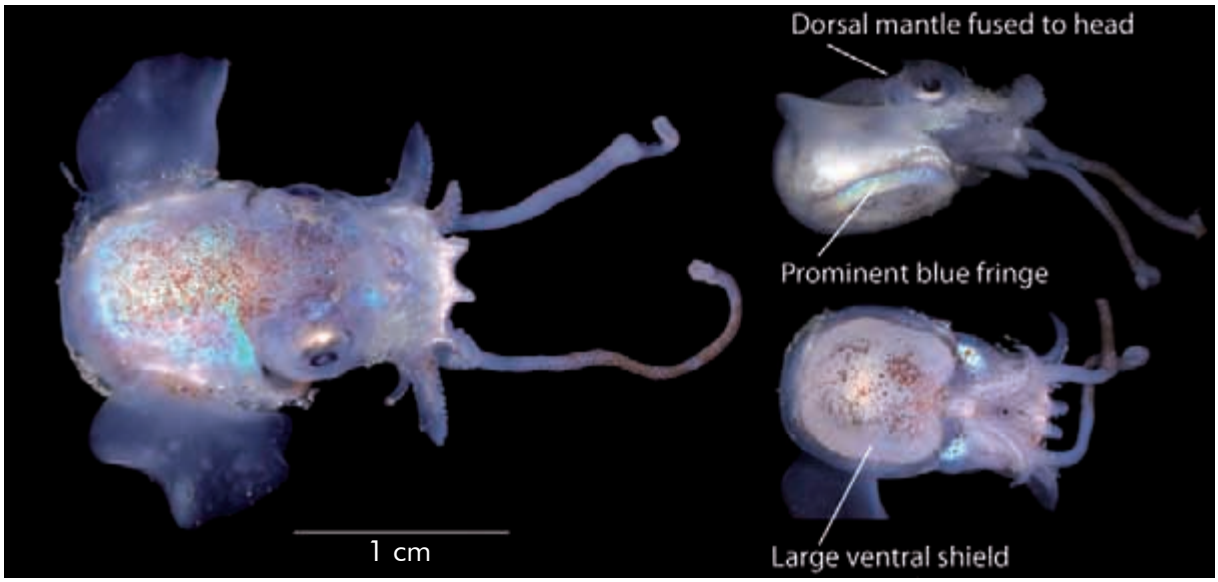
Depth: Pelagic over deepwater.

Similar species: In *Stoloteuthis maoria* the dorsal mantle is fused to the head. If uncertain use the code SEQ (Sepiolid squid). *Sepioloidea* species (SSQ) are benthic and lack a ventral shield and large photophore on ink sac.

References: Vecchione, M.; Young, R.E.; Roper, C.F.E. (2007). *Heteroteuthis dagamensis* Robson 1924. Version 26 December 2007 (under construction). http://tolweb.org/Heteroteuthis_dagamensis/20053/2007.12.26 in The Tree of Life Web Project, http://tolweb.org/

Phylum Mollusca
Class Cephalopoda
Order Sepiolida (Bobtail squids)
Family Sepiolidae

Stoloteuthis (sometimes *Iridoteuthis*) *maoria* (Bobtail squid) (IRM)



Distinguishing features: Mantle short, broad, rounded posteriorly, with large, well separated, ear-like fins extending most of mantle length. Mantle fused to head dorsally; ventral shield spans about 80% of ventral mantle surface, large photophore on ink sac. Males with several enlarged suckers on 2nd arms.

Colour: A silver band around lateral and posterior mantle and dorsally from eyes to tips of 2nd arms, prominent blue fringe on ventral shield, photophore luminescent.

Size: To about 2 cm mantle length.

Distribution: Widespread over deepwater around New Zealand, and the eastern Pacific.

Depth: Pelagic over deepwater.

Similar species: In *Heteroteuthis dagamensis* the dorsal mantle is not fused to the head. If uncertain use the code SEQ (Sepiolid squid). *Sepioloidea* species (SSQ) are benthic and lack a ventral shield or large photophore on ink sac.

References: Young, R.E.; Vecchione, M.; Roper, C.F.E. (2007). Stoloteuthis maoria (Dell 1959). Version 26 December 2007 (under construction). http://tolweb.org/Stoloteuthis_maoria/27775/2007.12.26 in The Tree of Life Web Project, http://tolweb.org/

Phylum Mollusca
Class Gastropoda
Order Littorinimorpha
Family Capulidae

Malluvium calcareum (Cap limpet) (MCC)

Distinguishing features: Cap-shaped, hooked apex, no pronounced ledge inside. Typically smaller individuals on or beside larger ones (smallest individuals are males: sex changes to female with increasing size).

Colour: White.

Size: Total height up to 20 mm.

Distribution: Common throughout the New Zealand EEZ living clustered around apertures on outsides of shells of gastropods occupied by hermit crabs. Occasionally found attached to shells of living gastropods.

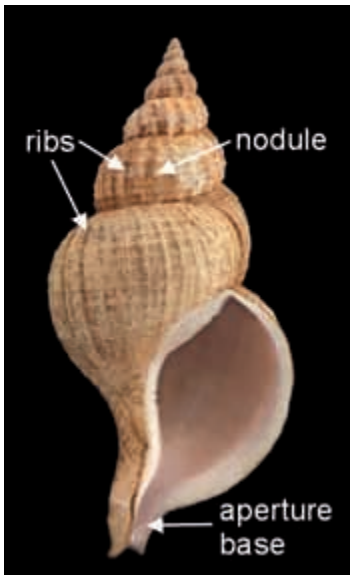
Depth: 110 to 1019 m, though rarely taken shallower than 200 m.

Similar species: *Capulus neozelanicus* (larger and lives exclusively on Acesta species).

References: Powell, A.W.B. (1979) New Zealand Mollusca. Marine, land and freshwater shells. Collins, Auckland p. 146.

Phylum Mollusca
Class Gastropoda
Order Littorinimorpha
Family Ranellidae (tritons)

Fusitriton magellanicus (FMA)



Distinguishing features: Shell sculptured with fine longitudinal and spiral ribs bearing small, rounded nodules. Base of aperture extending as a twisted canal of moderate length. Fresh specimens with a rather thick, yellowish brown, furry outer skin (periostracum).

Colour: Shell whitish, typically with yellowish brown, furry outer periostracum skin; aperture white or lavender within.

Size: Total height up to 120 mm.

Distribution: Throughout the New Zealand region.

Depth: 300 to 1000 m.

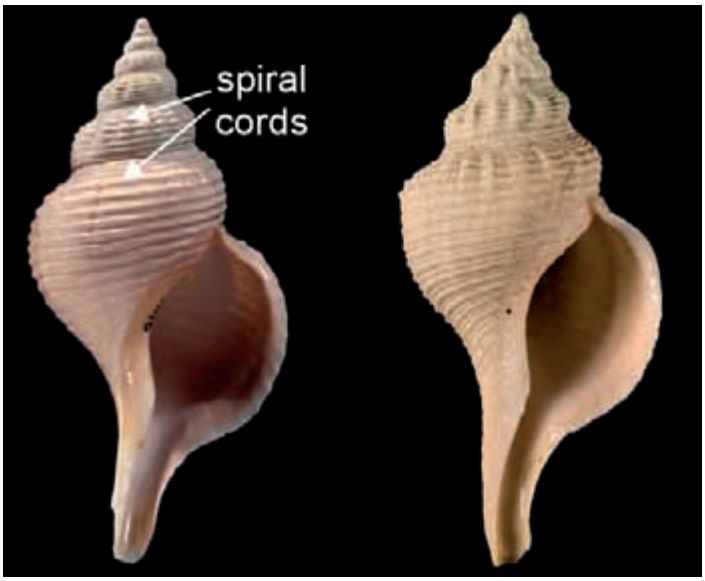
Similar species: This species is also known in the literature as *Fusitriton laudandum* or *F. retiolus*.

References: Powell, A.W.B. (1979). New Zealand Mollusca. Marine, land and freshwater shells. Collins, Auckland.

Beu, A.G. (1978). The marine fauna of New Zealand: the molluscan genera Cymatona and Fusitriton (Gastropoda, Family Cymatiidae). New Zealand Oceanographic Institute Memoir 65. 44p.

Phylum Mollusca
Class Gastropoda
Order Neogastropoda
Family Buccinidae (whelks)

Aeneator recens (AER)



Distinguishing features: Shell covered with well developed, rather widely spaced spiral cords, and with longitudinal ribs of variable devolopment; no nodules where the ribs cross one another. Base of aperture extended as a rather straight but oblique canal of moderate length.

Colour: Shell pinkish white.

Size: Total height up to 72 mm.

Distribution: Eastern North and South Islands, Stewart Island, and Chatham Rise.

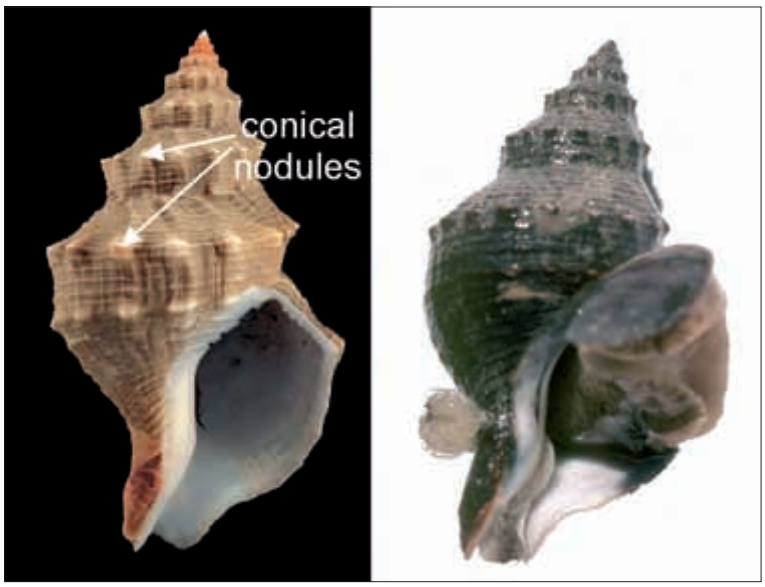
Depth: 300 to 700 m.

Similar species: *Aeneator otagoensis*. Note *Aeneator benthicola* is the same species.

References: Powell, A.W.B. (1979). New Zealand Mollusca. Marine, land and freshwater shells. Collins, Auckland.

Phylum Mollusca
Class Gastropoda
Order Neogastropoda
Family Buccinidae (whelks)

Austrofusus glans (Knobbed whelk) (KWH)



Distinguishing features: Shell sculptured with fine spiral ribs and rounded longitudinal ribs, and 2 rows of rounded or conical nodules (1 on middle of each turn on spire, 2 or 3 on last turn). Base of aperture extending as a short, twisted canal. Fresh specimens with a thin, yellowish brown or blackish outer periostracum skin (see image on right).

Colour: Shell whitish or yellowish brown beneath (fresh specimens) thin, outer yellowish-brown or blackish periostracum skin.

Size: Total height up to 93 mm.

Distribution: North, South, Stewart, and Chatham Islands.

Depth: 0 to 420 m.

Similar species: None.

References: Powell, A.W.B. (1979). New Zealand Mollusca. Marine, land and freshwater shells. Collins, Auckland.

Phylum Mollusca
Class Gastropoda
Order Neogastropoda
Family Buccinidae (whelks)

Penion chathamensis (PCH)

MOLLUSCA

Distinguishing features: Shell higher than wide, spire about as high as aperture. Externally covered with numerous, fine, irregular spiral threads; early whorls additionally with strong, rounded longitudinal ribs. Canal of moderate length. Aperture smooth within.

Colour: Exterior dirty white or yellowish. Interior of aperture polished white, rim sometimes yellowish.

Size: Total height up to 240 mm.

Distribution: North-eastern South Island and Chatham Rise.

Depth: 112 to 420 m.

Similar species: *Penion benthicolus*, *P. cuvierianus*, *P. fairfieldae*, *P. jeakingsi*, *P. ormesi*, *P. sulcatus*.

References: Powell, A.W.B. (1979) New Zealand Mollusca. Marine, land and freshwater shells. Collins, Auckland p. 201.

Phylum Mollusca
Class Gastropoda
Order Neogastropoda
Family Turbinellidae

Coluzea mariae (Pagoda shell) (CMR)

Distinguishing features: Conical spire sculptured with longitudinal and spiral ribs, with small, sharp, conical nodules where the ribs cross. Base of aperture extended as a very long, straight canal.

Colour: Shell typically whitish or greyish white.

Size: Total height up to 98 mm.

Distribution: Eastern South Island, Chatham Rise, and Auckland Islands.

Depth: 180 to 700 m.

Similar species: *Coluzea spiralis*, *C. wormaldi*, *C. altocanalis*, *Columbarium veridicum*.

References: Powell, A.W.B. (1979). New Zealand Mollusca. Marine, land and freshwater shells. Collins, Auckland.

Phylum Mollusca
Class Gastropoda
Order Neogastropoda
Family Turridae (turrids)

Comitas onokeana vivens (COV)

Distinguishing features: Shell high and narrow, spire higher than aperture. On spire, upper third of each whorl smooth and concave, lower third of each whorl with oblique, rounded ribs. Upper part of aperture deeply notched. Aperture smooth within. Canal short.

Colour: Chalky or greyish white.

Size: Total height up to 75 mm.

Distribution: Palliser slope, eastern South Island, Chatham Rise and Campbell Plateau.

Depth: 420 to 1000 m. On soft bottoms.

Similar species: None in Guide.

References: Powell, A.W.B. (1979) New Zealand Mollusca. Marine, land and freshwater shells. Collins, Auckland p. 229.

Phylum Mollusca
Class Gastropoda
Order Neogastropoda
Family Volutidae (volutes)

Alcithoe larochei (ALL)

Distinguishing features: Typically no nodules on the spire. Broad notch at base of aperture; 5 or 6 rounded plaits on wall of left (inner) side of the aperture.

Colour: Whitish shell, typically more or less covered with blackish skin.

Size: Total height up to 165 mm.

Distribution: Eastern North Island and northeastern South Island.

Depth: 200 to 650 m.

Similar species: *Alcithoe jaculoides*, *A. arabica*, *A. fissurata*, *A. benthicola*, *A. fusus*, *A. wilsonae*.

References: Powell, A.W.B. (1979). New Zealand Mollusca. Marine, land and freshwater shells. Collins, Auckland.

Phylum Mollusca
Class Gastropoda
Order Neogastropoda
Family Volutidae (Volutes)

Alcithoe wilsonae (AWI)

Distinguishing features: Shell narrowly elongate. Typically with elongate nodules on the spire, though some specimens are completely smooth. Narrow notch at base of the aperture; 5 or 6 rounded plaits on wall of left (inner) side of the aperture.

Colour: Shell uniform cream or chalky white; or yellowish with dark, irregular zigzag colour pattern.

Size: Total height up to 130 mm.

Distribution: Chatham Rise, eastern South Island, Snares Shelf and Campbell Plateau.

Depth: 124 to 585 m. On soft bottoms.

Similar species: *Alcithoe arabica*, *A. benthicola*, *A. fissurata*, *A. fusus*, *A. larochei*, *A. lutea*.

References: Bail, P.; Limpus, A. (2006). The recent volutes of New Zealand, with a revision of the genus *Alcithoe*

Adams, H.; A. Adams, (1853). A conchological iconography. Conchbooks, Hackenheim (p. 55).

Powell, A.W.B. (1979) New Zealand Mollusca. Marine, land and freshwater shells. Collins, Auckland p. 209.

Phylum Mollusca
Class Gastropoda
Order Neogastropoda
Family Volutidae (Volutes)

Provocator mirabilis (Golden volute) (GVO)

Distinguishing features: Highly polished and smooth. No nodules on the spire. Small notch at base of aperture; no plaits on wall of left (inner) side of the aperture.

Colour: Typically orange, occasionally white.

Size: Total height up to 160 mm.

Distribution: Eastern North and South Islands, Chatham Rise, and Auckland Islands.

Depth: 250 to 790 m.

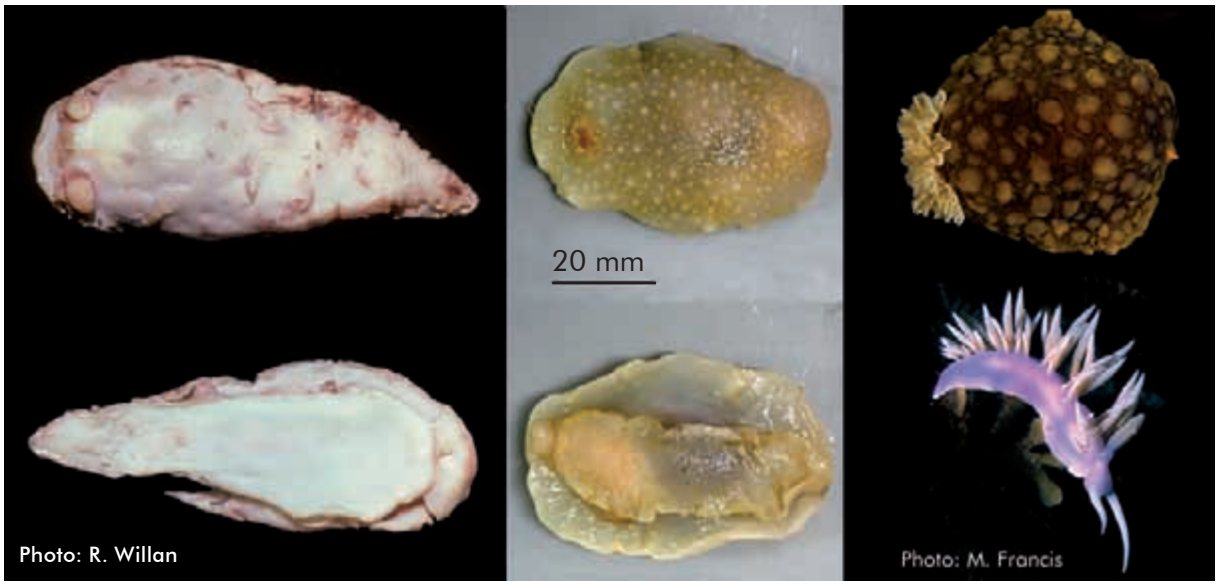
Similar species: *Alcithoe* spp.

References: Powell, A.W.B. (1979). New Zealand Mollusca. Marine, land and freshwater shells. Collins, Auckland.

Phylum Mollusca
Class Gastropoda
Order Nudibranchia (nudibranchs)
Family Arminidae, Dendrodorididae, Dorididae, Facelinidae, etc

(Sea slug, Nudibranch) (NUD)

MOLLUSCA



Distinguishing features: The soft fleshy body can be round or elongate and lacks any protective shell. The deep sea species *Heterodoris antipodes* (see dorsal and ventral views of holotype, left image) has a broad heart-shaped mantle, the mantle skirt running from the outer base of each rhinophore (chemosensory tentacle) down each side of the body to join at a point in the posterior midline. There are scattered rounded tubercles over the mantle and a series of quite large tapering papillae. ?*Doriopsilla* sp. (middle image) and Dorididae have a dorsum covered with pustules, *Doris wellingtonensis* (top right image), is the largest dorid found in shallow waters of NZ. Feathery projections are gills. Some nudibranchs bear numerous smooth tapering projections called cerata (see *Jason mirabilis* right image). This species is not usually taken in trawls, but the image is included to highlight morphological differences.

Colour: Red, yellow, cream, pink, orange, green, blue, spotted, white, purple, some brilliantly so, but lose colour when preserved.

Size: Total length. Total extended crawling length from 3 mm to 300 mm.

Distribution: Coastal regions of New Zealand. *H. antipodes* recorded on the slope of the Tasman Basin, west coast South Island. ?*Doriopsilla* sp. found on the Chatham Rise.

Depth: Intertidal to deepwater. *H. antipodes* found in 1760 to 1800 m.

Similar species: Could be mistaken for sea cucumbers, but can be distinguished by their strong, muscular snail-like foot and feathery gills.

References: Willan, R. C. (1981) A new abyssal arminacean nudibranch from *New Zealand. New Zealand Journal of Zoology* 8: 325–330.

Willan, R.C. (1983). New Zealand side-gilled sea slugs (Opisthobranchia: Notaspidea: Pleurobranchidae). *Malacologia* 23: 221–270.

Willan, R. C. (2010). Sub-class Opisthobranchia. In: Cook, S de C. (ed.). *New Zealand Coastal Marine Invertebrates Volume One*, p 422–462. Canterbury University Press, Christchurch, New Zealand.

Phylum Mollusca
Class Gastropoda
Order Vetigastropoda
Family Calliostomatidae (top shells)

Calliostoma selectum (Maurea) (CSS)

Distinguishing features: Shell top-shaped, edge angulate, sculptured with narrow spiral threads covered with many small nodules.

Colour: Spire pinkish white or pale yellowish brown, with yellowish brown and white spots and streaks on spiral threads. Base (aperture side) whitish. Aperture pearly within.

Size: Diameter up to 70 mm.

Distribution: North, South, Stewart and Chatham Islands.

Depth: 27 to 274 m.

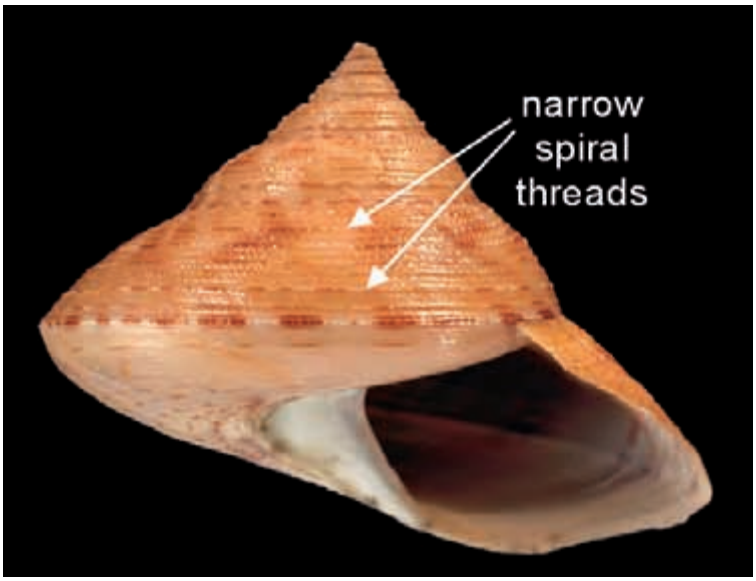
Similar species: *Calliostoma waikanae*, *C. pellucidum*, *C. turnerarum*

References: Marshall, B.A., (1995). A revision of the recent Calliostomatidae of New Zealand (Mollusca: Gastropoda: Trochoidea). *The Nautilus 108*: 83–126 (p. 108).

Powell, A.W.B. (1979) New Zealand Mollusca. Marine, land and freshwater shells. Collins, Auckland p. 61.

Phylum Mollusca
Class Gastropoda
Order Vetigastropoda
Family Calliostomatidae (top shells)

Calliostoma turnerarum (CTN)



Distinguishing features: Shell top-shaped, edge angulate, sculptured with narrow spiral threads covered with many small nodules.

Colour: Spire yellowish brown or light orange brown with reddish brown and white spots and streaks. Base (aperture side) whitish with yellowish to reddish brown streaks. Aperture pearly within.

Size: Diameter up to 85 mm.

Distribution: Three Kings Islands, northeastern North Island as far south as Cape Runaway, and off Ninety Mile Beach.

Depth: 230 to 530 m.

Similar species: *Calliostoma selectum*, *C. waikanae*.

References: Marshall, B.A. (1995). A revision of the recent Calliostomatidae of New Zealand (Mollusca: Gastropoda: Trochoidea). *The Nautilus 108*: 83–126.

Phylum Mollusca
Class Polyplacophora (chitons)
Order
Family

(Chiton) (CHT)

Distinguishing features: Symmetrical with an ovoid body and no eyes or tentacles. The shell is divided into 8 overlapping plates. Will be attached to some form of hard substrate.

Colour: Generally dull brown or greenish, but may be red or brighter colours.

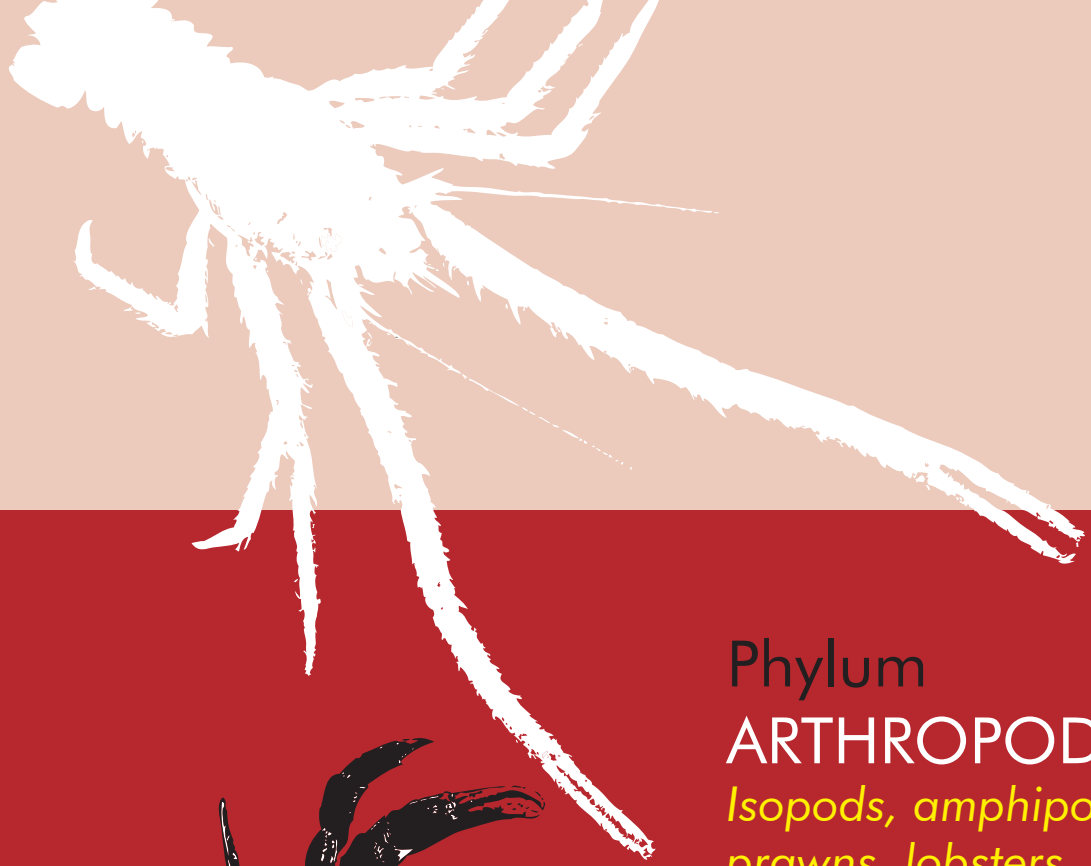
Size: From 20 to 110 mm.

Distribution: Worldwide.

Depth: Intertidal to deepwater.

Similar species: A generic image of a chiton is shown. There are several genera found in the New Zealand region.

References: Powell, A.W.B. (1979). New Zealand Mollusca. Marine, land and freshwater shells. Collins, Auckland.



Phylum ARTHROPODA

Isopods, amphipods, mysids, prawns, lobsters, crabs, barnacles, sea spiders

Shane Ahyong, John Booth, Niel Bruce,
Anne-Nina Loerz, Reyn Naylor,
Kareen Schnabel, Rick Webber

Phylum

ARTHROPODA

Isopods, amphipods, mysids, prawns, lobsters, crabs, barnacles, sea spiders

The **Arthropoda** (Greek *arthron*, joint, *podos*, foot) is the largest phylum of life. About 80% of all described species of animal life are arthropods — jointed-limb animals. On land, they are best represented by insects, arachnids (spiders, mites, and their relatives), myriapods (centipedes and millipedes), and some crustacean groups (woodlice and soil hoppers). In the sea, the **subphylum Crustacea** dominates, both on the seafloor and in the plankton. Marine insects are found intertidally and in shallow coastal waters but not in the deep sea. Sea spiders (Pycnogonida) are an ancient group of marine creatures that are not closely related to true spiders. Pycnogonids range from the intertidal to the deep sea.

The basic body plan of head, thorax, and abdomen is obvious in creatures like prawns and mantis shrimps. Most body segments have jointed limbs. These are primitively forked in many crustaceans but some limbs are simple (like the walking legs of crabs). Marine crustaceans vary enormously in size from microscopic parasites a tenth of a millimeter in size to giant crabs, lobsters, and sea lice (isopods) up to half a metre in length or breadth and weighing up to 20 kilograms, and the body regions can be highly modified. Calculations of the number of named living species of Crustacea range from approximately 50,000 to 67,000. Estimates of the potential number of species start from as many as ten times to one hundred times that number.

Subphylum Crustacea

Classes Maxillopoda and Malacostraca

Five or six classes of the subphylum Crustacea are recognised worldwide. Only the cave-dwelling Remipedia have not been found in New Zealand waters. The New Zealand fauna currently stands at about 2,800 species, more than 500 of which have not yet been formally identified or described. The major classes likely to be represented in deep-sea bycatch include the Maxillopoda (e.g., barnacles) and Malacostraca. There are several major orders of Malacostraca found in and on the deep seafloor, including Isopoda ("same feet", e.g., sea lice), Amphipoda ("both feet", e.g., hoppers), and Decapoda ("ten feet", e.g., crabs, shrimps, prawns). Much rarer are large deep-sea species of mantis shrimps (Stomatopoda). Cumacea (comma shrimps) and Tanaidacea (tanaids), though sometimes common, are quite small and likely to be overlooked.

Subphylum Chelicerata

Class Pycnogonida

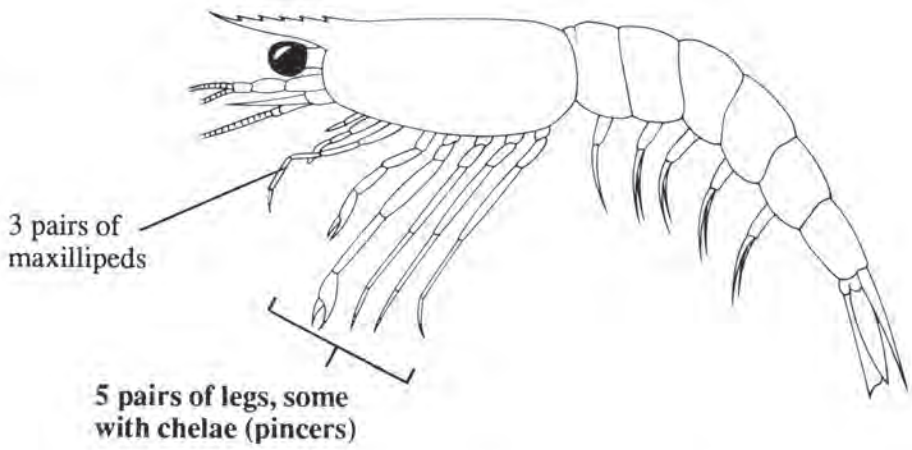
These slender creatures are all legs, with a short, thin body. Most have 8 legs; deep-sea species have 10 (one New Zealand species) or 12 legs. There are 83 species in the EEZ, associated with hydroids, sea anemones, or bryozoans, from which they suck body fluids using a tube-like proboscis.

Shrimp and prawn species

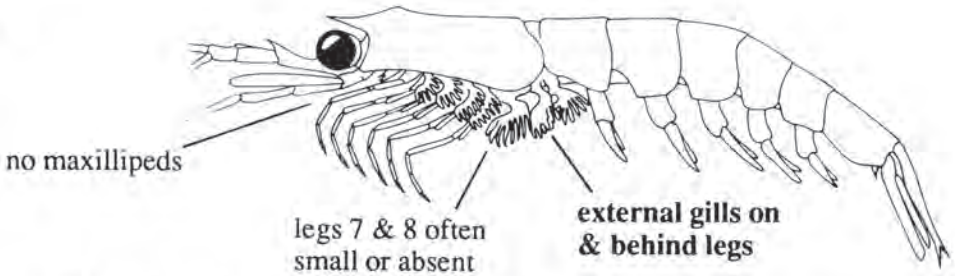
Natant decapods are similar in appearance to crustaceans in two other orders; the Euphausiacea (euphausids) and Mysidacea (mysids). The most obvious characters unique to natant decapods, to mysids, or to euphausids are labelled — **bold** labels indicate the most distinctive character of each.

Reproduced from: Webber, W.R.; Fenaughty, C.M.; Clark, M.R. (1990). A guide to some common offshore shrimp and prawn species of *New Zealand. New Zealand Fisheries Occasional Publication* 6. 42 p.

Decapoda
natant decapods
natants
shrimps
prawns

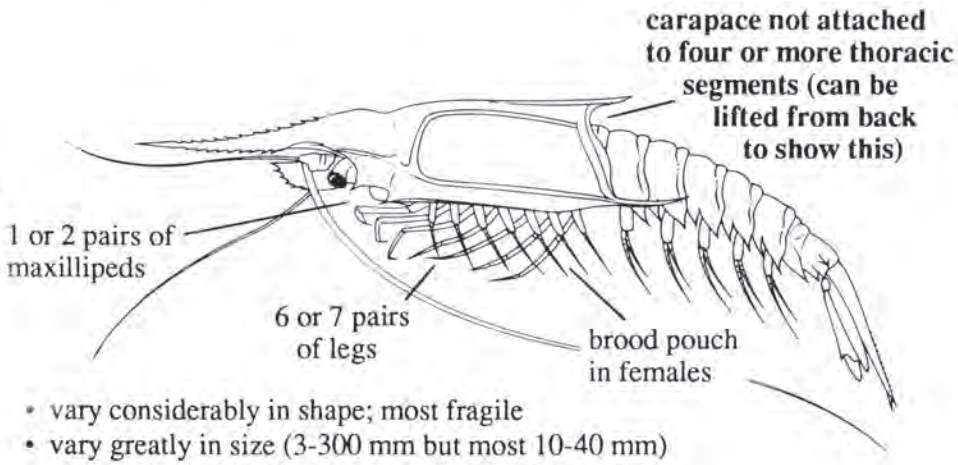


Euphausiacea
euphausids
krill - but not 'lobster krill'



- all fairly similar looking (none uniform scarlet)
- mostly 10-25 mm (largest 50 mm, smallest 8 mm)
- typically pelagic (swimming) in surface to deep water
- often in very large numbers

Mysidacea
mysids
opossum shrimps

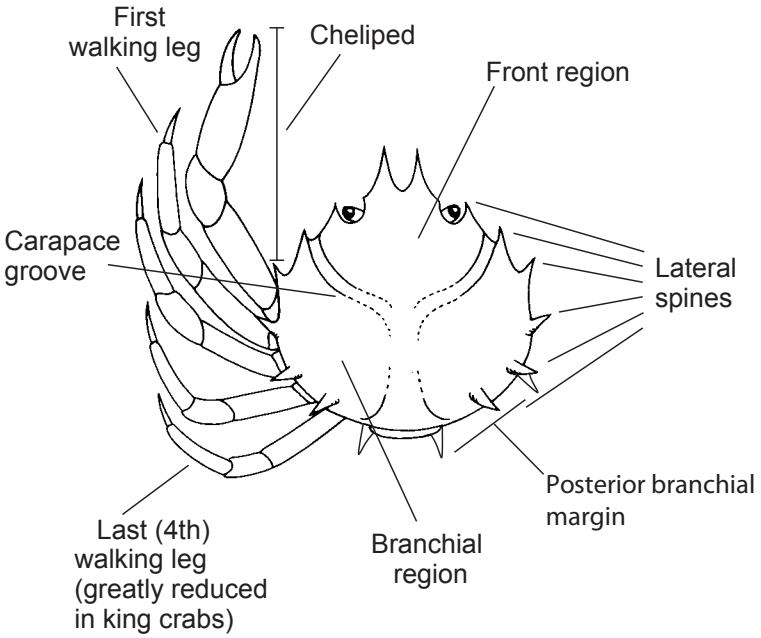


- vary considerably in shape; most fragile
- vary greatly in size (3-300 mm but most 10-40 mm)
- pelagic (swimming) or benthic (bottom living) from river mouths to very deep water
- occasionally in large numbers

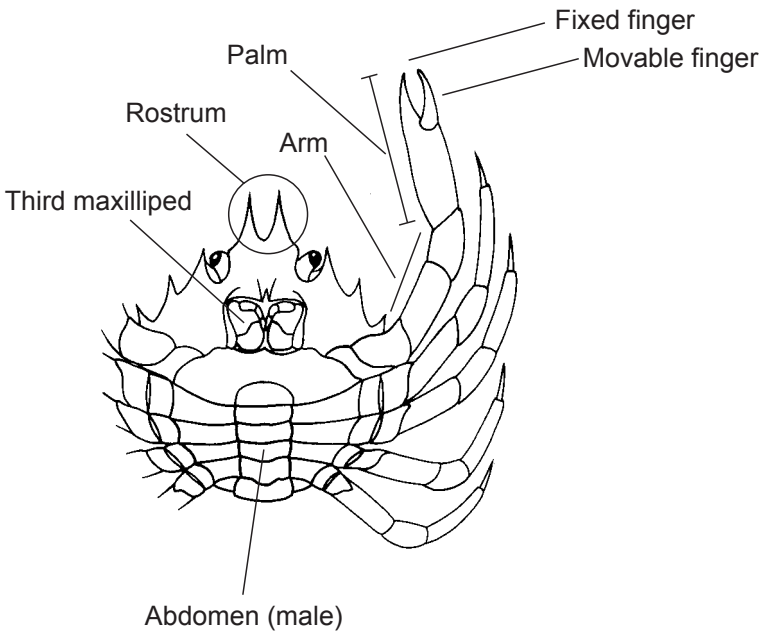
Generalised crab diagram and terms used in this guide

Reproduced from: Naylor, J.R.; Webber, W.R.; Booth, J.D. (2005). A guide to common offshore crabs in New Zealand waters. *New Zealand Aquatic Environment and Biodiversity Report No. 2.* 47 p.

Dorsal (top) view of carapace and legs



Ventral (bottom) view



Phylum Arthropoda (subphylum Crustacea)
Class Crustacea
Order Amphipoda
Family Eurytheneidae

Eurythenes gryllus (Amphipod) (EUG)

Distinguishing features: Compact body, large size. Mouthparts form a quadrate bundle. The first article of the second antenna is swollen. First side plate (coxa 1) is strongly shortened and partly covered by the second side plate (coxa 2). The first leg, gnathopod 1, is short and poorly subchelate. Telson is elongated and deeply cleft.

Colour: Adults red, juveniles often white.

Size: Total length up to 100 mm.

Distribution: Widespread in New Zealand region.

Depth: 180 to 6500 m.

Similar species: Other species of *Eurythenes*.

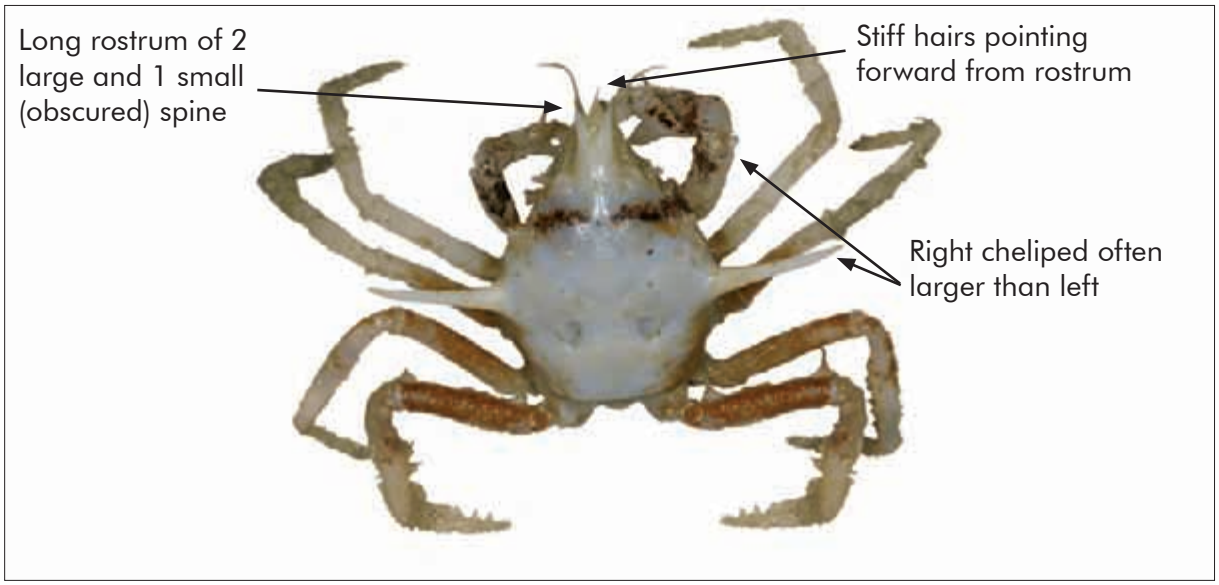
References: Barnard, J.L; (1961). Gammaridean amphipoda from depths of 400–6000 meters. *Galathea Reports 5*: 23–128.

Barnard, J.L., Karaman, G.S. (1991). The families and genera of marine gammaridean amphipoda (except marine gammaroids) Part 2. *Records of the Australian Museum, Supplement 13 (Part 2)*: 419–866.

Stoddart, H.; Lowry, J.K. (2004) The deep-sea lysianassoid genus *Eurythenes* (Crustacea, Amphipoda, Eurytheneidae n.fam.) *Zoosystema* 26(3): 425–468.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Atelecyclidae

Pteropeltarion novaezelandiae (Pteropeltarion crab) (PNO)



Distinguishing features: Two long, sharp lateral spines on each side of carapace. Carapace pentagonal; surface granular. Longish parallel-sided rostrum of 2 larger lateral spines and 1 smaller middle spine.

Colour: Legs white, carapace and chelae white to greyish blue.

Size: Carapace width to about 25 mm including lateral spines, about 11 mm, excluding spines.

Distribution: Around New Zealand and the Campbell Plateau.

Depth: About 500 to 900 m.

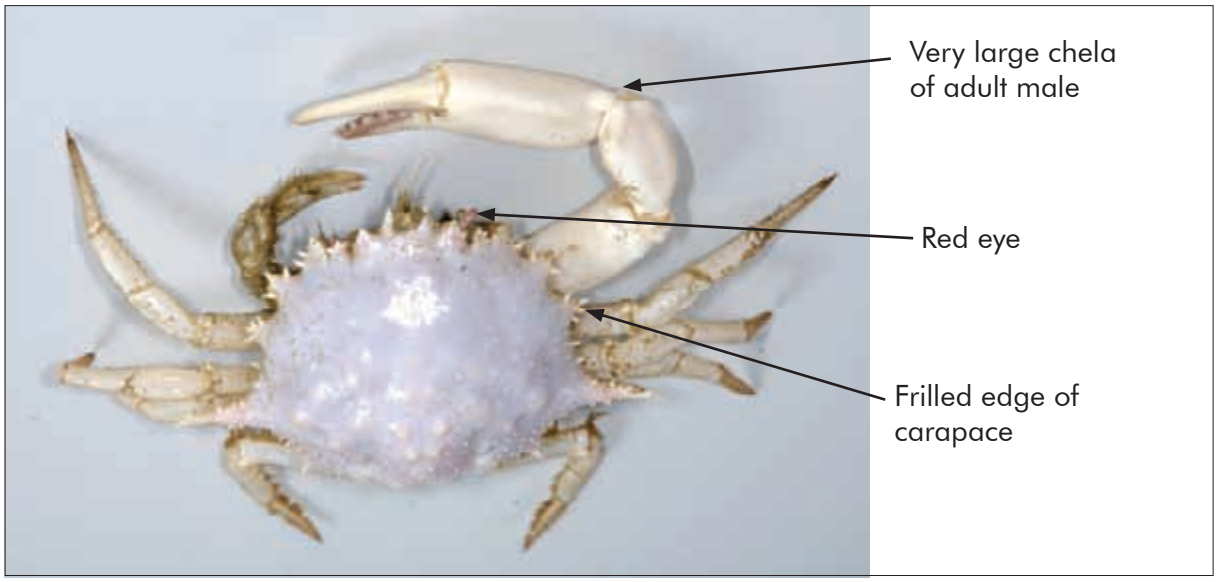
Similar species: The lack of a spiny margin to the carapace distinguish this genus from *Trichopeltarion*.

References: Dell, R.K. (1972). A new genus and species of Atelecyclid crab from New Zealand. *Transactions of the Royal Society of New Zealand*. 2: 55–59.

McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No.* 22. 463 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Atelecyclidae

Trichopeltarion fantasticum (Frilled crab) (TFA)



Distinguishing features: Carapace broadly oval, with a long lateral spine (bearing smaller spines) on each lateral edge. Anterior edge of carapace frilled with compound spines of 3 to 4 smaller spines. Widely spaced, rounded tubercles on surface of carapace, and raised groups of tubercles near back. Eyes red, chelae very large in adult males.

Colour: Legs white, carapace and chelae white to greyish blue.

Size: Carapace width to 60 mm (excluding spines).

Distribution: Around New Zealand and on the Chatham Rise.

Depth: Usually 70 to 730 m, occasionally as shallow as 15 m south of Cook Strait.

Similar species: No similar species in New Zealand waters.

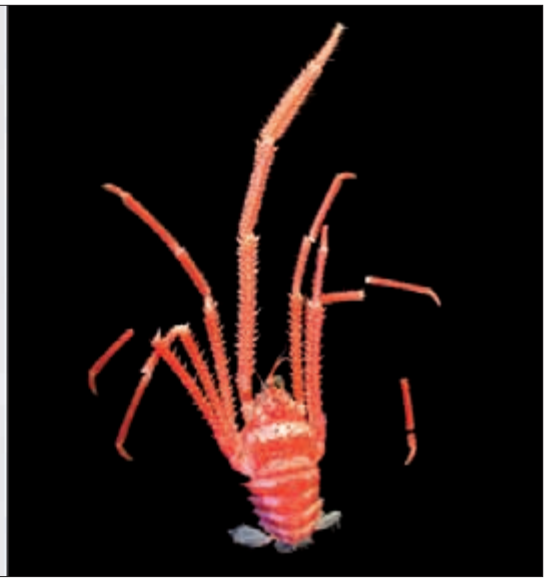
References: McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Richardson, L.R.; Dell, R.K. (1964). A new crab of the genus *Trichopeltarion* from New Zealand. *Transactions of the Royal Society of New Zealand Zoology 4*: 145–141.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Chirostylidae

Gastroptychus spp. (Squat lobsters) (GAT)

ARTHROPODA



Distinguishing features: Greatly elongate and slender limbs, spiny carapace and limbs, very short, spiniform (not triangular) rostrum. Abdomen folded up against itself and telson (middle appendage of tail) with transverse groove (junction), see *Uroptychus* image, next page.

Colour: Of the two known species in New Zealand, *G. rogeri* (the 'football crab'), right image, is bright red with transverse white stripes on the carapace, *G. novaezelandiae*, left image, is light pink with red bands on limbs.

Size: Carapace length from 15 to 50 mm. *G. rogeri* at the larger and *G. novaezelandiae* at the smaller end of this range.

Distribution: Southwest Pacific.

Depth: 264 to 1200 m.

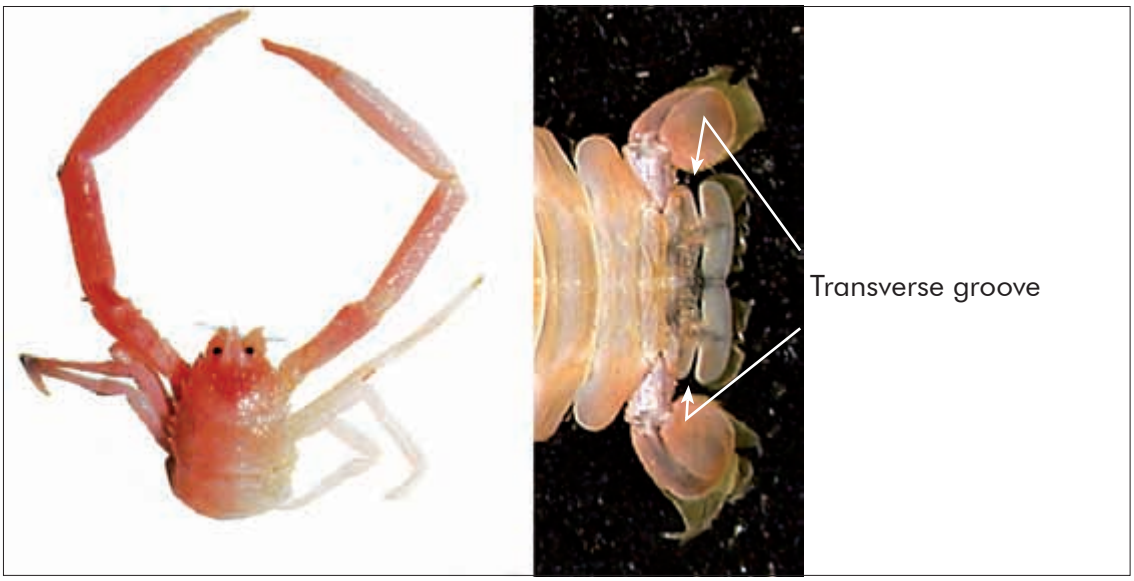
Similar species: Galatheids and other chirostylids.

References: O'Shea, S.; McKnight, D.; Clark, M. (1999). Bycatch – the common, unique and bizarre. *Seafood New Zealand* 7(5): 45–51.

Poore, G.C.B. (2004). Marine decapod Crustacea of Southern Australia: a guide to identification. CSIRO Publishing. 574p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Chirostylidae

Uroptychus spp. (Squat lobsters) (URP)



Distinguishing features: Crab-like, chelipeds greatly elongate and slender, abdomen folded up against itself. Telson (middle appendage of tail) with a transverse groove.

Colour: Light pink to red.

Size: Carapace length up to 20 mm. Size varies between species.

Distribution: Worldwide.

Depth: 100 to 5000 m.

Similar species: Galatheids and other chirostylids.

References: O'Shea, S.; McKnight, D.; Clark, M. (1999). Bycatch - the common, unique and bizarre. *Seafood New Zealand 7* (5): 45–51.

Poore, G.C.B. (2004). Marine decapod Crustacea of Southern Australia: a guide to identification. CSIRO Publishing. 574 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Galatheidae

Munida spp. (Squat lobster) (MNI)

ARTHROPODA

Distinguishing features: Crab-like, chelipeds greatly elongate and slender, abdomen folded up against itself. Telson (middle appendage of tail) without transverse groove (squat lobsters have a transverse groove), without sutures i.e. un-notched, and is made of multiple scaly plates. Image above of the endemic *Munida gracilis* (MGA).

Colour: Red to brown. Also orange, pink, sometimes striped.

Size: Carapace length up to 50 mm depending on species.

Distribution: Worldwide. *Munida gracilis* around New Zealand, Challenger Plateau and Chatham Rise.

Depth: 0 to 2000 m. Similar species: Chirostylids and other galatheid species.

References: O'Shea, S.; McKnight, D.; Clark, M. (1999). Bycatch – the common, unique and bizarre. *Seafood New Zealand* 7(5): 45–51.

Poore, G.C.B. (2004). *Marine decapod Crustacea of Southern Australia: a guide to identification*. CSIRO Publishing. 574 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Geryonidae

Chaceon bicolor (Red crab) (CHC)

Distinguishing features: Large. Distinctive carapace shape with 3 to 5 spines on each lateral edge of carapace. Tips of walking legs laterally flattened. Two-tone red-purple and tan colouring in most specimens.

Colour: Apart from the branchial regions which are yellowy tan, carapace red-purple to yellowy tan. Legs coloured similarly to carapace.

Size: Carapace width in males up to 200 mm, 125 mm in females.

Distribution: Japan to Australia and New Zealand. Off northern North Island, south to Chatham Rise.

Depth: 800 to 1100 m.

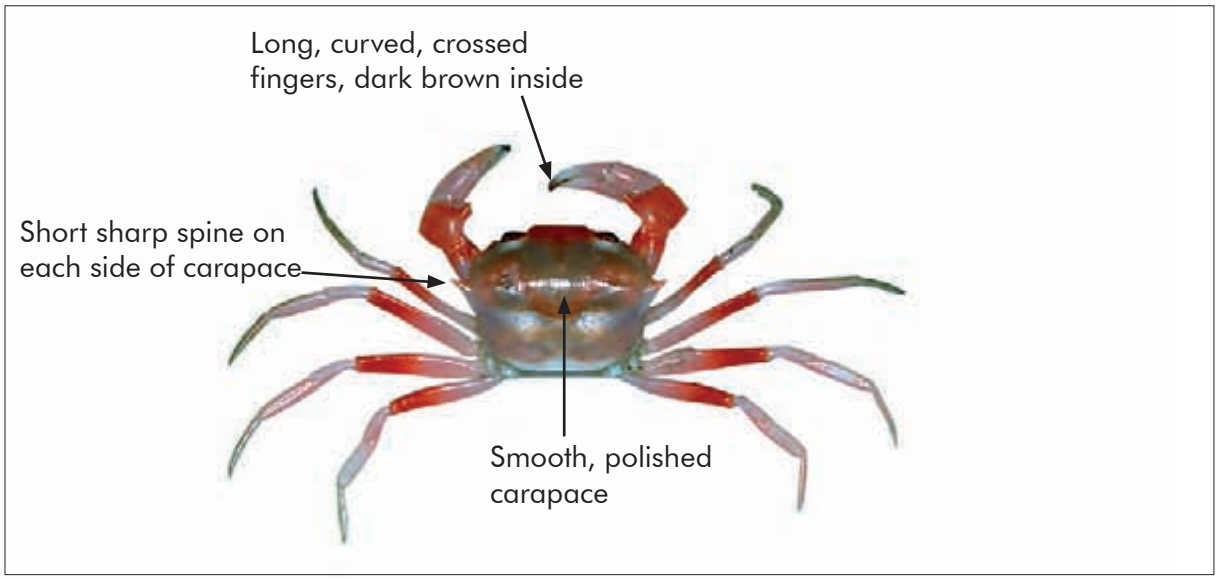
Similar species: *Chaceon yaldwyni* is almost indistinguishable, but is a rarely caught species from the eastern Chatham Rise. If in doubt, call it *Chaceon* sp., *Carcinoplax* species look similar, but much smaller (< 40 mm carapace width), tips of palms are black.

References: Dawson, E.W.; Webber, W.R. (1991). Guide to information about the deep-sea red crab Chaceon (" *Geryon* "), including a list of species of the family Geryonidae. *National Museum of New Zealand, Miscellaneous Series No 24*. 83 p.

McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Goneplacidae

Pycnoplax victoriensis (Two-spined crab) (CVI)



Distinguishing features: Smooth polished carapace, wider than long. Front of carapace between eyes flattish. Long, thin legs. Short, sharp lateral spines on edge of carapace. Large inner and smaller outer spine on inflated carpus. Long, curved, crossed fingers, dark brown inside. This species was previously known as *Carcinoplax victoriensis*.

Colour: Carapace and chelipeds pale pinkish white with dark yellow edge on front of carapace, and lighter yellow on anterior surface and carpi. Walking legs pale pink with wide dark red bands near the middle.

Size: Carapace width to nearly 40 mm in males, nearly 30 mm in females.

Distribution: Around New Zealand and on the Chatham Rise.

Depth: 125 to 765 m.

Similar species: *Pycnoplax meridionalis* is similar but has two large spines behind the eye on the edge of carapace, shorter, thinner, and black fingers, no spines on edge of carpus, and shorter and thicker fingers.

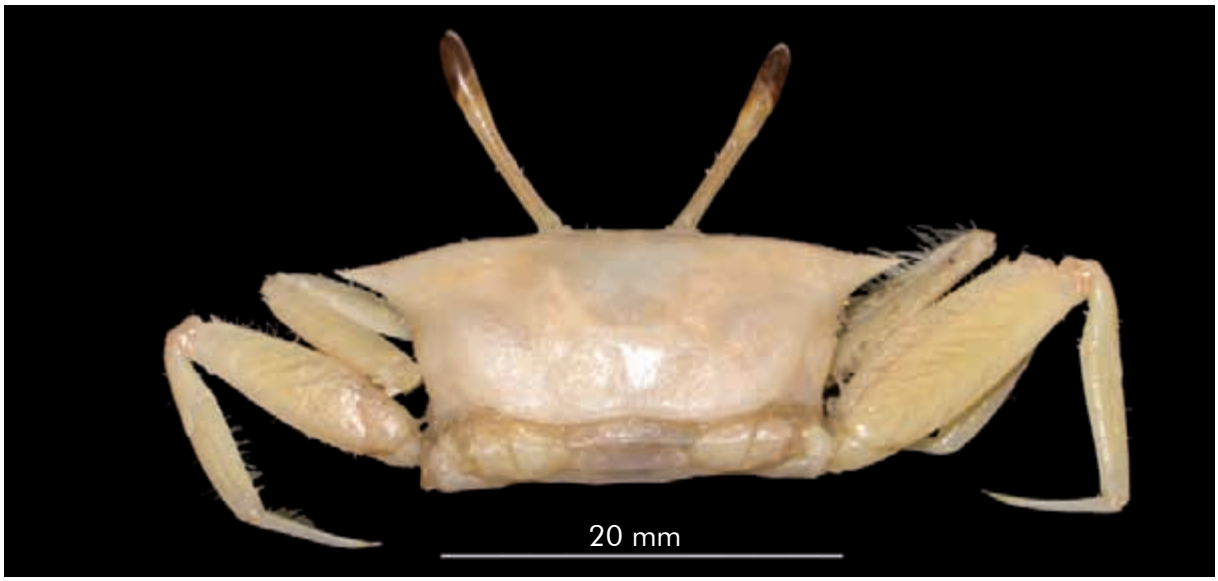
References: McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Rathbun, M.J. (1923). Report on the crabs obtained by the F.I.S. "Endeavour" on the coasts of Queensland, New South Wales, Victoria, South Australia and Tasmania. *Biological results of the fishing experiments carried out by the F.I.S. "Endeavour" 1909–14*. 5 (3), 93–156.

Castro P. (2007). A reappraisal of the family Goneplacidae MacLeay, 1838 (Crustacea, Decapoda, Brachyura) and revision of the subfamily Goneplacinae, with the description of 10 new genera and 18 new species. Zoosystema 29: 609–774.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Goneplacidae

Neommatocarcinus huttoni (Policeman crab) (NHU)



Distinguishing features: Very long eyestalks. Carapace wider at the front than back, and wider than long. A strong lateral spine on each side at the front of the carapace. Chelipeds long in mature specimens.

Colour: Carapace a yellowish reddish orange, gastric region darker. Chelipeds and legs mainly creamy white, but red, orange, yellow, and purple in places.

Size: Carapace width to about 40 mm.

Distribution: Around New Zealand and the Chatham Islands.

Depth: As shallow as about 20 m, more commonly between about 300 and 600 m.

Similar species: No other species of this genus known from New Zealand waters.

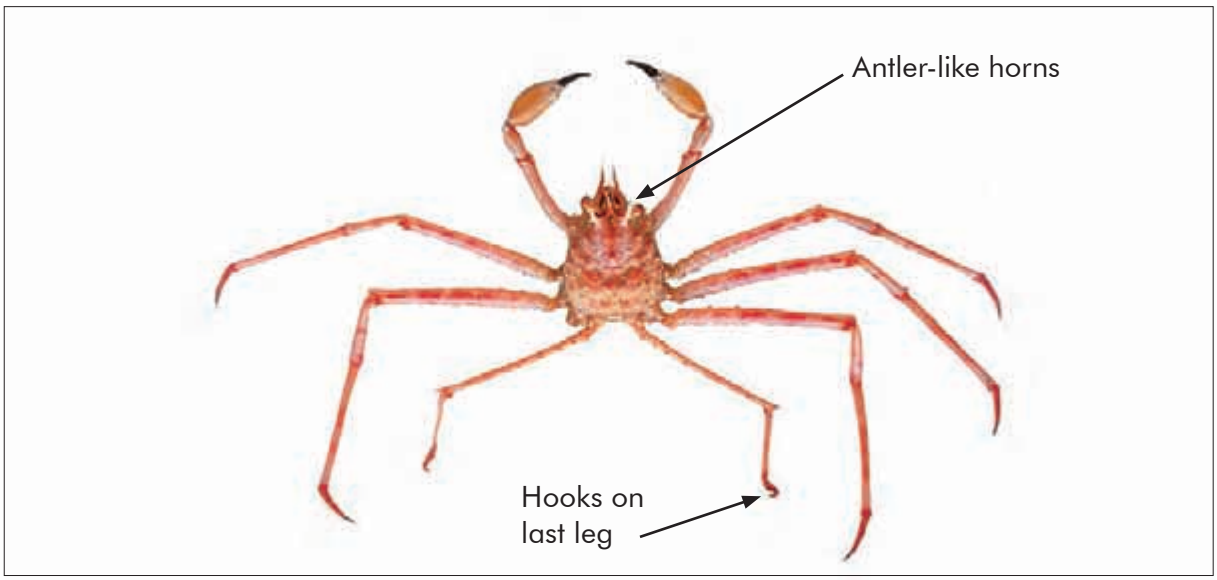
References: Bennett, E.W. (1964). The marine fauna of New Zealand: Crustacea Brachyura. New Zealand Department of Scientific and Industrial Research Bulletin 153. (*New Zealand Oceanographic Institute Memoir 22*). 120 p.

Dell, R.K. (1963). Nature in New Zealand: Native crabs. Reed, Wellington. 64 p.

McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Homolidae

Dagnaudus petterdi (Antlered crab) (DAP)



Distinguishing features: Antler-like horns to either side above eyes. Sharp, simple rostrum is a single spine. Fingers with black tips. Palms bulbous in adult males. Long, thin walking legs. Last pair of legs with hooks, normally held above carapace.

Colour: Carapace and legs pale yellowish white, mottled with red. Red around joints, and elsewhere on legs.

Size: Carapace width to 75 mm.

Distribution: East coast, Northland to Fiordland and Snares Islands. Locally common (e.g., off Banks Peninsula); also Australia and New Caledonia.

Depth: 180 to 540 m.

Similar species: *Homola orientalis* and *Yaldwynopsis spinimana* are similar in overall appearance, but lack antlers.

References: Bennett, E.W. (1964). The marine fauna of New Zealand: Crustacea Brachyura. New Zealand Department of Scientific and Industrial Research Bulletin 153. (*New Zealand Oceanographic Institute Memoir 22*). 120 p.

McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Homolidae

Homola orientalis (Carrier crab) (HOO)

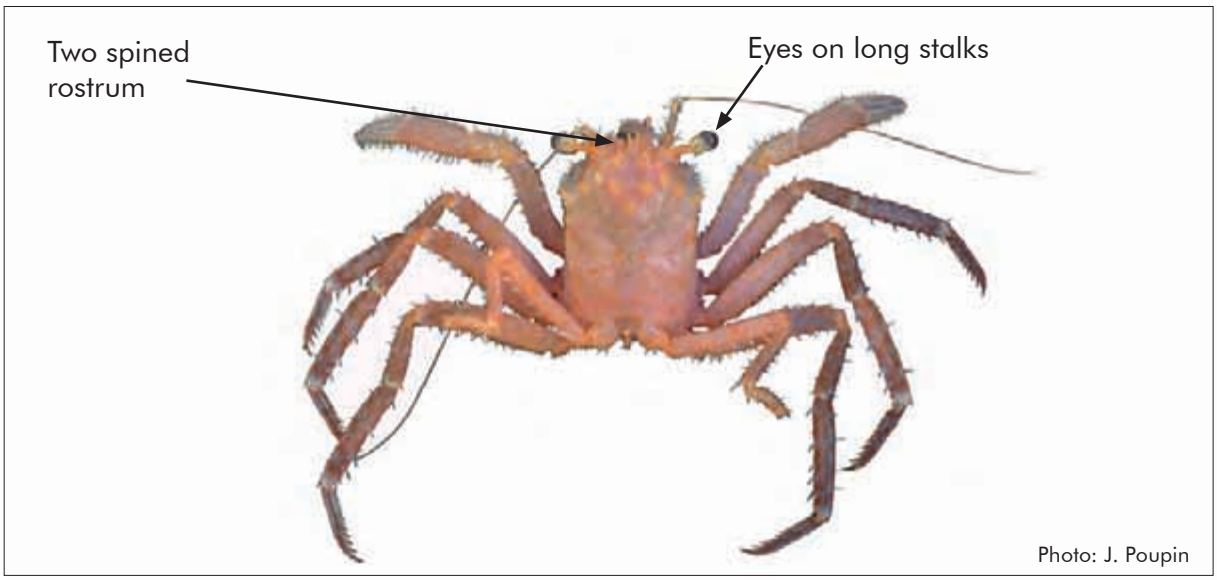


Photo: J. Poupin

Distinguishing features: Carapace rectangular. Eyes on long thin stalks. Short rostrum of two spines. Long antennae. Long thin walking legs. Last pair of legs with hooked pinchers.

Colour: Carapace and legs pale yellowish white, mottled with red.

Size: Carapace width to 30 mm.

Distribution: Indo-West Pacific. One specimen recorded from the Bay of Plenty.

Depth: About 40 to 550 m.

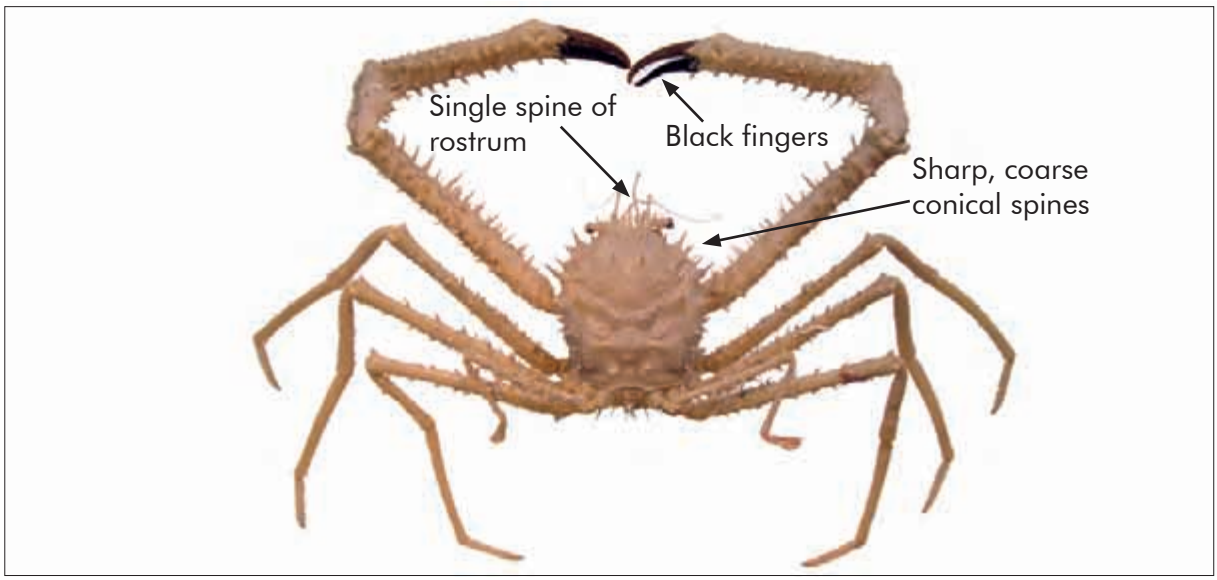
Similar species: Antlered crab (*Dagnaudus petterdi*) is similar, but has antler-like horns to either side above eyes. *Yaldwynopsis spinimana* is similar, but has rostrum of only 1 spine and sharp, coarse, conical spines at front and sides of carapace.

References: McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Yaldwin, J.C.; Dawson, E.W. (1976). First records of the crab genera Homola, Randallia, and Rochinia from New Zealand (crustacea: Decapoda: Brachyura). *National Museum of New Zealand Records. 1* (6). 91–103.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Homolidae

Yaldwynopsis spinimana (Yaldwyn's crab) (YSP)



Distinguishing features: Carapace urn shaped; sharp, coarse, conical spines at front and sides.

Colour: Carapace and legs uniform bright orange, tips of chelipeds black. (Specimen in photo preserved and faded.)

Size: Carapace width to about 40 mm.

Distribution: Off Three Kings Islands. Only two specimens caught in New Zealand waters.

Depth: 90 to 100 m.

Similar species: Antlered crab (*Dagnaudus petterdi*) is similar, but has antler-like horns to either side above the eyes. *Homola orientalis* is similar, but has a two-spined rostrum lacks narrow sharp spines on chelipeds and front half of carapace.

References: Griffin, D.J.G. (1965). A new species of Paramola (Crustacea), Decapoda, Thelxiopidae from New Zealand. *Transactions of the Royal Society of New Zealand 7*: 85–91. (as *Paramola spinimana*).

McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. Leigh Laboratory Bulletin No. 22. 463 p. (as *Paramola spinimana*).

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Inachidae

Platymaia maoria (Dell's spider crab) (PTM)

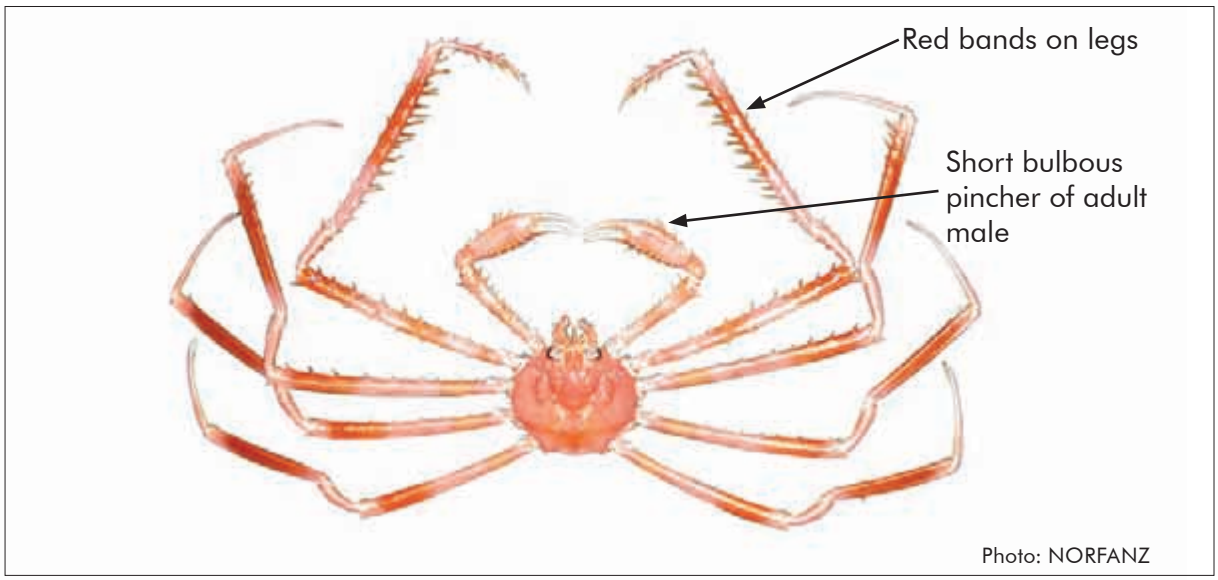


Photo: NORFANZ

Distinguishing features: Carapace nearly round from above. Rostrum of 3 short, strong spines. A few stubby spines on carapace. Palms short and bulbous in adult males. Walking legs flattened with rows of sharp spines along front edges of front 3 pairs. Legs with red bands on peach-white.

Colour: Peach coloured, red bands on legs.

Size: Carapace width to 60 mm.

Distribution: North of Cape Brett to northeast of Poor Knights Islands; Challenger Plateau; also eastern Australia.

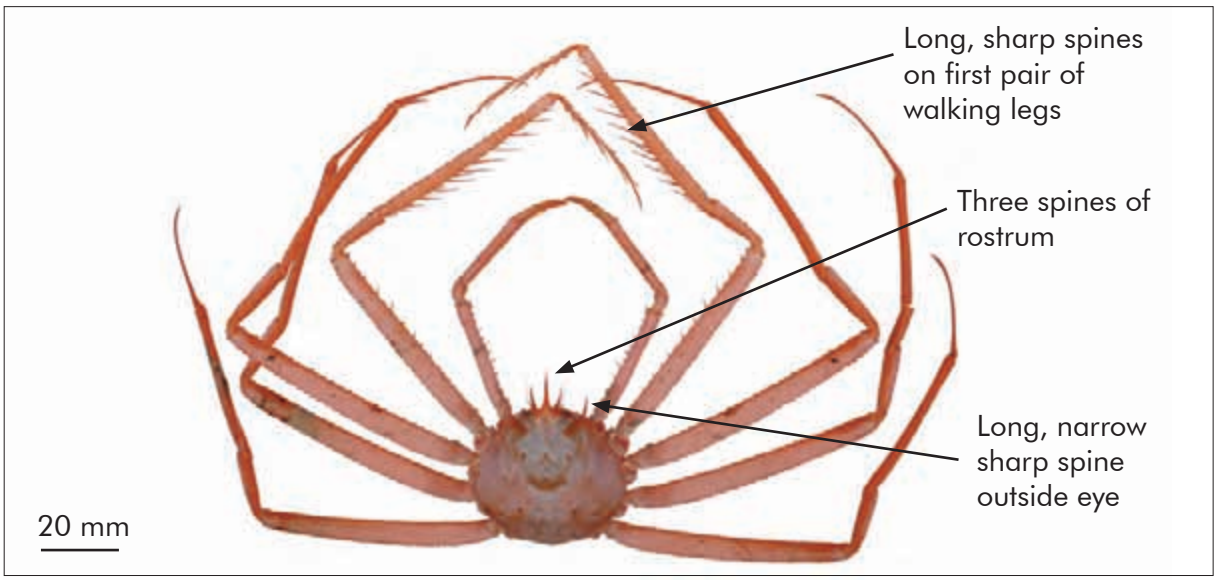
Depth: 270 to 950 m.

Similar species: *Vitjazmaia latidactyla* is similar, but carapace more oval in profile, 3 spines of rostrum and spine outside eye much longer, narrower, and sharper. Carapace and legs with many tiny, sharp spines red-orange spines and less colour on carapace and legs.

References: Dell, R.K. (1963). Nature in New Zealand: Native crabs. Reed, Wellington. 64 p.
McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No.* 22.463 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Inachidae

Vitjazmaia latidactyla (Deep-sea spider crab) (VIT)



Distinguishing features: Carapace nearly round from above, oval in profile. Trident-like rostrum with strong, sharp middle spine (see below). A long, narrow, sharp spine outside each eye. Walking legs very long and flat, covered with tiny, sharp, curved spines. Long, sharp spines on second pair of legs. Numerous, small sharp spines on carapace. Palms heavier and tapered in male.

Colour: Juveniles almost unpigmented. Spines on rostrum and carapace bright red-orange. Abdomen and ends of palms light red-orange in males. Fresh specimens often blue-grey due to fine deposits of bottom sediment on small setae of carapace and legs.

Size: Carapace width to 80 mm in males, 75 mm in females.

Distribution: Western Indian Ocean to New Zealand. Wanganella Bank, east and west of North Island, Challenger Plateau, Chatham Rise, and Chatham Islands.

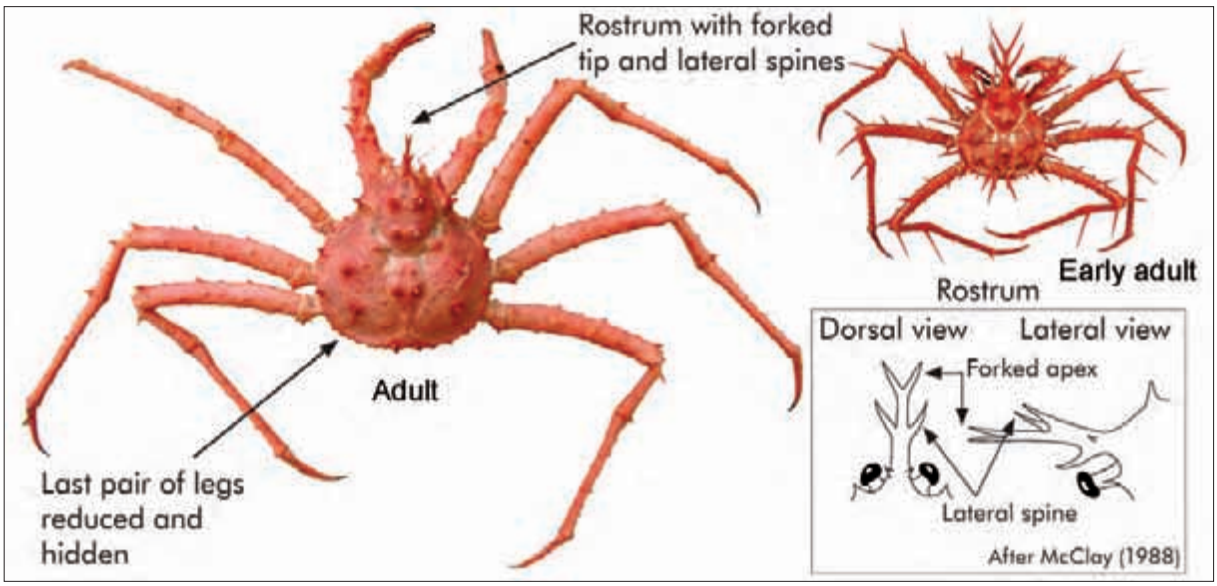
Depth: 500 to 1300 m.

Similar species: *Platymaia maoria* is similar, but with red and white bands on legs and eyes relatively larger. 3 spines of rostrum shorter and stouter and spine outside eye stubby. Palms short and bulbous in adult males and carapace less oval in profile without covering of tiny sharp spines on carapace and legs.

References: Webber, W.R.; Richer de Forges. (1995). Deep sea Majidae (Decapoda: Brachyura) new to New Zealand with a description of *Oxypleurodon wanganella* sp. nov. *Journal of the Royal Society of New Zealand 25 (4)*: 501–516.

Phylum Arthropoda
Class Malacostraca
Order Decapoda
Family Lithodidae

Lithodes aotearoa (New Zealand king crab) (LAO)



Distinguishing features: Large. Distinctive rostrum, with 2 strong lateral spines before the forked tip. Rostrum much more pronounced in juveniles. Short, stubby spines on carapace and legs in adults, very long, sharp spines on carapace and legs in juveniles and early adults. Marginal and central plates of second abdominal somite fused (see similar species section). Last pair of legs reduced and hidden. Adult *L. aotearoa* were previously referred to as *L. murrayi* (LMU). Juvenile and early adult *L. aotearoa* were previously referred to as *L. cf. longispinus* (LLT).

Colour: Juveniles uniformly deep red. Adults dark wine red to brick red with paler patches.

Size: Carapace width to 20 cm+ in males, less in females.

Distribution: Southern Ocean, around New Zealand, more commonly off Kaikoura Peninsula, East Cape, west coast of Stewart Island, Solander Island, Wellington, on the Chatham Rise, the Bounty Plateau, the Challenger Plateau, and in Foveaux Strait.

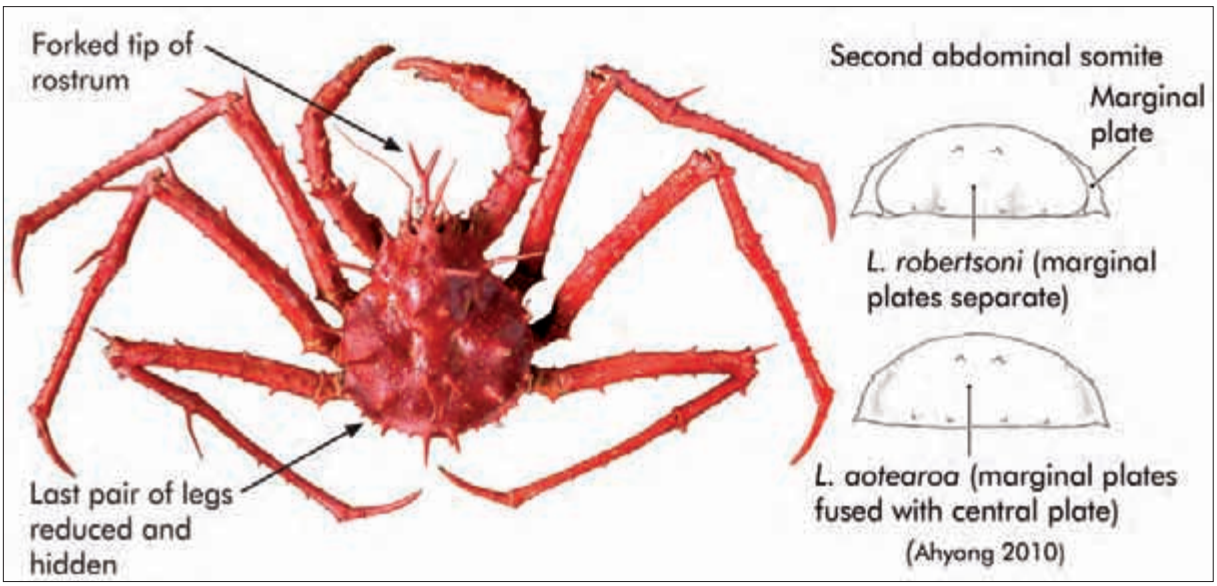
Depth: 250 to 1500 m.

Similar species: The king crab *L. robertsoni* is similar, but has 3 separate plates in abdominal somite 2 (the 2nd segment on the abdomen). In *L. aotearoa* the 2 marginal plates on abdominal somite 2 are fused with the central plate. See sheet for *L. robertsoni*. The second abdominal somite is the large plate visible below the back of the carapace (the first somite is tucked under the carapace). *L. robertsoni* also has 7 or 8 spines on the posterior branchial margin. *L. aotearoa* has 8 to 12 spines on the posterior branchial margin. The legs and rostrum are generally more slender in *L. robertsoni* than in *L. aotearoa*.

References: Ahyong, S.T. (2010). King crabs of New Zealand, Australia, and the Ross Sea (Crustacea: Decapoda: Lithodidae). *NIWA Biodiversity Memoir 123*. 196 p

Phylum Arthropoda
Class Malacostraca
Order Decapoda
Family Lithodidae

Lithodes robertsoni (Robertson's king crab) (LRO)



Distinguishing features: Large. Distinctive rostrum, with 2 strong lateral spines before the forked tip. Carapace in adults with slender spines, sharp spines on legs. Marginal and central plates of second abdominal somite separate (see similar species section). Last pair of legs reduced and hidden.

Colour: Uniformly deep red.

Size: Carapace width to about 12 cm.

Distribution: Around New Zealand, found on the Challenger Plateau, the Chatham Rise, the Bounty Trough, and near the Snares.

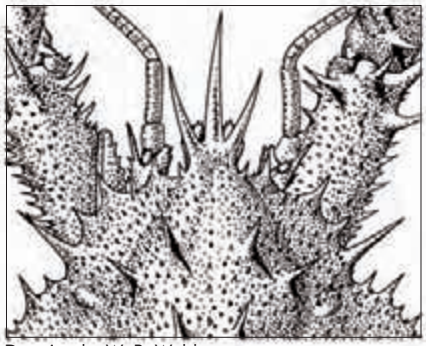
Depth: 900 to 1300 m.

Similar species: The king crab *L. aotearoa* is similar, but the 2 marginal plates on abdominal somite 2 (the 2nd segment on the abdomen) are fused with the central plate. *L. robertsoni* has 3 separate plates in abdominal somite 2. The second abdominal somite is the large plate visible below the back of the carapace (the first segment is tucked under the carapace). *L. aotearoa* also has 8 to 12 spines on the posterior branchial margin. *L. robertsoni* has 7 or 8 spines on the posterior branchial margin. The legs and rostrum are generally more slender in *L. robertsoni* than in *L. aotearoa*.

References: Ahyong, S.T. (2010). King crabs of New Zealand, Australia, and the Ross Sea (Crustacea: Decapoda: Lithodidae). *NIWA Biodiversity Memoir 123*. 196 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Lithodidae

Neolithodes brodiei (Brodie's king crab) (NEB)



Drawing by W. R. Webber

Distinguishing features: Carapace pear-shaped. Front of carapace bearing 3 forward-pointed spines (above). Carapace and legs very spiny, spines much longer in juveniles. Last pair of legs reduced and hidden.

Colour: Typically uniform brick to bright red.

Size: Carapace width to 180 mm.

Distribution: Widely distributed from north of Three Kings Islands to Campbell Plateau.

Depth: 800 to 1100 m.

Similar species: The king crabs *Lithodes aotearoa* and *L. robertsoni* are similar, but have
- single rostrum with forked tip
- 2 lateral spines on rostrum before tip.

References: Griffin, D.J.G. (1966). The marine fauna of New Zealand: spider crabs, family Majidae (Crustacea, Brachyura). *New Zealand Oceanographic Institute Memoir No. 35*. 112 p.

McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Webber, W.R. (1997). The Royal Family–King crabs at home and abroad. *Seafood New Zealand 5(4)*: 81–84.

Ahyong, S.T. (2010). King crabs of New Zealand, Australia, and the Ross Sea (Crustacea: Decapoda: Lithodidae). *NIWA Biodiversity Memoir 123. 196 p*

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Lithodidae

Paralomis dawsoni (Warty king crab) (PDA)

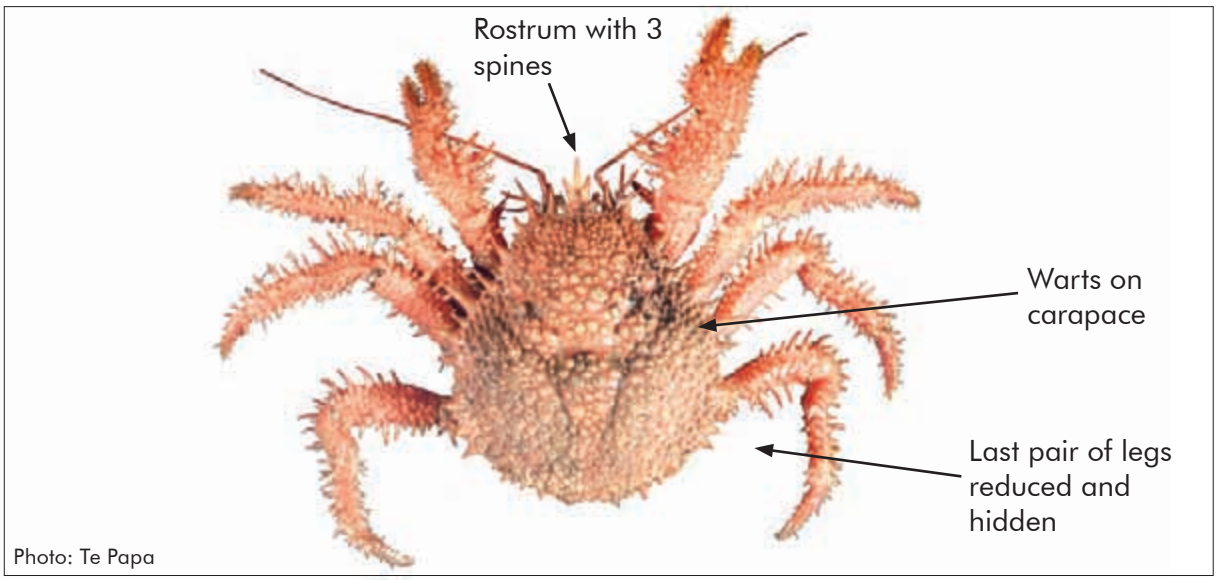


Photo: Te Papa

Distinguishing features: Carapace broadly pear-shaped to hexagonal; surface warty. Short rostrum of 3 spines. Last pair of legs reduced and hidden.

Colour: Pinky red.

Size: Carapace width to 140 mm.

Distribution: North, east, and west of North Island, particularly Bay of Plenty; also New Caledonia.

Depth: About 1000 m.

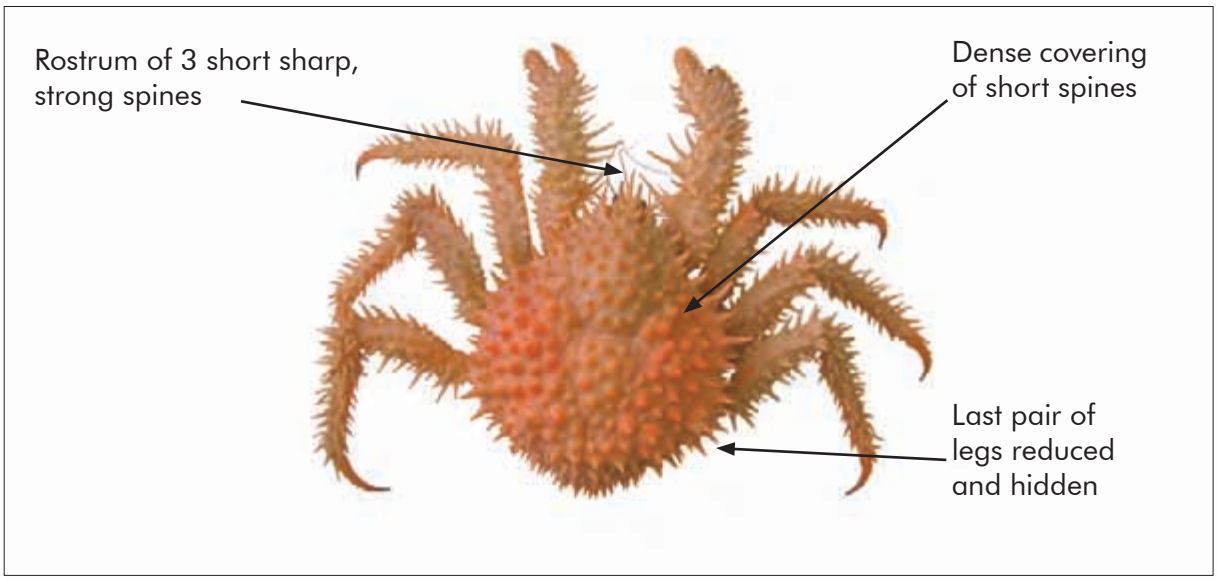
Similar species: The king crab *Paralomis zealandica* is similar in shape, but has uniform covering of short, strong, sharp spines, not warts.

References: MacPherson, E. (2001). New species and records of lithodid crabs (Crustacea, Decapoda) from the southwestern and central Pacific Ocean. *Zoosystema 24* (4): 797–805.

Webber, R.; Naylor, R. (2004). King crabs 2 – Paralomis warts and all. *Seafood New Zealand 12* (10): 78–79.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Lithodidae

Paralomis zealandica (Prickly king crab) (PZE)



Distinguishing features: Carapace pear-shaped. Rostrum of 3 short, strong, sharp spines. Juveniles with longer curved spines; adult covered with short upright, strong spines (including abdomen). Last of legs reduced and hidden.

Colour: Red on creamy white.

Size: Carapace width to 130 mm.

Distribution: Eastern central and southern New Zealand and Campbell Plateau.

Depth: 550 to 650 m.

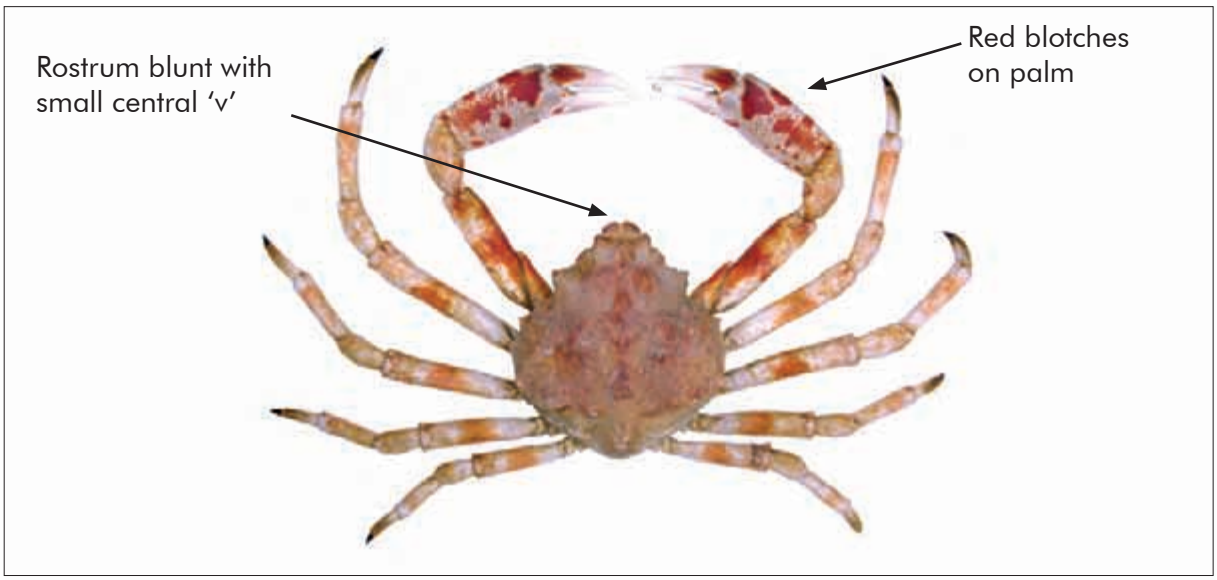
Similar species: The king crab *Paralomis dawsoni* is similar, but has warts, not spines on carapace.

References: McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Webber, R.; Naylor, R. (2004). King crabs 2 – *Paralomis* warts and all. *Seafood New Zealand 12* (10): 78–79.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Majidae

Jacquinotia edwardsii (Giant spider crab) (GSC)



Distinguishing features: Large. Rostrum blunt with a small, central 'v'. Long, stout legs.

Colour: Carapace brick red to yellowish brown, often covered by white or mauve-pink, paint-like coralline algae. Palms yellowish white with bright red blotches. Colour lighter or darker depending on moult stage.

Size: Carapace width up to 200 mm in males, 140 mm in females.

Distribution: Offshore, southern coast of New Zealand as far north as Kaikoura, around Chatham and Stewart Islands, and on the Pukaki Rise. Shallower around Auckland, Campbell, Bounty, and Snares Islands.

Depth: Intertidal to 550 m.

Similar species: Long-legged masking crab (*Leptomithrax longipes*) is similar, but adults smaller and have maxillipeds with porcelain-like knobs and thinner legs.

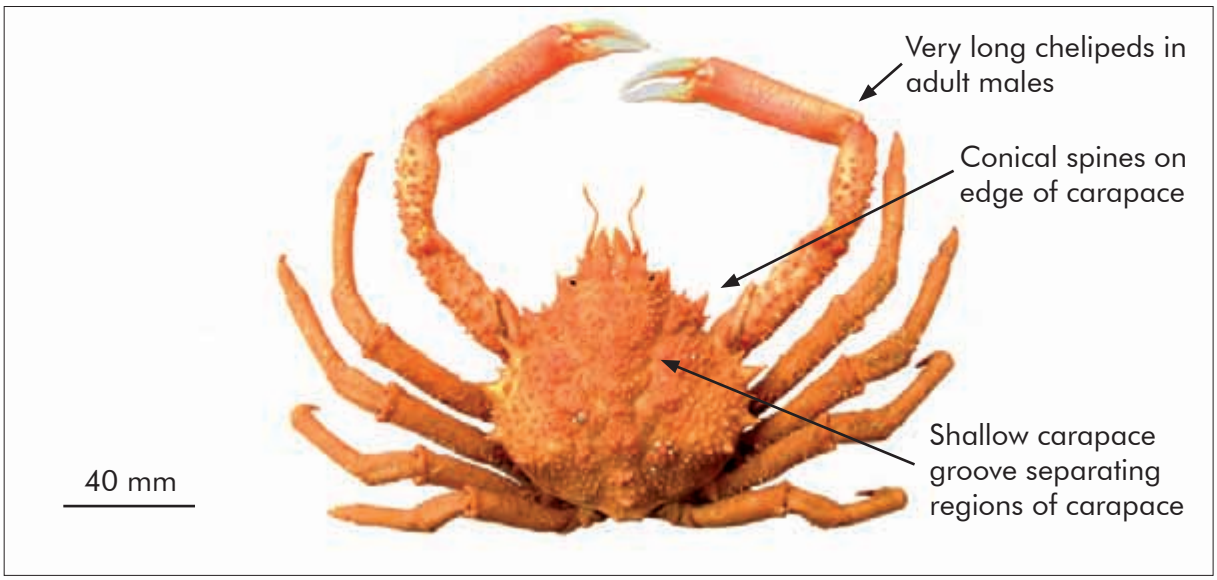
References: Griffin, D.J.G. (1966). The marine fauna of New Zealand: spider crabs, family Majidae (Crustacea, Brachyura). *New Zealand Oceanographic Institute Memoir No. 35*. 112 p.

McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Ritchie, L.D. (1970). Southern spider crab (*Jacquinotia edwardsii* (Jacquinot, 1853)) survey–Auckland Islands and Campbell Island. *Fisheries Technical Report No 52*.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Majidae

Leptomithrax australis (Giant masking crab) (SSC)



Distinguishing features: Large. Carapace pear-shaped. Shallow carapace groove. Six equally spaced and prominent conical spines on lateral margins of carapace. Numerous small, blunt spines/knobs on carapace. Very long chelipeds in adult males with blunt spines on arms. Long, thin walking legs.

Colour: Carapace and legs orange-red to deep red. Teeth on fixed finger of palm and tips of legs white. Shallow-water specimens often masked with seaweed, deepwater specimens frequently covered with sessile animals (e.g., anemones, sponges).

Size: Carapace width to 90 mm in males, 60 mm in females.

Distribution: Offshore from Cook Strait to Stewart Island, around the Chatham Islands, and on the Pukaki Rise. Shallower around the Snares, Auckland, Bounty, and Campbell Islands

Depth: Intertidal to about 100 m.

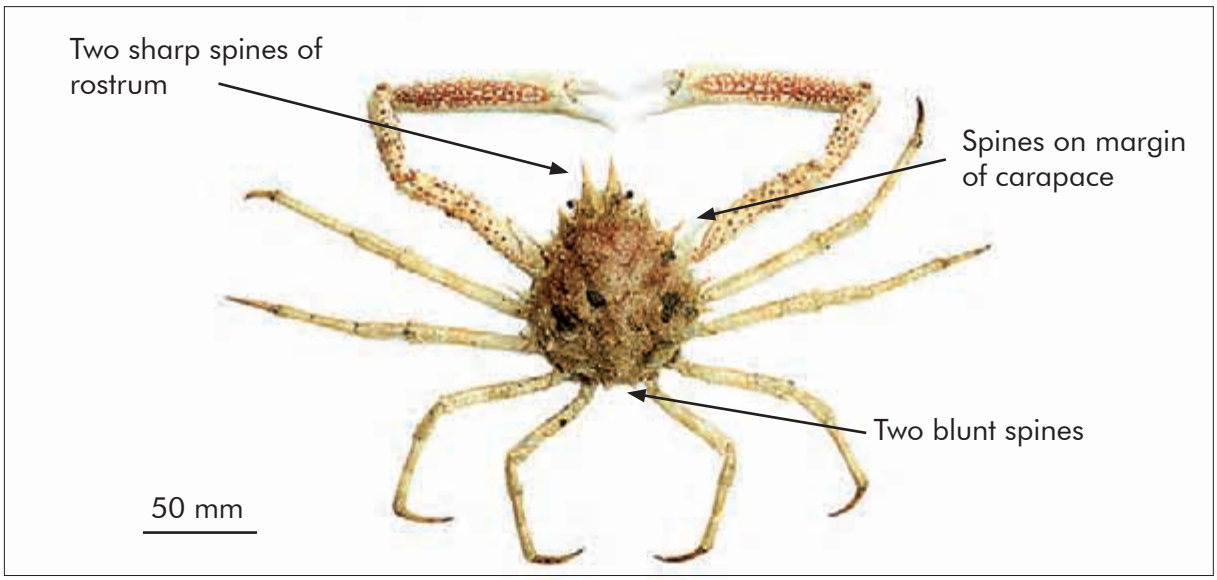
Similar species: Long-handed masking crab (*Leptomithrax longimanus*) very similar, but more pear-shaped, less oval; carapace groove deeper, more obvious. Palms longer and with tubercles. Legs thicker in adult males. Garrick's masking crab (*L. garricki*) very similar, but longer, sharper rostral spines and found in deeper water (180 to 800 m). Long-legged masking crab (*L. longipes*) similar, but has shiny porcelain-like knobs on third maxillipeds.

References: Griffin, D.J.G. (1966). The marine fauna of New Zealand: spider crabs, family Majidae (Crustacea, Brachyura). *New Zealand Oceanographic Institute Memoir No. 35*. 112 p.

McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Majidae

Leptomithrax garricki (Garrick's masking crab) (GMC)



Distinguishing features: Carapace pear-shaped. Deep groove separating front and expanded branchial regions of carapace. Six equally spaced, short conical spines on margin of each side of carapace. Very long chelipeds in adult males. Tubercles, not spines, on arms of chelipeds. Long, thin walking legs.

Colour: Carapace and legs a dull yellowish brown. Chelipeds in adult males dark brown with yellowish markings on inside of palm. Females lighter colour. Often with encrusting polychaete worms and sponges on carapace and legs.

Size: Carapace width to 50 mm in males, 35 mm in females.

Distribution: Uncommon. From Three Kings Islands to Stewart Island.

Depth: Most often 20 to 220 m, rarely intertidal, and occasionally to 550 m.

Similar species: Giant masking crab (*Leptomithrax australis*) similar, but less pear-shaped, more oval; carapace groove less obvious less expanded branchial regions and shorter palms. Thinner legs in adult males.
Garrick's masking crab (*L. garricki*) similar, but longer rostral spines; less pear-shaped, more oval; carapace groove less obvious and less obvious branchial regions. Small spines, not tubercles, on cheliped arms. Long-legged masking crab (*L. longipes*) similar, but has shiny porcelain-like knob on third maxillipeds.

References: Bennett, E.W. (1964). The marine fauna of New Zealand: Crustacea Brachyura. New Zealand Department of Scientific and Industrial Research Bulletin 153. (*New Zealand Oceanographic Institute Memoir 22*). 120 p.

Griffin, D.J.G. (1966). The marine fauna of New Zealand: spider crabs, family Majidae (Crustacea, Brachyura). *New Zealand Oceanographic Institute Memoir No. 35*. 112 p.

McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Majidae

Leptomithrax longimanus (Long-handed masking crab) (LHC)

Distinguishing features: Carapace pear-shaped. Deep groove separating front and expanded branchial regions of carapace. Six equally spaced, short conical spines on margin of each side of carapace. Very long chelipeds in adult males. Tubercles, not spines, on arms of chelipeds. Long,thin walking legs.

Colour: Carapace and legs a dull yellowish brown. Chelipeds in adult males dark brown with yellowish markings on inside of palm. Females lighter colour. Often with encrusting polychaete worms and sponges on carapace and legs.

Size: Carapace width to 50 mm in males, 35 mm in females.

Distribution: Uncommon. From Three Kings Islands to Stewart Island.

Depth: Most often 20 to 220 m, rarely intertidal, and occasionally to 550 m.

Similar species: Giant masking crab (*L. australis*) similar, but less pear-shaped, more oval; carapace groove less obvious; less expanded branchial regions and shorter palms, thinner legs in adult males.
Garrick's masking crab (*L. garricki*) similar, but longer rostral spines; less pear-shaped, more oval; carapace groove less obvious and less obvious branchial regions. Small spines, not tubercles, on cheliped arms.
Long-legged masking crab (*L. longipes*) similar, but has shiny porcelain-like knob on third maxillipeds.

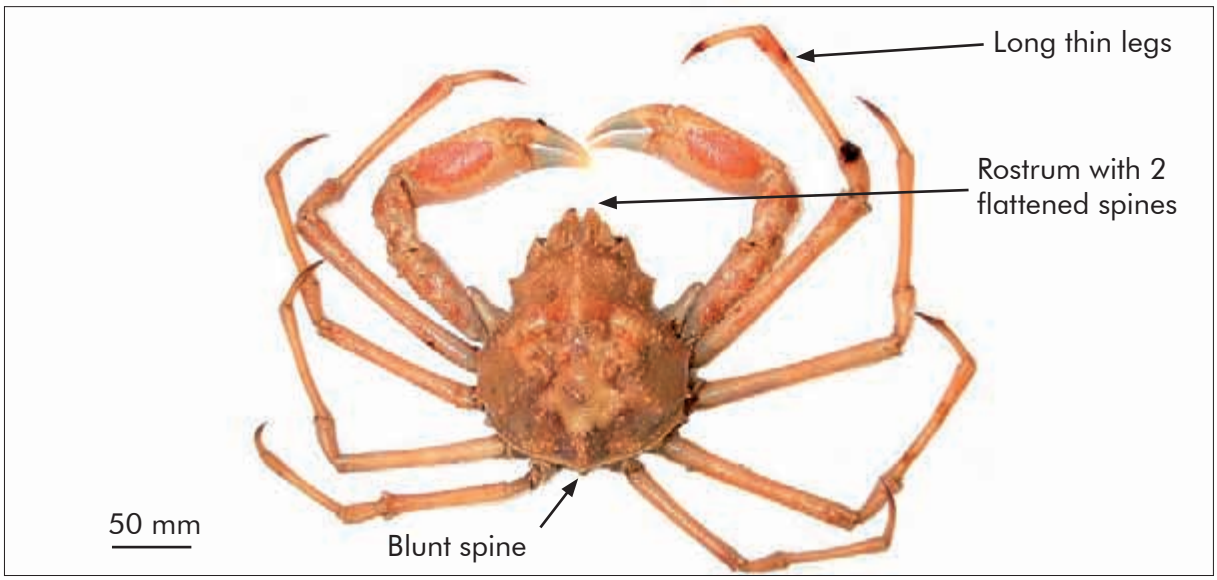
References: Bennett, E.W. (1964). The marine fauna of New Zealand: Crustacea Brachyura. New Zealand Department of Scientific and Industrial Research Bulletin 153. (*New Zealand Oceanographic Institute Memoir 22*). 120 p.

Griffin, D.J.G. (1966). The marine fauna of New Zealand: spider crabs, family Majidae (Crustacea, Brachyura). *New Zealand Oceanographic Institute Memoir No. 35*. 112 p.

McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Majidae

Leptomithrax longipes (Long-legged masking crab) (LLC)



Distinguishing features: Shiny, porcelain-like knobs on third maxillipeds. Long, thin walking legs. Rostrum of 2 short flattened spines. Short, blunt spine at back of carapace.

Colour: Carapace pale yellowish white; red speckling and blotches on legs. Often covered with invertebrates such as sponges and anemones.

Size: Carapace width to 70 mm in males, 30 mm in females.

Distribution: Cook Strait to Foveaux Strait, Chatham Islands, and Macquarie Island.

Depth: 20 to 380 m.

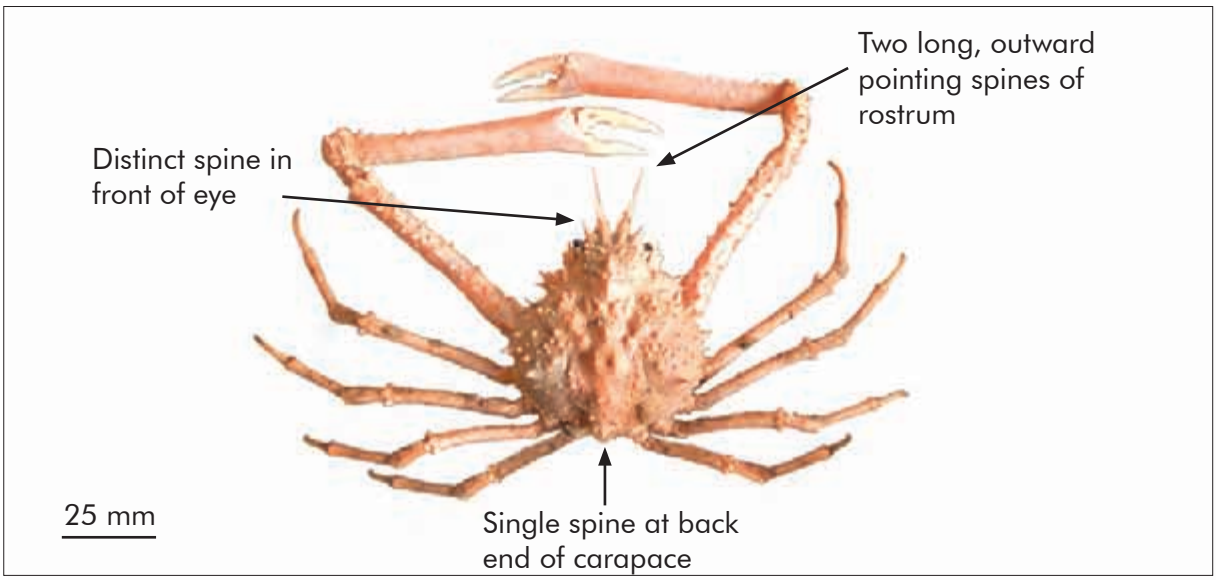
Similar species: Giant spider crab (*Jacquinotia edwardsii*) similar, but lacks shiny, porcelain-like knob on third maxillipeds (N.B., small *Jaquinotia* will be very difficult to distinguish from *L. longipes* except for the porcelain knobs). Also has stouter walking legs.
Giant (*L. australis*) and long-handed (*L. longimanus*) masking crabs similar, but they lack shiny, porcelain-like knob on third maxillipeds.

References: Griffin, D.J.G. (1966). The marine fauna of New Zealand: spider crabs, family Majidae (Crustacea, Brachyura). *New Zealand Oceanographic Institute Memoir No. 35*. 112 p.

McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Majidae

Teratomaia richardsoni (Spiny masking crab) (SMK)



Distinguishing features: Distinct spine in front of eye. Rostrum of 2 long divergent spines. Carapace pear-shaped. Single large, sharp spine at back of carapace. Chelipeds long, especially in adult males.

Colour: Dull creamy white. Some red on carapace and legs.

Size: Carapace width to 50 mm in males, 40 mm in females.

Distribution: Kermadec Trench, Challenger Plateau, Chatham Rise, Campbell Plateau, and Bounty Plateau.

Depth: 300 to 7000 m.

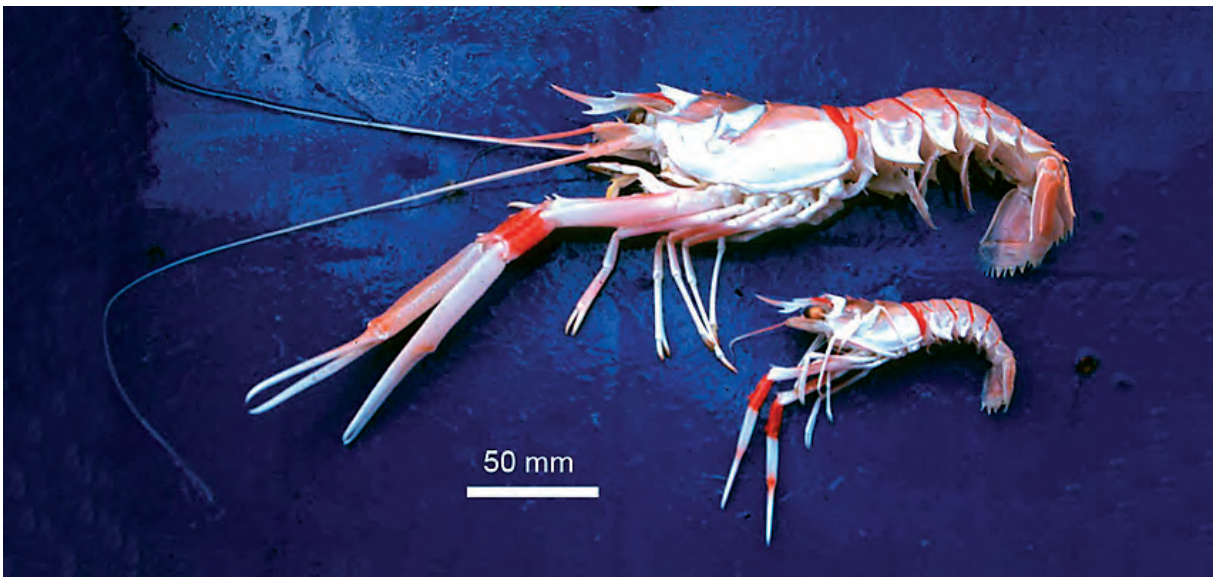
Similar species: *Leptomithrax* species are similar, but have no distinct spine in front of eye and shorter, less divergent rostral spines.

References: Griffin, D.J.G. (1966). The marine fauna of New Zealand: spider crabs, family Majidae (Crustacea, Brachyura). *New Zealand Oceanographic Institute Memoir No. 35*. 112 p.

McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Nephropidae

Metanephrops challengeri (Scampi) (SCI)



Distinguishing features: Lobster-like, with prominent, slightly uprising rostral horn, and a pair of elongate pincers. Large eyes. Distinctive and spectacular.

Colour: Upper surfaces fawn or reddish brown; lateral surfaces white; carpus of chelipeds conspicuously crimson, with transverse bands of crimson across posterior margin of carapace and posterior margins of tail segments.

Size: Total length up to 250 mm. More commonly to 180 mm.

Distribution: Widespread in New Zealand waters in mud substrates, but most abundant off the east coast of the North Island, the Chatham Rise, off the northwest of the South Island, on the Challenger Plateau, and east and south of Auckland Island.

Depth: 140 to 640 m. Most common 200 to 500 m.

Similar species: None in New Zealand waters, but resembles European scampi, *Nephrops norvegicus*.

References: Holthuis, L.B. (1991). Marine lobsters of the world. *FAO Species Catalogue 13*. 292 p.

O'Driscoll, R.L. et al. (2003). Areas of importance for spawning, pupping or egg-laying, and juveniles of New Zealand deepwater fish, pelagic fish, and invertebrates. *NIWA Technical Report 119*. 377 p.

Webber, W.R. (2002). All the pretty lobsters III. *Seafood New Zealand 10(2)*: 48–52.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Paguridae

Diacanthurus rubricatus (Hermit crab) (DIR)

Distinguishing features: Antennules white, eyestalks white with red longitudinal stripes, antennae reddish-brown, chelae and legs yellow-brown with bright red bands on distal ends.

Colour: Reddish-brown with pink and red markings.

Size: From 2 to 18 mm. Measurement is shield length (SL), measured from the tip of the rostrum to the midpoint of the posterior margin of the shell.

Distribution: Apparently endemic to New Zealand. Three Kings Islands to Stewart Island and east to the Chatham Islands.

Depth: 15 to 2200 m. Most collected between 180 and 300 m.

Similar species: Other pagurid species.

References: Forest, J.; de S. Laurent, M.; McLaughlin, P.A.; Lemaitre, R. (2000). The marine fauna of New Zealand: Paguridea (Decapoda: Anomura) exclusive of the Lithodidae. *NIWA Biodiversity Memoir 114*. 250 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Palinuridae

Projasus parkeri (Deepwater rock lobster) (PPA)

Distinguishing features: Prominent supraorbital horns with row of 2 spines behind each. A single median spine followed by 2 submedian rows of 8 spines. Low median carina on first 5 segments of abdomen; 6th segment with 2 pairs of submedian spines and others on posterior margin.

Colour: Light orange to straw brown.

Size: Carapace length up to 92 mm. Specimens available mainly 70 to 90 mm.

Distribution: South Africa, Southern Australia and New Zealand. Challenger Plateau, Bay of Plenty to Castlepoint, Chatham Rise, Louisville Ridge.

Depth: 480 to 970 m. Species has been taken as shallow as 330 m in other parts of the world.

Similar species: Rock lobsters with such carapace spination are unique in New Zealand waters.

References: Booth, J.; Webber, R. (2001). All the pretty lobsters. I. *Seafood New Zealand 9*(11): 20–23.

Holthuis, L.B. (1991). Marine lobsters of the world. FAO *Fisheries Synopsis 125*.

Webber, W.R.; Booth, J.D. (1988). Projasus parkeri (Stebbing, 1902) in New Zealand and description of a Projasus puerulus from Australia. *National Museum of New Zealand Records 3*: 81–92.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Parapaguridae

Sympagurus dimorphus (Hermit crab) (SDM)

Distinguishing features: Large-bodied, chelipeds markedly dissimilar and hairy. Right cheliped massive. Walking legs overreach extended right cheliped. Tail fan (telson and uropods) markedly asymmetrical.

Colour: Overall body colour is cream.

Size: Carapace length up to 30 mm, most commonly up to 20 mm.

Distribution: Southern Australia and New Zealand. The most abundant parapagurid in New Zealand waters, found on soft sediment and seamount environments. Widespread in southern hemisphere.

Depth: 90 to 2000 m. New Zealand records 200 to 1000 m.

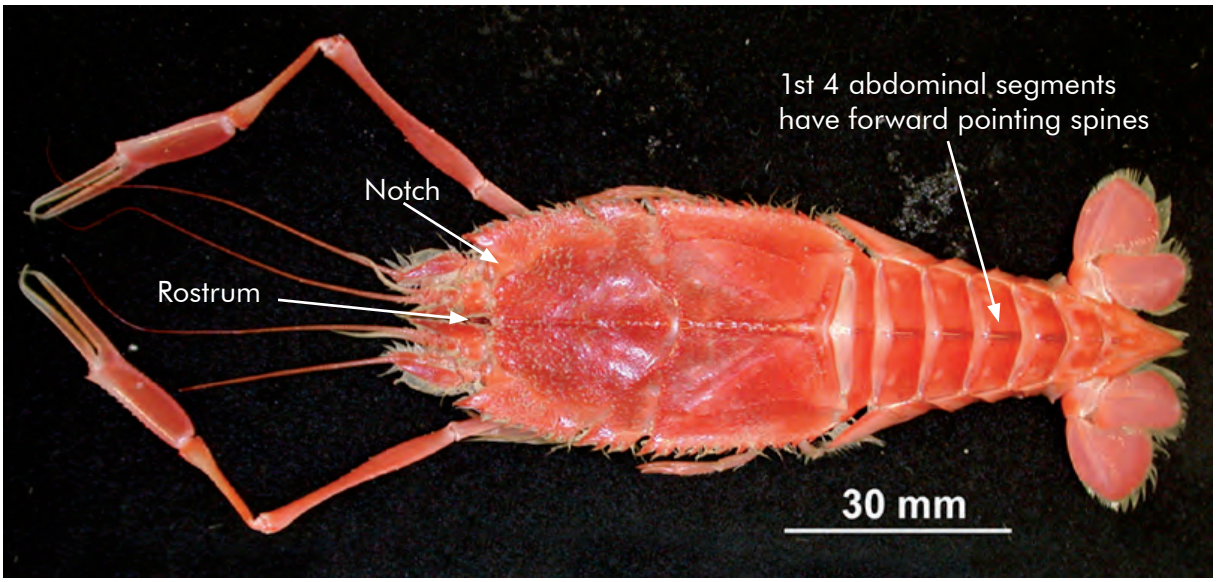
Similar species: At least 5 other parapagurid species.

References: Forest, J.; Laurent, M. de S.; McLaughlin, P.A.; Lemaitre, R. (2000). The marine fauna of New Zealand: Paguridea (Decapoda: Anomura) exclusive of the Lithodidae. *NIWA Biodiversity Memoir 114*. 250 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Polychelidae

Polycheles spp. (Deepsea blind lobster) (PLY)

ARTHROPODA



Distinguishing features: Lobster-like, but first 4 pairs of legs (all in females) with pincers – long and slender on the first pair and small and short on the rest. Elongate, flat-topped cephalothorax, bordered with sharp spines. Small rostrum of 1 or 2 spines. Dorsal orbital notches triangular. First four abdominal segments with forward pointing spines.

Colour: Generally pink with the carapace spines and abdominal terga a darker rose pink.

Size: Carapace length up to 75 mm.

Distribution: Australia and New Zealand. Widespread in New Zealand waters, at least from Bay of Plenty to Auckland Islands.

Depth: 290 to 2200 m.

Similar species: Several species in New Zealand waters. Image above is *P. enthrix* the more common species in New Zealand. Other polychelids known from New Zealand region that are also very similar are – *Polycheles nanus*, *P. surdus*, *P. scultpus*, *Pentachels laevis*, *Pentacheles validus*, and *Willemoesia pacifica*.

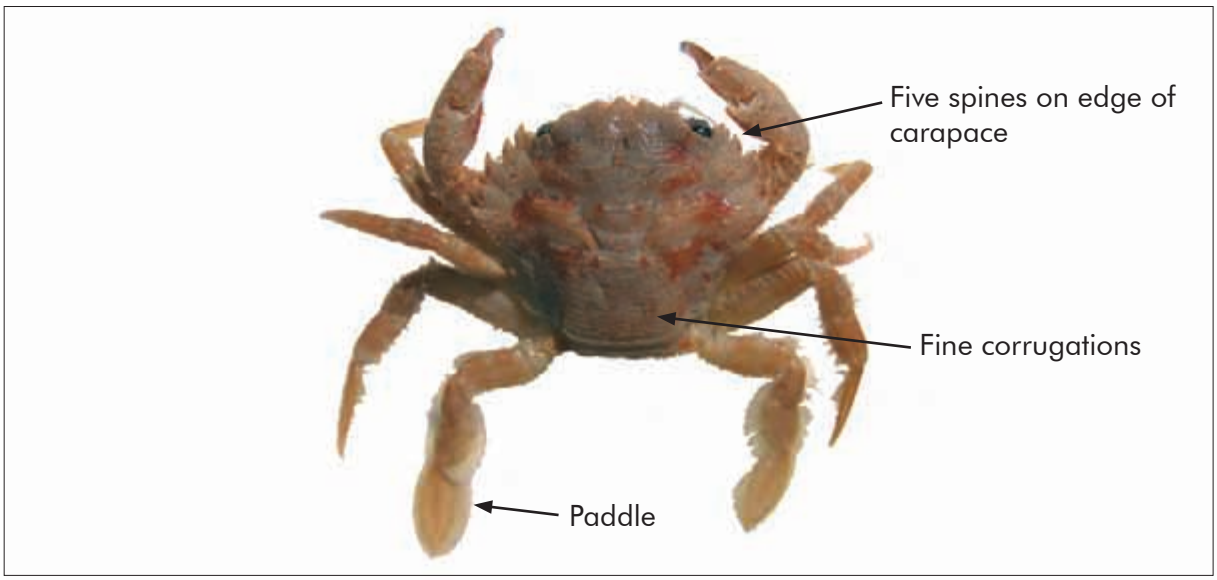
References: Ahyong, S.T.; Brown, D.E. (2002). New species and new records of Polychelidae from Australia (Crustacea: Decapoda). *Raffles Bulletin of Zoology 50*: 53–79.

Bate, C.S. (1888). Report on the scientific results of the voyage of HMS Challenger during the years 1873–76. *Zoology 24*: 1–942.

Galil, B.S. (2000). Crustacea Decapoda: review of the genera and species of family Polychelidae. *Memoires du Museum National d'Histoire Naturelle 184*: 285–387.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Portunidae

Liocarcinus corrugatus (Dwarf swimming crab) (LCO)



Distinguishing features: Five spines of about the same size on edge of carapace. Fine corrugations over much of the carapace. Last pair of legs flattened into paddles.

Colour: Variable, white, grey to reddish brown.

Size: Carapace width up to 20 mm in males, 25 mm in females.

Distribution: Widely distributed around the world, in northern and central New Zealand.

Depth: Intertidal to 140 m.

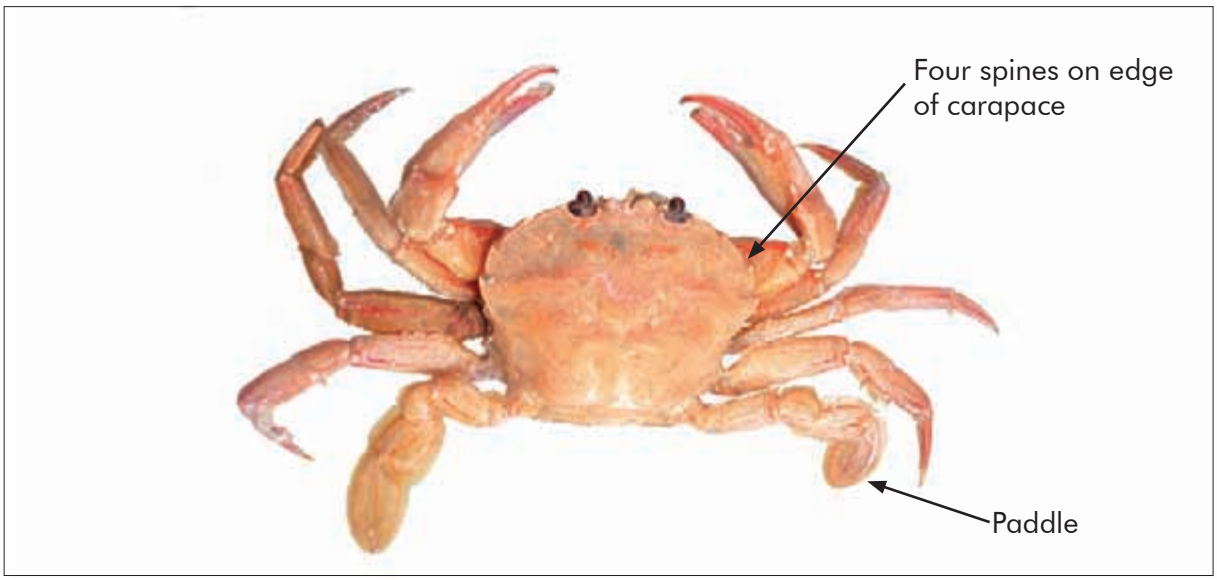
Similar species: The paddle crab (*Ovalipes catharus*) and the swimming crab (*O. molleri*) are similar with five spines on lateral edges of carapace, but have no corrugations on carapace and are much larger.
The smooth red swimming crab (*Nectocarcinus bennetti*) and the hairy red swimming crab (*N. antarcticus*) are similar, but have 4 spines on each lateral edge of carapace, no corrugations on carapace and are much larger.

References: McClay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Morton, J.E.; Millar, M.C. (1968) The New Zealand Sea Shore. Collins, London, 653 pp.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Portunidae

Nectocarcinus antarcticus (Hairy red swimming crab) (NCA)



Distinguishing features: Four spines on each lateral edge of carapace. Last pair of legs flattened into paddles. Surface of carapace and legs with matted woolly hairs.

Colour: Carapace and upper surface of legs speckled with dark red, and red over pinkish red. Small white marks on ridges and spines. No iridescence.

Size: Carapace width to 90 mm in males, smaller in females.

Distribution: New Zealand mainland, Chatham, Stewart, Bounty, and Auckland Islands, and possibly Campbell Island.

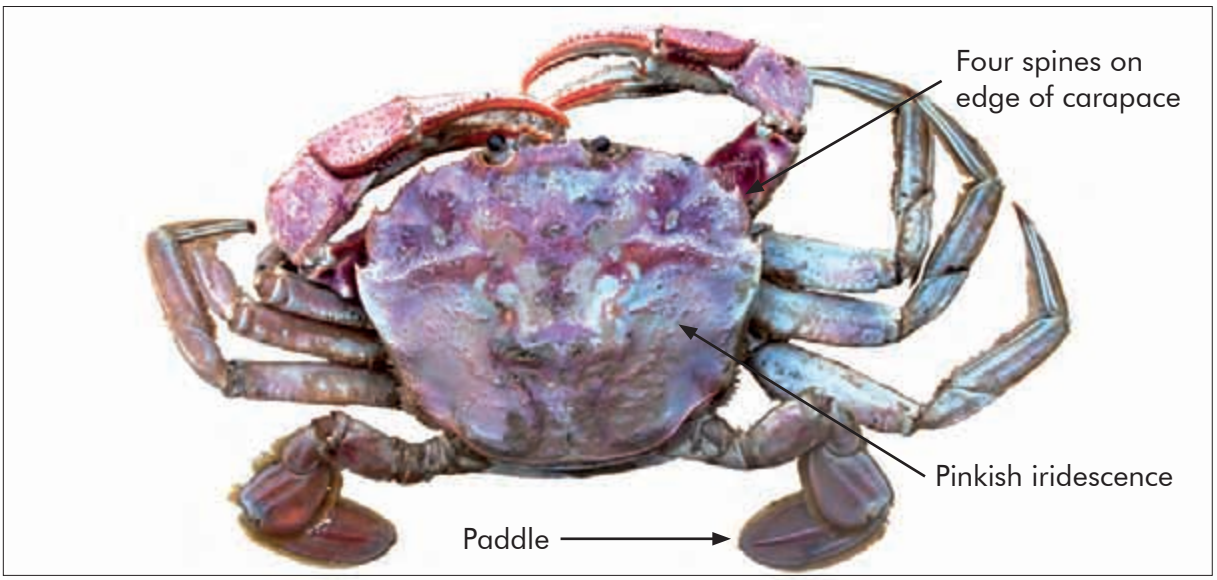
Depth: Intertidal to 550 m.

Similar species: The smooth red swimming crab (*Nectocarcinus bennetti*) is similar, but may have iridescence on carapace, has no matted woolly hairs on carapace or legs and has more prominent lateral spines at front of carapace.
The paddle crab (*Ovalipes catharus*) is similar, but has 5 spines on each lateral edge of carapace and dark-brown speckling on carapace.
The swimming crab (*Ovalipes molleri*) is similar, but has 5 spines on each lateral edge of carapace and iridescence on the carapace. Palms and legs are flattened, spiny-edged area on palm.

References: Bennett, E.W. (1964). The marine fauna of New Zealand: Crustacea Brachyura. New Zealand Department of Scientific and Industrial Research Bulletin 153. (*New Zealand Oceanographic Institute Memoir 22*). 120 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Portunidae

Nectocarcinus bennetti (Smooth red swimming crab) (NCB)



Distinguishing features: Four spines on each lateral edge of carapace. Carapace and legs smooth, except for small granular areas. Areas of pinkish iridescence on carapace. Last pair of legs flattened into paddles.

Colour: Colour of carapace and top of chelipeds variable, from tan to purplish red, areas of iridescence, especially in adults; some paler, regularly patterned areas near back of carapace.

Size: Carapace width to 85 mm in males, 70 mm in females.

Distribution: Chatham Rise and Pukaki Rise, southern South Island, Stewart, Snares, Auckland, and Campbell Islands.

Depth: 20 to 480 m, most common between 60 and 180 m.

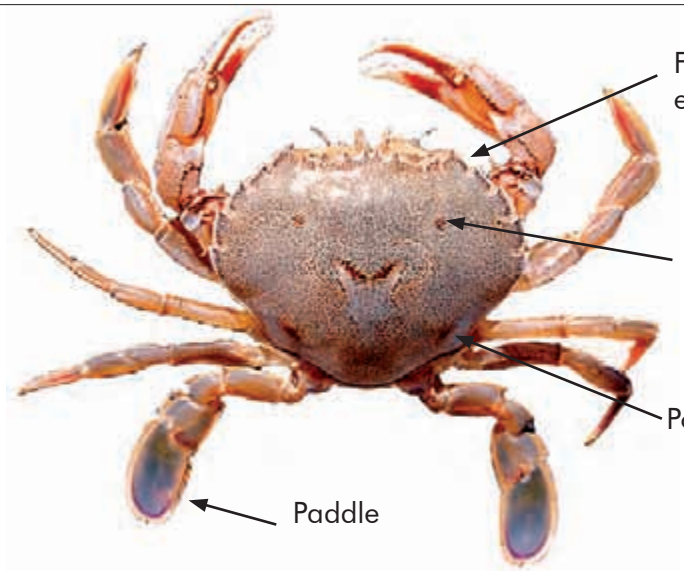
Similar species: The hairy red swimming crab (*Nectocarcinus antarcticus*) is similar, but has no pink iridescence on carapace, matted woolly hairs on carapace and legs and spines on lateral edges of carapace are less prominent. The paddle crab (*Ovalipes catharus*) is similar, but has 5 spines on each lateral edge of carapace and dark-brown speckling on carapace.
The swimming crab (*Ovalipes molleri*) is similar, but has 5 spines on each lateral edge of carapace, reddish iridescence on the carapace and a more flattened, spiny edged area on palm.

References: Dell, R.K.; Griffin, D.J.G.; Yaldwyn, J.C. (1970). A new swimming crab from the New Zealand subantarctic and a review of the genus *Nectocarcinus* A. Milne Edwards. *Transactions of the Royal Society of New Zealand 12* (7): 49–68.

McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Portunidae

Ovalipes catharus (Paddle crab) (PAD)



Distinguishing features: Last pair of legs flattened into paddles. Carapace smooth, speckled with red-brown spots. Five spines on each lateral edge of carapace.

Colour: Pale orange bluish, densely speckled with dark red-brown spots. Colour spots concentrated into 2 forward and 2 larger posterior spots.

Size: Carapace width up to 150 mm in males, 115 mm in females.

Distribution: Southern Australia and New Zealand. Widely distributed around New Zealand and at the Chatham Islands. On open sandy beaches, in harbours and estuaries.

Depth: Intertidal to 100 m. Most common in upper 10 m.

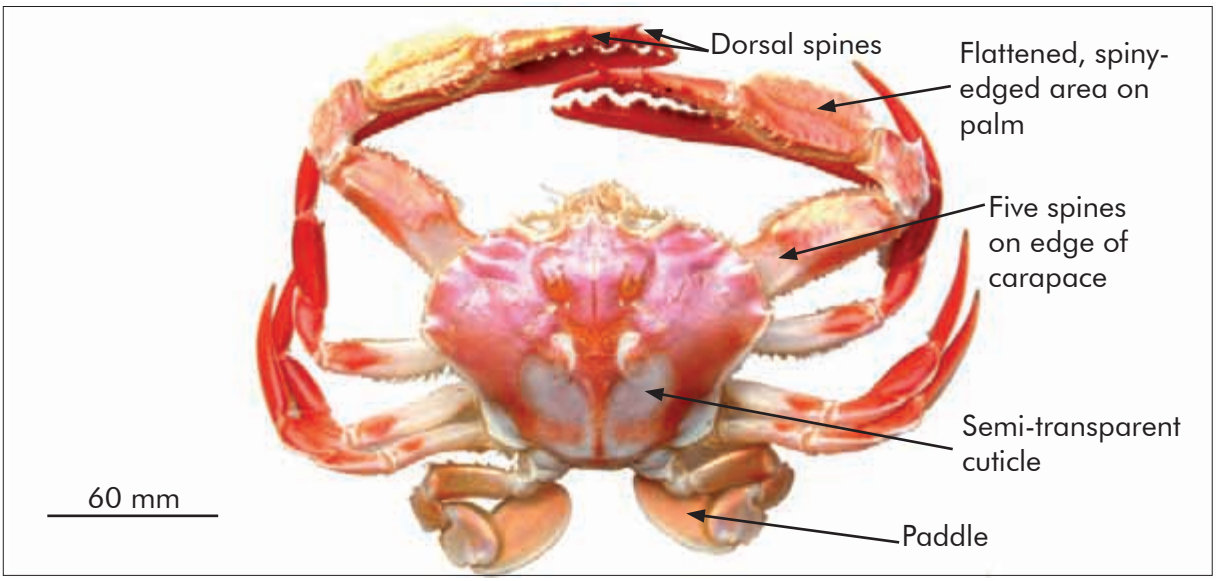
Similar species: The swimming crab (*Ovalipes molleri*) is similar, but has reddish iridescence on carapace and no dark brown speckling. Also flattened, spiny edged area on palms and legs.
The dwarf swimming crab (*Liocarcinus corrugatus*) is broadly similar, but has a series of corrugations over much of carapace and is much smaller.
The smooth red swimming crab (*Nectocarcinus bennetti*) is similar, but has only 4 spines on each lateral edge of carapace, no dark-brown speckling on carapace and may have pink iridescence on carapace.
The hairy red swimming crab (*Nectocarcinus antarcticus*) is similar, but has only 4 spines on each lateral edge of carapace, and the carapace is covered with fine hair, no dark-brown speckling.

References: McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Stevens, D.W. (1999). A summary of biology and commercial landings and a stock assessment of paddle crabs Ovalipes catharus (White, 1843) (Crustacea, Portunidae), in New Zealand. *New Zealand Fisheries Assessment Research Document 99/18*. 26p. (Unpublished report held in NIWA library, Wellington).

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Portunidae

Ovalipes molleri (Swimming crab) (OVM)



Distinguishing features: All upper surfaces highly iridescent. Sharp spines on carapace between eyes. Five spines on each edge of carapace. Two semi-transparent areas of shell near back of carapace in mature specimens. Flattened, spiny-edged area on palm behind movable finger. Movable finger with dorsal spines. Last pair of legs flattened into paddles.

Colour: Carapace iridescent red (fades quickly after death).

Size: Carapace width up to 120 mm. Less in females.

Distribution: Eastern Australia and New Zealand, Northern North Island, south to the Chatham Rise.

Depth: 70 to 600 m.

Similar species: The paddle crab (*Ovalipes catharus*) is similar, but dark-brown speckling on carapace, no iridescence on carapace or legs; flattened, spiny-edged area on palm less pronounced and spines on movable finger.
The smooth red swimming crab (*Nectocarcinus bennetti*) is similar, but has 4 spines on each lateral edge of carapace, with spines on carapace between eyes short and blunt.
The hairy red swimming crab (*Nectocarcinus antarcticus*) is similar, but has 4 short, blunt spines on each lateral edge of carapace and no iridescence on carapace.
The dwarf swimming crab (*Liocarcinus corrugatus*) is broadly similar, but is much smaller and has a series of corrugations over much of carapace.

References: McLay, C.L. (1988). Brachyura and crab-like Anomura of New Zealand. *Leigh Laboratory Bulletin No. 22*. 463 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Scyllaridae

Ibacus alticrenatus (Prawn killer) (PRK)

ARTHROPODA

Distinguishing features: Dorso-ventrally flattened. Second antenna modified to a closely hinged series of 5 flat plates. Carapace covered by velvety pubescence. Wide, deep notch in margin of carapace.

Colour: Dorsal surface of carapace and antennae red-orange to brown, with darker red spots in the middle of the carapace. Lateral carapace spines and pleural spines tipped with yellow brown. 6th abdominal segment and uropods and telson yellow-brown.

Size: Carapace length up to 63 mm. More commonly less than 50 mm.

Distribution: Australia and New Zealand. North Island, northern South Island as far south as Oamaru, and Chatham Islands. Possibly at Kermadec Islands and on Campbell Plateau and Chatham Rise.

Depth: 20 to 700 m. Possibly deeper too, but mostly on shelf and upper slope.

Similar species: *Ibacus brucei* more flattened, and appears to lack 'hair' on the carapace. Outer margin of distal antennal lamellae of *Arctides antipodarum* has numerous insignificant teeth.

References: Dell, R.K. (1955). A record of *Latreillopsis petterdi* Grant from New Zealand, with notes on some other species of Crustacea. *Records of the Dominion Museum* 2: 147–149.

Holthuis, L.B. (1985). A revision of the Family Scyllaridae 1. Subfamily Ibacinae. *Zoologische Verhandelingen 218 p.*

O'Driscoll, R.L. et al. (2003). Areas of importance for spawning, pupping or egg-laying, and juveniles of New Zealand deepwater fish, pelagic fish, and invertebrates. *NIWA Technical Report 119*. 377 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Isopoda
Family Aegidae

Aega monophthalma (Fish biter) (AMO)

Distinguishing features: Huge eyes that meet in the middle. Antennule flattened. Body heavily pitted on the posterior segments. Mouthparts form a conical bundle under the head.

Colour: Pale yellow to brown, orange laterally, white below; eyes dark brown to black.

Size: Total length from 40 to 63 mm. Size range is for adults; females are larger than males.

Distribution: Widespread in the Atlantic, southwestern Pacific and Southern Ocean; also eastern Australia.

Depth: 440 to 930 m.

Similar species: Several other similar species including *Aega semicarinata*. Other species have separate eyes or a smooth body surface.

References: Bruce, N. L. (2002). Parasites or predators? New Zealand's aegid isopod crustaceans. *Biodiversity Update 5*: 8.

Bruce, N.L.; Lew Ton, H.M. ; Poore, G.C.B. (2002). Aegidae White, 1850. p. 159–163. *In*: Poore, G.C.B. (ed.) Crustacea: Malacostraca: Syncarida and Peracarida: Isopoda, Tanaidacea, Mictacea, Thermosbaenacea, Spelaeogriphacea. Melbourne. CSIRO Publishing. 433 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Isopoda
Family Cymothoidae

Elthusa neocytta (Gill biter or Tongue biter) (ENE)

Distinguishing features: A large cream or white isopod with obvious eyes. Commonly found in mouths of oreos, left image. The body shape is more-or-less straight, and the fifth abdominal segment is overlapped by the fourth segment. The tips of all legs are clawed, and generally the body and appendages are without setae.

Colour: White to cream in life.

Size: Total length from 26 to 60 mm. (Size refers to adults.)

Distribution: Southwestern Pacific, Tasman Sea and New Zealand EEZ.

Depth: 50 to 1000 m.

Similar species: The genus *Elthusa* is large (more than 25 species) but with low diversity in cool and cold waters. *Elthusa raynaudii* (Milne Edwards, 1840) is also known from New Zealand, and can be immediately identified by its assymetric body shape and convex body outline.

References: Bruce, N.L. (1990). The genera Catoessa, Elthusa, Ichthyoxenus, Idusa, Livoneca and Norileca n. gen. (Isopoda, Cymothoidae), crustacean parasites of marine fishes, with descriptions of eastern Australian species. *Records of the Australian Museum 42*: 247–300.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Isopoda
Family Cymothoidae

Elthusa propinqua (Gill biter) (ELP)

Distinguishing features: A medium-size isopod with a distinctly acute front margin to the head and with prominent eyes. The body is wide, and usually twisted to one side. All legs bear strongly recurved 'claws'.

Colour: Cream coloured except for the eyes; entirely lacking chromatophores.

Size: Total length from 14 to 26 mm.

Distribution: Western Pacific from Japan and Philippines to eastern Australia and New Zealand; also northern Indian Ocean.

Depth: 340 to 835 m.

Similar species: The genus *Elthusa* is large (more than 25 species) but with low diversity in cool and cold waters. *Elthusa raynaudii* (Milne Edwards, 1840) is also known from New Zealand, but is far larger, has a bluntly rounded head and the uropods (tail appendages) are rounded rather than acute as in the present species.

References: Bruce, N.L. (1990). The genera *Catoessa*, *Elthusa*, *Ichthyoxenus*, *Idusa*, *Livoneca* and *Norileca* n. gen. (Isopoda, Cymothoidae), crustacean parasites of marine fishes, with descriptions of eastern Australian species. *Records of the Australian Museum* 42: 247–300.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Isopoda
Family Serolidae

Acutiserolis spp. (Spiny serolid isopod) (ACU)

Distinguishing features: Body strongly flattened, lateral margins with conspicuous spines; eyes dorsal.

Colour: Varying from translucent, slate grey, or brown; eyes may be copper, brown, black, or bright pink.

Size: Total length from 10 to 40 mm.

Distribution: *Acutiserolis* species are found throughout the New Zealand EEZ, from the continental shelf to depths of about 3000 m.

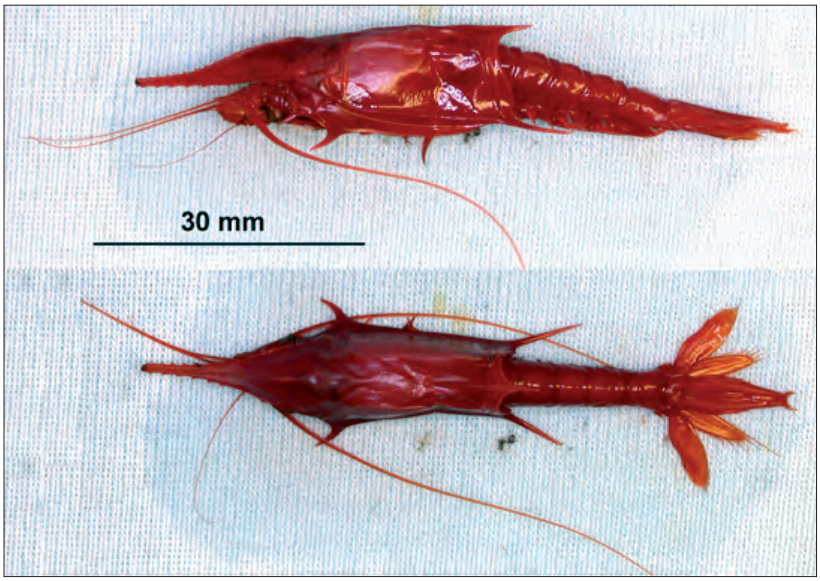
Depth: 100 to 3000 m.

Similar species: The genus has 8 to 12 species in New Zealand waters, none of which appear to have been named. Other serolid genera are similarly flattened, but lack the lateral spines and some are without eyes.

References: Poore, G.C.B.; Brandt, A. (1997). Crustacea Isopoda Serolidae: *Acutiserolis cidaris* and *Caecoserolis novaecaledoniae*, two new species from the Coral Sea. Résultats de Campagnes MUSORSTOM, Vol. 18. *Mémoires du Muséum National d'Histoire Naturelle, Paris 176*: 151–168.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Lophogastrida
Family Gnathophausiidae

Gnathophausia ingens (Giant red mysid) (NEI)



Distinguishing features: These mysids are prawn-like, fragile and soft, deep to bright scarlet. Rostrum elongate (triangular in cross section). Antenna 2 scale, outer margin serrated and without setae. Uropod exopod with distal articulation.

Colour: Bright scarlet.

Size: Total length up to 300 mm. More commonly much smaller – 30 mm.

Distribution: Widespread in tropical and temperate seas.

Depth: 50 to 900 m. Migrate vertically in water column diurnally, so depths given are depth in water, not bottom depths.

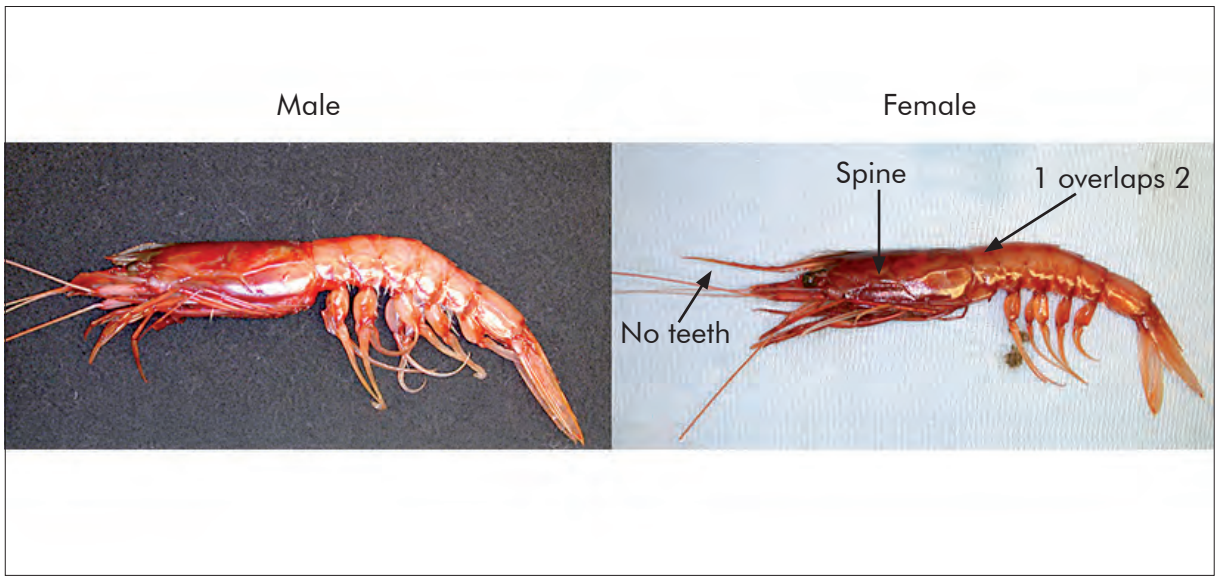
Similar species: Mysids are distinguished from shrimps, prawns, and krill in that the carapace is not attached to the last few segments at the posterior end and so can be lifted.

References: Lowry, J.K.; Stoddart, H.E. (2003). Crustacea: Malacostraca: Peracarida: Amphipoda, Cumacea, Mysidacea. *Zoological Catalogue of Australia 19.2B*.

Webber, R. (2002). Prawns coming in from the cold. *Seafood New Zealand 10(9)*: 75–78.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Aristaeidae

Aristaeomorpha foliacea (Royal red prawn) (AFO)



Distinguishing features: Rostrum is long and slender in females, with more than 3 teeth on top and none on the bottom; males have a short rostrum. There is one small hepatic spine on the side of the carapace; abdominal segment 1 overlaps segment 2; legs 1 to 3 have small chelae (pincers).

Colour: A fairly uniform red over the whole body.

Size: Total length up to 230 mm (includes rostrum).

Distribution: A worldwide species. In New Zealand waters it has occasionally been caught on the Chatham Rise and Challenger Plateau, but typically occurs north of Cook Strait, with frequent records in the Bay of Plenty.

Depth: 250 to 1400 m. Most common between 400 and 1100 m.

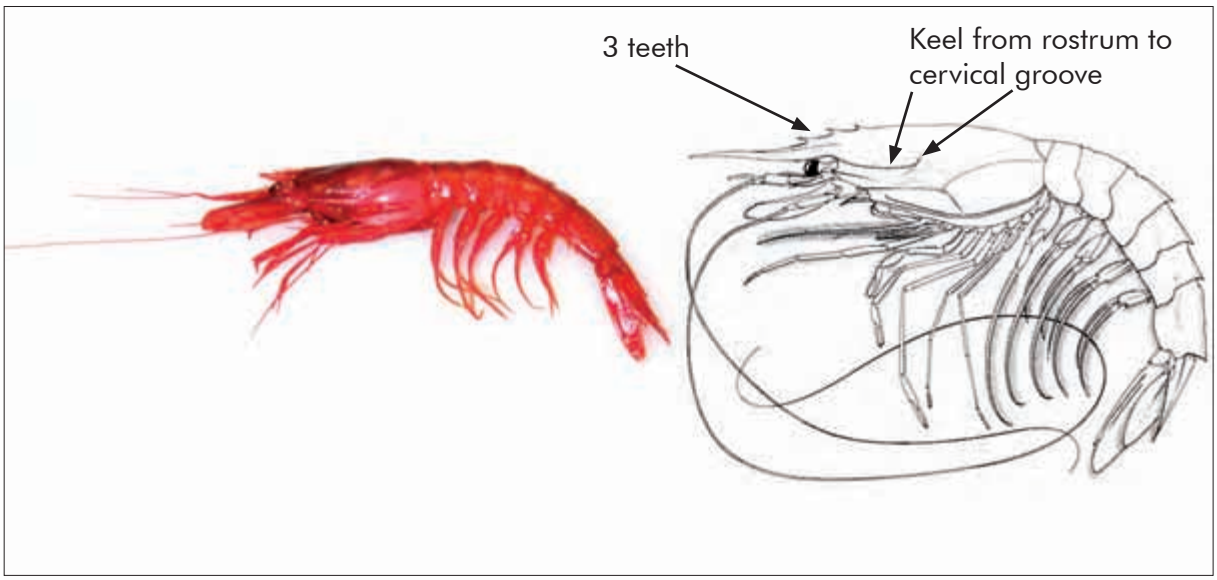
Similar species: *Aristaeopsis edwardsiana* (and *Aristeus* spp.) have only 3 teeth on top of the rostrum, and do not have an hepatic spine. *Nematocarcinus* spp. appear similar, but abdominal segment 2 overlaps segment 1, there are usually a few small teeth spread along the bottom of the rostrum, only legs 1 and 2 have chelae, legs 3 to 5 very long.

References: Webber, W.R. (2002). Prawns coming in from the cold (Pt 1). *Seafood New Zealand 10*(9): 75–78.

Webber, W.R.; Fenaughty, C.M.; Clark, M.R. (1990). A guide to some common offshore shrimp and prawn species of New Zealand. *New Zealand Fisheries Occasional Publication 6*. 42 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Aristaeidae

Aristaeopsis edwardsiana (Scarlet prawn) (PED)



Distinguishing features: The base of the rostrum has 3 teeth on top, above the eye. The sides of the carapace have several ridges, including one which runs from the rostrum to the cervical groove.

Colour: Uniformly scarlet to bright red, to deep crimson.

Size: Total length up to 350 mm.

Distribution: Worldwide distribution. Occurs in deep water around much of New Zealand. Distribution is continuous around the North Island and extends out to the Chatham Rise and Challenger Plateau. Puysegur Bank is the most southern record.

Depth: 200 to 1800 m. Most common between 900 and 1100 m.

Similar species: *Aristeus* spp. are very similar in shape and features. They are generally smaller bodied, and do not have the ridge on the carapace from the rostrum to the cervical groove (ridge either absent or very short and not reaching cervical groove).

References: Perez Farfantes, I.; Kensley, B. (1997). Penaeoid and sergestoid shrimps and prawns of the world: keys and diagnostics for the families and genera. *Memoires du Museum National d'Histoire Naturelle 175*. 233 p.

Webber, W.R.; Fenaughty, C.M.; Clark, M.R. (1990). A guide to some common offshore shrimp and prawn species of New Zealand. *New Zealand Fisheries Occasional Publication 6*. 42 p.

Webber, W.R. (2002). Prawns coming in from the cold (Pt 2). *Seafood New Zealand 10*(10): 70–71.

Phylum Arthropoda
Class Malacostraca
Order Decapoda
Family Aristeidae

Austropenaeus nitidus (ANI)

Distinguishing features: The rostrum is long, slender and slightly to moderately upturned. The base of the rostrum has 2 dorsal teeth on top, and 1 post-rostral tooth. The carapace is featureless with no obvious keels, hepatic spine absent.

Colour: Pale pink.

Size: Total length up to 380 mm.

Distribution: Occurs in deep water around much of New Zealand, commonly seen on the Chatham Rise. Also occurs off Australia, in the Indian Ocean, and South Atlantic.

Depth: 400 to 1300 m.

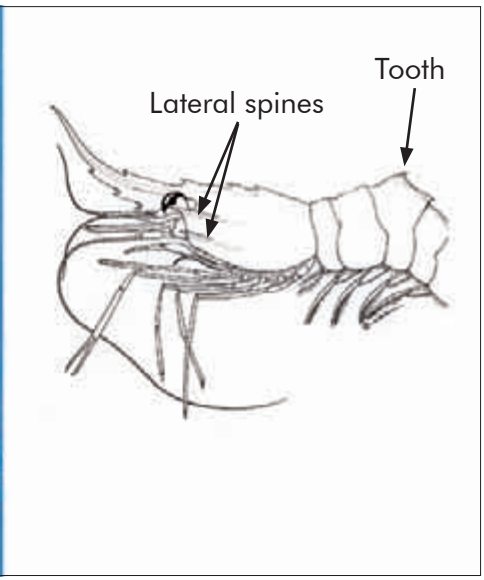
Similar species: Could be confused with the other Aristeidae *Aristaeopsis edwardsiana* and *Aristaeomorpha foliacea*, but these 2 prawns are bright red and have either more teeth on their rostra and or prominant keels.

References: Barnard, K.H. (1947). Descriptions of new species of South African decapod Crustacea, with notes on synonymy and new records. *Annals and Magazine of Natural History* 11 (13): 361–392.

Perez Farfantes, I.; Kensley, B. (1997). Penaeoid and sergestoid shrimps and prawns of the world: keys and diagnostics for the families and genera. *Memoires du Museum National d'Histoire Naturelle 175*. 233 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Campylonotidae

Campylonotus rathbunae (Sabre prawn) (CAM)



Distinguishing features: A distinctive heavy-bodied and well armed species. It has a rigid carapace and blade-like rostrum. Two strong lateral spines on the carapace. The 3rd abdominal segment has a pronounced tooth.

Colour: Body pink to yellow-orange. Tip of rostrum is orange to red.

Size: Total length up to 140 mm (includes rostrum).

Distribution: Endemic to Australasia, occurring off New Zealand and eastern and southern Australia. Around New Zealand it has been recorded from Northland south (especially in the Bay of Plenty), Chatham Rise to Campbell Plateau. Not known from Challenger Plateau or Kermadec region.

Depth: 270 to 800 m. Most common at depths of 400 to 600 m.

Similar species: None. It is the only member of its family in New Zealand waters.

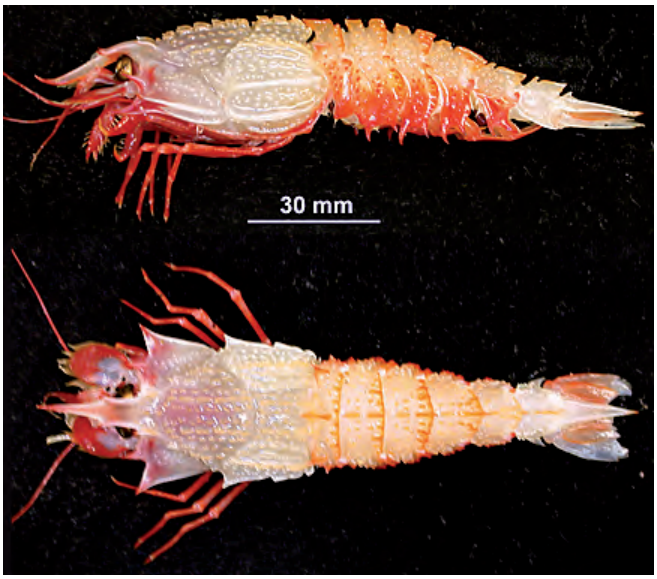
References: Webber, W.R.; Fenaughty, C.M.; Clark, M.R. (1990). A guide to some common offshore shrimp and prawn species of New Zealand. *New Zealand Fisheries Occasional Publication* 6. 42 p.

Webber, W.R. (2002). Prawns coming in from the cold (Pt 1). *Seafood New Zealand 10*(9): 75–78.

Yaldwyn, J.C. (1960). Crustacea Decapoda Natantia from the Chatham Rise: a deep water bottom fauna from New Zealand. *New Zealand DSIR Bulletin 139*: 13–53.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Glyphocrangonidae

Glyphocrangon spp. (Goblin prawn) (GLO)



Distinguishing features: Prominent rostral spine, about half carapace length, with 2 pairs of lateral spines. Large lateral carapace flange just posterior to eye, with smaller one half-way to posterior of carapace. Median carina on abdomen segments, spine-like on first segment.

Colour: Carapace yellowish, otherwise the prominent colour is the scarlet of the spine tips against a yellowish background.

Size: Carapace length up to 35 mm.

Distribution: Northern New Zealand continental slope and seamounts, and off eastern Australia.

Depth: 720 to 980 m.

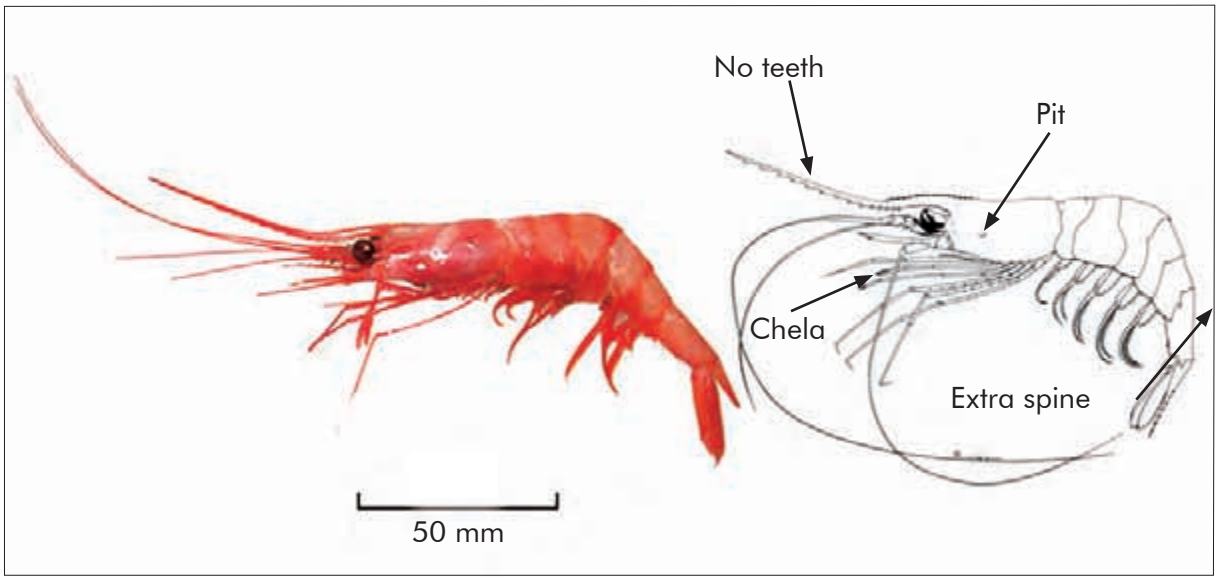
Similar species: Several species in New Zealand waters, many undescribed/unidentified.

References: Kensley, B.; Tranter, H.A.; Griffin, D.J.G. (1987). Deepwater decapod Crustacea from eastern Australia (Penaeidae and Caridae). *Records of the Australian Museum 39*: 263–331.

Takeda, M. (1990). Fishes collected by the R/V *Shinkai Maru* around New Zealand. Japan Marine Fishery Resource Research Centre (JAMARC). 410 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Nematocarcinidae

Lipkius holthuisi (Omega prawn) (LHO)



Distinguishing features: Second abdominal side plate overlaps the first, long rostrum with teeth (>10) along the bottom spread out towards tip. Top of rostrum has no teeth for most of its length. Carapace has small pit on side, 5th abdominal segment has an extra spine, first and second legs have chelae (but these features hard to see without magnifying glass).

Colour: Anterior half of body is red, with abdomen partly red, partly colourless.

Size: Total length up to 200 mm (includes rostrum).

Distribution: Australia and New Zealand. Around New Zealand it is distributed south of 37° S. Found almost continuously along margin of continental slope from East Cape southwards, along the Chatham Rise, around the Campbell Plateau, out to Challenger Plateau.

Depth: 350 to 1700 m. Most common 800 to 1000 m.

Similar species: *Nematocarcinus* spp. in the same family, but have teeth on top of rostrum out to tip. *Plesionika martia* has many small teeth on the bottom of rostrum.

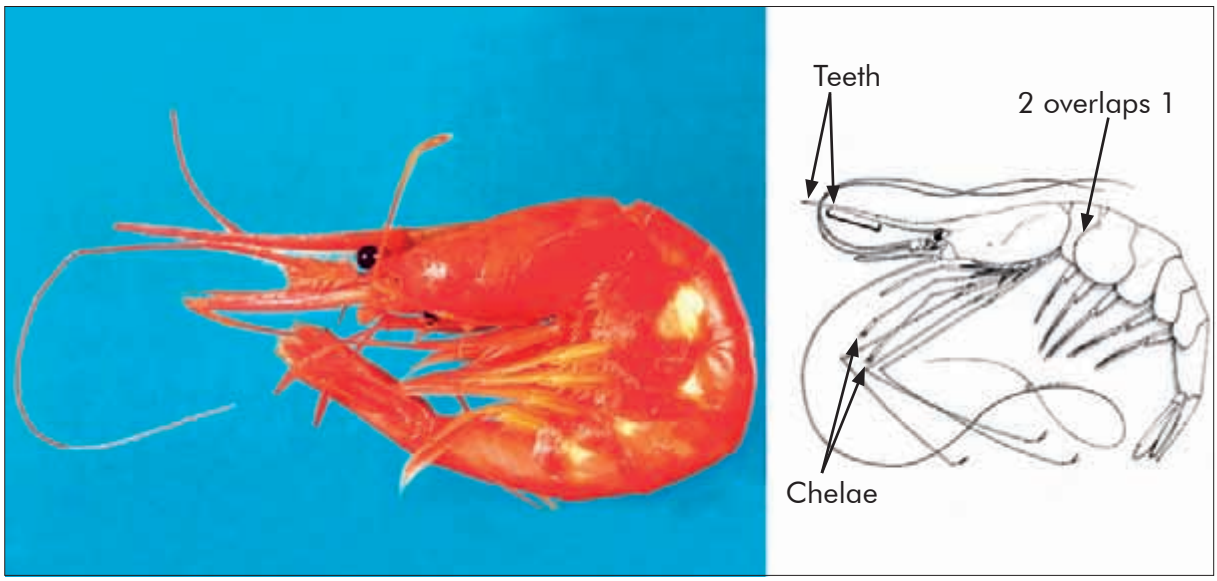
References: Webber, W.R. (2002). Prawns coming in from the cold (Pt 1). *Seafood New Zealand 10*(9): 75–78.

Webber, W.R.; Fenaughty, C.M.; Clark, M.R. (1990). A guide to some common offshore shrimp and prawn species of New Zealand. *New Zealand Fisheries Occasional Publication 6*. 42 p.

Yaldwyn, J.C. (1960). Crustacea Decapoda Natantia from the Chatham Rise: a deep water bottom fauna from New Zealand. *New Zealand DSIR Bulletin 139*: 13–53.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Nematocarcinidae

Nematocarcinus spp. (Spider prawn) (NEC)



Distinguishing features: Teeth on top of rostrum extend right out to the tip; bottom of rostrum with none or a few teeth; legs 3, 4,5 are very long (often broken); legs 1 and 2 have chelae (pincers); abdominal segment 2 overlaps segment 1.

Colour: Body red, orange to yellow area under carapace, abdomen partly red, partly colourless.

Size: Total length up to 170 mm (includes rostrum).

Distribution: Worldwide. Around New Zealand they occur in small numbers around the margins of the continental shelf off the Chatham Rise, Challenger Plateau, and west coast of the South Island.

Depth: 800 to 1200 m. Mostly occurs 900 to 1100 m.

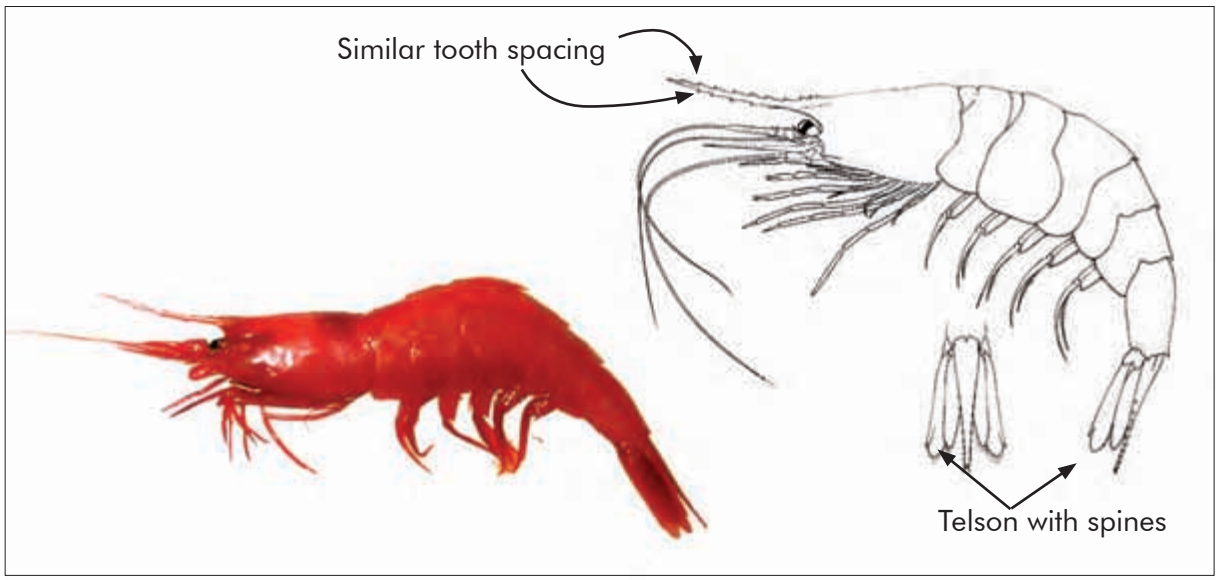
Similar species: There are five species in this genus known from the New Zealand region. *Lipkius holthuisi*, *Notopandalus magnoculus*, and *Plesionika martia* have a similar shape, but the teeth on top of the rostrum do not extend out to the tip, and they have more than 10 teeth on the bottom of the rostrum.

References: Webber, W.R.; Fenaughty, C.M.; Clark, M.R. (1990). A guide to some common offshore shrimp and prawn species of New Zealand. *New Zealand Fisheries Occasional Publication* 6. 42 p.

Richardson, L.R.; Yaldwyn, J.C. (1958). A guide to the natant decapod crustacea (shrimps and prawns) of New Zealand. *Tuatara* 7: 17–41.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Oplophoridae

Acanthephyra spp. (Subantarctic ruby prawn) (ACA)



Distinguishing features: Few species are as uniformly bright red as *Acanthephyra*. Telson with 4 pairs of spines (*A. quadrispinosa* (AQU)) or 7 to 11 pairs (*A. pelagica* (APE)). Spacing of teeth on the rostrum is similar on both top and bottom.

Colour: Uniformly bright red to scarlet.

Size: Total length up to 140 mm.

Distribution: Both species have been reported in all but the southern most parts of the New Zealand EEZ, with *Acanthephyra quadrispinosa* more commonly found in the north (north of Cook Strait) and *A. pelagica* in the south (Challenger Plateau and Chatham Rise down to 50° S on the Campbell Plateau).

Depth: 400 to 2000 m. Most commonly recorded around 1000 m.

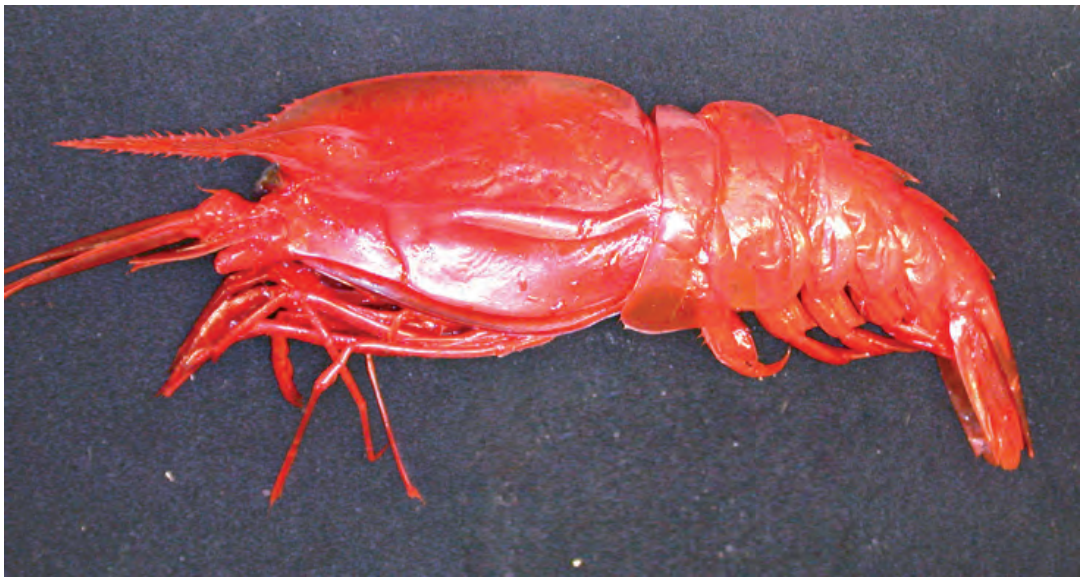
Similar species: Three other species of *Acanthephyra* are found in New Zealand waters, but they are infrequently caught. *Systellaspis debilis* is similar in shape, but body colour is partly red, partly translucent, or colourless; and lower parts of the carapace have a line of photophores.

References: Webber, W.R. (2002). Prawns coming in from the cold (Pt 1). *Seafood New Zealand 10*(9): 75–78.

Webber, W.R.; Fenaughty, C.M.; Clark, M.R. (1990). A guide to some common offshore shrimp and prawn species of New Zealand. *New Zealand Fisheries Occasional Publication 6*. 42 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Oplophoridae

Notostomus auriculatus (Scarlet prawn) (NAU)



Distinguishing features: Large uniformly scarlet/crimson species. Long rostrum with teeth on top and bottom. Five lateral keels on each side of carapace. Strong, blade-like, finely serrated ridge along top of carapace. Two lateral keels at base of rostrum, upper keel longer, extending posteriorly beyond eye.

Colour: Uniformly scarlet.

Size: Up to 180 mm (including rostrum).

Distribution: South Atlantic, NSW, Tasmania, southern Indo-West Pacific, and around New Zealand.

Depth: From the surface to at least 1200 m.

Similar species: Other (uncommon) *Notostomus* species are similar, but have only the upper 3 of the 5 lateral keels on the carapace, and the upper keel on the rostrum does not extend back beyond the eye.

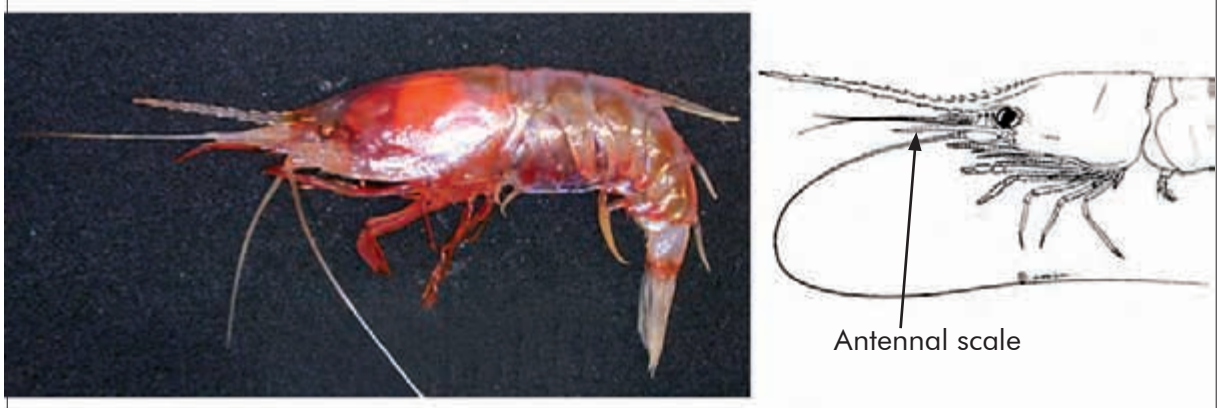
References: Poore, C.B. (2004). Marine decapod Crustacea of Southern Australia: a guide to identification. CSIRO Publishing. 574 p.

Richardson, L.R.; Yaldwyn, J.C. (1958). A guide to the Natant Decapod Crustacea (shrimps and prawns) of New Zealand. *Tuatara* 7: 17–41.

Webber, W.R.; Fenaughty, C.M.; Clark, M.R. (1990). A guide to some common offshore shrimp and prawn species of New Zealand. *New Zealand Fisheries Occasional Publication* 6. 42 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Oplophoridae

Oplophorus spp. (Deepwater prawn) (OPP)



Distinguishing features: Refers to two similar species found in New Zealand waters. Solid body, prominent and long spines on abdominal segments 3 to 5. *Oplophorus novaezeelandiae* (ONO) has a smooth outer edge to the antennal scale, but there are small spines on that of *O. spinosus* (OPS). Use code OPP when unsure of species.

Colour: Anterior half of body red, abdomen red-striped, rostrum and large spines transparent.

Size: Total length up to 100 mm (total length measurement includes rostrum).

Distribution: Widespread through the South Atlantic and southern Pacific Oceans, western Australia, and New Zealand. Around New Zealand, *O. novaezeelandiae* is recorded from the Kermadec Ridge to the southern margin of the Campbell Plateau. *O. spinosus* has a more northern distribution than *O. novaezeelandiae*, with the latter dominating south of East Cape.

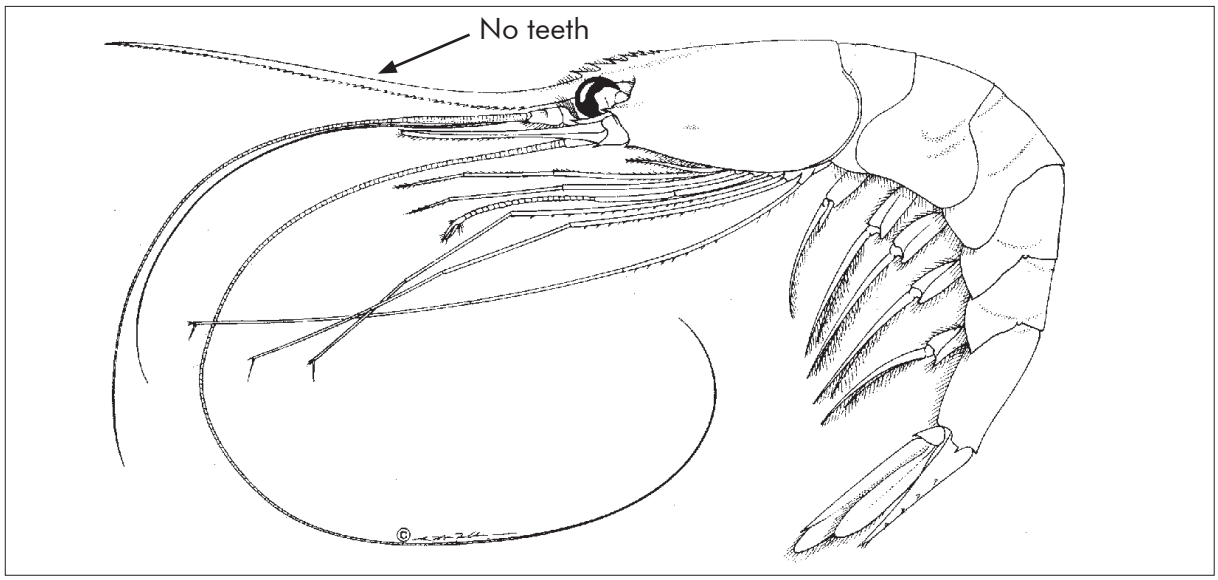
Depth: 200 to 1100 m. Mainly taken from 800 to 950 m. Has also been recorded at or near surface.

Similar species: None. The abdominal spines are very distinctive.

References: Webber, W.R.; Fenaughty, C.M.; Clark, M.R. (1990). A guide to some common offshore shrimp and prawn species of New Zealand. *New Zealand Fisheries Occasional Publication* 6. 42 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Pandalidae

Plesionika martia (Golden prawn) (PLM)



Distinguishing features: The bottom of the rostrum has many small and close-set teeth right out to the tip; teeth are absent from the top of the rostrum except above the eye; females with ming-blue eggs.

Colour: Most of body translucent to light pink, tip of rostrum red, small red areas on abdomen and telson.

Size: Total length up to 170 mm (including long rostrum).

Distribution: Widely distributed; around New Zealand found from the Kermadec Islands to Cook Strait, with records predominantly from the Bay of Plenty and Challenger Plateau.

Depth: 180 to 2100 m. Most commonly caught from 400 to 600 m.

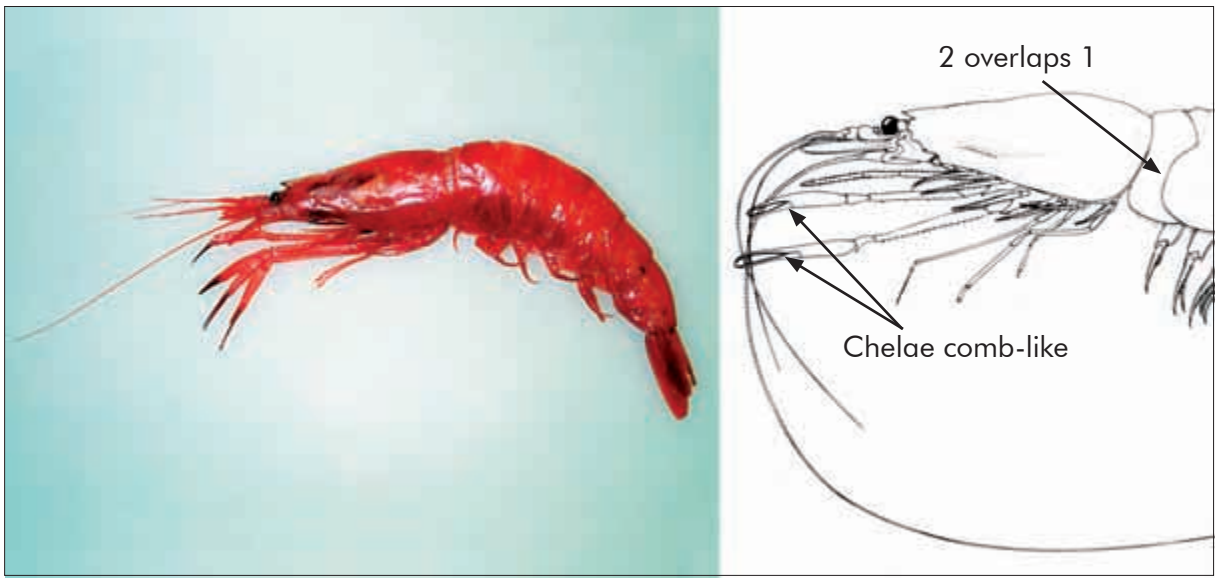
Similar species: *Notopandalus magnoculus*, teeth on bottom of rostrum are spaced out more towards the tip; teeth above the eye are slender and moveable. *Lipkius holthuisi*, teeth on bottom of rostrum also spaced out more towards the tip. *Nematocarcinus* spp. teeth occur on the top of the rostrum, out to the tip.

References: Webber, W.R.; Fenaughty, C.M.; Clark, M.R. (1990). A guide to some common offshore shrimp and prawn species of New Zealand. *New Zealand Fisheries Occasional Publication 6*: 42 p.

Webber, W.R. (2002). Prawns coming in from the cold (Pt 2). *Seafood New Zealand 10(10)*: 70–71.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Pasiphaeidae

Pasiphaea aff. tarda (Deepwater prawn) (PTA)



Distinguishing features: A large, noticeably flat-sided prawn with a very small rostrum (largest of the genus *Pasiphaea* in New Zealand). Long fine chelae (pincers) on legs 1 & 2, cutting edges of pincers with comb-like rows of fine teeth. Abdominal segment 2 overlaps segment 1.

Colour: Red.

Size: Total length up to 160 mm including rostrum.

Distribution: *Pasiphaea aff. tarda* is commonly caught in trawls on the Chatham Rise, Challenger Plateau, and around the South Island. Also recorded off East Cape and in Bay of Plenty, but generally has a more southern distribution.

Depth: 750 to 1500 m. Most commonly reported from 800 to 1200 m.

Similar species: Small specimens of *Pasiphaea aff. tarda* very hard to distinguish by eye from other species of the genus. Any large animal (longer than 100 mm) is almost certainly *P. aff tarda*. *Sergia potens* has abdominal segment 1 overlapping segment 2, and chelae on legs 2 and 3 which are are very small.

References: Webber, W.R.; Fenaughty, C.M.; Clark, M.R. (1990). A guide to some common offshore shrimp and prawn species of New Zealand. *New Zealand Fisheries Occasional Publication 6*. 42 p.

Webber, W.R. (2002). Prawns coming in from the cold (Pt 2). *Seafood New Zealand 10(10)*: 70–71.

Phylum Arthropoda (subphylum Crustacea)
Class Maxillipoda
Order Decapoda
Family Penaeidae

Funchalia spp. (Funchalia prawn) (FUN)

Distinguishing features: Short rostrum (but longer than eye) with teeth on top only. No teeth on side of carapace behind front edge. Small flat hairs on surface of body. First three legs with chelae. First abdominal segment overlaps second.

Colour: Transparent with areas of pink-orange-yellow.

Size: Up to 160 mm long.

Distribution: Atlantic, Indian Ocean, West Pacific, Antarctic, Australia, and New Zealand.

Depth: From near surface (at night) to more than 500 m.

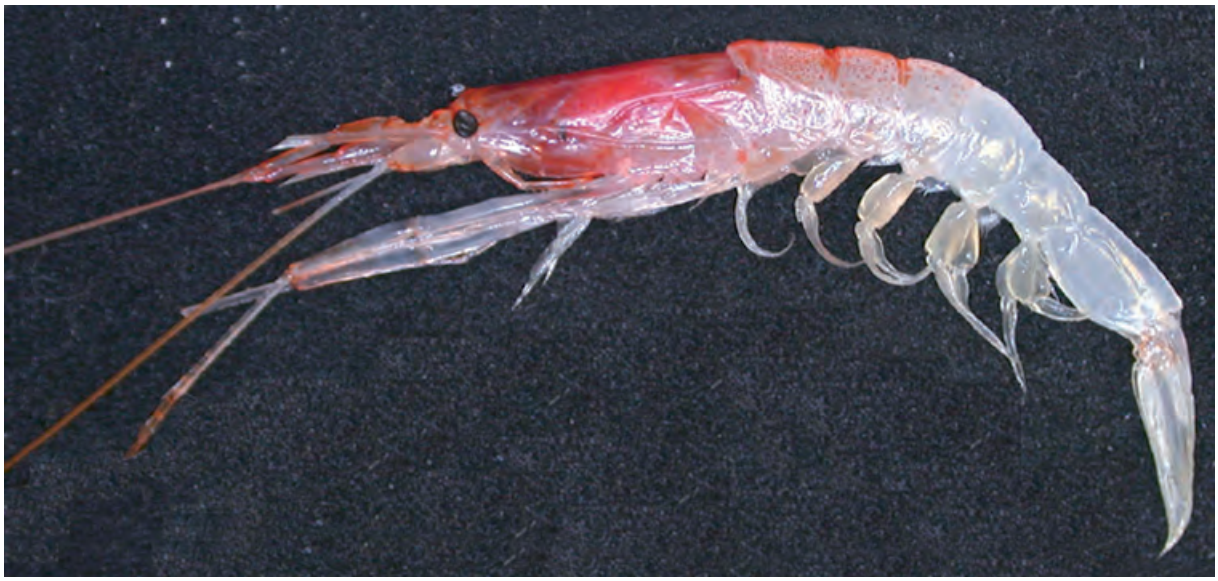
Similar species: *Haliporoides sibogae* and *Solenocera comata* are similar, but have no body hair, and have 2 and 3 spines respectively on side of carapace, behind front edge. *Chlorotocus novaezealandiae* is similar, but the second abdominal segment overlaps the first, and a chela is present on the second leg only.

References: Poore, C.B. (2004). *Marine decapod Crustacea of Southern Australia: a guide to identification*. CSIRO Publishing. 574 p.

Webber, W.R.; Fenaughty, C.M.; Clark, M.R. (1990). A guide to some common offshore shrimp and prawn species of New Zealand. *New Zealand Fisheries Occasional Publication 6*. 42 p.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Sergestidae

Sergestes spp. (Sergestid prawn) (SER)



Distinguishing features: Small to medium size, soft, fragile, and transparent, usually with red spots. Short rostrum (much shorter than eyestalks). Chelae (legs 2 and 3) microscopically small. Last two pairs of legs reduced or absent. First abdominal segment overlaps second. Eyestalks often pointing outwards.

Colour: Transparent with red spots (chromatophores). Stomach and light producing organs visible through carapace.

Size: Up to 70 mm.

Distribution: Worldwide including New Zealand.

Depth: 0 to 2000 m.

Similar species: *Sergia* species are similar but are usually scarlet to deep crimson. *Pasiphaea* species are also similar, but have larger, visible, long slender chelae with comb-like cutting edges, and the second abdominal segment overlaps the first.

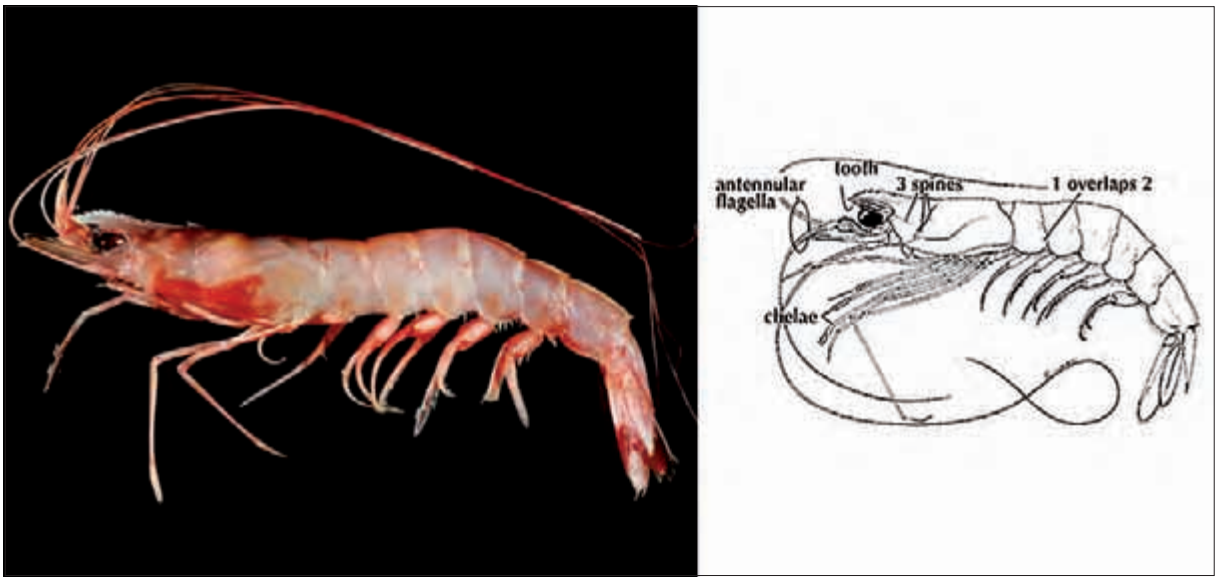
References: Poore, C.B. (2004). Marine decapod Crustacea of Southern Australia: a guide to identification. CSIRO Publishing. 574 p.

Webber, W.R.; Fenaughty, C.M.; Clark, M.R. (1990). A guide to some common offshore shrimp and prawn species of New Zealand. *New Zealand Fisheries Occasional Publication 6*. 42 p.

Webber, W.R. (2002). Prawns coming in from the cold (PT 2). *Seafood New Zealand 10 (10)*: 70–71.

Phylum Arthropoda (subphylum Crustacea)
Class Malacostraca
Order Decapoda
Family Solenoceridae

Haliporoides sibogae (Jack-knife prawn) (HSI)



Distinguishing features: A single small tooth below the rostrum tip; rostrum arched dorsally; rostrum longer than eye; 3 small spines on side of carapace; antennular flagella round (not flat); first abdominal segment overlaps second; legs 1 to 3 have small chelae (pincers).

Colour: Red-pink, with colourless to yellow-orange areas on abdomen.

Size: Total length up to 150 mm.

Distribution: Widely distributed. Around New Zealand, distributed primarily between North Cape and the Chatham Rise, with a few occurrences on the Campbell Plateau.

Depth: 100 to 1500 m. A wide range of depths, most frequently recorded from 350 to 600 m.

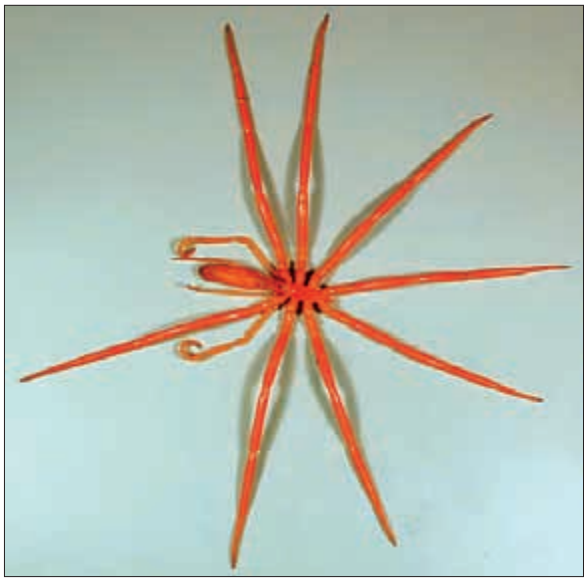
Similar species: *Solenocera comata* has no tooth below the rostral tip, rostrum is shorter than eye, 2 (not 3) spines on side of carapace, flattened antennular flagella. *Funchalia* spp. are 'hairy' on the body, no tooth below rostrum tip. *Chlorotocus novaezelandiae*: abdominal segment 2 overlaps segment 1, and only leg 2 has chelae.

References: Webber, W.R.; Fenaughty, C.M.; Clark, M.R. (1990). A guide to some common offshore shrimp and prawn species of New Zealand. *New Zealand Fisheries Occasional Publication 6*. 42 p.

Grey, D.L.; Dall, W.; Baker, A. (1983). A guide to the Australian penaeid prawns. Department of Primary Production of the Northern Territory, Australia. 140 p.

Phylum Arthropoda (subphylum Chelicerata)
Class Pycnogonida
Order Pantopoda
Family Colossendeidae

Colossendeis spp. (Giant sea spiders) (PYC)



Distinguishing features: Eight legs or more, spider-like, large bodied, eyes usually completely lacking.

Colour: Most dull white or brown, but some bright reddish orange.

Size: From 10 to 60 mm body length.

Distribution: Cosmopolitan deepsea genus often found in quite shallow Antarctic waters.

Depth: 5 to 1000 m.

Similar species: Other members of Family Colossendeidae.

References: Allan-Child, C. (1998). The marine fauna of New Zealand: Pycnogonida (sea spiders). *NIWA Biodiversity Memoir 109*. 71 p.

Fry, W.G.; Hedgpeth, J.L. (1969). The fauna of the Ross Sea. Part 7. Pycnogonida, 1. *New Zealand Oceanographic Institute Memoir 49*. 139 p.

Phylum Arthropoda (subphylum Maxillipoda)
Class Maxillipoda
Order Thoracica
Family Scalpellidae

(Stalked barnacles) (SBN)

Distinguishing features: Large barnacle with 13 white calcereous plates which make up the capitulum and are separated by brown chitinous material. Stalked barnacles also known as goose barnacles.

Colour: Chocolate to dark straw-coloured stalk with fine white spines.

Size: Total length to 130 mm.

Distribution: Worldwide. Occurs on the flat slope, and on seamounts.

Depth: 120 to 1100 m.

Similar species: Other scalpellid barnacles.

References: Buckeridge, J. (1999). Barnacles, not just a fouling nuisance. *Seafood New Zealand* 7(2): 38–39.

Foster, B.A. (1978). The marine fauna of New Zealand: barnacles (Cirripedia: Thoracica). *New Zealand Oceanographic Institute Memoir 69*. 160 p.

Phylum BRYOZOA

Bryozoans, moss animals, lace-corals, sea mats

Dennis Gordon

Phylum

BRYOZOA

Bryozoans, moss animals, lace-corals, sea mats

The **Bryozoa** (Greek *bryon* moss, *zoon*, animal) is a group of animals that can look like hydroids, turfing seaweeds, or small corals, which means that they are frequently mistaken for other organisms and scarcely ever recognised for what they are. They are colonies of minute individuals (zooids), mostly less than 1 mm long, whose feeding tentacles strain the water for food particles. Colonies can be encrusting (sea mats), bushy (moss animals), or coral-like. Some of them form hard mesh-like fronds and look like solid lace (lace corals). On the continental shelf, bryozoans can dominate some parts of the seafloor, as in Tasman Bay, Foveaux Strait, or off Otago Peninsula, where they form habitat for Bluff oysters or juveniles of commercial fish. Their fossil remains are common in limestones at Waitomo, Punakaiki, and Oamaru. There are about 950 species of marine bryozoans in New Zealand waters (out of nearly 6000 worldwide).

Two classes of Bryozoa, representing three orders, are found in the sea.

Class Stenolaemata

Order Cyclostomata

This is an ancient group of bryozoans that survives to the present day. Colonies are mostly small, but endemic *Cinctipora elegans* in Foveaux strait and on the Otago shelf forms twiggy coral-like colonies up to 30 cm high. The zooids in cyclostome colonies are somewhat tubular in shape and the anterior end where the tentacles emerge is not closed (between feeding sessions) by a lid-like operculum. When reproducing, eggs and larvae are incubated in one or a few brood chambers that serve the whole colony. There are 120 species in New Zealand waters (c. 740 worldwide). Fairly uncommon in the deep sea.

Class Gymnolaemata

Order Ctenostomata

Another ancient order of bryozoans. Unlike other marine bryozoans, all ctenostomes are uncalcified, hence their colonies are soft. A few native species are encrusting; most are bushy. Some shallow-water species form large "fluffy" colonies of abundant delicate branches. Their zooids are like tiny transparent sausages disposed along hollow stems that resemble thin noodles. As in cyclostomes, individuals have no operculum. There are 48 species in New Zealand waters (c. 310 worldwide). Rare and tiny in the deep sea.

Order Cheilostomata

This is the geologically youngest bryozoan order, dating from the latest Jurassic. All marine species are calcified and colonies range from nearly microscopic to well over 30 cm high and across, depending on the species. The zooids in cheilostome colonies are somewhat box-like, with a lid-like closing apparatus (operculum) at one end. There are 782 species in New Zealand waters (c. 4950 worldwide). Common in the deep sea.

Phylum Bryozoa
Class Gymnolaemata
Order Cheilostomata (lace corals)
Family Phidoloporidae

Hippellozoon novaezelandiae (Erect cheilostome bryozoan) (HNO)

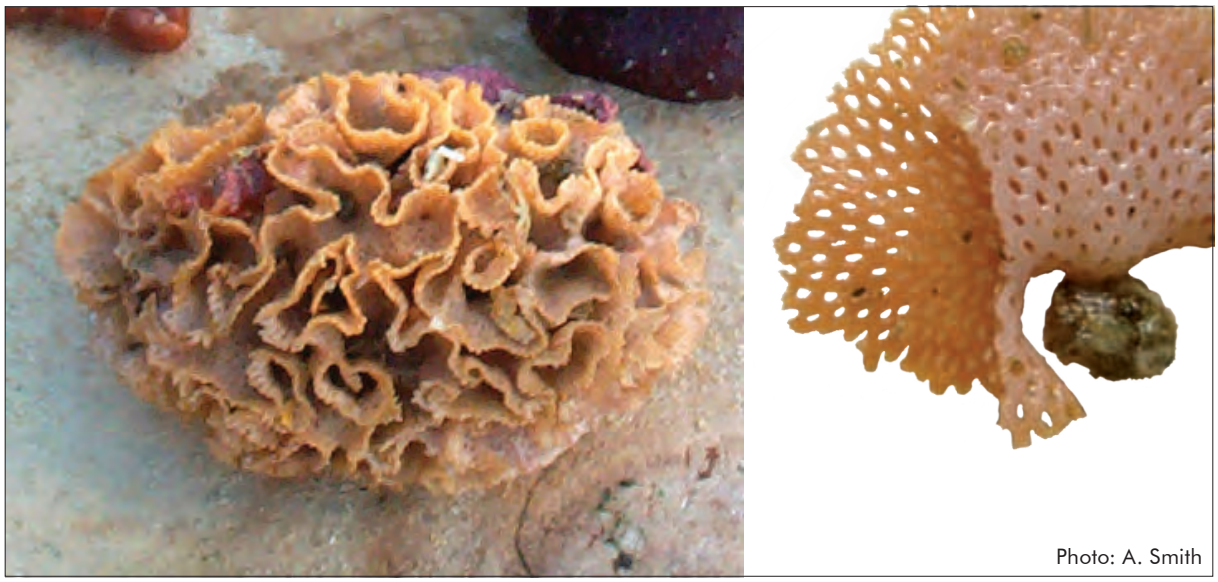


Photo: A. Smith

Distinguishing features: Hard coral-like structures with tiny pores around or along the branches. (The pores are the openings for microscopic feeding tentacles to emerge.) Distinguishing features tend to be microscopic; in lengthways sections of branches, the zooids appear as relatively short and variably box-like.

Colour: Varies according to species.

Size: From 5 to 30 cm high depending on the species.

Distribution: Widespread in New Zealand waters.

Depth: 0 to 5000 m.

Similar species: None.

References: 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*: 1–121.

Gordon, D.P. (1987). The deep-sea Bryozoa of the New Zealand region. Pp 97-104 *In:* Ross, J.R.P. (ed.) Bryozoa: Present and Past. Western Washington University, Bellingham. 333 p.

Phylum Bryozoa
Class Stenolaemata
Order Cyclostomata
Family

(Erect cyclostome bryozoans) (ECB)

BRYOZOA

Distinguishing features: Hard coral-like structures with tiny pores around or along the branches. (The pores are the openings for microscopic feeding tentacles to emerge.) Distinguishing features tend to be microscopic; in lengthways sections of branches, the zooids appear as long narrow tubes. Left image *Tetrocycloecia neozelanica*, right image *Cinctipora elegans*.

Colour: Varies according to species.

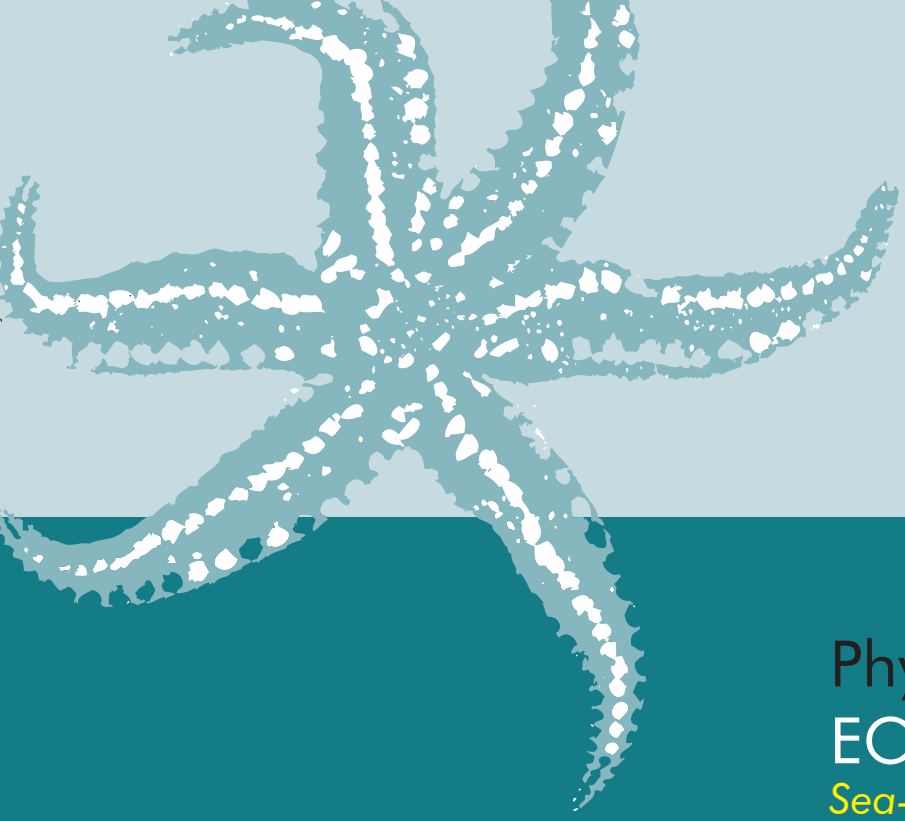
Size: From 5 to 30 cm. This is a height measurement, and size depends on the species.

Distribution: Widespread in New Zealand region.

Depth: 12 to 1156 m for relatively large colonies. Records over 700 m may represent dead colonies transported from shallower depths.

Similar species: Cheilostome bryozoans with a similar colony form.

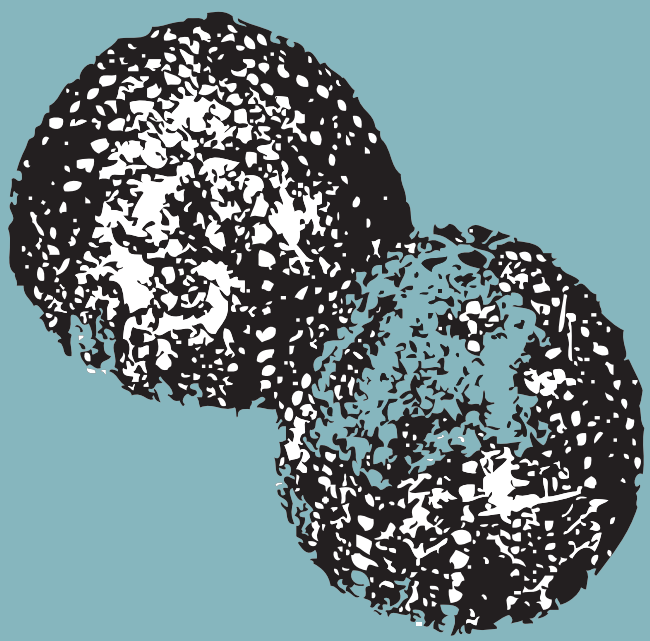
References: Taylor, P.D.; Gordon, D.P.; Batson, P.B. (2004). Bathymetric distributions of modern populations of some common Cenozoic Bryozoa from New Zealand, and paleodepth estimation. *New Zealand Journal of Geology and Geophysics 47*: 57–69.



Phylum ECHINODERMATA

Sea-stars, brittle stars, sea urchins, sea cucumbers, feather stars, sea lilies

Owen Anderson, Niki Davey, Don McKnight, Sadie Mills, Kate Neill



Phylum

ECHINODERMATA

Sea-stars, brittle stars, sea urchins, sea cucumbers, feather stars, sea lilies

The **Echinodermata** is a group of animals with spiny skins and tube-feet, showing a great variety of shapes and sizes; members of the commoner classes are generally recognisable as starfish or sea-stars, brittle stars, or sea urchins. Less well known are the feather stars, sea lilies, and sea cucumbers. All common extant forms have a basic pentaradial symmetry with tube-feet present, and an endoskeleton of calcitic plates or ossicles, these ranging from microscopic to conspicuous. Echinoderms have an extensive fossil history, but only five classes are likely to be collected in commercial trawling operations.

Asteroids (sea stars or starfish) are among the most familiar echinoderms. The central disc merges with the arms, and on the underside the tube-feet are placed in a groove. Extensions of the gut extend into the arms, and in a few species the gonads may similarly extend or are limited to the arms. Sea stars show a great variety of shapes, from pentagonal to those with elongate arms and a small disc. There are usually five arms but several species have more. The more unusual types occur in the Order Brisingida, where the disc is small and the deciduous arms appear distinct from the disc.

Ophiuroids (brittle stars) differ from sea stars in lacking the distinct groove on the underside of the arms, with the tube-feet piercing the ventral arm plates. The arms are distinctly separated from the disc. Most species have only five arms, though a few have six or more. Brittle-stars are generally small and fragile, and the arms are often broken when captured. Most brittle-stars (**Order Ophiurida**) have arms usually coiling horizontally (though in some they coil vertically) and the armspines are placed on the sides of the arms, either erect or pressed against the side. Brittle-stars of the Order Euryalinida, known as basket-stars or snake-stars, differ from the typical forms in having arms coiling vertically, with the armspines pointing downward; the larger basket-stars have the arms branching, usually from close to the edge of the disc, while the snake-stars have simple arms.

Echinoids (sea urchins or sea eggs) lack arms, and have a variety of forms. The commoner type is spherical or globose, but discoidal or heart-shaped forms also occur. The body or test is composed of distinct plates, in 20 columns, 10 of which are pierced by the tube-feet. Conspicuous spines, sometimes modified, are present, and in the spherical and discoidal species a complex jaw apparatus (Aristotle's lantern) is present on the underside; this is absent in the heart-shaped species.

Holothurians (sea cucumbers) generally have a soft, usually cylindrical, body with microscopic plates or ossicles embedded in the body wall, though a few species are more or less rigid, with small overlapping plates present. Five rows of tube-feet are usually present, though they are absent in one order. Although most species are small to medium in size, some tropical and deepsea species can be quite large. Identification of species usually requires laboratory examination of the ossicles embedded in the skin.

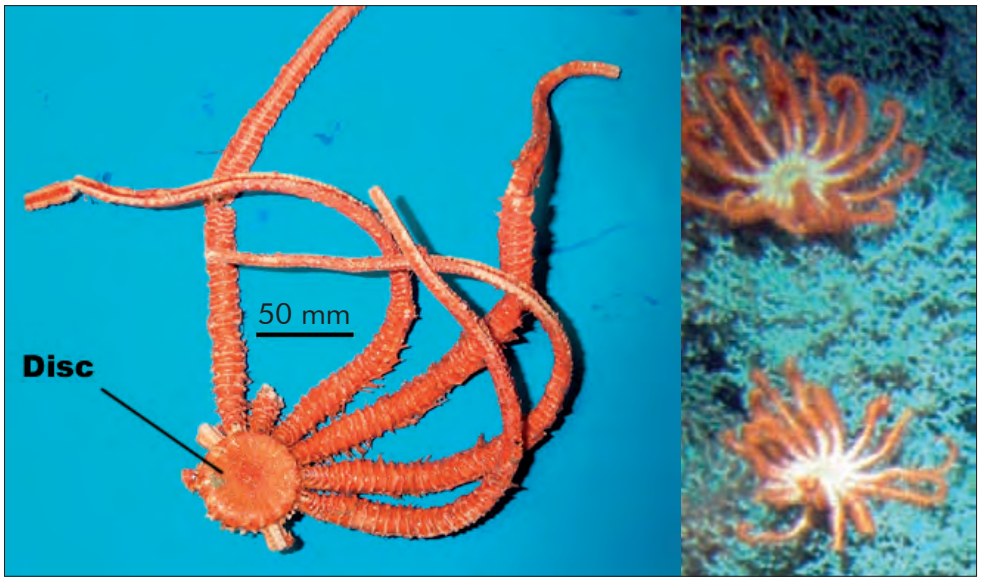
Crinoids are stalked (sea lilies) or unstalked (feather stars) with a small cup-like body, or calyx, composed of plates in cycles of five. This body is roofed by a membrane that may have immersed plates; moveable arms, usually branched, extend from the margin of the calyx, and are made up of small subcircular plates united by muscles. The arms contain extensions of the viscera, gonads, nerves, and water vascular systems. The tube-feet are inconspicuous, and extend to the arm tips. Sea lilies have a stem made up of discoidal plates, and attach to the seafloor by terminal roots, or a flattened basal piece; others have thin-jointed cirri along the stem, each with a terminal hook, to enable temporary attachment.

Feather stars have the stem reduced to a plate at the base of the calyx, to which the cirri are attached.

Crinoids are generally fragile, and often only fragments are found in samples. Entire specimens will often fragment when exposed on deck.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Brisingida
Family Brisingidae, Hymenodiscidae, Novodiniidae, Freyellidae

(Armless stars) (BRG)



Distinguishing features: All species in this order have at least 6 arms, usually over 10, with a small, rounded disc. The arms, constructed from tiny plates immersed in skin, are long, often higher than wide, and are quite deciduous and often all that is taken. Arms have transverse rows of plates the largest of which, at the ventro-lateral margin, bearing one or more long spines. All spines have a thick coating of skin. Tube feet in 2 rows, with sucking-discs.

Colour: Various.

Size: Total width up to 260 mm.

Distribution: Throughout New Zealand.

Depth: 150 to 6000 m.

Similar species: There are at least 14 local species in this order, all with a small disc and at least 6 fragile arms. A detailed examination is necessary to accurately identify them. Pictured is *Brisinga chathamica*.

References: McKnight, D.G. (2006). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). 3. Orders Velatida, Spinulosida, Forcipulatida, Brisinga with addenda to Paxillosida, Valvatida. *NIWA Biodiversity Memoir 120*. 187 p.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Forcipulatida
Family Asteriidae

Allostichaster spp. (Three-and-three stars) (ALH)

Distinguishing features: Small starfish with 5-8 arms, often of unequal sizes. Upper surface is covered with short, blunt spines, the tips of which are knob-like.

Colour: Cream.

Size: Total width up to 76 mm.

Distribution: Occasional North Island records, most common from southern areas and often associated with small hills or seamounts.

Depth: 0 to 1162 m.

Similar species: Three species of *Allostichaster* have been reported from New Zealand and detailed examination is required to separate them. They are similar in appearance to another sea-star from the same family, *Smilasterias*, however *Smilasterias* only has 5 arms that are similar in length.

References: McKnight, D.G. (2006). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). 3. Orders Velatida, Spinulosida, Forcipulatida, Brisinga with addenda to Paxillosida, Valvatida. *NIWA Biodiversity Memoir 120*. 187 p.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Forcipulatida
Family Asteriidae

Cosmasterias dyscrita (Cat's-foot star) (CDY)

Distinguishing features: Disc small with 5 long rounded arms. Marginal plates inconspicuous. Plates of upper surface in fairly regular longitudinal rows, generally wider than long, each covered with short, blunt spines. Pedicellariae scattered over surface of body. Tube-feet with sucking-discs, in 4 rows. Arms often break from the disc.

Colour: Pale orange.

Size: Total width up to 260 mm.

Distribution: Widespread throughout the New Zealand region, also present in Australia.

Depth: 50 to 1200 m.

Similar species: *Pseudechinaster rubens*, which has a mainly transverse arrangement of the plates on the upper surface.

References: McKnight, D.G. (2006). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). 3. Orders Velatida, Spinulosida, Forcipulatida, Brisinga with addenda to Paxillosida, Valvatida. *NIWA Biodiversity Memoir 120*. 187 p.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Forcipulatida
Family Asteriidae

Pseudechinaster rubens (PRU)

Distinguishing features: Disc small, with 5 gently tapering arms, rounded above. Plates on upper surface of arms form transverse arcs, and also longitudinal series. Arms are often broken. Plates of upper and lower surfaces with 1-2 short spines. Mouth sunken and inconspicuous.

Colour: Reddish.

Size: Total width up to 340 mm.

Distribution: East coast of New Zealand, more common on the Chatham Rise.

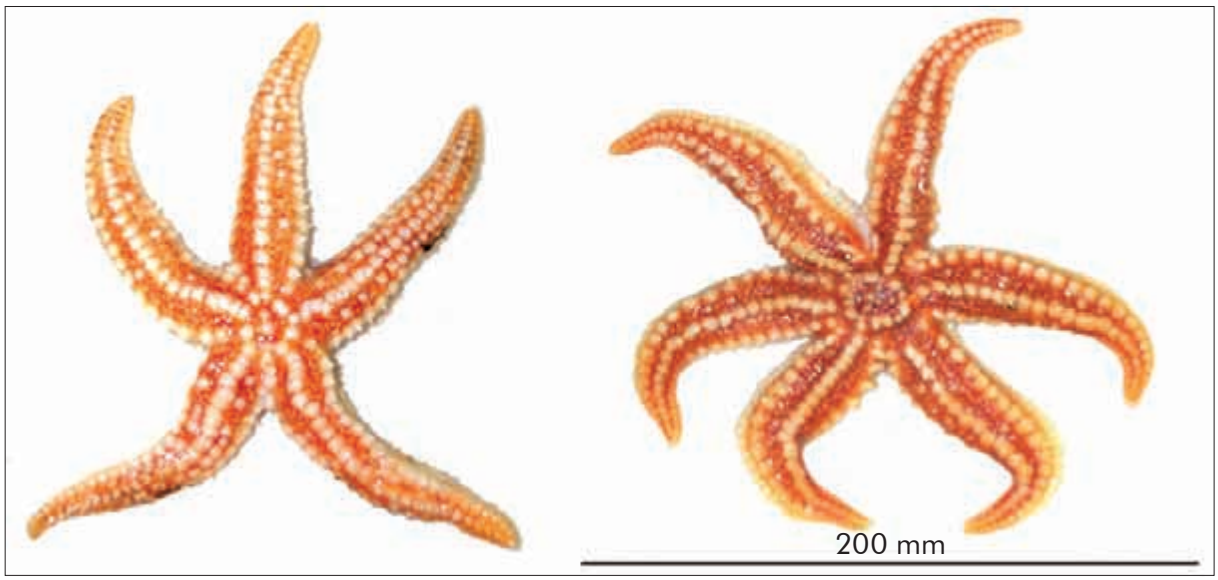
Depth: 75 to 400 m.

Similar species: *Cosmasterias dyscrita* is similar in appearance but lacks the transverse arcs of plates on the upper surface.

References: McKnight, D.G. (2006). The marine fauna of New Zealand Echinodermata: Asteroidea (Sea-stars). Orders Spinulosida, Forcipulatida and Brisingida. *NIWA Biodiversity Memoir 120*. 187 p.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Forcipulatida
Family Asteriidae

Sclerasterias mollis (Cross-fish) (SMO)



Distinguishing features: Disc small, with 5 rounded or 5-sided arms (rarely 6); plates of upper surface in longitudinal rows, most with one spine, with a wreath of tiny pedicellariae (jaw-like appendages) around the base which may appear as a gelatinous sheath. Marginal plates inconspicuous. Tube feet in 4 rows, each with a distinct sucking-disc.

Colour: Orange to brick-red, arms with spines in 5 rows of whitish, cream, or yellow.

Size: Total width up to 400 mm.

Distribution: Widespread throughout the New Zealand region, from the Kermadec Islands to the Auckland Islands, including the Chatham Islands; common south of Cook Strait.

Depth: 0 to 660 m.

Similar species: The wreaths around the spines of the upper surface differentiate this species from *Cosmasterias* and *Pseudechinaster*. Two rarer species in genera *Perissasterias* and *Taranuiaster* lack the orange mottling. One other species, apparently new to New Zealand, is known only from active submarine volcanoes north of the Bay of Plenty. It differs in being uniformly very dark red to almost black.

References: McKnight, D.G. (2006). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). 3. Orders Velatida, Spinulosida, Forcipulatida, Brisinga with addenda to Paxillosida, Valvatida. *NIWA Biodiversity Memoir 120*. 187 p.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Forcipulatida
Family Zoroasteridae

Zoroaster spp. (Rat-tail stars) (ZOR)

Distinguishing features: Five long, rounded, rigid, and slowly tapering arms and a small disc; plates regularly arranged, marginal plates not conspicuous. Upper surface with small spines, becoming larger down sides of rounded arms. Tube-feet in 4 rows, sometimes 2 rows near arm tip.

Colour: Brownish, red / orange, or pale, usually a little lighter below.

Size: Total width up to 350 mm. Disc radius to a maximum of 30 mm.

Distribution: Throughout the New Zealand region.

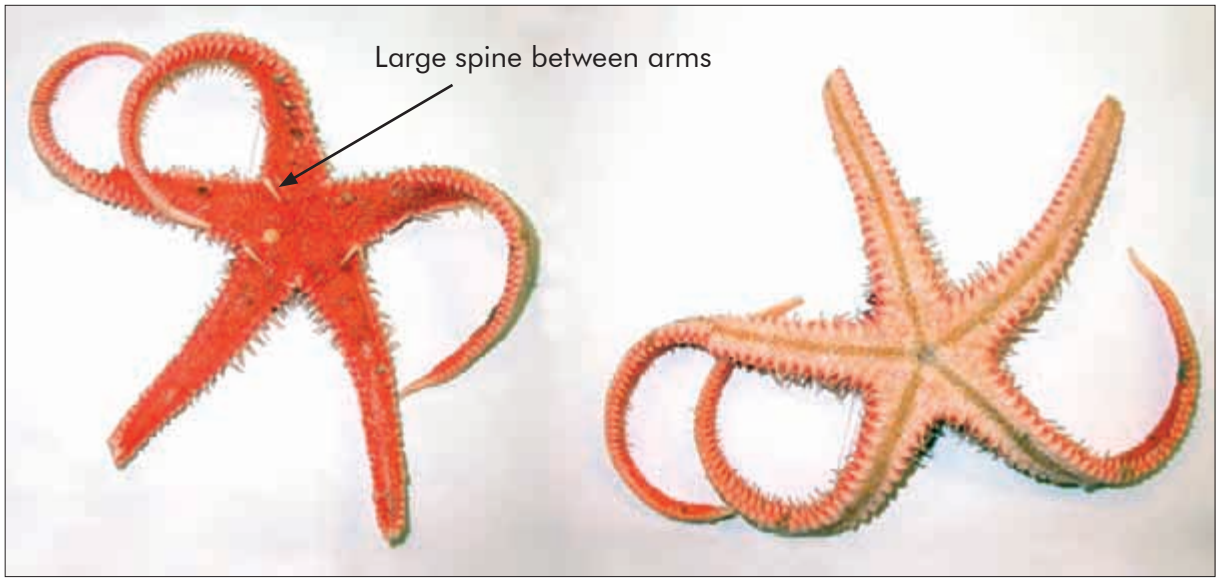
Depth: 300 to 2500 m.

Similar species: Seven species of *Zoroaster* are known from New Zealand waters, all similar in shape, and readily identified to genus; however a detailed examination is necessary to accurately identify the species. Several species of *Zoroaster* are illustrated here.

References: McKnight, D.G. (2006). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). 3. Orders Velatida, Spinulosida, Forcipulatida, Brisinga with addenda to Paxillosida, Valvatida. *NIWA Biodiversity Memoir 120*. 187 p.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Notomyotida
Family Benthopectinidae

Benthopecten spp. (BES)



Distinguishing features: Disc small the 5 flat arms tapering, often coiled at the tips; lower and upper surfaces flat. Upper surface with numerous small spines and some larger; lower surface with larger spines. Plates at margins wider than long, with conspicuous erect spines, and between arm bases is one enlarged plate with 1 to 2 very large spines.

Colour: Upper surface often scarlet or reddish becoming pink distally; underside pale pink then whitish towards tip; larger spines red or white.

Size: Total width up to 220 mm.

Distribution: Throughout New Zealand, as far south as the Campbell Plateau.

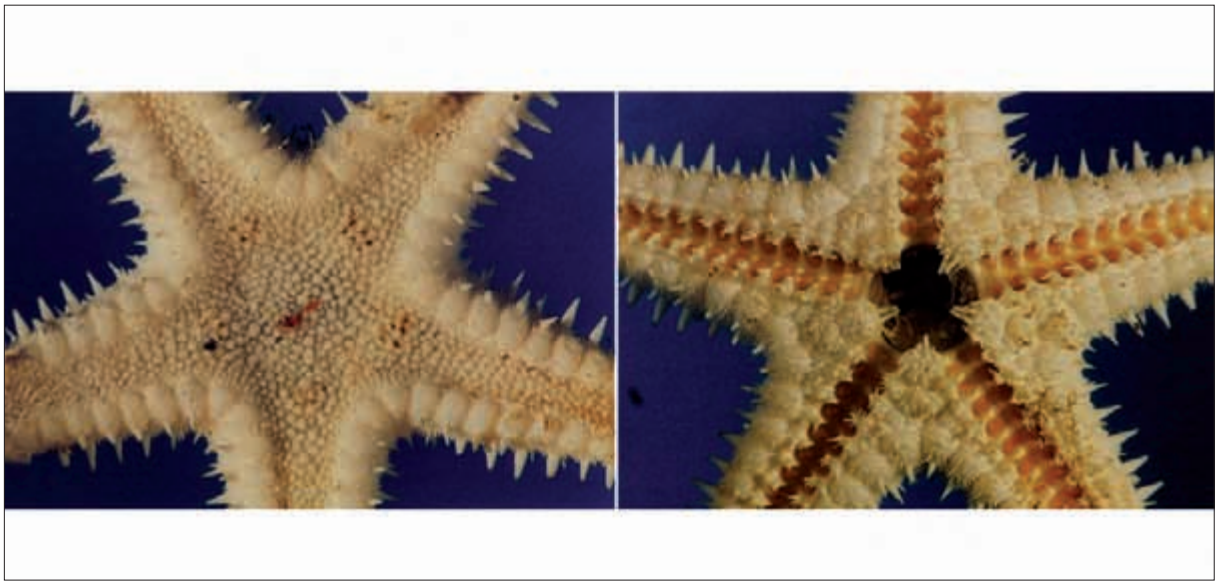
Depth: 200 to 620 m.

Similar species: Three species of *Benthopecten* have been reported from New Zealand, and are difficult to separate without a detailed examination.

References: Clark, H.E.S.; McKnight, D.G. (2000). The marine fauna of New Zealand: Echinodermata: Asteroidea. Orders Paxillosida and Notomyotida. *NIWA Biodiversity Memoir 116*. 196 p.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Notomyotida
Family Benthopectinidae

Cheiraster monopedicellaris (CMP)



Distinguishing features: Disc and arms flat, upper and lower surfaces with numerous short spines, plates at margin conspicuous and swollen, each with 1 to 3 larger stubby spines. On lower surface behind mouth are two opposing combs of short curved spines which interlock, with one structure between each pair of arms.

Colour: Pink or gray on upper surface, cream below.

Size: Total width up to 80 mm.

Distribution: East coast of northern and central New Zealand.

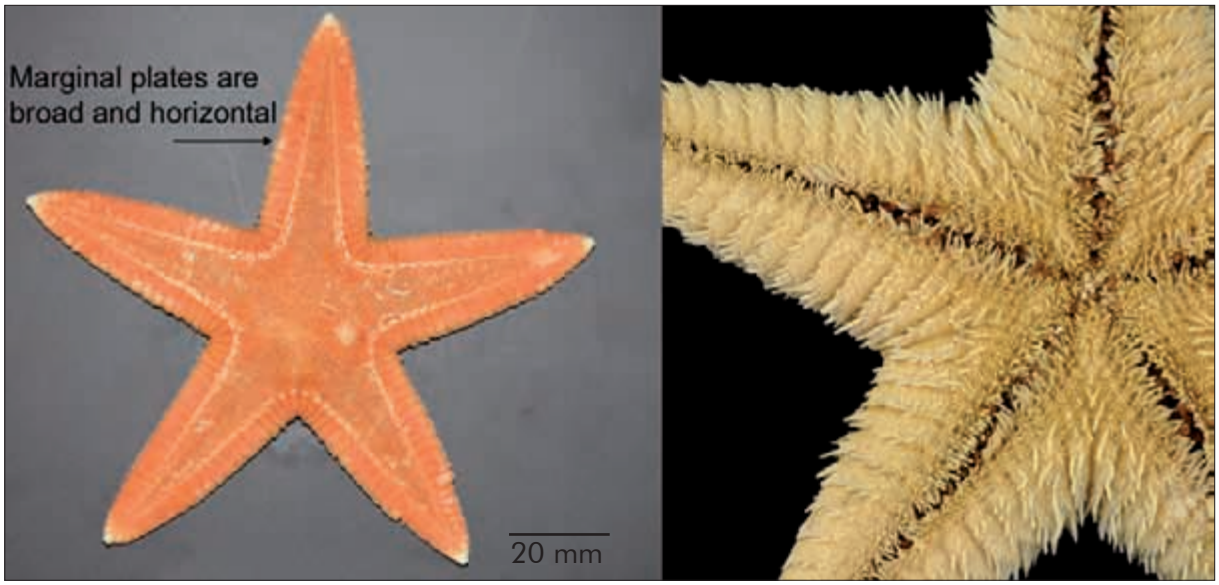
Depth: 600 to 900 m.

Similar species: There are six other species of *Cheiraster* recorded locally, and a detailed examination is needed to separate them; however this is the only species with the single comb-like structure behind the mouth.

References: Clark, H.E.S.; McKnight, D.G. (2000). The marine fauna of New Zealand: Echinodermata: Asteroidea. Orders Paxillosida and Notomyotida. *NIWA Biodiversity Memoir 116*. 196 p.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Paxillosida
Family Astropectinidae

Astromesites primigenius (APM)



Distinguishing features: Marginal plates large and conspicuous, forming a regular broad, horizontal row around the margin of both surfaces. The underside, including the lower marginal plates, is covered in enlarged spines giving a bristly/shaggy appearance.

Colour: Orange to red.

Size: Total width up to 140 mm, average width about 70 mm.

Distribution: Occasional North Island records, most common from off Banks Peninsula area and south to the Snares and Auckland Islands and east to the Chatham Rise and Bounty Islands.

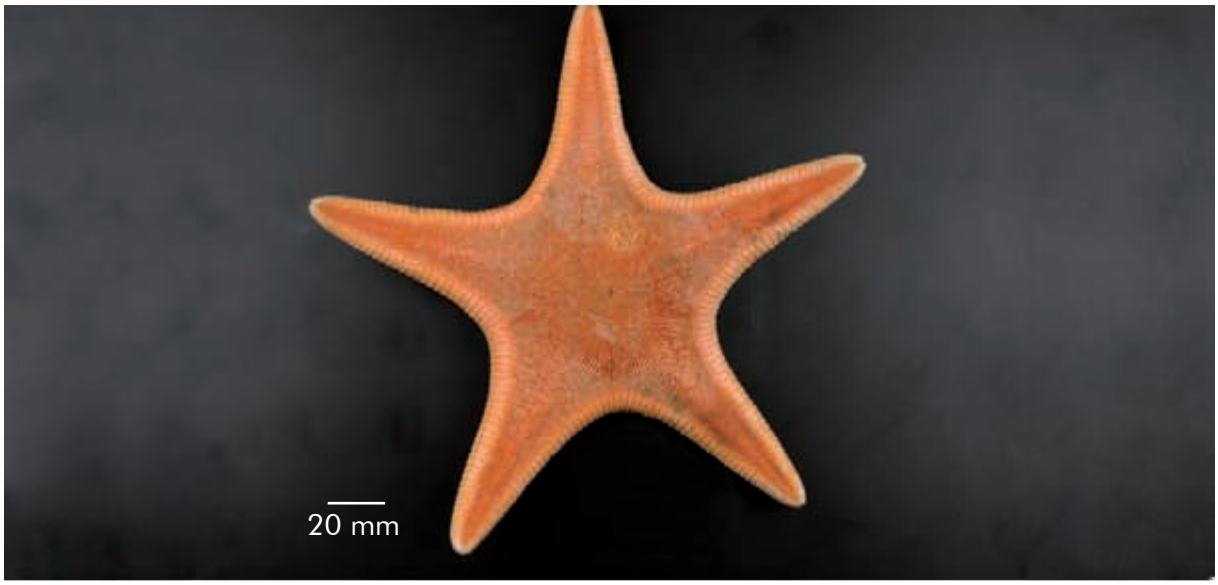
Depth: 55 to 690 m.

Similar species: Can be confused with both *Psilaster acuminatus* and *Proserpinaster neozelanicus*. However it lacks enlarged spines on the upper marginal plates (see *Proserpinaster*), and its marginal plates are very broad, regular and horizontal, even between the arms, unlike *Psilaster* whose marginal plates become more vertical between the arms.

References: Clark, H.E.S.; McKnight, D.G. (2000). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). Order Paxillosida. *NIWA Biodiversity Memoir 116*. 196 p.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Paxillosida
Family Astropectinidae

Dipsacaster magnificus (Magnificent sea-star) (DMG)



Distinguishing features: Large, with large, 5-armed flat disc. Arms broad at the base, tapering rapidly and evenly to a sharp tip. Plates of upper surface with clusters of short spinelets. Madreporite large, obscured by spinelets in a slightly depressed area near the marginal plates. Lower marginal plates project beyond upper plates to form a very distinct edge to disc and arms; both series of marginal plates bearing spinelets. Tube-feet pointed, in 2 rows, the sucking disc scarcely apparent.

Colour: Usually orange, but also recorded as light dirty grey with patches of yellow and salmon pink above, cream below.

Size: Total width up to 360 mm.

Distribution: Widespread around New Zealand, from Lord Howe Rise in the north to Campbell Plateau in the south, including the Chatham Rise and Louisville Ridge. Also widespread in Australian waters.

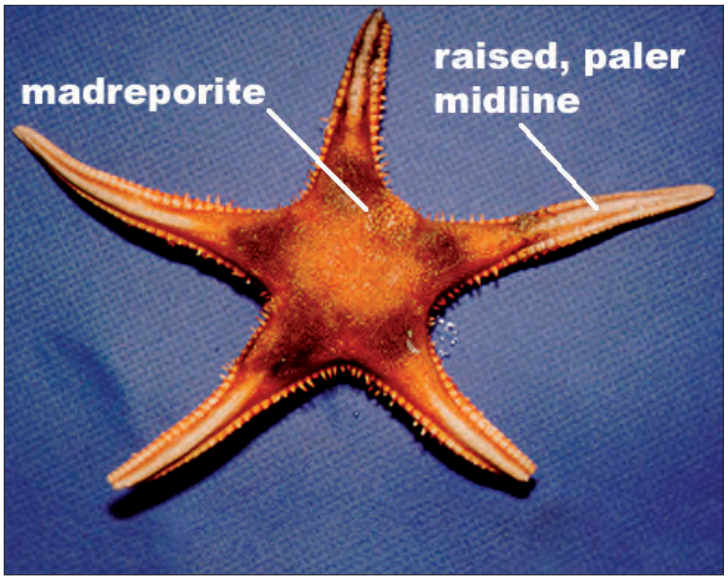
Depth: 100 to 1100 m.

Similar species: The only member of this genus found in New Zealand, *D. magnificus* is broadly similar to species of *Plutonaster*, *Proserpinaster*, and *Psilaster* but is larger, with broader arms and more regular rows of plates on both upper and lower surfaces, and lacks enlarged spines on the marginal plates.

References: Clark, H.E.S.; McKnight, D.G. (2000). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). Orders Paxillosida and Notomyotida. *NIWA Biodiversity Memoir 116*. 196 p.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Paxillosida
Family Astropectinidae

Plutonaster knoxi (Abyssal star) (PKN)



Distinguishing features: Disc large and flat, or slightly raised centrally and along midline of the 5, long, slender, arms. Plates of upper surface with short spines. Marginal plates separated by grooves lined with small spinelets, plates covered with granules, and usually each with an erect spine. Madreporite very large, intricately patterned, and covered by bushy clumps of spines. Tube-feet pointed, in 2 rows.

Colour: Generally orange, orange/red, with pale yellow. Often a paler orange/yellow stripe along midline of arms.

Size: Total width up to 260 mm.

Distribution: Widespread around the New Zealand region, especially common on the Chatham Rise.

Depth: 500 to 2000 m.

Similar species: Seven species of *Plutonaster* are recorded from the New Zealand region, but *P. knoxi* is the most common; it also could be confused with *Dipsacaster*, *Psilaster*, and *Proserpinaster*.

References: Clark, H.E.S.; McKnight, D.G. (2000). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). Orders Paxillosida and Notomyotida. *NIWA Biodiversity Memoir 116*: 82–87.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Paxillosida
Family Astropectinidae

Proserpinaster neozelanicus (PNE)

Distinguishing features: Disc large and flat, with 5 tapering arms. Plates of upper surface regularly arranged, covered with short spines; underside similar, but plates less regular in arrangement and often also with a larger spine. The upper plates of the marginal rows are broad, particularly on the arms, and both rows bear 1 to several larger spines.

Colour: Reddish or salmon-pink above, cream below.

Size: Total width up to 260 mm.

Distribution: New Zealand, from near the Three Kings Islands to the southern shelf; common on the Chatham Rise.

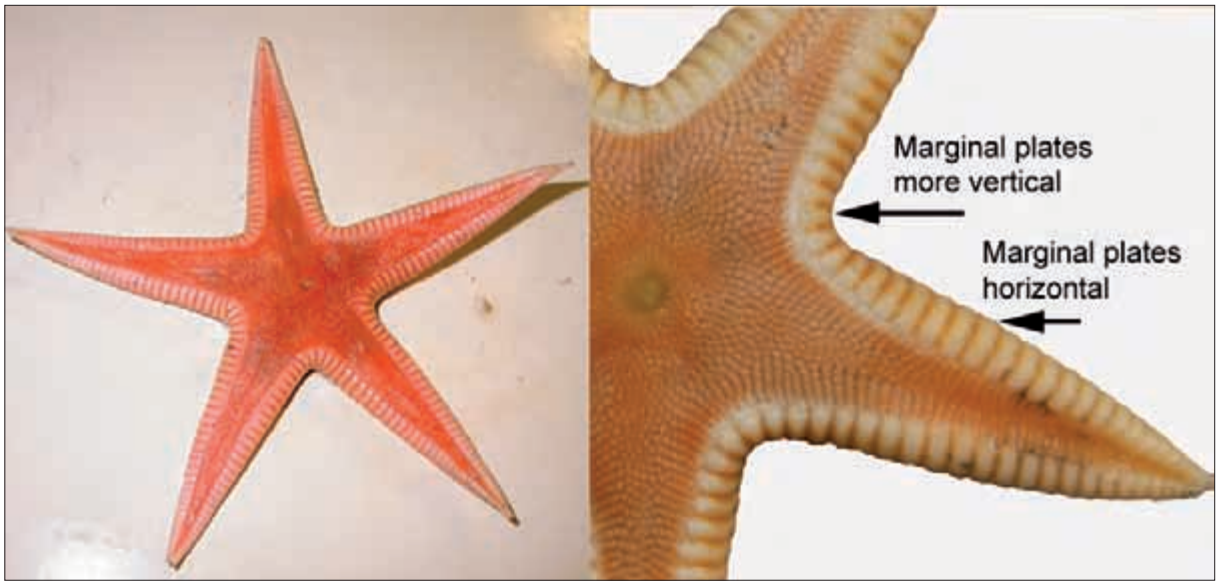
Depth: 90 to 1700 m.

Similar species: *Psilaster acuminatus* and *Astromesites primigenius* are similar however *P. acuminatus* lacks rows of enlarged spines on the upper marginal plates. *A. primigenius* lacks enlarged spines on the upper series of marginal plats and the marginal plates are broad and horizontal on and between the arms.

References: Clark, H.E.S.; McKnight, D.G. (2000). The marine fauna of New Zealand: Echinodermata: Asteroidea. Orders Paxillosida and Notomyotida. *NIWA Biodiversity Memoir 116*. 196 p.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Paxillosida
Family Astropectinidae

Psilaster acuminatus (Geometric star) (PSI)



Distinguishing features: Outline strongly star-shaped; disc and 5 arms flat although slightly raised near arm bases and slightly depressed centrally. Conspicuous madreporite located between arms and nearer to marginal plates than disc centre. Plates of upper surface with short spines. Marginal plates conspicuous, those of the upper series slightly raised and separated from each other by deep grooves, forming a distinct edge to the disc and arms. Lower marginal plates with some enlarged spines. Tube-feet pointed, in 2 rows.

Colour: Usually uniformly orange above, with much paler marginal plates. Upper surface also described as dark-pink, orange-pink, and bright-salmon. Creamy yellow below with delicate pink tube-feet.

Size: Total width up to 240 mm.

Distribution: Very common in the New Zealand region, from Lord Howe Island in the north to Campbell Island in the south, including the Chatham Islands, but no records from Foveaux Strait or Stewart Island. Also known from Australia and South Africa.

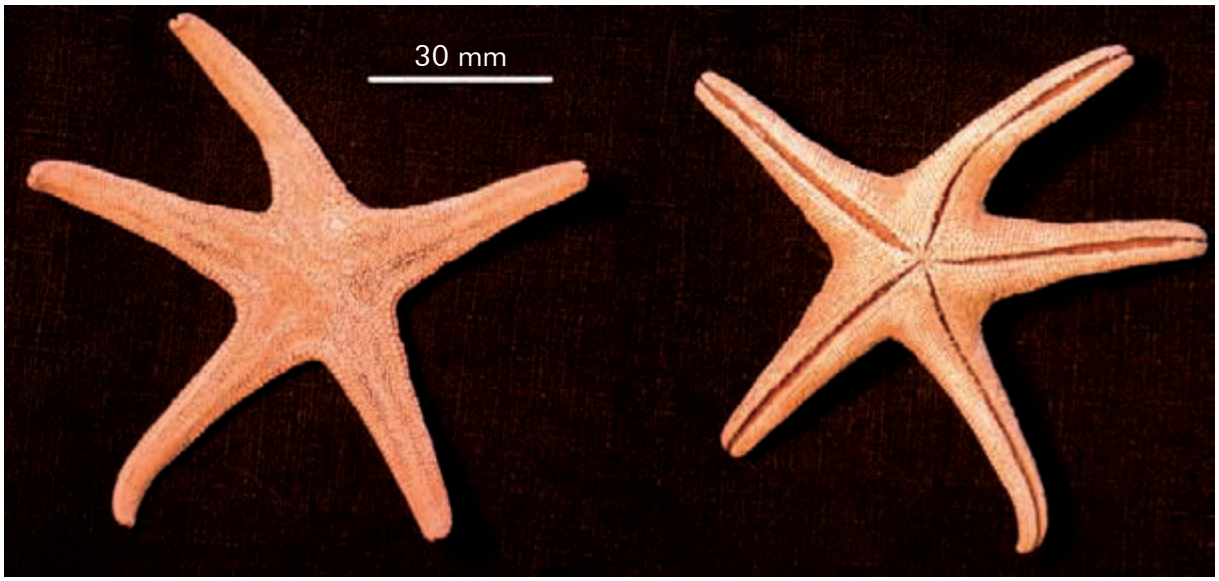
Depth: 30 to 2500 m. Most common from 200 to 600 m.

Similar species: Could be confused with species of *Astromesites*, *Dipsacaster*, and *Proserpinaster*, but can be distinguished by its distinctive marginal plates, enlarged spines on the lower marginal plates and lack of enlarged spines on the upper marginal plates.

References: Clark, H.E.S.; McKnight, D.G. (2000). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). Orders Paxillosida and Notomyotida. *NIWA Biodiversity Memoir 116*: 99–104.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Paxillosida
Family Radiasteridae

Radiaster gracilis (RGR)



Distinguishing features: Disc flat with 5 tapering arms. Upper surface covered with short spines; lower surface plates with a slight ridge covered with small spines separated by narrow bare areas; plates at margin inconspicuous.

Colour: Bright orange.

Size: Total width up to 240 mm.

Distribution: Widespread throughout New Zealand, also south-eastern Australia and Tasmania.

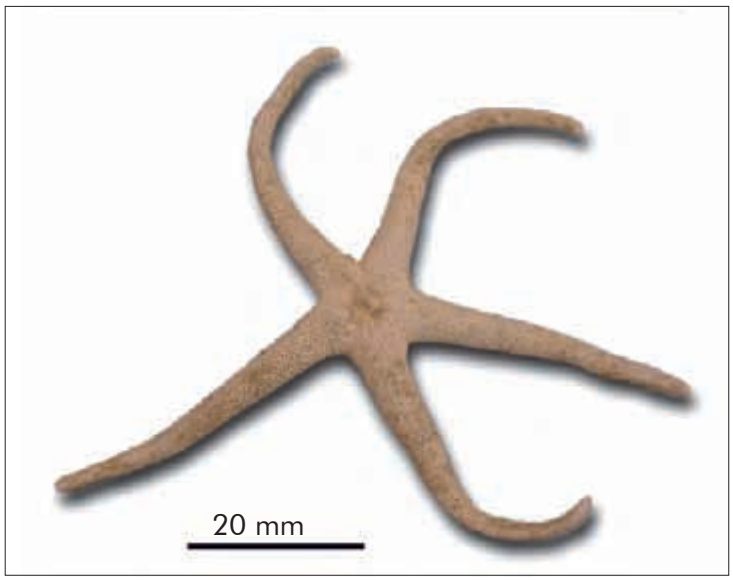
Depth: 30 to 2400 m.

Similar species: *Psilaster acuminatus* though similar has more prominent plates at the margin.

References: Clark, H.E.S.; McKnight, D.G. (2000). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). Orders Paxillosida and Notomyotida. *NIWA Biodiversity Memoir 116*: 92–96.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Spinulosida
Family Echinasteridae

Henricia compacta (HEC)



Distinguishing features: Disc small with 5 tapering, rounded, rigid arms. Entire surface densely covered with small erect spines, the underlying plates rounded and irregularly arranged, with small skin-covered areas between; short finger-like papillae project through the skin.

Colour: Usually cream or very light brown.

Size: Total width up to 140 mm. Generally small.

Distribution: Widespread throughout the New Zealand region, the Tasman Sea and south-eastern Australia. In New Zealand common on seamounts.

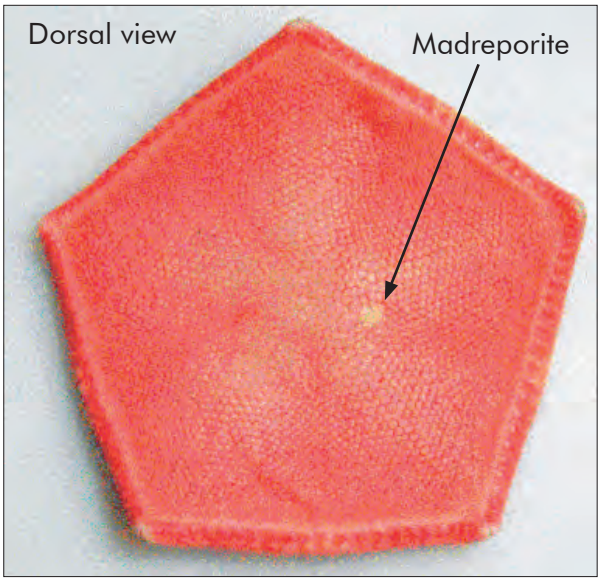
Depth: 100 to 1500 m.

Similar species: There are several species of *Henricia* known locally as well as a few in the related genera *Odontohenricia* and *Echinaster*. While none of these are as densely spined as *H. compacta*, separation of species in this family usually requires examination under a microscope.

References: McKnight, D.G. (2006). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). 3. Orders Velatida, Spinulosida, Forcipulatida, Brisinga with addenda to Paxillosida, Valvatida. *NIWA Biodiversity Memoir 120*. 187 p.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Valvatida
Family Goniasteridae

Ceramaster patagonicus (Pentagon star) (CPA)



Distinguishing features: Strongly and distinctively pentagonal and flat. Arms very short, tips gently upturned. Upper surface with regularly arranged, 4 to 6 sided plates, covered in granules. Madreporite small, naked, 5-sided, slightly raised, and near disc centre. Upper marginal plates form a definite, bevelled edge to the disc and arms, and number 26 from arm tip to arm tip. Tube-feet with sucking discs, in two rows.

Colour: Bright red or reddish-orange above, cream below.

Size: Total width up to 200 mm.

Distribution: Widespread in the Pacific, South Atlantic, and southern Indian Ocean. Found throughout much of southern New Zealand, but more common south of the Chatham Rise, including the Bounty Islands and Macquarie Island. Not recorded north of the Bay of Plenty.

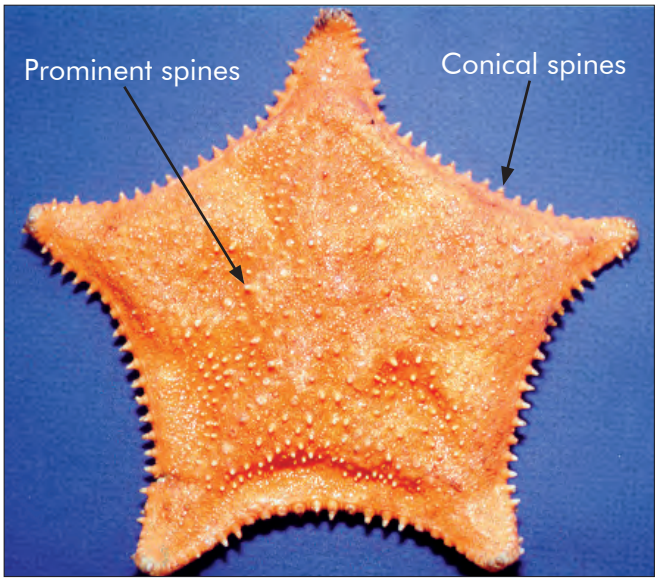
Depth: 200 to 1200 m.

Similar species: There are two subspecies. *Ceramaster. p. australis* (known only from the Macquarie Ridge) lacks the pedicellariae (jaw-like appendages) present on the upper marginal plates of *Ceramaster. p. patagonicus*. Small specimens from seamounts may represent different species. Species of *Pillsburiaster* differ in having rounded plates on the upper surface, and those of *Sphaeriodiscus* have scattered granules over the marginal plates.

References: Clark, H.E.S.; McKnight, D.G. (2001). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). Order Valvatida. *NIWA Biodiversity Memoir 117*: 33–36.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Valvatida
Family Goniasteridae

Hippasteria phrygiana (Trojan star) (HTR)



Distinguishing features: Five short arms, disc large, near pentagonal, and usually inflated. Sturdy, blunt, conical spines form 2 rows on marginal plates (1 to 3 spines per plate). Large and small plates of the upper surface rounded, both with granules, the larger often with an erect spine. Tube-feet with sucking discs, in 2 rows.

Colour: Pale orange above, paler cream below.

Size: Total width up to 320 mm.

Distribution: Widely distributed in the northern hemisphere and in Australia (New South Wales and Victoria). In New Zealand it occurs from the Bay of Plenty south. Common on the Chatham Rise.

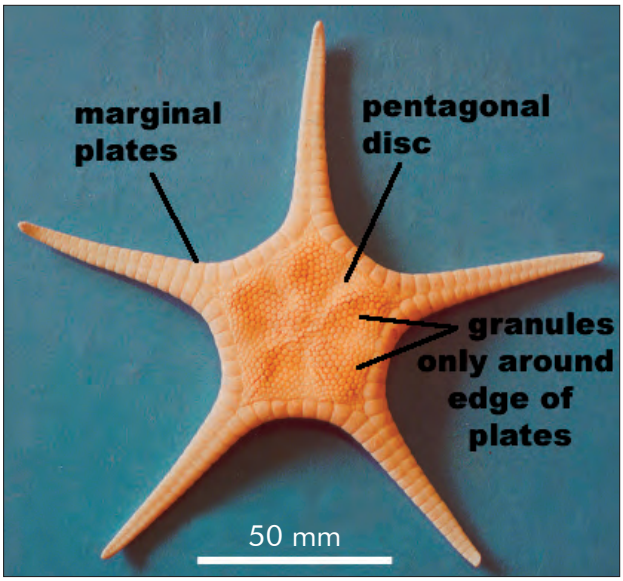
Depth: 20 to 1300 m. Most records from deeper than 500 m.

Similar species: The strong spines on the margins help to distinguish this species from similar shaped goniasterids such as *Mediaster* spp. and *Gilbertaster anacanthus*, which lack these spines, as does a rare species of *Hippasteria* from south of Tasmania.

References: Clark, H.E.S.; McKnight, D.G. (2001). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). Order Valvatida. *NIWA Biodiversity Memoir 117*: 54–59.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Valvatida
Family Goniasteridae

Lithosoma novaezelandiae (Rock star) (LNV)



Distinguishing features: Disc pentagonal, bordered by conspicuous upper marginal plates which completely encase the arms from base to tip. Plates of the upper surface naked, ringed with small granules, close-fitting, mostly hexagonal, and very regularly arranged into rows. Madreporite small, naked, between arms, and nearer centre than edge of disc. Marginal plates relatively much larger in juveniles. Tube-feet with terminal sucking discs, in 2 rows.

Colour: Pale brown-cream above, light fawn below.

Size: Total width up to 320 mm.

Distribution: Widespread around New Zealand from north of the North Island to the Campbell Rise, but not known from the east coast between East Cape and Christchurch or from the west coast between North Cape and Cape Farewell.

Depth: 120 to 1200 m. Most common at 600 to 800 m.

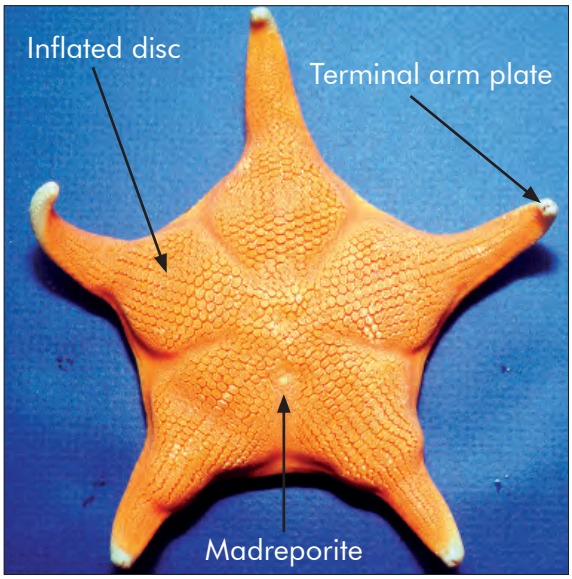
Similar species: *Glyphodiscus mcknighti*, from near Norfolk Island, is very similar. Two species of Rosaster also have the upper surface of the arms composed only of marginal plates, but plates of the upper surface are covered with granules.

References: Clark, H.E.S.; McKnight, D.G. (2001). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). Order Valvatida. *NIWA Biodiversity Memoir 117*: 63–69.

McKnight, D.G. (1973). Additions to the asteroid fauna of New Zealand: Family Goniasteridae. *NZOI Records 1(13)*: 172–195.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Valvatida
Family Goniasteridae

Mediaster sladeni (Sladen's star) (MSL)



Distinguishing features: Disc large, irregularly inflated centrally and at arm bases. The 5 arms slender, evenly tapering to oval terminal plates. Plates on upper surface are regular in shape (having an oval, enlarged, flattened head) and form a close cover. Some plates bear in their centre relatively conspicuous pedicellariae (jawlike appendages) with 2 to 3 jaws. Madreporite hexagonal, between arms, and nearer to disc than to marginal plates.

Colour: Orange.

Size: Total width up to 230 mm. Average width about 120 mm.

Distribution: From Three Kings Islands in the north to south of The Snares. Many records from the Chatham Rise.

Depth: 40 to 1000 m.

Similar species: *Mediaster gartrelli*, known from similar depths, but only from off Taranaki and the Kermadec Islands, has shorter arms; *M. arcuatus*, widespread at 600 to 1300 m, has shorter arms.

References: Clark, H.E.S.; McKnight, D.G. (2001). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). Order Valvatida. *NIWA Biodiversity Memoir 117*: pp. 78–82.

McKnight, D.G. (1973). Additions to the asteroid fauna of New Zealand: Family Goniasteridae. *NZOI Records 1(13)*: 172–195.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Valvatida
Family Goniasteridae

Pillsburiaster aoteanus (PAO)

Distinguishing features: Outline almost pentagonal, the sides slightly concave. Upper surface covered with small granules, the plates round or ovoid in outline, and not in regular rows. Lower surface covered with similar small granules, plates at the margins often with a bare patch, which may become larger towards the arm tip.

Colour: Yellow to light brown.

Size: Total width up to 250 mm.

Distribution: Widespread throughout New Zealand and moderately common on seamounts.

Depth: 120 to 1600 m.

Similar species: It is similar to species of *Ceramaster*, but these can be distinguished by their bright red colour and the plates of their upper surface which are rectangular to hexagonal and arranged in regular rows.

References: Clark, H.E.S.; Mcknight, D.G. (2001). The marine fauna of New Zealand Echinodermata: Asteroidea (Sea-stars). Order Valvatida. *NIWA Biodiversity Memoir 117.*

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Valvatida
Family Odontasteridae

Odontaster benhami (Pentagonal tooth-star) (ODT)

Distinguishing features: Outline roughly pentagonal, with a variable degree of arc between arm tips. Marginal plates separated by shallow grooves and slightly larger nearer the disc. On the underside, each of the oral plates (at the side of the mouth) has a larger, usually visible, backward-curving, glassy spine; tube-feet with sucking discs, in 2 rows.

Colour: Dull coloured, mostly light brown, reddish or orange, almost cream below.

Size: Total width up to 80 mm.

Distribution: The species has a generally southern distribution in the New Zealand region, from Cook Strait to near The Snares.

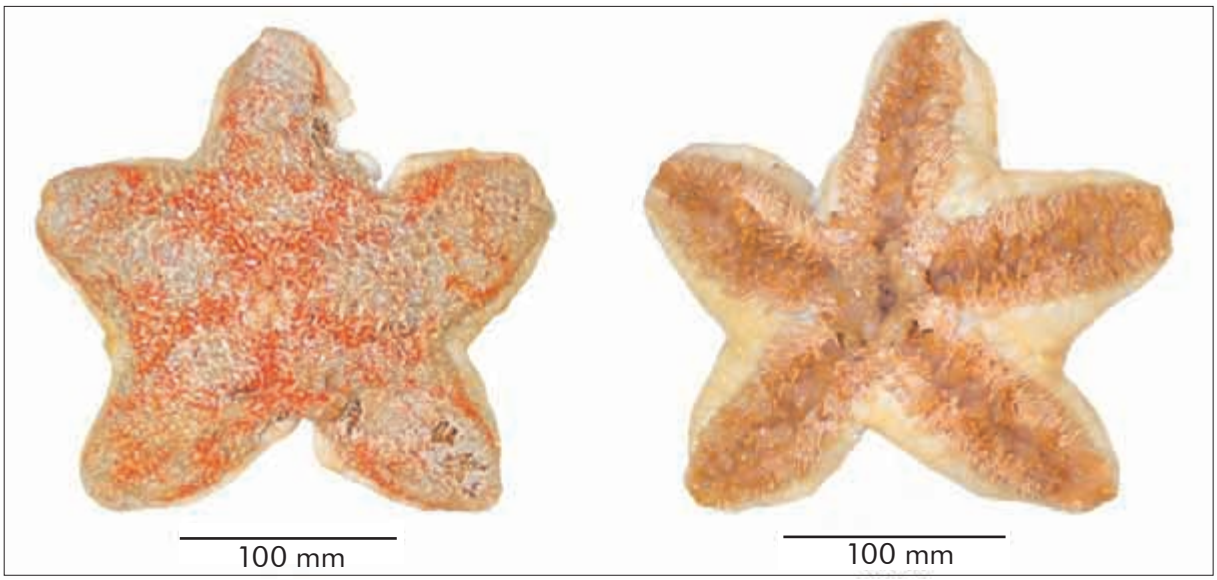
Depth: 0 to 550 m.

Similar species: Two other species occur in the New Zealand region, both superficially similar to *Odontaster benhami*. A lab examination may be necessary to separate them; *O. aucklandensis* is mainly subantarctic, 55 to 350 m, and *O. rosagemmae* occurs off the east coast of North Island and east of the Chatham Islands, 450 to 1200 m. Species of *Diplodontias* (in the same family) are also quite similar.

References: Clark, H.E.S.; McKnight, D.G. (2001). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). Order Valvatida. *NIWA Biodiversity Memoir 117*: 144–145.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Velatida
Family Pterasteridae

Diplopteraster sp. (DPP)



Distinguishing features: Disc large, fleshy and inflated, with a cover of skin supported by groups of spines. Plates at margin barely distinguishable. Tubefeet in four rows, small spines form transverse rows from tube feet, are united by a web of skin and alternate in number.

Colour: Grayish or cream.

Size: Total width up to 200 mm.

Distribution: East coast of New Zealand.

Depth: 800 to 1700 m.

Similar species: One other species of *Diplopteraster* is present and a detailed examination is needed to separate them. Other species in this family appear similar but differ in having the tube feet in 2 rows.

References: McKnight, D.G. (2006). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). 3. Orders Velatida, Spinulosida, Forcipulatida, Brisinga with addenda to Paxillosida, Valvatida. *NIWA Biodiversity Memoir 120*. 187 p.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Velatida
Family Pterasteridae

Hymenaster carnosus (HYC)

Distinguishing features: Disc large, almost pentagonal. Upper surface inflated and covered in skin with the underlying spinelets forming distinct figures on the surface. Lower surface flat. Tubefeet in 2 rows, spines along furrow not linked by skin, 2 spines to each pair of tube feet.

Colour: Light cream, sometimes with a slight purplish tinge.

Size: Total width up to 260 mm.

Distribution: Throughout New Zealand and also reported from off South America.

Depth: 1000 to 2000 m.

Similar species: There are at least 6 other species of *Hymenaster* known from local waters, though all are smaller with total diameter up to about 100 mm.

References: McKnight, D.G. (2006). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). 3. Orders Velatida, Spinulosida, Forcipulatida, Brisinga with addenda to Paxillosida, Valvatida. *NIWA Biodiversity Memoir 120*. 187 p.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Velatida
Family Solasteridae

Crossaster multispinus (Sun-star) (CJA)

Distinguishing features: Wide, flattened disc, with 11 to 12 arms; plates of upper surface spaced apart, each with a bundle of spinelets up to 5 to 10 mm long. Only lower marginal plates apparent, with short spines and granules; tube-feet with sucking discs, in 2 rows.

Colour: Orange-pink, whitish-pink, or mauve above.

Size: Total width up to 140 mm.

Distribution: Present throughout the New Zealand region, from the Kermadec Islands to the Campbell Plateau.

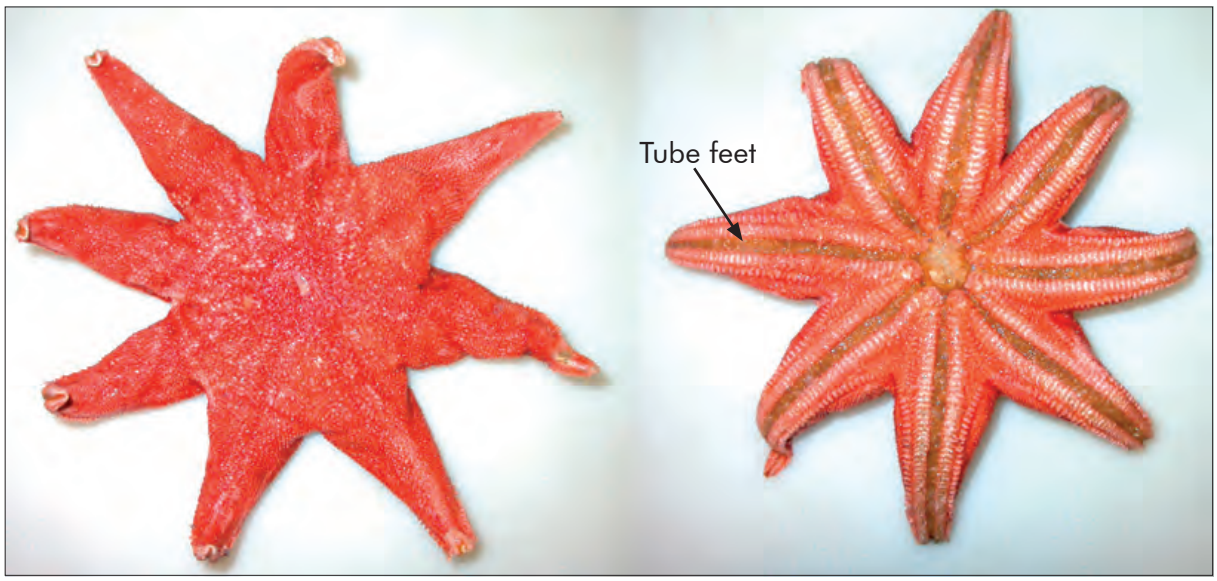
Depth: 90 to 1200 m.

Similar species: One other species, with 10 arms, is known from central and southern New Zealand, 200 to 400 m.

References: McKnight, D.G. (2006). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). 3. Orders Velatida, Spinulosida, Forcipulatida, Brisinga with addenda to Paxillosida, Valvatida. *NIWA Biodiversity Memoir 120*. 187 p.

Phylum Echinodermata
Class Asteroidea (sea-stars)
Order Velatida
Family Solasteridae

Solaster torulatus (Chubby sun-star) (SOT)



Distinguishing features: With 7 to 9 arms, usually 8. Disc near flat, arms rounded, plump at the base. Upper marginal plates smaller than lower, which bear spinelets in a transverse row. Groups of 1 to 5 spines present on each plate of the upper surface. Tube-feet with sucking discs, in 2 rows.

Colour: Uniform orange (ranging to light brown) above, orange to light brown with paler tube-feet below.

Size: Total width up to 300 mm.

Distribution: Widespread over the Chatham Rise and sub-Antarctic. Also known from the Kermadec Islands and the east coast of the North Island, Australia, and Japan.

Depth: 219 to 1550 m.

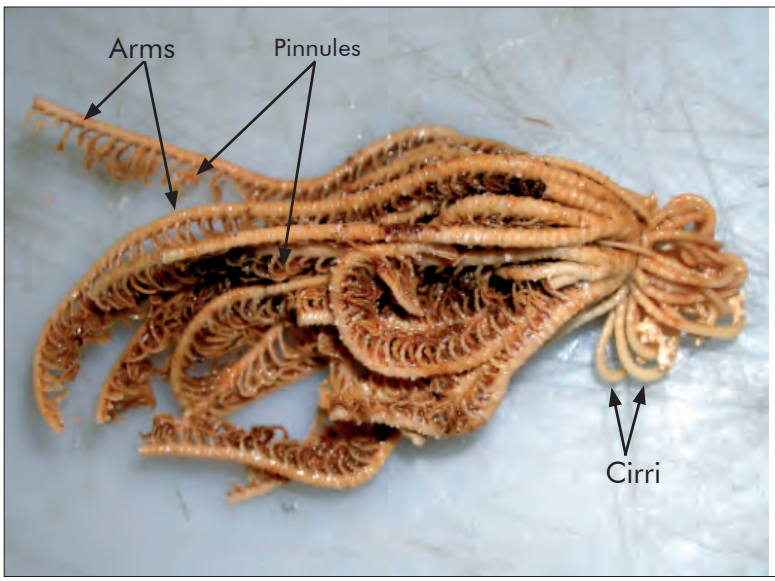
Similar species: Other sun-stars (family Solasteridae), such as *Crossaster japonicus*, which is common. It differs from *S. torulatus* in having finer, longer, and more numerous spines on the more closely spaced plates of the upper surface.

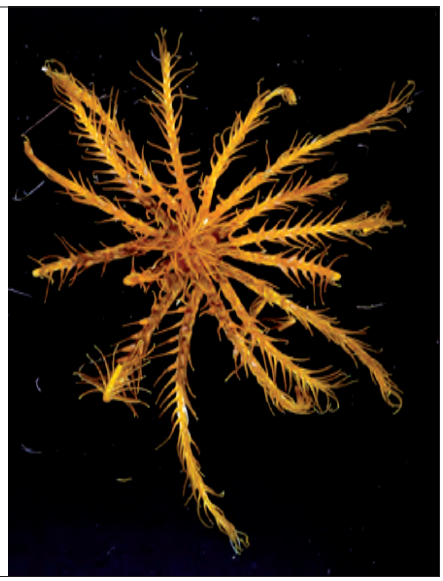
References: McKnight, D.G. (2006). The marine fauna of New Zealand: Echinodermata: Asteroidea (sea-stars). 3. Orders Velatida, Spinulosida, Forcipulatida, Brisinga with addenda to Paxillosida, Valvatida. *NIWA Biodiversity Memoir 120*. 187 p.

McKnight, D.G. (1973). Additions to the asteroid fauna of New Zealand: Families Radiasteridae, Solasteridae, Pterasteridae, Asterinidae, Ganeriidae and Echinasteridae. *NZOI Records 2(1)*. 15 p.

Phylum Echinodermata
Class Crinoidea (sea lilies and feather stars)
Order Comatulida (feather stars)
Family

(Feather stars) (CMT)





Distinguishing features: Stalks are vestigial in this modern branch of the crinoids although their cirri remain, encircling the base of the 5–40 arms. The cirri are used for grasping the substrate when the animal is at rest, and are long and slender in soft bottom forms and short and stout in forms that rest on rocks, corals, etc. Each arm bears a row of pinnules producing a feather like appearance. They are fragile, and often only fragments are present in a sample.

Colour: Various, often strikingly coloured, but deepwater species more likely to be yellow or brown.

Size: From 100 to 350 mm (arm length).

Distribution: Widespread, but rare in the New Zealand region. They occur on soft or hard substrates.

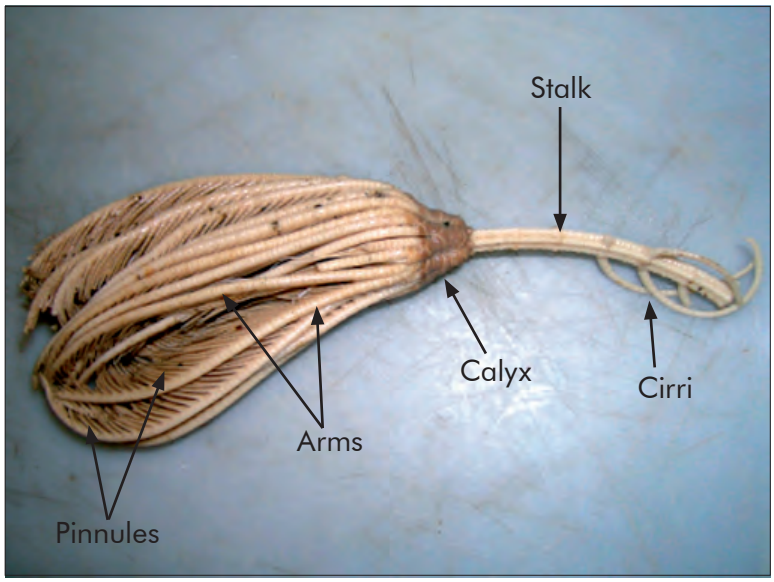
Depth: 50 to 2500 m. Range may be greater.

Similar species: At least 40 species of feather stars are present in the New Zealand region, and a microscopic examination is needed for species determination. Can be distinguished from sea lilies by the absence of a stalk. The photo is of *Oxycomanthus* sp.

References: McKnight, D.G. (1977). Additions to the New Zealand crinoid fauna. *NZOI Records 3 (11)*: 93–112.

Phylum Echinodermata
Class Crinoidea (sea lilies and feather stars)
Order Isocrinida (sea lilies)
Family

(Sea lilies with cirri) (CRN)



Distinguishing features: Sea lilies attach to the substrate with a stalk, up to 1 m long, topped with feathery arms arising from a small body (calyx). In this order small, segmented, cirri are present on the stalks. There are 5 arms at the base but they usually branch several times. A large specimen may have 40 or more arms. Each arm bears a row of small branches (pinnules) which bear the small tube-feet and produce a feather like appearance. Sea lilies are fragile, and often only fragments are salvaged.

Colour: Various. Reported as emerald green, purplish, or grey.

Size: Total length up to 1000 mm.

Distribution: Sea lilies are mostly found in deep water, especially on seamounts and, although rare in collections, are probably widespread in the New Zealand region.

Depth: 100 to 2000 m.

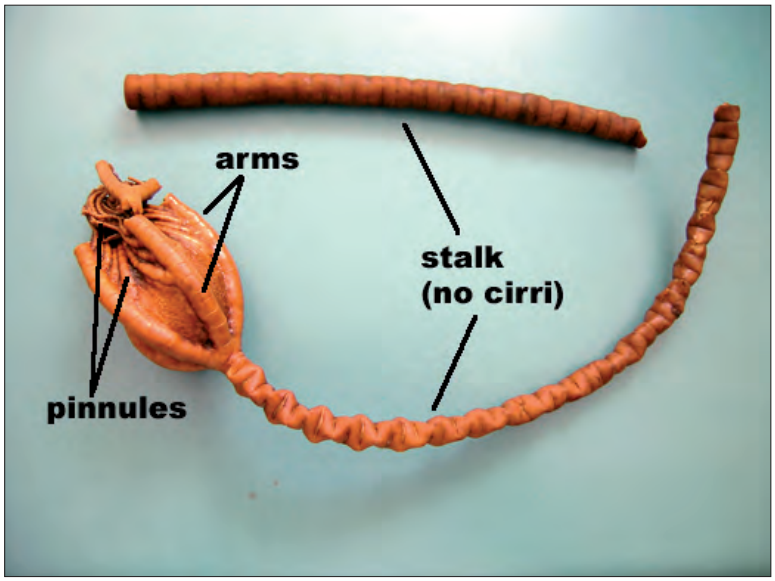
Similar species: Can be distinguished from feather stars (order Comatulida) by the presence of a stalk, and from the other two orders of sea-lilies (Millericrinida and Cyrtocrinida) by the presence of cirri on the stalk. The photo is of *Metacrinus* sp.

References: McKnight, D.G. (1977). Additions to the New Zealand crinoid fauna. *NZOI Records 3* (11): 93–112.

McKnight, D.G. (1973). Stalked crinoids from the New Zealand region. *NZOI Records 1(14)*: 199–210.

Phylum Echinodermata
Class Crinoidea (sea lilies and feather stars)
Order Millericrinida, Cyrtocrinida (sea lilies)
Family

(Sea lilies without cirri) (CRN)



Distinguishing features: Sea lilies attach to the substrate with a stalk, up to 1 m long, topped with feathery arms arising from a small body (calyx). No cirri are present on the stalks in this order. Each arm bears a row of small branches (pinnules) which bear the small tube-feet and produce a feather-like appearance. Sea lilies are fragile, and often only fragments are salvaged.

Colour: Various.

Size: Total length up to 1000 mm.

Distribution: Recorded from seamounts and areas of steep rocky relief throughout the New Zealand region.

Depth: 400 to 1500 m.

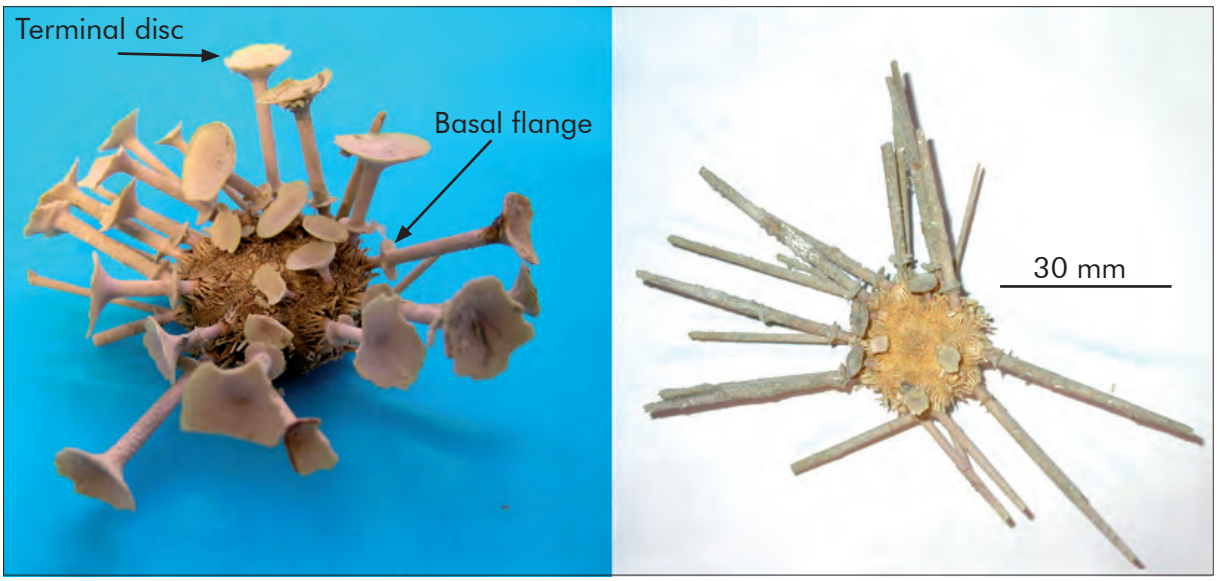
Similar species: The only species likely to be present in trawl samples is *Phrynocrinus nudus* (pictured, note: arms missing). It is similar in size to the isocrinid sea-lilies but, like all other members of these two orders, it lacks cirri on the stalk, and the arms branch irregularly.

References: McKnight, D.G. (1977). Additions to the New Zealand crinoid fauna. *NZOI Records 3 (11)*: 93–112.

McKnight, D.G. (1973). Stalked crinoids from the New Zealand region. *NZOI Records 1(14)*: 199–210.

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Cidaroida
Family Cidaridae

Goniocidaris parasol (Parasol urchin) (GPA)



Distinguishing features: Larger spines long and thick, often encrusted with sponges, polyzoa, and hydroids. Spines on the upper surface terminating in a large, umbrella-like disc and bearing a complete or partial disc or flange at their base. Variable in form with some (possibly younger) individuals having longer spines with smaller terminal disks.

Colour: Test and secondary spines pale brown/cream, primary spines cream.

Size: Diameter up to 30 mm (spines up to 50 mm).

Distribution: Common from the Chatham Rise to the Campbell Plateau, including the Bounty Plateau.

Depth: 200 to 1000 m.

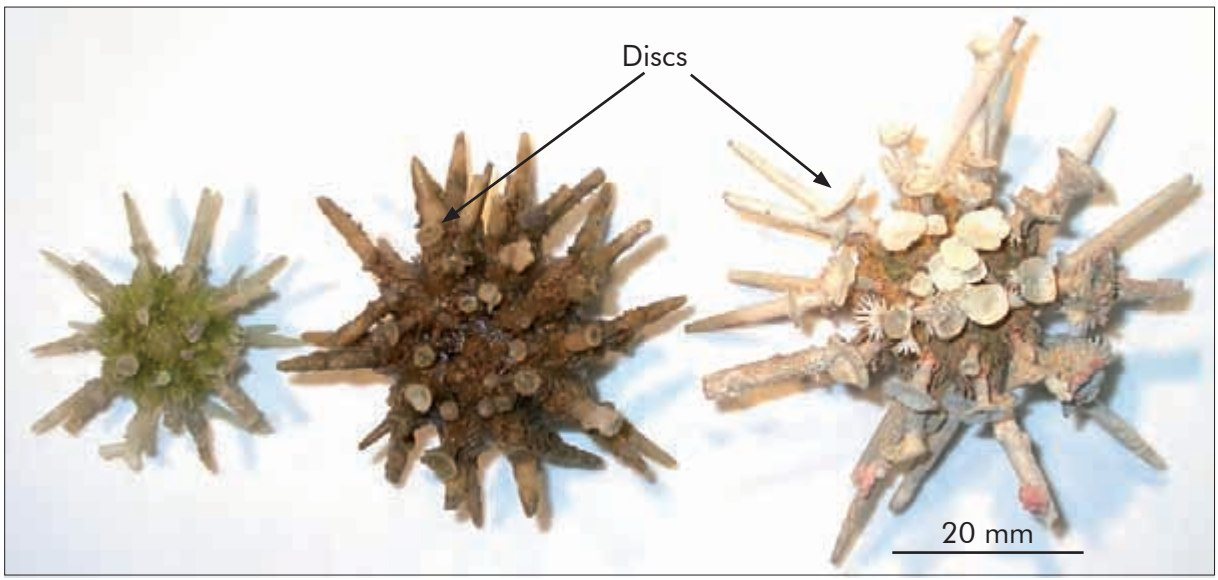
Similar species: May be confused with *G. umbraculum*, which also have (small) umbrella-like discs on their large spines, but the spines themselves are shorter and instead of a disc or flange bear spurs or thorns at the base. *G. umbraculum* is also more common in shallower waters, 20 to 200 m.

References: Fell, H.B. (1958). Deep-sea echinoderms of New Zealand. *Zoology Publications from Victoria University of Wellington 24*. 40 p.

Fell, H.B. (1960). Biological results of the Chatham Islands 1954 Expedition. Part 2. Archibenthal and littoral echinoderms. *NZOI Memoir 5*. 98 p.

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Cidaroida
Family Cidaridae

Goniocidaris umbraculum (Umbrella urchin) (GOU)



Distinguishing features: Primary spines short (generally less than the test diameter), thick, pale coloured, and often encrusted with sponges, polyzoa, and hydroids. Spines on upper surface bear small, umbrella-like discs at the outer end and spurs or thorns at the inner end.

Colour: Test often distinctly greenish on the upper surface. Larger spines brown, those at the circumference may be tinged with green near the base.

Size: Diameter up to 30 mm.

Distribution: Well known from Foveaux Strait where they were commonly caught in oyster dredges. Also found off the east coast of South Island up to Cook Strait and occasionally on the Chatham Rise.

Depth: 60 to 400 m.

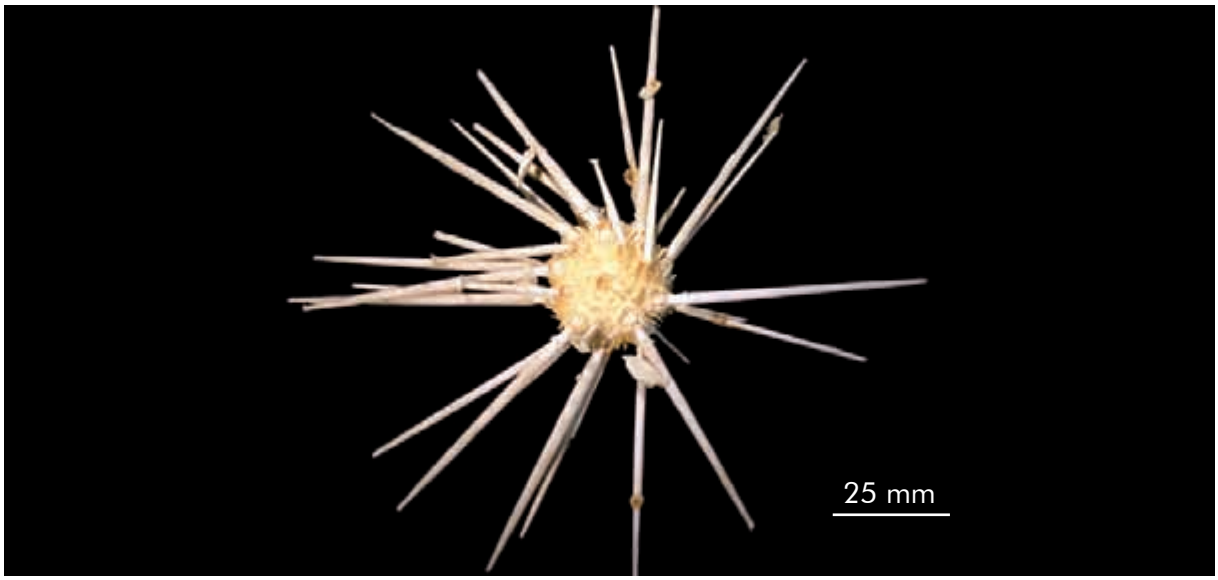
Similar species: The larger spines of *G. parasol* are longer than those of *G. umbraculum* and have larger terminal umbrellas and a complete or partial disc or flange close to their base. *G. parasol* is more common over the Chatham Rise and elsewhere south of Cook Strait, in deeper waters. Other species of *Goniocidaris* and *Ogmocidaris benhami*, all found in northern waters, may also have umbrella-like spines.

References: Fell, H.B. (1960). Biological results of the Chatham Islands 1954 Expedition. Part 2. Archibenthal and littoral echinoderms. *NZOI Memoir No. 5*. 94 p.

Barker. M.F. (1984). Reproduction and development in *Goniocidaris umbraculum*, a brooding echinoid. *Proceedings of the 5th International Echinoderm Conference, Galway, 1984* : pp. 207–214.

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Cidaroida
Family Cidaridae

Ogmocidaris benhami (OBE)



Distinguishing features: Test flattened. Peristome (bottom section) smaller than apical system (round, upper section). Apical system about 50% of test diameter. Larger spines with very short collar and neck (differentiated basal sections); spine shafts ornamented with fine granules and dense hairs. Spines around mouth flattened with serrated edges. Larger specimens may have small umbrella-like disks on short spines on the upper surface (as in *Goniocidaris* spp.), and longer spines may have a trumpet shaped tip.

Colour: Pale brown.

Size: Diameter up to 25 mm.

Distribution: Relatively common in northern New Zealand waters, also recorded from the Chatham Rise.

Depth: 200 to 800 m.

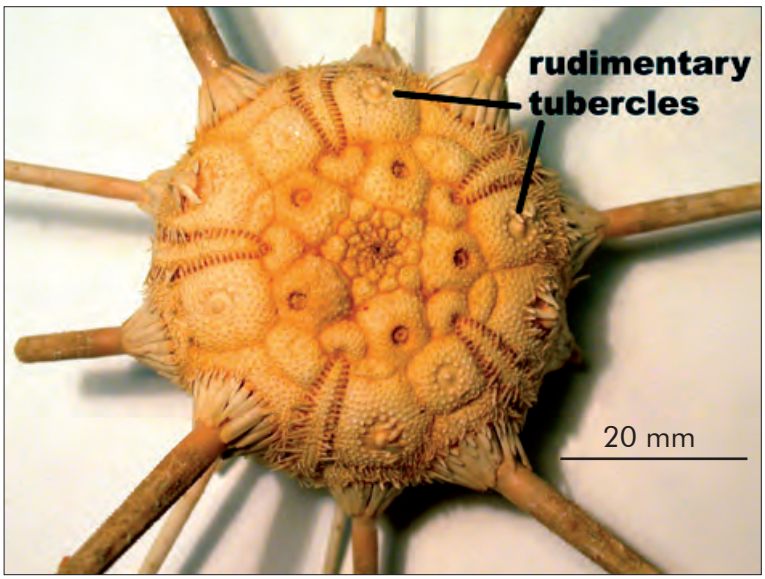
Similar species: Similar to other species in the same sub-family (Goniocidarinae), especially the 2 common *Goniocidaris* species, but the lack of basal flanges on the primary spines readily distinguishes *Ogmocidaris* from these. Could be confused with other small cidarid species, e.g., *Austrocidaris pawsoni* (apical system < 50% of test diameter), *Aporocidaris milleri* (apical system 56-75% of test diameter), *Prionocidaris* spp. (test hardly flattened), and *Rhopalocidaris* spp. (smaller).

References: Mortensen, T. (1922). Papers from Dr. Th. Mortensen's Pacific Expedition 1914–16. VIII. Echinoderms of New Zealand and the Auckland-Campbell Islands. I. Echinoidea. *Vid. Medd. 73*. 139–198.

O'Shea, S.; McKnight, D.G.; Clark, M.R. (1999). Bycatch-the common, unique, and bizarre. *Seafood New Zealand, June 1999*. pp 45–51.

Phylum Echinodermata
Class Echinodea (sea urchins)
Order Cidaroida
Family Cidaridae

Stereocidaris spp. (STC)



Distinguishing features: These are typically large, robust urchins with sturdy spines. All plates are densely covered in spines. The top one or two test plates in each double series bears only a rudimentary tubercle, with no spine. The primary spines are highly variable, often cylindrical, cigar, club, or even oar shaped and often have thorny narrow ribs.

Colour: Test and spines generally pale yellowish to dull, light brown. Neck (innermost section) of primary spines a bright shining pink in one species at least.

Size: Diameter up to 80 mm. Spines up to 100 mm.

Distribution: Records come mainly from Hawke Bay, the Bay of Plenty, the southern Kermadec Ridge and Three Kings Ridge.

Depth: 400 to 1000 m.

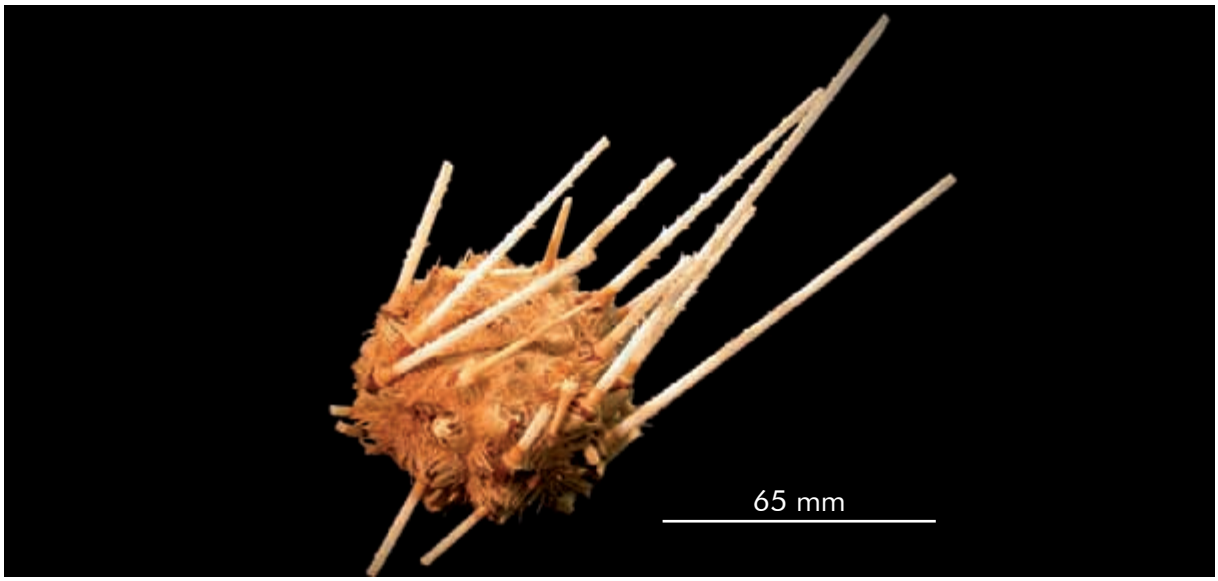
Similar species: Includes *S. sceptriferoides*, *S. microtuberculata*, and possibly one other species. The only other large deepwater cidarid sea urchins in New Zealand waters that *Stereocidaris* could be confused with are *Histocidaris* spp., which have large naked areas on the genital plates and fully formed uppermost primary spines.

References: Mortensen, T. (1928). Monograph of the echinoidea, I. Cidaroidea. Copenhagen.

Pawson, D.L. (1965). Some echinozoans from northern New Zealand. *Transactions of the Royal Society of New Zealand. 5(15)*. 198–224.

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Cidaroida
Family Histocidaridae

Histocidaris spp. (HIS)



Distinguishing features: The apical plates (central group of plates on upper side) bear few spines, leaving large naked areas. Primary spines long and cylindrical, and can be either smooth or thorny depending on species. Tubercles (spine attachment points on the test) are crenulated (toothed) rather than smooth as in most other cidarid species, but this feature is difficult to see without first removing the spine and bleaching away the muscle tissue. The spines around the mouth are short, curved and strongly serrated.

Colour: Spines mostly white or pale coloured, test brownish.

Size: Diameter up to 70 mm. Spines can be longer than 120 mm.

Distribution: Recorded from the Macquarie Ridge and Campbell Plateau in the south, and widespread in areas of seamounts from Hawkes Bay north. Not recorded from the Chatham Rise.

Depth: 150 to 2300 m.

Similar species: Five species are present in New Zealand. *H. australiae* (pictured), *H. elegans*, *H. variabilis*, *H. acutispinus,* and *H. recurvata*. Large specimens could be confused with *Stereocidaris* or *Poriocidaris* but the genital plates on these species are densely spined. Without close inspection, smaller specimens could also be confused with these, and other, genera.

References: Schultz, H. (2005). Sea urchins – a guide to worldwide shallow water species. Scientific Publications, Germany. 484 p.

Mortensen, T. (1928). Monograph of the echinoidea, I. Cidaroidea. Copenhagen.

Miskelly, A. (2002). Sea urchins of Australia and the Indo-Pacific. Capricornica Publications, Sydney. 180 p.

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Cidaroida
Family Histocidaridae

Poriocidaris purpurata (PCD)

Distinguishing features: A large, robust, sea urchin with sturdy spines up to 2.5 times the diameter of the test. The primary spines are either uniformly pale and tapered with a long brown collar extending up from the base or, in some individuals, the collar is a rich purple colour and swollen making the spine fusiform (cigar) shaped. The pedicellariae (tiny pincers scattered over the surface of the test) are unique among sea urchins in that they are large and of a flattened, two-valved form.

Colour: Test and secondary spines, light brown; collar of primary spines brown or purplish, shaft pale or white, or purplish near collar.

Size: Diameter from 10 to 65 mm excluding spines. Spines up to 100 mm.

Distribution: Known from the Bay of Plenty, Kermadec Ridge, Hawke Bay, and north Chatham Rise. Mainly associated with seamounts.

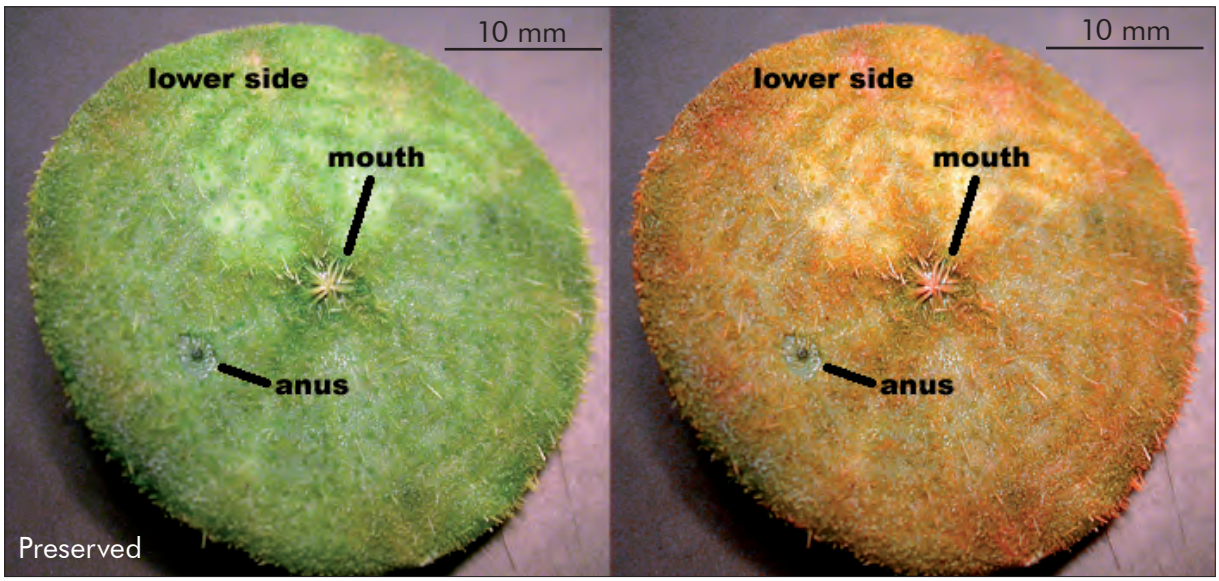
Depth: 600 to 1800 m.

Similar species: The closest relatives to this (monospecific) genus are in the genus *Histocidaris*, of which up to 5 species may be represented in the New Zealand region. *Histocidaris* species differ in that they tend to have long, slender, sometimes thorny, spines, and bear very large (up to 5 mm) three-valved pedicellariae.

References: Mortensen, T. 1928. Monograph of the echinoidea, I. Cidaroidea. Copenhagen

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Clypeasteroida (sand dollars)
Family Laganidae

Peronella hinemoae (Sand dollar) (PHI)



Distinguishing features: Test flat, disc-like, more or less circular, with a rounded edge. Anus on lower side, somewhat in from the test edge. Pores of the madreporite (sieve plate) are scattered over the genital plates and are individually visible. Spines of upper side short and dense. Spines of lower side longer and more scattered.

Colour: Test and spines red, but turn green and fade on preservation. Dead test white to straw coloured.

Size: Diameter up to 45 mm.

Distribution: Known from around North Island from Cape Egmont to the Bay of Plenty and from seamounts further north, and also from Fiordland and the Stewart-Snares shelf.

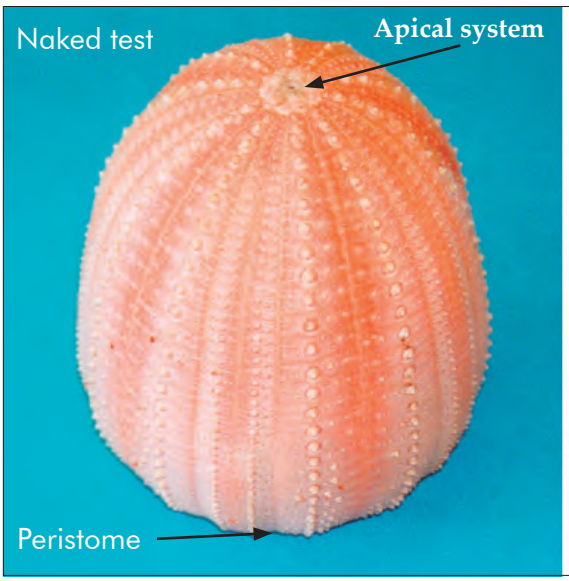
Depth: 17 to 775 m.

Similar species: There are six other species in this order known from New Zealand. The three species of *Clypeaster* are oval to pentagonal in outline and have the anus adjacent to the edge of the test. *Fellaster zelandiae* is also round in outline, but has a sharp edge and the anus adjacent to it. *Echinocyamus polyporus* is similar but very small (less than 10 mm), less flattened, and paler than *Peronella*.

References: McKnight, D.G. (1969). An outline distribution of the New Zealand shelf fauna. Benthos survey, station list, and distribution of the echinoidea. *NZOI Memoir No. 47.*

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Echinoida
Family Echinidae

Dermechinus horridus (Deepsea urchin) (DHO)



Distinguishing features: Test height the largest of any sea urchin (to over 130 mm) and (in large specimens) usually greater than the test diameter. Apical system and peristome very small and of similar size. Larger spines long and slender, forming vertical series. Secondary spines very numerous, fine, bearing thorns, and terminating in a hook.

Colour: Test dull to bright red/orange, primary spines orange, smaller spines sometimes whitish.

Size: Diameter up to 110 mm. Test height 30 to 130 mm.

Distribution: Circumpolar (South Africa, South America, South Australia). Widespread in New Zealand (Northland, Challenger Plateau, Bay of Plenty, west coast South Island, Kaikoura, and the Chatham Rise).

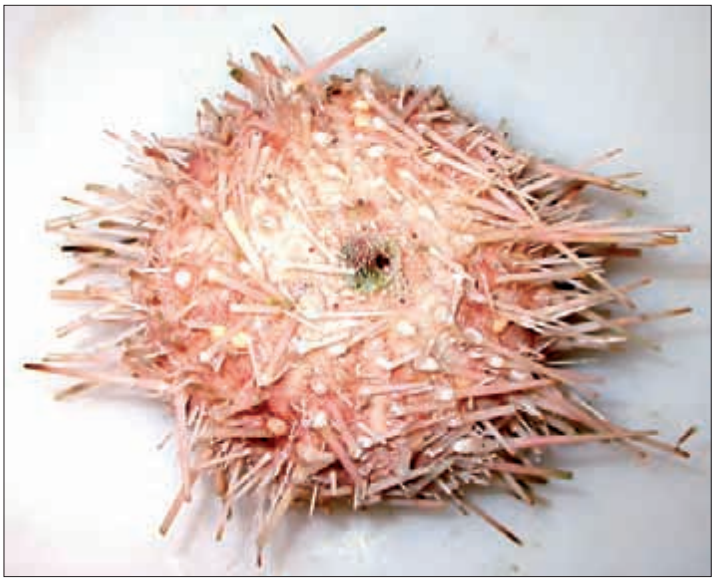
Depth: 200 to 1200 m.

Similar species: The only other New Zealand species in this family, *Gracilechinus multidentatus*, is unlikely to be confused with *D. horridus* due to its much paler colour and more numerous and robust primary spines. Smaller specimens, which have not yet become very tall, could be confused with *Pseudechinus flemingi*, but the peristome and apical system of this species are relatively large.

References: McKnight, D.G. (1974). Some echinoids new to New Zealand waters. *New Zealand Oceanographic Institute Records* 2(3): 27–44.

Class Echinodermata
Class Echinoidea (sea urchins)
Order Echinoida
Family Echinidae

Gracilechinus multidentatus (Deepsea kina) (GRM)



Distinguishing features: Large test, variable in ratio of test diameter to height. Larger spines 30 to 35 mm long and tapered. Probably the most common species of sea urchin in trawl bycatch in the New Zealand region; often caught in large numbers, especially on the south Chatham Rise. The roe are edible when ripe (late August-early September on the Chatham Rise).

Colour: Test colour variable but always very pale, either pink, cream, or light brown. Spines are pink/white and darker at the tips.

Size: Diameter up to 100 mm. Spines about equal in length to test diameter.

Distribution: Widespread around the New Zealand region, from the Lord Howe Rise, Kermadec Ridge, and Bay of Plenty in the north, to the Auckland Islands in the south. Particularly common on the south Chatham Rise.

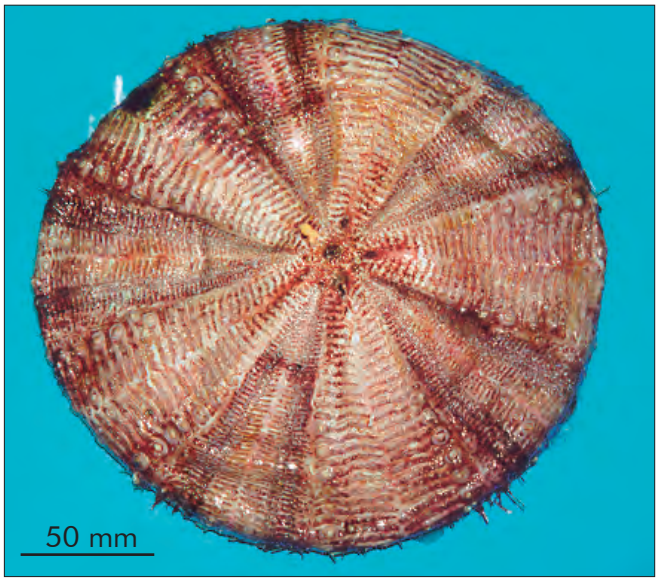
Depth: 250 to 1400 m.

Similar species: The only other member of the family in New Zealand, *Dermechinus horridus*, is bright orange.

References: McKnight, D.G. (1968). Additions to the echinoid fauna of New Zealand. *New Zealand Journal of Marine and Freshwater Research* 2 : 90–110.

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Echinothurioida (Tam O'Shanters)
Family Echinothuriidae, Phormosomatidae

(Tam O'Shanters) (TAM)



Distinguishing features: Test flexible, usually compressed into a disc or frisbee-like shape when captured. Larger spines usually more numerous on lower surface than upper; larger spines terminate in a whitish hoof-like piece or a glandular bag. In many species these large spines readily brush off with capture, making identification difficult. Handle with care as some species deliver a painful sting.

Colour: Purple, sometimes streaked with white, bright-reddish, or brown.

Size: Diameter up to 250 mm.

Distribution: Widespread throughout the New Zealand region.

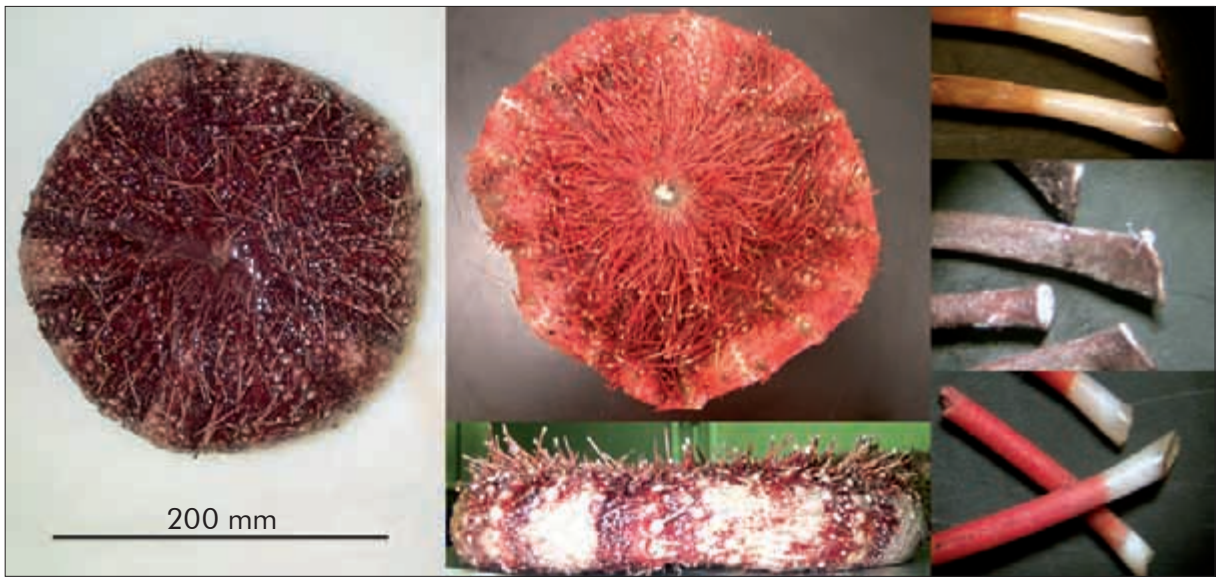
Depth: 200 to 3000 m. Possibly deeper.

Similar species: At least 9 species are known from New Zealand waters, and more may be expected, as this group of echinoderms is not well studied.

References: Baker, A.N. (1972). *Araeosoma coriaceum* (A. Agassiz) and *Pseudoboletia indiana* (Michelin), new to New Zealand, with notes on other echinoids from the Bay of Plenty, New Zealand. *Records of the Dominion Museum 8*(2): 9–19.

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Echinothurioida (Tam O'Shanters)
Family Echinothuriidae

(Tam O'Shanters) (ECT)



Distinguishing features: Test flexible, discus-shaped, usually compressed flat in the trawl. Larger (primary) spines usually less numerous on upper surface than lower, where they terminate in a whitish hoof which, along with the spines, readily brush off on capture. Handle with care as some species deliver a painful sting.

Colour: Several species are dark purple, two are more or less bright red, and one or two are brownish. Hoofs are always a shade of white.

Size: Diameter from 30 to 200 mm.

Distribution: Widespread locally, throughout the New Zealand region.

Depth: 200 to 3000 m. Possibly deeper.

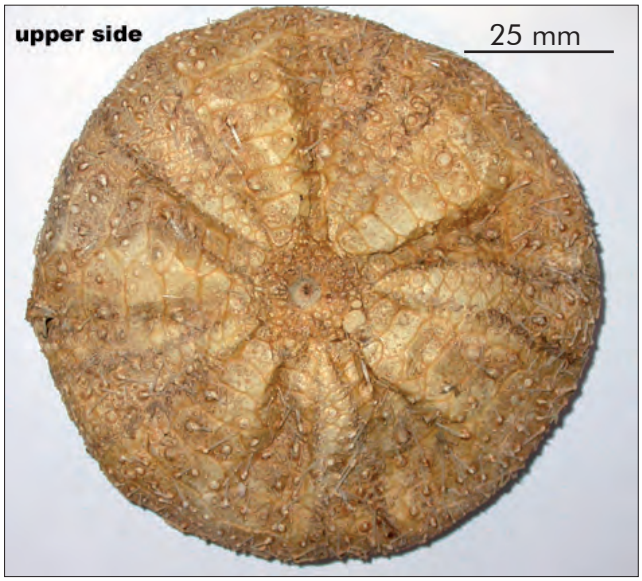
Similar species: At least 7 species (in 5 genera) are known from New Zealand waters, although the exact identity of three or more species is still uncertain. *Phormosoma* spp. are similar, but can usually be distinguished by their light brown colour, sharply pointed teeth, large sunken tubercles, and lack of terminal glassy hoofs on the large spines of the lower surface.

References: Mortensen, T. (1935). Monograph of the echinoidea, II. Bothriocidaroidea, Melonechinoida, Lepidocentroida, and Stirodonta. Copenhagen.

Baker, A.N. (1972). *Araeosoma coriaceum* (A. Agassiz) and *Pseudoboletia indiana* (Michelin), new to New Zealand, with notes on other echinoids from the Bay of Plenty, New Zealand. *Records of the Dominion Museum 8(2)*: 9–19.

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Echinothurioida (Tam O'Shanters)
Family Phormosomatidae

Phormosoma spp. (PHM)



Distinguishing features: Test flexible, discus-shaped, usually compressed flat in the trawl. Larger (primary) spines usually less numerous on upper surface than lower, where they terminate in a glandular sac. Spines readily brush off with capture. Handle with care as some Tam O'Shanters deliver a painful sting.

Colour: Brownish or orange-yellow.

Size: Diameter from 40 to 120 mm.

Distribution: *P. bursarium* is widely distributed throughout the Indo-Pacific, *P. rigidum* is known only from New Zealand, off the Bay of Plenty.

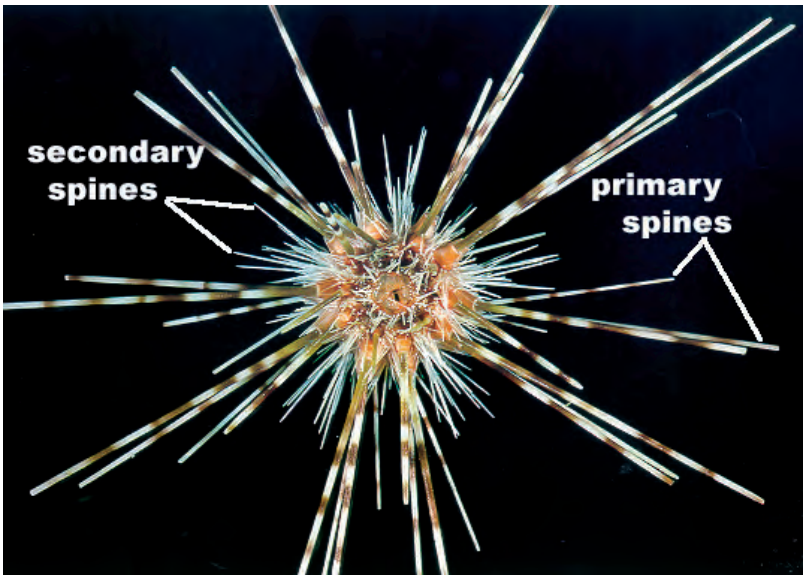
Depth: 170 to 2340 m. *P. rigidum* known only from 1260 m.

Similar species: Two species are recognised from New Zealand, with microscopic differences. The tube feet on the upper side are arranged in distinct arcs of three in *P. bursarium* whereas in *P. rigidum* the tube feet are less well developed and formed into single columns. *Phormosomas* differ from other Tam O'Shanters in that areoles of their tubercles (spine bases) are large and deeply sunk into the test, the teeth are strongly pointed, and (although often lost on capture) the primary spines of the lower surface terminate in a gelatinous sac rather than a glassy hoof.

References: Mortensen, T. (1935). Monograph of the echinoidea, II. Bothriocidaroidea, Melonechinoida, Lepidocentroida, and Stirodonta. Copenhagen

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Pedinoida
Family Pedinidae

Caenopedina novaezelandiae (Banded-spine urchin) (CNO)



Distinguishing features: Test height about half of the test diameter. Primary spines up to 3 times test diameter with broad colour bands (up to about 5 mm wide). Secondary spines long and generally white, sometimes with green-tinged tips. All spines bear numerous spinelets.

Colour: Larger spine bands green (especially near base), white, and reddish brown. Shorter spines generally white, sometimes with green-tinged tips. Test white/brownish-green; apical system (centre of upper surface) green.

Size: Diameter up to 30 mm.

Distribution: Bay of Plenty north.

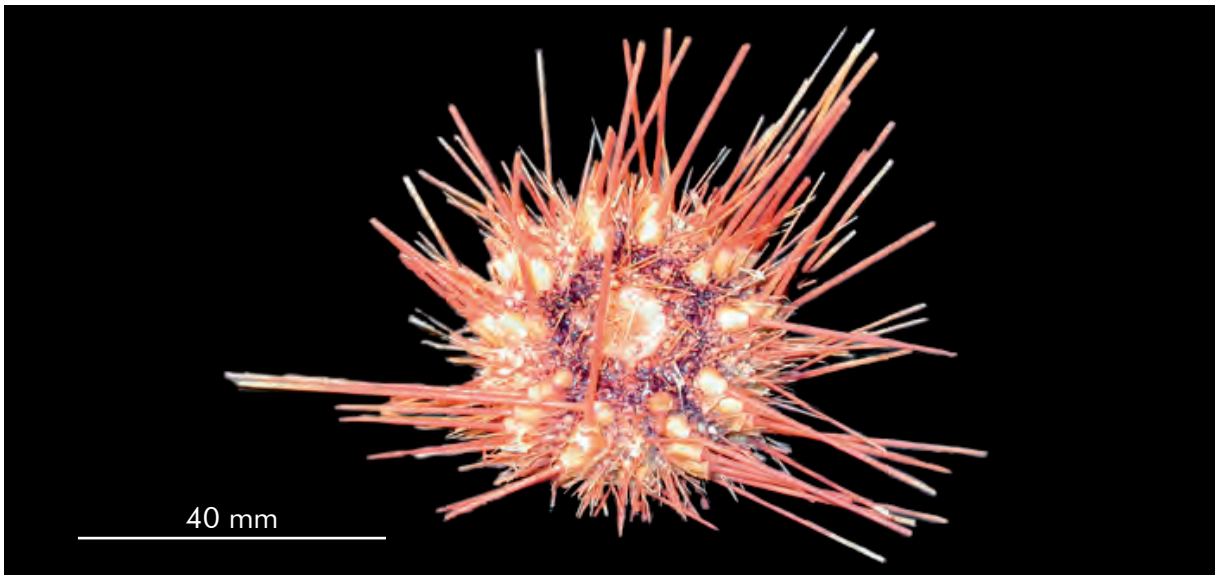
Depth: 300 to 500 m.

Similar species: Two other species of *Caenopedina* are known from the New Zealand region, both are more or less uniform reddish-brown in colour. One is known from near Norfolk Island, the other from off Dunedin.

References: Pawson, D.L. (1964). The genus *Caenopedina* in New Zealand. *Transactions of the Royal Society of New Zealand* 5(5): 63–70.

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Pedinoida
Family Pedinidae

Caenopedina otagoensis (CAO)



Distinguishing features: The primary spines are long (up to twice the diameter of the test), slender, and tapering, with longitudinal striations and very fine teeth. Internally, the supports for the jaw muscles which ring the opening on the lower surface consist of 5 pairs of peglike "auricles" and are not joined at the outer end as in most other species of sea urchins.

Colour: Test and spines reddish brown, apical system dark purplish, nearly black. Spines may be lighter in colour towards the tip.

Size: Diameter from 15 to 40 mm.

Distribution: Known only from off the southeast coast of South Island, but likely to be more widespread.

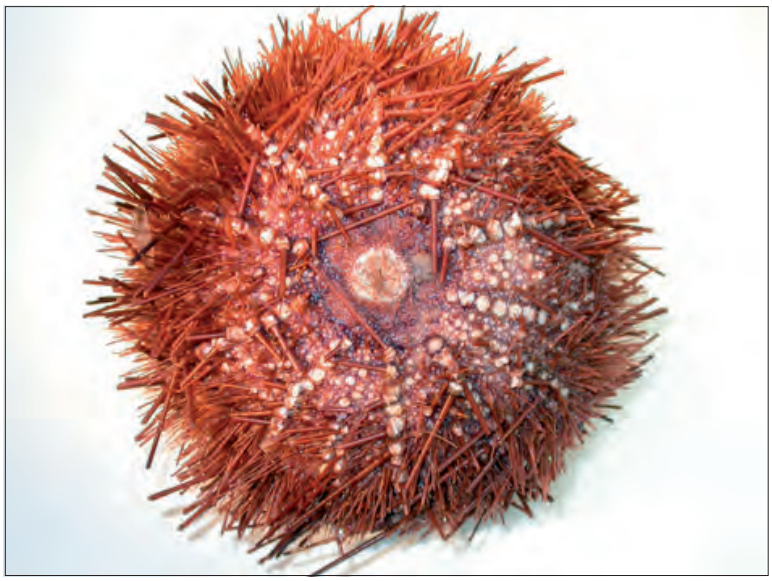
Depth: 1200 to 1300 m. Range likely to widen with more records.

Similar species: None of the three or four other *Caenopedina* species have the reddish brown test and spines, along with the dark apical system (round set of plates at centre top). Skeletal differences (mostly internal) separate this order from other sea urchins.

References: McKnight, D.G. (1968). Additions to the echinoid fauna of New Zealand. *N.Z. Journal of Marine and Freshwater Research* 2 : 90–110.

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Pedinoida
Family Pedinidae

Caenopedina porphyrogigas (Giant purple pedinid) (CAL)



Distinguishing features: Large and uniformly dark brown. The order Pedinoida is differentiated from more modern sea urchins mostly by internal skeletal structures, especially the primitive nature of the jaw parts (which are not joined at the top), jaw muscle supports (pairs of unjoined peg-like structures), and teeth (grooved rather than t-shaped). Spines long, in smaller specimens may be twice the diameter of the test. The secondary (thinner) spines are hollow.

Colour: Spines and test rich, dark brown.

Size: Diameter from 20 to 100 mm.

Distribution: Found from the northern Macquarie Ridge in the south to the West Norfolk Ridge in the North, and from the South Tasman Rise in the west to the Louisville Ridge in the east.

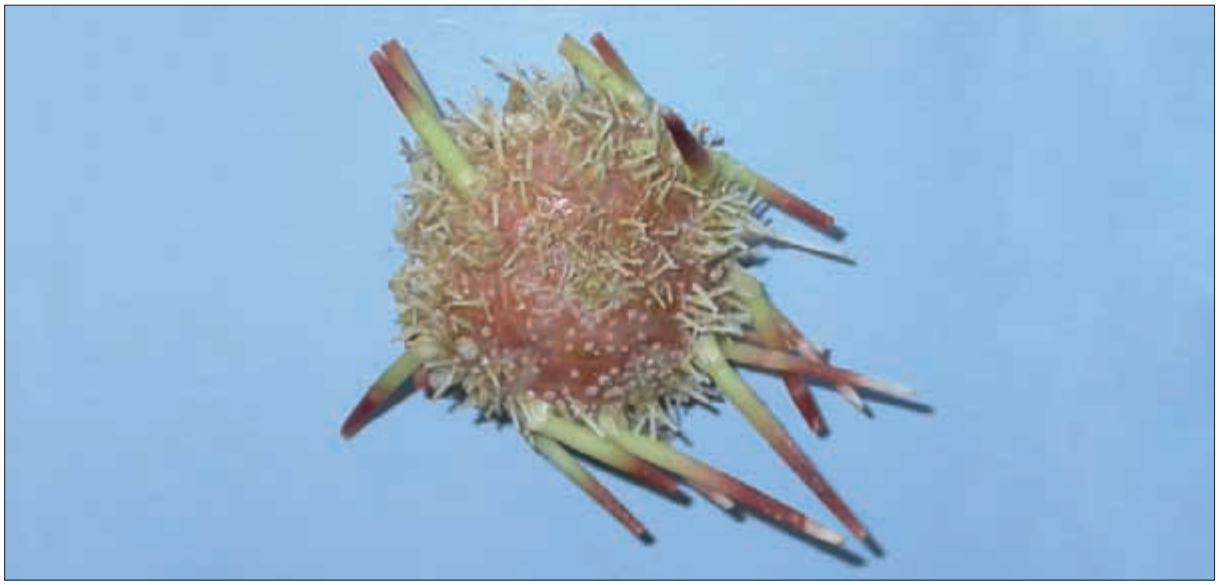
Depth: 370 to 530 m. Range possibly wider.

Similar species: There are three other described species of *Caenopedina* known from the New Zealand region, and one more awaiting description.

References: Anderson, O.F. (2009). The giant purple pedinid–a new species of *Caenopedina* (Echinodermata: Echinoidea: Pedinidae) from New Zealand and Australia. *Zootaxa* 2007: 43–53.

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Pedinoida
Family Pedinidae

Caenopedina pulchella (CPU)



Distinguishing features: This species is readily distinguished from all other New Zealand species of *Caenopedina* by its short and stout primary spines.

Colour: The spines are green basally and reddish distally, occasionally with white tips. Other smaller spines are whitish.

Size: These are small urchins, mostly less than 30 mm test diameter. The primary spines are usually shorter than the test diameter.

Distribution: Known only from northern New Zealand in the Bay of Plenty, the Three Kings Ridge, and the Colville Ridge. Also known from off Hawaii and Johnston Atoll in the northern Pacific.

Depth: 370 to 530 m.

Similar species: There are three other described species of *Caenopedina* known from the New Zealand region, and one more awaiting description. *C. porphyrogigas* is generally much larger and brown coloured. *C. novaezelandiae* has similar coloured spines but they are more or less distinctly banded, and comparatively slender. The spines of *C. otagoensis* are light reddish brown and unbanded. The undescribed species has reddish brown spines with white, often slightly flattened, tips.

References: Anderson, O.F. (2009). The giant purple pedinidùa new species of Caenopedina (Echinodermata: Echinoidea: Pedinidae) from New Zealand and Australia. Zootaxa 2007: 43–53.

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Spatangoida
Family Brissidae

Brissopsis oldhami (BRO)

Distinguishing features: Oval-shaped and very fragile (usually broken) with short spines, many of which are spatulate to aid digging into the sediment, forming a canopy over the test. The fasciole (dark ring of short spines) surrounding the central 'petal' on the upper surface has distinctive lateral bulges. If unsure use the code BSO for *Brissopsis* spp.

Colour: Yellowish-brown-pink, the fascioles wine or purplish-coloured.

Size: Up to about 80 mm long.

Distribution: Found in soft sediments mainly on the Chatham Rise and off the east coast of New Zealand from Kaikoura to East Cape. There are also several records from the southern Challenger Plateau. This species also occurs throughout the Indo-west-Pacific and is therefore likely to be found north of New Zealand.

Depth: Wide depth range, 75 to 2300 m.

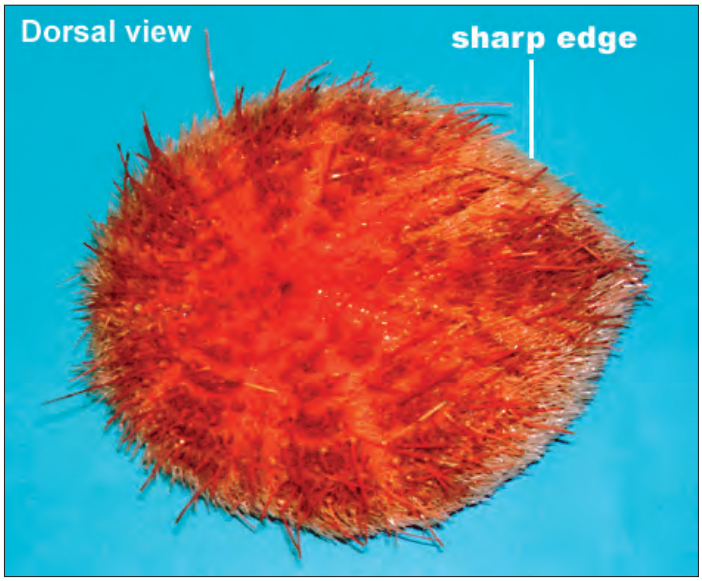
Similar species: A second (undescribed) species of *Brissopsis* was discovered in New Zealand recently, differing in the patterning of the subanal fasciole which, unlike in *B. oldhami*, has extensions to the upper surface. The distribution of another species of heart urchin, *Hemiaster expergitus*, overlaps with that of *B. oldhami* and they are often collected together. It is similar in general appearance and colour to *B. oldhami* but tends to be smaller and more spherical, with a greenish and more oval peripetalous (upper) fasciole.

References: Fell, H.B. (1958). Deep-sea echinoderms of New Zealand. Zoology publications from Victoria University of Wellington No. 24.

Pawson, D.L. (1965). Some Echinozoans from North of New Zealand. *Transactions of the Royal Society of New Zealand 5(15)* 197–224.

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Spatangoida (heart urchins)
Family Spatangidae

Paramaretia peloria (Microsoft mouse) (PMU)



Distinguishing features: Test ovate and low, lower surface very flat to concave and upper surface evenly rounded. Frontal notch absent. Edge of upper surface sharp. Upper surface densely covered in tubercles, strongly sunken into the test. Spines slightly curved but usually broken.

Colour: Test dull grey, spines reddish-brown above, paler on sides.

Size: Total length up to 90 mm.

Distribution: S.E. Australia (NSW, Victoria, Tasmania), widespread in New Zealand from Stewart Island to Three Kings Islands, including the Chatham Rise.

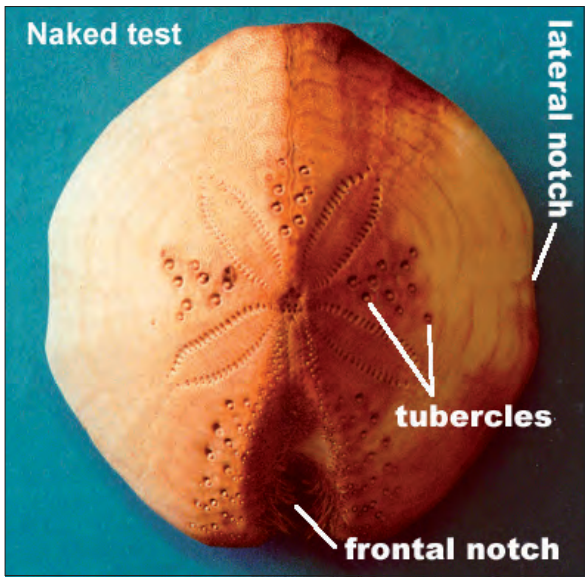
Depth: 50 to 700 m.

Similar species: *Paramaretia tuberculata*, although less common, has a similar distribution in New Zealand. It can be distinguished from *P. peloria* by the much fewer number of large tubercles on the upper surface and the more rounded test edge.

References: Baker, A.N.; Rowe, F.W.E. (1990). Atelostomatid sea urchins from Australian and New Zealand waters (Echinoidea: Cassiduloida, Holasteroida, Spatangoida, Neoplampadoida). *Invertebrate Taxonomy 4*: 281–316.

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Spatangoida (heart urchins)
Family Spatangidae

Spatangus mathesoni (Matheson's heart urchin) (SMT)



Distinguishing features: Test large, heart-shaped in outline and tent-shaped in profile with a deep frontal notch and shallow lateral notches. The upper surface is not inflated (i.e., flat rather than convex). On upper surface large, sunken, spine bearing tubercles are limited to the area between the petaloid ambulacra. Upper surface also covered by a dense coat of small spines. On the lower surface the spines are longer but less dense.

Colour: Deep reddish-brown, purple in preserved specimens.

Size: Diameter up to 110 mm.

Distribution: Challenger Plateau, east and west coasts of the North Island, Chatham Rise.

Depth: 650 to 1050 m.

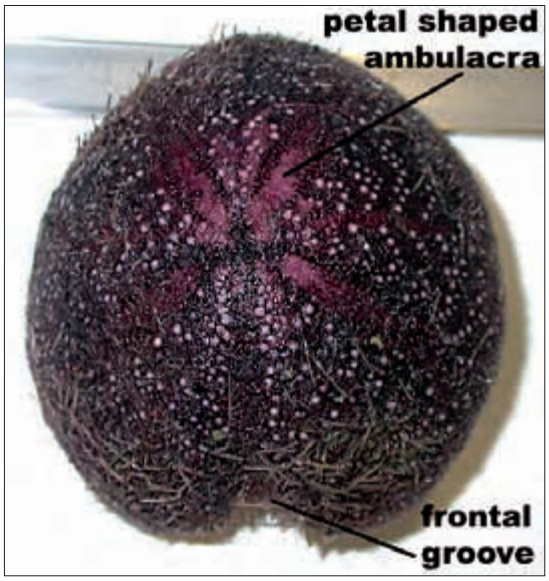
Similar species: *Spatangus multispinus* has numerous larger spines all over the inflated upper surface; *S. lutkeni* has fewer spines but is also quite strongly inflated on the upper surface.

References: Baker, A.N.; Rowe, F.W.E. (1990). Atelostomatid sea urchins from Australian and New Zealand waters (Echinoidea: Cassiduloida, Holasteroida, Spatangoida, Neoplampadoida). *Invertebrate Taxonomy 4*: 281–316.

McKnight, D.G. (1968). Additions to the echinoid fauna of New Zealand. *New Zealand Journal of Marine and Freshwater Research* **2:** 90–110.

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Spatangoida (heart urchins)
Family Spatangidae

Spatangus multispinus (Purple-heart urchin) (SPT)



Distinguishing features: Broadly oval-heart-shaped large test with a deep frontal notch. The distinct, petaloid (petal-shaped) ambulacra lie close to flush with the surface of the test. Primary spines long, erect, and fairly dense on upper surface.

Colour: Test and spines a deep, rich violet fading to mauve after preservation.

Size: Diameter up to 100 mm.

Distribution: Found throughout New Zealand, especially off the east coasts of the North and South Islands, the Chatham Rise, and Stewart Island.

Depth: 30 to 1000 m.

Similar species: *Spatangus mathesoni* tends to be larger and have a sharper latero-ventral margin. Also *S. lutkeni* (very similar, but less common) and *S. capensis* (rare). These species generally have fewer larger tubercles, limited on the upper surface to the areas between the petaloid ambulacra.

References: Baker, A.N.; Rowe, F.W.E. (1990). Atelostomatid sea urchins from Australian and New Zealand waters (Echinoidea: Cassiduloida, Holasteroida, Spatangoida, Neoplampadoida). *Invertebrate Taxonomy 4*: 281–316.

McKnight, D.G. (1969). An outline of the New Zealand shelf fauna: benthos survey, station list, and distribution of the Echinoidea. *New Zealand Oceanographic Institute Memoir 47*. 86 p.

Phylum Echinodermata
Class Echinoidea (sea urchins)
Order Temnopleuroida
Family Temnopleuridae

Pseudechinus flemingi (Fleming's urchin) (PFL)

Distinguishing features: Long, fine, densely matted larger spines of length up to equal the test diameter. Test slightly flattened, especially on lower surface. Peristome (membranous area at centre of lower surface) is wider than the apical system (area at centre of upper surface).

Colour: Spines a rich orange-red or deep salmon colour, test a rich rose red with paler rose tubercles (spine supports).

Size: Diameter up to 50 mm.

Distribution: Found on the Chatham Rise, especially the south flanks and around the Mernoo Bank, and off Otago.

Depth: 90 to 600 m.

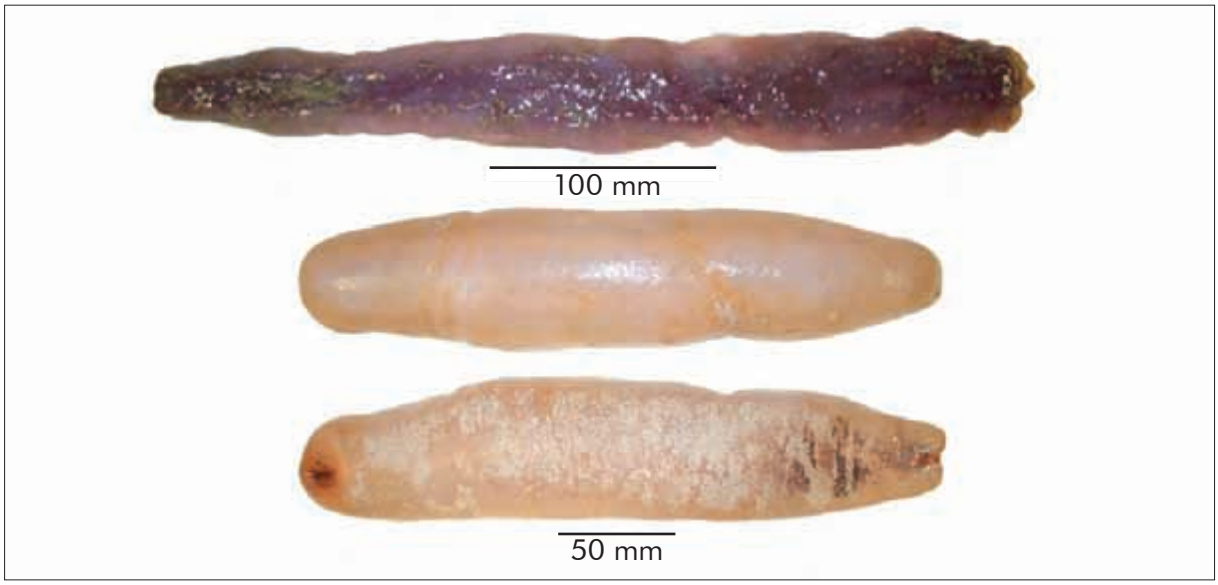
Similar species: The 4 other species of *Pseudechinus* found in the New Zealand region are of a similar size and shape, but are duller in colour, and generally found in shallower water. *Dermechinus horridus* is a similar colour but has shorter spines, a taller test (in large specimens), and smaller, even sized, apical systems and peristomes.

References: Fell, H.B. (1958). Deep-sea echinoderms of New Zealand. *Zoology Publications from Victoria University of Wellington 24*. 40 p.

McKnight, D.G. (1969). An outline distribution of the New Zealand shelf fauna. *New Zealand Oceanographic Institute Memoir 47*. 91 p.

Phylum Echinodermata
Class Holothuroidea (sea cucumbers)
Order
Family

(Sea cucumbers) (HTH)



Distinguishing features: Usually soft-bodied and cylindrical. Mouth and anus at opposite ends, mouth surrounded by feeding tentacles, usually retracted on capture. 5 rows of tube feet along body, absent in the order Apodida. The calcite skeleton common to echinoderms reduced to microscopic plates in most species, and embedded in body wall. As the plates are commonly used to differentiate between species, identification usually requires laboratory examination.

Colour: A range of colours from browns, reds, purples, grey, white.

Size: Up to 300 mm.

Distribution: Throughout the New Zealand region, from the intertidal to abyssal depths, where they may make up to 90% of the benthic biomass.

Depth: 0 to 5000 m.

Similar species: More than 100 species known in New Zealand, with representatives of all 6 orders of holothurians having been recorded from New Zealand region. Commonly known commercially as beche-de-mer.

References: McKnight, D.G.; Eagle, M.K.; Pawson, D.L.; Ameziane, N.; Vance, D.J.; Baker, A.N.; Clark, H.E.S.; Alcock, N. (2009): Phylum Echinodermata – sea-stars, brittlestars, sea urchins, sea cucumbers, sea lilies, and kin. In: Gordon, D.P. (ed.), The New Zealand inventory of biodiversity. Volume 1. Kingdom Animalia – Radiata, Lophotrochozoa, and Deuterostomia. Canterbury University Press.

Phylum Echinodermata
Class Holothuroidea (sea cucumbers)
Order Aspidochirotida
Family Synallactidae

Bathyplotes spp. (BAM)

Distinguishing features: Body wall fungiform (with low white wart-like discs on the end of thin stalks) and with brown spots. Fragile (often collapses on collection). Body wall may peel off and separate into 1-2 strips. Tentacles (18-20) often damaged. This species has previously been called *Bathyplotes moseleyi* Theel, 1886 but recent work (N. Davey pers comm.) has distinguished the Antarctic species as the true *B. moseleyi*. The Antarctic species differs from the New Zealand species description.

Colour: White with brown spotting. Tentacles orange with white stalks.

Size: Length up to 250 mm.

Distribution: New Zealand.

Depth: About 220 to 480 m around New Zealand, elsewhere to about 800 m.

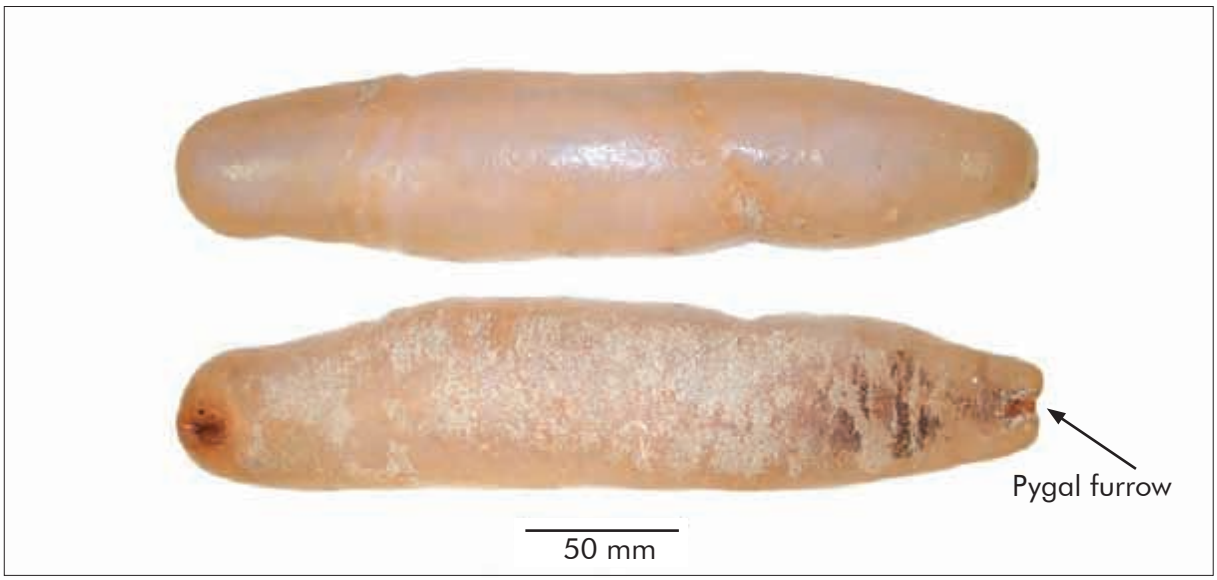
Similar species: Fungiform warts and brown spots distinguish this species from others of the genus.

References: Pawson, D. (1965). The Bathyal Holothurians of the New Zealand Region. *Zoology Publications from Victoria University of Wellington* No. 39. 33 p.

Pawson, D. (1970). The Marine fauna of New Zealand: Sea Cucumbers (Echinodermata: Holothuroidea). NZOI Memoir no.52. 69 p.

Phylum Echinodermata
Class Holothuroidea (sea cucumbers)
Order Aspidochirotida
Family Synallactidae

Pseudostichopus mollis (PMO)



Distinguishing features: Distinctly cylindrical often holding its shape after collection and preservation. Thick leathery body wall. Tube feet small and often inconspicuous. Pygal furrow (5 lobes around anus) visible on some specimens.

Colour: Pale brown to creamy white body wall often covered with grit.

Size: Length up to 225 mm.

Distribution: North and South Pacific Ocean, southern Indian Ocean, eastern Australian continental slope, Antarctic ocean, Western Antarctica, Weddell Sea.

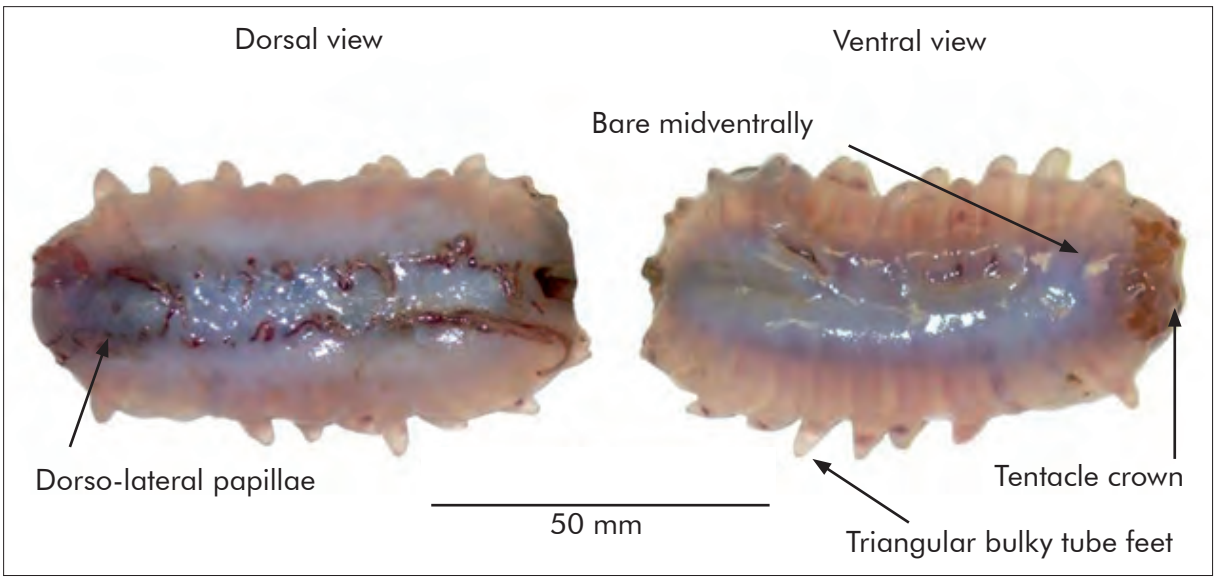
Depth: Usually 200–500 m, 91–1587 m in Antarctic Ocean.

Similar species:

References: O'Loughlin, P.M., Ahearn, C. (2005). A review of pygal-furrowed Synallactidae Echinodermata: Holothuroidea), with new species from the Antarctic, Atlantic and Pacific oceans. *Memoirs of Museum Victoria 62 (2)*: 147–179.

Phylum Echinodermata
Class Holothuroidea (sea cucumbers)
Order Elasipodida
Family Laetmogonidae

Laetmogone spp. (LAG)



Distinguishing features: Short thick body with a gelatinous texture. Shape holds well before and after preservation. Triangular bulky tube feet with a small sucking end disc on ventro-lateral edge. No tube feet mid-ventrally and a distinct tentacle crown at the anterior end with 15 tentacles. Dorso-lateral papillae in 1 or 2 rows.

Colour: Transparent, off white, shades of lavender. Dark red/violet dorsal papillae.

Size: Length up to 110 mm.

Distribution: Pacific, Atlantic, Antarctica (very cosmopolitan).

Depth: 250 to 1800 m.

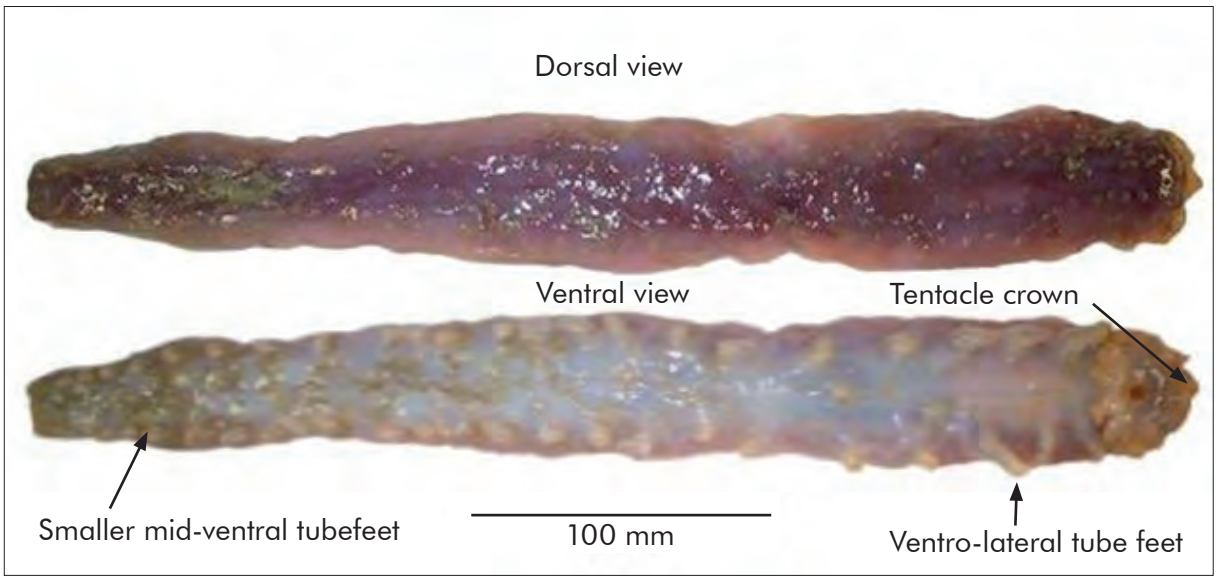
Similar species: Only identified to genus, 9 species in genus, all similar in external appearance. Species identification requires microscopic examination.

References: Hansen, B., (1975). Systematics and biology of the deep sea holothurians. Part 1. *Elasipoda. Galathea Report 13*: 1–262, pls 1–14.

Pawson, D. (1970). The Marine fauna of New Zealand: Sea Cucumbers (Echinodermata: Holothuroidea). *NZOI Memoir no.52*. 69 p.

Phylum Echinodermata
Class Holothuroidea (sea cucumbers)
Order Elasipodida
Family Laetmogonidae

Pannychia moseleyi (PAM)



Distinguishing features: Body gelatinous and slimy. Can be quite long and flimsy. Often in poor condition after collection. Ventral tentacle crown with 20 tentacles. Ventro-lateral tube feet more prominent and larger than the mid ventral tube feet.

Colour: Greyish lavender with off-white tube feet.

Size: Length up to 250 to 300 mm.

Distribution: Pacific Ocean coasts and Tasman Sea. From Australia and New Zealand to Peru, and off the Hawaiian and Galapagos Islands.

Depth: About 210 to 2600 m.

Similar species: *Laetmogone* sp. may be similar but lack mid-ventral tube feet. Body of *Pannychia moseleyi* also longer and thinner, skin slimy and flimsy, and tube feet less bulky.

References: Hansen, B. (1975). Systematics and biology of the deep sea holothurians. Part 1. Elasipoda. *Galathea Report 13*: 1–262, pls 1–14.

Pawson, D. (1970). The Marine fauna of New Zealand: Sea Cucumbers (Echinodermata: Holothuroidea). *NZOI Memoir no.52*. 69 p.

Phylum Echinodermata
Class Holothuroidea (sea cucumbers)
Order Elasipodida
Family Pelagothuridae

Enypniastes eximia (EEX)

Distinguishing features: Transparent body with sediment filled intestine, other internal organs readily visible. Jellyfish-like body form, fragile and usually destroyed on removal from water. Anterior tentacles clearly visible in a circle around the mouth. Transparent cape-like structure around the anterior. Cape often destroyed or partially damaged in dead specimens.

Colour: Live specimens pale pink to brownish red, off white to pale pink in alcohol preserved specimens.

Size: Length up to 250 mm.

Distribution: World wide in bathyal to abyssal depths.

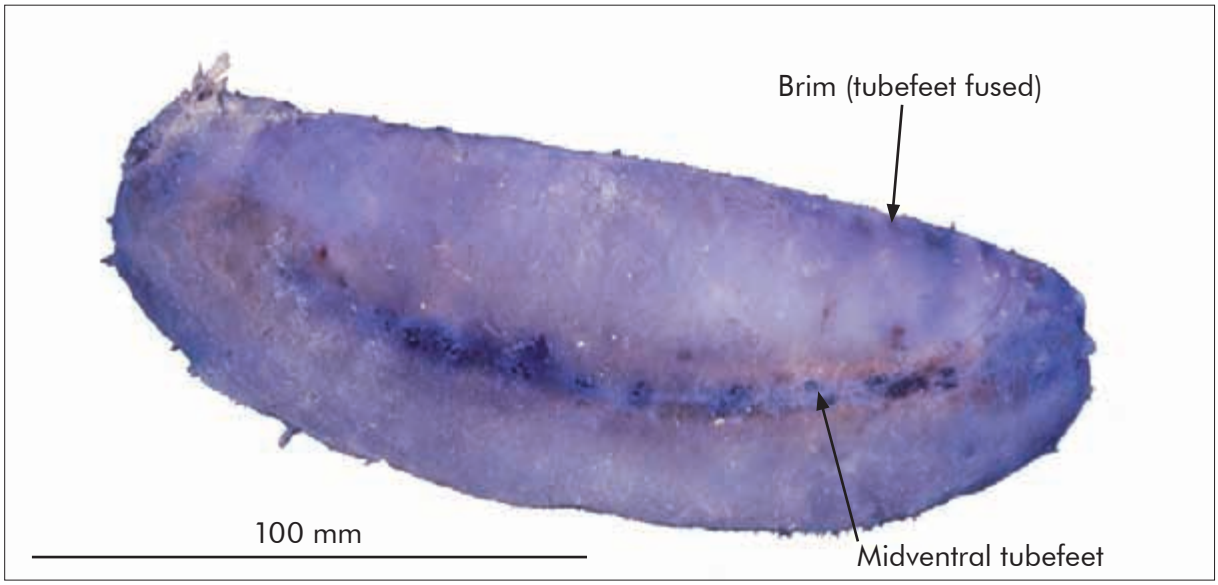
Depth: About 500 to 5700 m. Usually near the bottom where they burrow and eat in the sand/mud. Have been found several hundred feet off bottom.

Similar species: The only species in the family Pelagothuriidae known from New Zealand waters.

References: Miller, J.E.; Pawson, D.L. (1990). Swimming Sea Cucumbers (Echinodermata: Holothuroidea): a survey, with analysis of swimming behaviour in four bathyal species. *Smithsonian contributions to the Marine Sciences 35:17* p.

Phylum Echinodermata
Class Holothuroidea (sea cucumbers)
Order Elasipodida
Family Psychropotidae

Benthodytes sp. (BTD)



Distinguishing features: Species within these genera are large. Body wall can be firm or thin and predominanlty appears flat on collection. Lateral tube feet fused into a brim that surrounds the body. Also visible is a row of tubefeet midventrally. Anus dorsal, a ring of papillae around the tentacles. Tentacles (15), retractable and often not visible.

Colour: Frequently distinctive, from deep violet through to various shades of lavender/grey. Tentacle crown and tube feet are often a deeper violet than rest of body.

Size: New Zealand specimens up to 300 mm length.

Distribution: Throughout New Zealand waters. Also Antarctic, Pacific, Indian, and Atlantic waters.

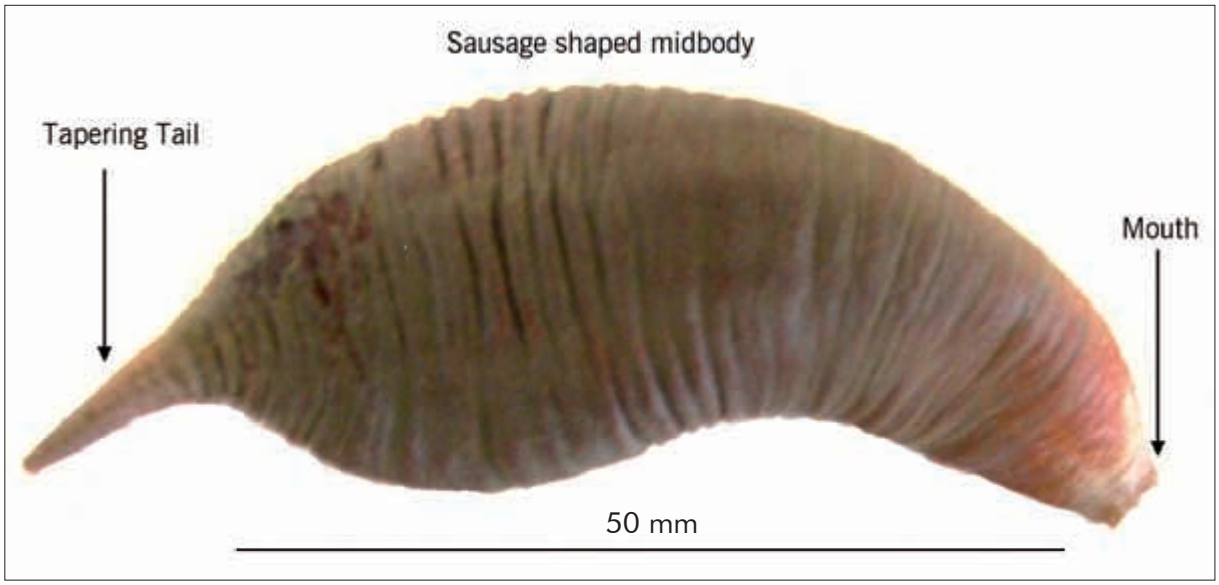
Depth: Found deeper than 1000 m.

Similar species: The circum-oral papillae and dorsal anus are distinctive for the genus. Identification to species level requires microscopic examination.

References: Hansen, B., (1975). Systematics and biology of the deep sea holothurians. Part 1. Elasipoda. *Galathea Report* 13: 1–262, pls 1–14.

Phylum Echinodermata
Class Holothuroidea (sea cucumbers)
Order Molpadiida
Family Molpadiidae

Molpadia musculus (Molpadia sea cucumber) (MOM)



Distinguishing features: Mid body is sausage shaped with a distinctive tapering tail. The body wall is leathery. Specimens are often full of mud as these species are benthic and they burrow and feed on sediment. Tentacles are small and almost always retracted on capture, however 15 small spots around the mouth show where tentacles are present. There are no tube feet and the body wall is smooth to touch.

Colour: Deep red through to grey with pink spots.

Size: Up to 200 mm.

Distribution: Cosmopolitian, but not above Arctic circle. Common in New Zealand waters.

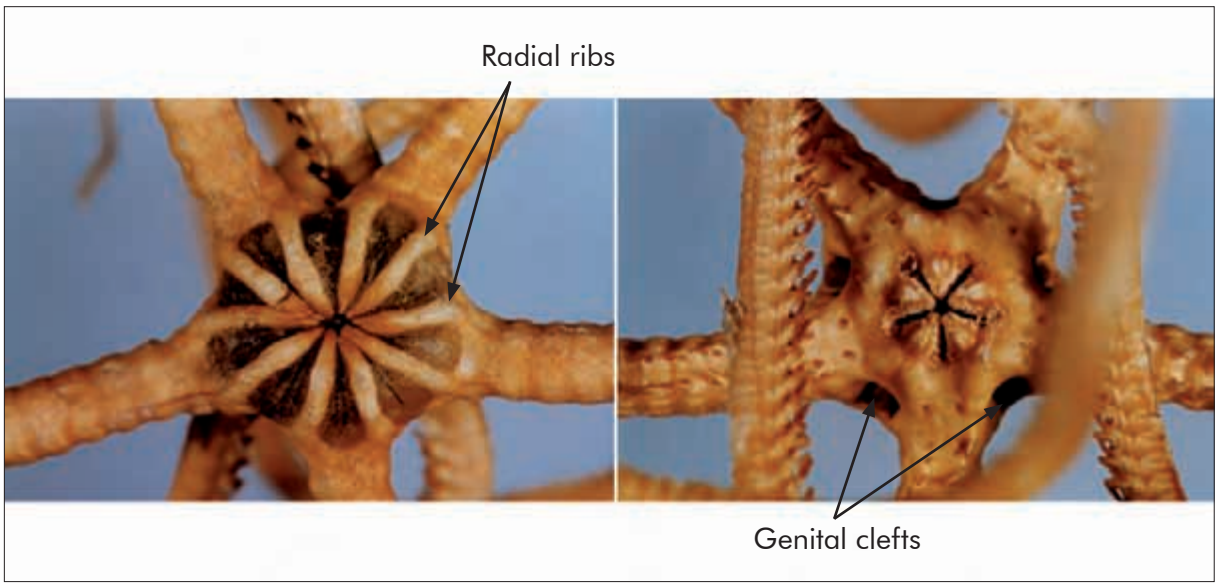
Depth: 30 to 5205 m.

Similar species: *Heteromolpadia marenzelleri* and *H. pikei*. Both these species are found in New Zealand waters and have grey to red colouring. Found shallower than 500 m and tend to be more speckled in colouration compared to *Molpadia musculus* Risso, 1826.

References: Pawson, D. (1977). Molpadia sea cucumbers (Echinodermata:Holothuroidea) of the Southern Atlantic, Pacific, and Indian Oceans. *Biology of the Antarctic Seas VI, Antarctic Research Series Volume 26*. 123 p.

Phylum Echinodermata
Class Ophiuroidea (brittle stars)
Order Euryalinida (basket stars)
Family Asteroschematidae

Ophiocreas sibogae (OSI)



Distinguishing features: Disc moderately large, with 5 very long arms; rounded above, flat or concave below and often coiled; disc and arms covered by skin, with minute granules sometimes present. Conspicuous radial ribs extend from either side of arm base to centre of disc. On the lower suface large genital clefts are clearly visible. Two armspines over most of the arm, placed at lower edges and pointing downwards; thickened towards tip.

Colour: Light brown, occasionally darker in patches, with the radial ribs usually much lighter. Rarely part or all of a specimen is reddish.

Size: Diameter up to 15 mm. Arms up to 300 mm.

Distribution: Widespread in the New Zealand region, from the Three Kings Rise to the Campbell Plateau, and often found coiled in branches of larger Gorgonacean corals. It is also known from southern Australia and Indonesia.

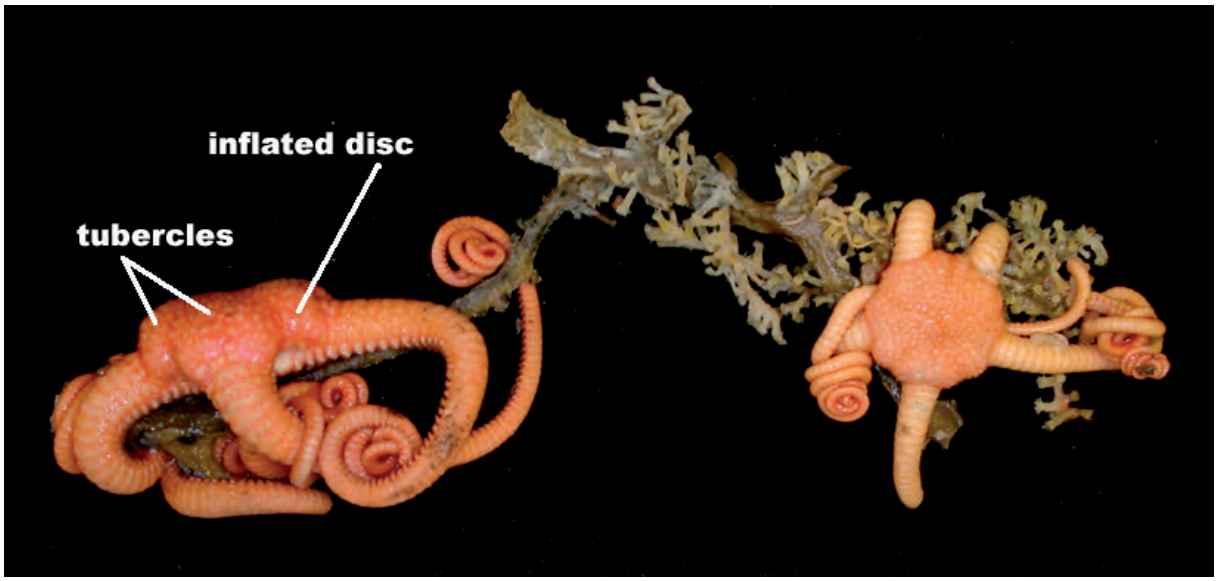
Depth: 200 to 2000 m.

Similar species: There are 4 other species of *Ophiocreas* recorded locally, as well as 2 in the somewhat similar genus *Astrobrachion*. They are all difficult to determine at sea, and require microscopic examination.

References: McKnight, D.G. (2000). The marine fauna of New Zealand. Basket-stars and snake-stars. (Echinodermata:Ophiuroidea: Euryalinida). *NIWA Biodiversity memoir 115*.

Phylum Echinodermata
Class Ophiuroidea (brittle stars)
Order Euryalinida (basket stars, snake stars)
Family Gorgonocephalidae

Astrothorax waitei (Waite's snake-star) (AWA)



Distinguishing features: Five unbranched arms. Disc inflated above, flat on underside; upper surface completely covered with larger and smaller tubercles, those on the underside with finer, uniform granulation. Arms with transverse bands of granules, interspersed with narrow, smooth, depressed bands; 5 to 10 short, thorny, armspines at outer margins of underside of arms. Mouth with distinct spines along margins; genital slits present at edge of disc, between the arms.

Colour: Creamy white to pinkish-orange.

Size: Up to 20 mm (disc diameter). Arms up to 100 mm.

Distribution: Widespread throughout the New Zealand region, near Norfolk Island to the Chatham Rise. Also known from Australia and South Africa.

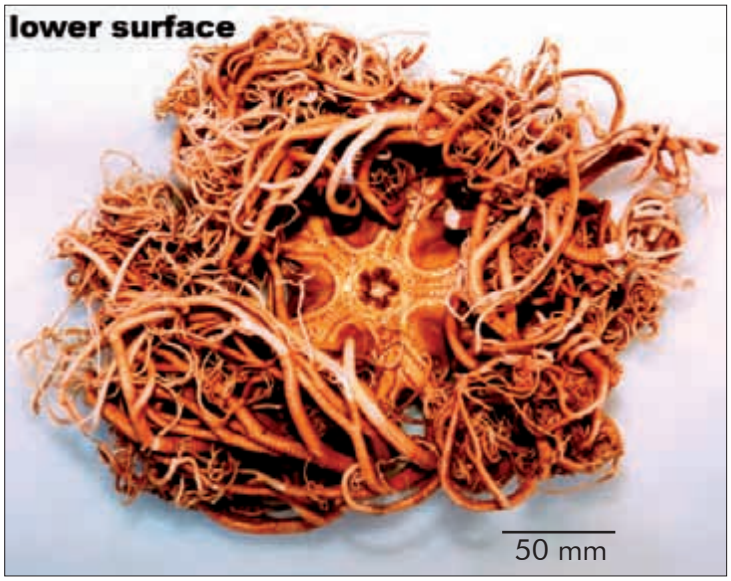
Depth: 120 to 1200 m.

Similar species: At least 6 other snake-star species are recorded in this family.

References: McKnight, D.G. (2000). The marine fauna of New Zealand. Basket–stars and snake–stars (Echinodermata: Ophiuroidea: Euryalinida). *NIWA Biodiversity Memoir 115*: 61–63.

Phylum Echinodermata
Class Ophiuroidea (brittle stars)
Order Euryalinida (basket stars, snake stars)
Family Gorgonocephalidae

Gorgonocephalus spp. (Gorgon's head basket-stars) (GOR)



Distinguishing features: Five long arms, branching extensively (up to 10 or more times) from near the disc or within the disc margin. The arms are deciduous and a large tangled mass of arms may be the only sample taken. Upper side of disc with 5 pairs of conspicuous radial ribs. Six species with branching arms are recorded from the New Zealand region, and 4 of these (in 2 genera) may be present in trawl catches. Laboratory examination is required to determine the species.

Colour: Creamy white to dull or pale brown. Radial ribs on disc usually paler.

Size: Up to 70 mm (disc diameter).

Distribution: *Gorgonocephalus chilensis*, mainly Chatham Rise; *G. dolichodactylus* mainly Bay of Plenty; *G. pustulatum* and *G. sundanus* rare but widespread.

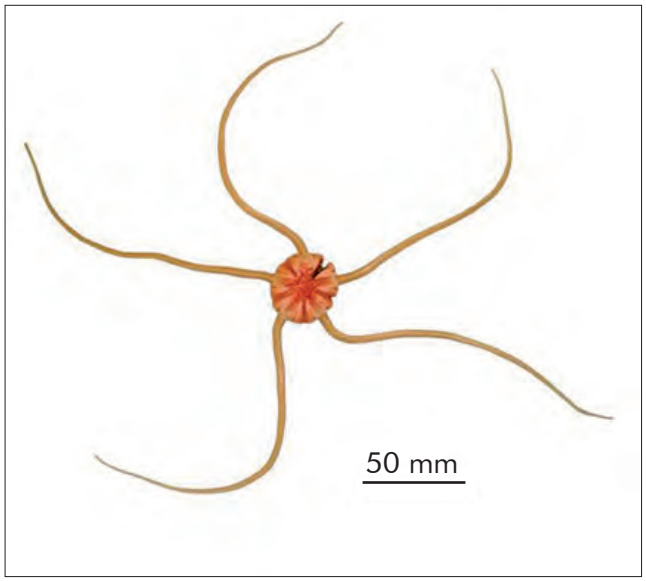
Depth: 70 to 1400 m.

Similar species: None.

References: McKnight, D.G. (2000). The marine fauna of New Zealand. Basket-stars and snake-stars (Echinodermata: Ophiuroidea: Euralyalinida). *NIWA Biodiversity Memoir 115*: 45–53.

Phylum Echinodermata
Class Ophiuroidea (brittle stars)
Order Ophiurida
Family Ophiodermatidae

Bathypectinura heros (Deepsea brittle star) (BHE)



Distinguishing features: Arms long sharply set off from disc, often intact or only broken near tip. Upper side of disc covered with small granules, rarely with a few plates exposed; lower side of disc also covered except around the mouth, where plates are naked. Arms more or less smooth, with small armspines closely pressed against the sides.

Colour: Reddish or brown.

Size: Up to 50 mm (disc diameter). Arms may be over 200 mm.

Distribution: Present in almost all oceans, and widespread around New Zealand.

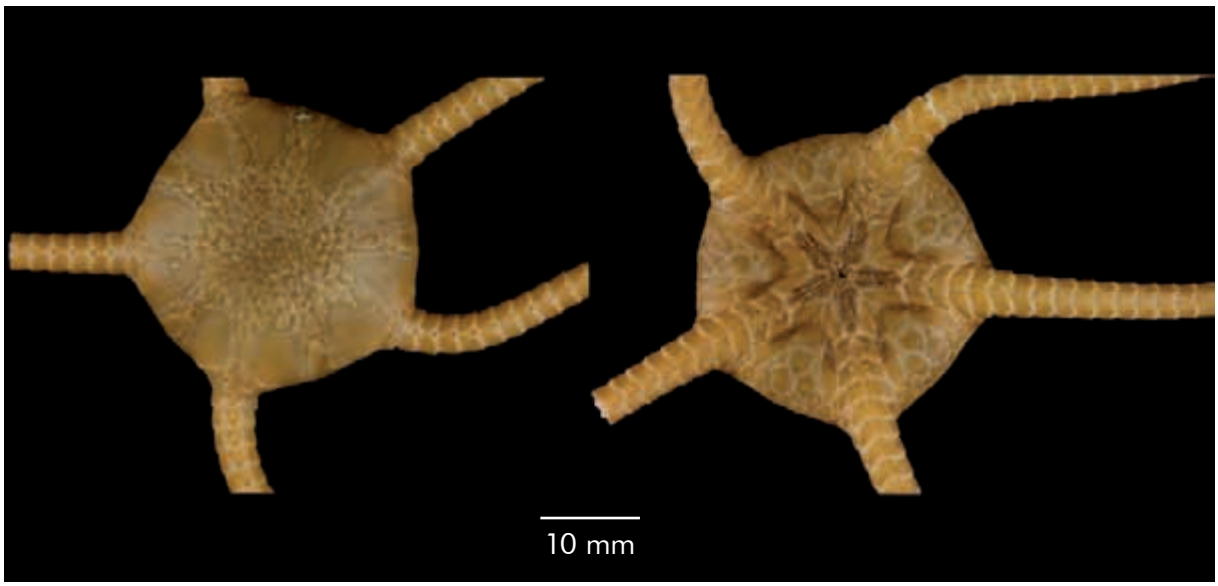
Depth: 200 to 2500 m.

Similar species: None in the deeper waters. *Ophiopsammus maculata* is similar but is more or less confined to the continental shelf.

References: Paterson, G.L.J. (1985). The deep-sea Ophiuroidea of the North Atlantic Ocean. *Bulletin of the British Museum (Natural History) 49*. 162 p.

Phylum Echinodermata
Class Ophiuroidea (brittle stars)
Order Ophiurida
Family Ophiuridae

Ophiomusium lymani (Deepsea brittle star) (OLY)



Distinguishing features: Disc and arms rigid, arms almost always broken. Dorsal side of disc with distinct plates and large radial shields sometimes with a tubercular appearance to their surface. Ventral side of disc covered with a few large distinct plates, sides of jaw with fused squarish papillae, two pairs of tentacle pores covered by oval scales on armplates closest to disc centre. Lateral arm plates bear numerous very small adpressed armspines.

Colour: Whitish, cream, or light brown.

Size: Up to 30 mm (disc diameter).

Distribution: Widespread throughout the New Zealand region, also known from temperate regions of the Pacific, Indian and Atlantic Oceans.

Depth: 130 to 4000 m. This species is often very abundant on fine sediments in depths of 900–1500 m.

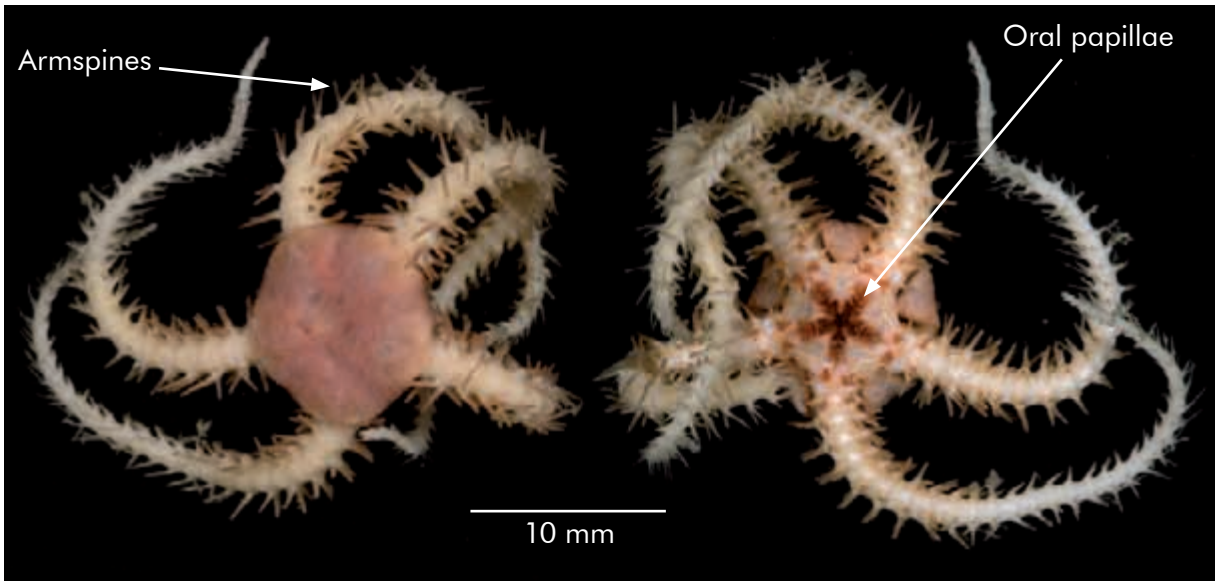
Similar species: There are several similar species in this genus and in other closely related genera present in New Zealand waters.

References: Baker, A.N. (1979). Some Ophiuroidea from the Tasman Sea and adjacent waters. *New Zealand Journal of Zoology 6*: 21–51.

McKnight, D.G.; Probert, P.K. (1997). Epibenthic communities on the Chatham Rise, New Zealand. *New Zealand Journal of Marine & Freshwater Research 31*: 505–513.

Phylum Echinodermata
Class Ophiuroidea (brittle stars)
Order Ophiurida
Family Ophiacanthidae

Ophiophthalmus relictus (Deepsea brittle star) (ORE)



Distinguishing features: Five robust spiny arms, which are usually curling (but not coiling) under the disc. Lateral plate bearing 6 denticulate armspines which do not meet on dorsal midline of arm. Separated oval or rounded radial shields are visible on the disc. Disc surface covered with small imbricating scales, usually obscured by numerous spiny granules. Granules also present in single fringing row on distal edge of basal dorsal armplates. Seven oral papillae line each jaw (3 along each side and one apical papilla). This species is commonly found associated with bamboo corals, hard corals such as *Solenosmilia variabilis* and in dead gastropod shells.

Colour: Reddish-pink disc, sometimes with a grey tinge, pink granules, creamy white arms, sometimes orange-tinged arm spines.

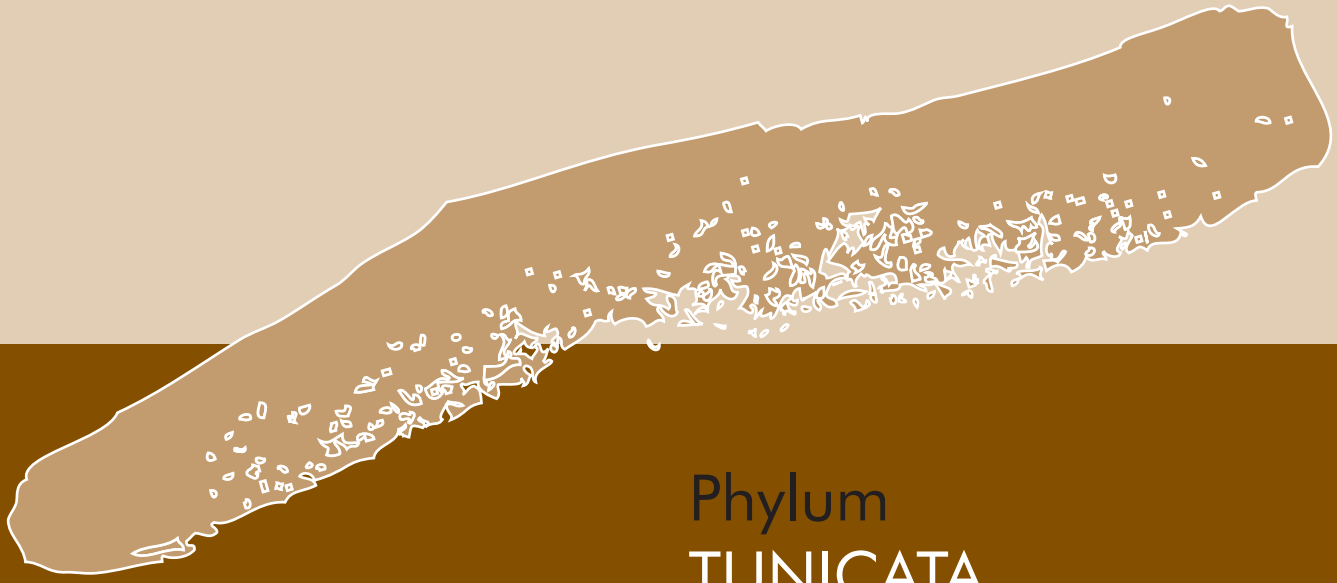
Size: Up to 13 mm (disc diameter).

Distribution: Widely distributed in the New Zealand region, and also widespread in the Indo-West Pacific region.

Depth: 420 to 2194 m.

Similar species: This species could be confused with other spiny-armed species of the family Ophiacanthidae, which have less-curling arms, or with the ophiactid *Ophiactis abyssicola*, which is also often found with its arms curled in and around hard corals and also has a spiny disc. Ophiactids have numerous, clearly visible disc plates and a different arrangement of oral papillae.

References: Koehler, R. (1904). Ophiures de l'expédition du Siboga. Part 1. Ophiures de mer profonde. Siboga Expedition 45a.



Phylum TUNICATA

Sea squirts, salps

Mike Page

Phylum

TUNICATA

Sea squirts and salps

The **Tunicata** is very unusual phylum of animals. Indeed, most tunicates scarcely resemble animals. The best-known are solitary sea squirts. Stand on a sea squirt at low tide, and a thin jet of water will spurt from its sac-like body. In open water, divers frequently see large numbers of small, transparent, barrel-shaped creatures called salps, which don't look at all like sea squirts but are related to them. Sea squirts and salps are strange creatures indeed and most people would be surprised to learn that, traditionally, they have been included in the same animal phylum as ourselves, the Chordata. Like chordates, tunicates (also called urochordates, Greek, oura, tail; Latin, chorda, cord) have a dorsal, hollow nerve cord and rod-like notochord (at least for part of their lives), and pharyngeal gill slits. The most unusual feature of tunicates is their manufacture of a type of cellulose, called tunicin, for their distinctive outer coverings, or tunics.

Tunicates, so-called because of the tunic, are classified in three classes — Ascidiacea (sea squirts), Thaliacea (salps), and Appendicularia (sometimes called Larvacea), which have no common name. The latter two groups are entirely planktonic and so are not further considered here.

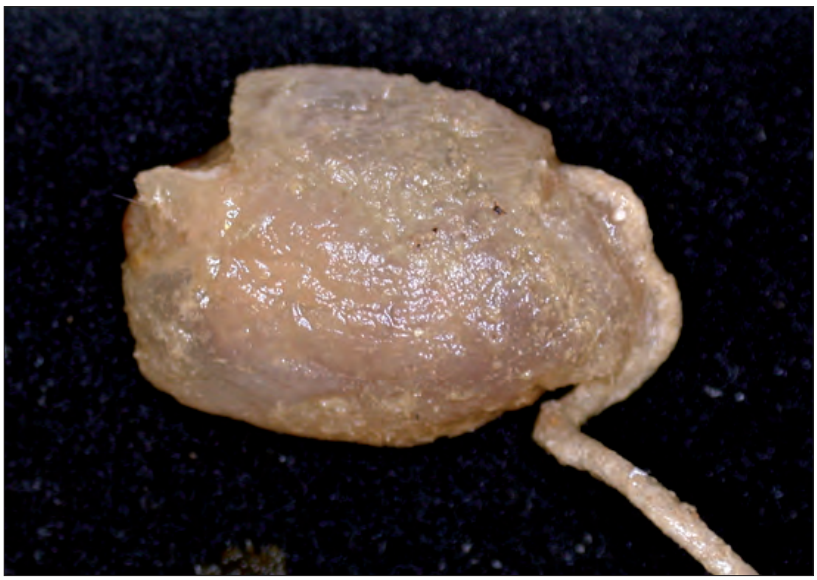
Ascidiacea

Sea squirts are solitary or colonial. The name Ascidiacea comes from the Greek askidion, a leather wine flask, named for the tough outer tunicin coat, which in the solitary forms a leathery consistency. In colonial forms the tunicin coating (test) is gelatinous or thin and membranous. Colonial ascidians are vegetatively produced replicates (zooids) that are either covered in and joined by a layer of test, or partially or entirely embedded in thin sheets, cushions, slabs, cylinders, spheres, cones, or massive blocks of test. They have a tailed, tadpole-like larva and it is the larva that has a nerve cord and notochord. When the larva settles, and attaches itself to the substratum, the tail is absorbed (together with the nerve cord and notochord) and it changes (metamorphoses) into the adult form, encased in its external coat of tunicin. Cut open a large sea squirt and you will see a sac like body inside the tunicate, often with the digestive tract and gonads visible because of their colour. At the anterior end and one side of the body are two tube-like siphons, one for drawing water into the large gill-like pharynx, the other for expelling it. The pharynx strains incoming seawater, removing minute planktonic organisms and organic particles.

New Zealand has 166 species of ascidians in its EEZ, of which a high proportion (73%) is endemic.

Phylum Tunicata
Class Ascidacea (sea squirts)
Order
Family

(Sea squirt or Ascidian) (ASC)



Distinguishing features: Have inhalent and exhalant apertures and if squeezed should squirt out water from either or both siphons. Have tough leathery test or "tunic" and are often attached basally to cobbles or rocks. May be heavily encrusted with epibionts such as hydrozoans and bryozoans.

Colour: Highly variable – cream to reddish brown.

Size: Total height from 5 to 100 mm.

Distribution: Widely distributed throughout New Zealand.

Depth: 5 to 300 m. Intertidal, continental shelf slope, and abyssal depths.

Similar species: Several tunicate species are found in New Zealand waters.

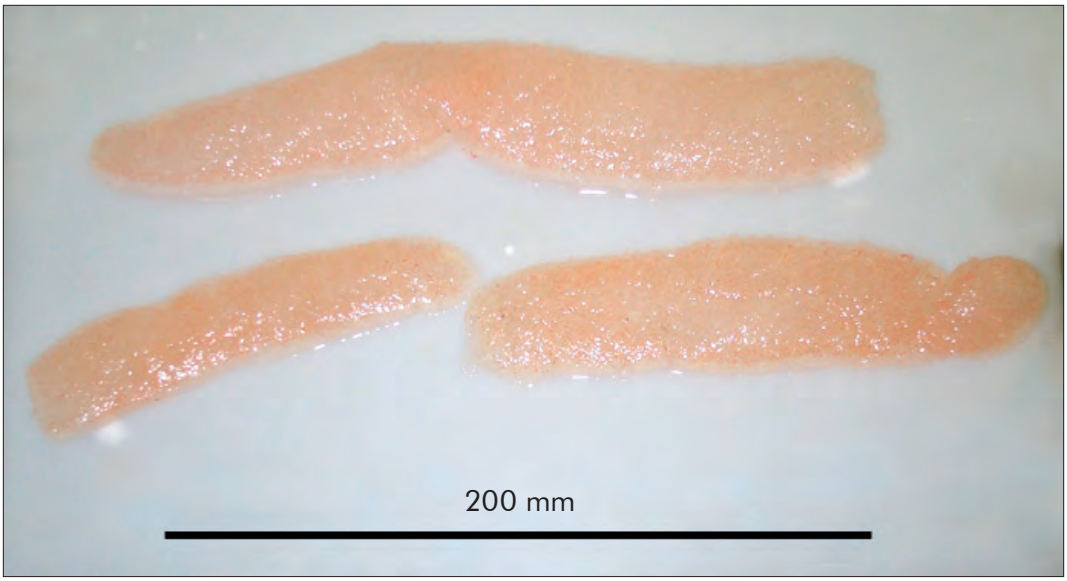
References: Miller, R.H. (1982). The marine fauna of New Zealand. *New Zealand Oceanographic Institute Memoir 85*. 114 p.

Stocker, L.J. (1985). An identification guide to some common New Zealand ascidians. University of Auckland Leigh Marine Laboratory, Auckland. 74 p.

Phylum Tunicata
Class Thaliacea (salps)
Order Pyrosomida
Family Pyrosomatidae

Pyrosoma atlanticum (PYR)

TUNICATA



Distinguishing features: Pyrosoma is a colonial thaliacean, with affinities to ascidians. Pyrosoma are gelatinous, transparent/opaque, free-swimming, and planktonic. They have oral siphons on the outside of the colony and an anal siphon on the inside. A light organ is present on each side of the brachial sac of each zooid and this gives the organism its name.

Colour: Pale translucent pink.

Size: Up to 20 m. Can grow to massive size.

Distribution: Very widespread – from tropical to temperate waters.

Depth: Throughout the water column.

Similar species: Several species of salps are found in the New Zealand region.

References: Van Soest, R.W.M. (1981). A monograph of the order Pyrosomatida (Tunicata, Thaliacea). *Journal of Plankton Research 3*: 603–631.

Index 1: Common Names

Common Name	Scientific name	MFish code	Page
Abyssal star	*Plutonaster knoxi*	PKN	243
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Common Name	Scientific name	MFish code	Page
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Common Name	Scientific name	MFish code	Page
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Policeman crab	*Neommatocarcinus huttoni*	NHU	173
Prawn killer	*Ibacus alticrenatus*	PRK	200
Precious corals	*Corallium* spp.	CLL	68
Prickly king crab	*Paralomis zealandica*	PZE	183
Primnoa sea fans	*Primnoa* spp.	PMN	78
Primnoid sea fans	Primnoidae	PRI	77
Pteropeltarion crab	*Pteropeltarion novaezelandiae*	PNO	166
Purple sea pen	*Pennatula* spp.	PNN	84
Purple-heart urchin	Spatangus multispinus	SPT	280
Queen scallop	Zygochlamys delicatula	QSC	113
Quill worm	*Hyalinoecia tubicola*	HTU	103
Rat-tail stars	*Zoroaster* spp.	ZOR	238
Red crab	*Chaceon bicolor*	CHC	171
Red hydrocorals	*Errina* spp.	ERR	81
Robertson's king crab	*Lithodes robertsoni*	LRO	180
Rock star	*Lithosoma novaezelandiae*	LNV	250
Rocky dumpling sponge	*Pachymatisma* sp.	PAZ	38
Royal red prawn	*Aristaeomorpha foliacea*	AFO	206
Rubber sponge	*Psammocinia* sp.	PHW	41
Sabre prawn	*Campylonotus rathbunae*	CAM	209
Salp	*Pyrosoma atlanticum*	PYR	302

Common Name	Scientific name	MFish code	Page
Sand dollar	*Peronella hinemoae*	PHI	267
Scaled squid	*Lepidoteuthis grimaldii*	LGR	128
Scallop	*Delectopecten fosterianus*	DFO	114
Scallop	*Veprichlamys kiwaensis*	VKI	115
Scampi	*Metanephrops challengeri*	SCI	190
Scarlet prawn	*Aristaeopsis edwardsiana*	PED	207
Scarlet prawn	*Notostomus auriculatus*	NAU	214
Sea cucumbers	Holothuroidea	HTH	282
Sea cucumbers	*Bathyplotes* sp.	BAM	283
Sea cucumbers	*Pseudostichopus mollis*	PMO	284
Sea cucumbers	*Laetmogone* spp.	LAG	285
Sea cucumbers	*Pannychia moseleyi*	PAM	286
Sea cucumbers	*Enypniastes eximia*	EEX	287
Sea cucumbers	*Benthodytes* spp.	BTD	288
Sea lilies with cirri	Isocrinida	CRN	259
Sea lilies without cirri (o+)	Millericrinida, Cyrtocrinida	CRN	260
Sea mice	*Aphrodita* spp.	ADT	104
Sea slug, Nudibranch	Nudibranchia	NUD	154
Sea squirt or Ascidian	Ascidacea	ASC	301
Sea urchin	*Caenopedina otagoensis*	CAO	274
Sea urchin	*Caenopedina pulchella*	CPU	276
Sea-star	*Pseudechinaster rubens*	PRU	236
Sea-star	*Benthopecten* spp.	BES	239
Sea-star	*Cheiraster monopedicellaris*	CMP	240
Sea-star	*Astromesites primigenius*	APM	241
Sea-star	*Proserpinaster neozelanicus*	PNE	244
Sea-star	*Radiaster gracilis*	RGR	246
Sea-star	*Henricia compacta*	HEC	247
Sea-star	*Pillsburiaster aoteanus*	PAO	252
Sea-star	*Diplopteraster* sp.	DPP	254
Sea-star	*Hymenaster carnosus*	HYC	255
Sergestid prawn	*Sergestes* spp.	SER	219
Siboga sea pen	*Gyrophyllum sibogae*	GYS	83
Sladen's star	*Mediaster sladeni*	MSL	251
Sloan's arrow squid	*Nototodarus sloanii*	NOS	135
Smooth deepsea anemones	Actinostolidae	ACS	60
Smooth red swimming crab	*Nectocarcinus bennetti*	NCB	197
Smooth white cup sponge	*Corallistes fulvodesmus*	CFU	44
Solitary bowl coral	*Stephanocyathus platypus*	STP	89
Spider prawn	*Nematocarcinus* spp.	NEC	212
Spiny masking crab	*Teratomaia richardsoni*	SMK	189
Spiny serolid isopod	*Brucerolis* spp.	ACU	204
Spiny white hydrocorals	*Lepidotheca* spp.	LPT	82
Squat lobsters	*Gastroptychus* spp.	GAT	168
Squat lobsters	*Uroptychus* spp.	URP	169
Squat lobsters	*Munida* spp.	MNI	170
Stalked barnacle	Scalpellidae	SBN	222
Subantarctic ruby prawn	*Acanthephyra* spp.	ACA	213
Sun-star	*Crossaster multispinus*	CJA	256
Swimming crab	*Ovalipes molleri*	OVM	199
Tam O'Shanters	Echinothurioida	TAM	270
Tam O'Shanters	Echinothuriidae	ECT	271

Common Name	Scientific name	MFish code	Page
Tam O'Shanters	*Phormosoma* spp.	PHM	272
Thermiphione scale-worm	*Thermiphione* (undescribed)	THE	105
Three-and-three stars	*Allostichaster* spp.	ALH	234
Todarodes squid	*Todarodes filippovae*	TSQ	137
Top shell	*Calliostoma turnerarum*	CTN	156
Tritons	*Fusitriton magellanicus*	FMA	145
Trojan star	*Hippasteria phrygiana*	HTR	249
Turrid	*Comitas onokeana vivens*	COV	150
Two-spined crab	*Pycnooplax victoriensis*	CVI	172
Umbrella octopus	*Opisthoteuthis* spp.	OPI	122
Umbrella urchin	*Goniocidaris umbraculum*	GOU	262
Violet squid	*Histioteuthis* spp.	VSQ	127
Volute	*Alcithoe larochei*	ALL	151
Volute	*Alcithoe wilsonae*	AWI	152
Waite's snake-star	*Astrothorax waitei*	AWA	291
Warty deepsea anemones	Hormathiidae	HMT	61
Warty king crab	*Paralomis dawsoni*	PDA	182
Warty squid	*Onykia* (formerly *Moroteuthis*) *ingens*	MIQ	138
Warty squid	*Onykia* (formerly *Moroteuthis*) *robsoni*	MRQ	139
Whelk	*Aeneator recens*	AER	146
Whelk	*Penion chathamensis*	PCH	148
Whip-lash squids	*Mastigoteuthis* spp.	MSQ	131
White hydrocoral	*Calyptopora reticulata*	CRE	80
Worm-commensal bamboo coral	*Minuisis* spp.	MIN	74
Yaldwyn's crab	*Yaldwynopsis spinimana*	YSP	176
Yellow octopus	*Enteroctopus zealandicus*	EZE	118
Yoyo sponge	*Thenea novaezelandiae*	THN	40
Zoanthid anemone	*Epizoanthus* spp.	EPZ	95
Zoanthids	Zoantharia	ZAH	94

Scientific name	Common Name	MFish code	Page
Acanella spp.	Bushy bamboo coral	ACN	71
Acanthephyra spp.	Subantarctic ruby prawn	ACA	213
Acesta maui	Giant file shell	AMA	111
Acesta saginata	Acesta	ASG	112
Aciculites pulchra	Pimpled ear sponge	APU	45
Actinostolidae	Smooth deepsea anemones	ACS	60
Aega monophthalma	Fish biter	AMO	201
Aeneator recens	Whelk	AER	146
Alcithoe larochei	Volute	ALL	151
Alcithoe wilsonae	Volute	AWI	152
Allostichaster spp.	Three-and-three stars	ALH	234
Amphineura	Chiton	CHT	157
Anthomastus (Bathyalcyon) robustus	Gigantic coral	ARO	63
Antipatharia	Black corals	COB	65
Aphrodita spp.	Sea mice	ADT	104
Architeuthis spp.	Giant squid	GSQ	124
Aristaeomorpha foliacea	Royal red prawn	AFO	206
Aristaeopsis edwardsiana	Scarlet prawn	PED	207
Ascidacea	Sea squirt or Ascidian	ASC	301
Astromesites primigenius	Sea-star	APM	241
Astrothorax waitei	Waite's snake-star	AWA	291
Austrofusus glans	Knobbed whelk	KWH	147
Austropenaeus nitidus	Gamba prawns	ANI	208
Bathypectinura heros	Deepsea brittle star	BHE	293
Bathyplotes sp.	Sea cucumbers	BAM	283
Benthoctopus spp.	Deepwater octopii	BNO	117
Benthodytes spp.	Sea cucumbers	BTD	288
Benthopecten spp.	Sea-star	BES	239
Bolocera spp.	Deepsea anemones	BOC	59
Brisingidae, Hymenodiscidae, Novodiniidae, Freyellidae	Armless stars	BRG	233
Brissopsis oldhami	Heart urchin	BRO	277
Brucerolis spp.	Spiny serolid isopod	ACU	204
Caenopedina novaezelandiae	Banded-spine urchin	CNO	273
Caenopedina otagoensis	Sea urchin	CAO	274
Caenopedina porphyrogigas	Giant purple pedinid	CAL	275
Caenopedina pulchella	Sea urchin	CPU	276
Calliostoma selectum	Maurea	CSS	155
Calliostoma turnerarum	Top shell	CTN	156
Callyspongia sp.	Airy finger sponge	CRM	43
Calyptopora reticulata	White hydrocoral	CRE	80
Campylonotus rathbunae	Sabre prawn	CAM	209
Caryophyllia spp.	Carnation cup coral	CAY	85
Ceramaster patagonicus	Pentagon star	CPA	248
Chaceon bicolor	Red crab	CHC	171
Cheiraster monopedicellaris	Sea-star	CMP	240
Chiroteuthis veryani	Chiroteuthid squid	CVE	125
Chloeia inermis	Fire worm	CIM	101
Chrysogorgia spp.	Golden corals	CHR	69
Colossendeis spp.	Giant sea spiders	PYC	221
Coluzea mariae	Pagoda shell	CMR	149
Comatulida	Feather stars	CMT	258

Scientific name	Common Name	MFish code	Page
Comitas onokeana vivens	Turrid	COV	150
Corallimorphidae	Coral-like anemones	CLM	67
Corallistes fulvodesmus	Smooth white cup sponge	CFU	44
Corallium spp.	Precious corals	CLL	68
Cosmasterias dyscrita	Cat's-foot star	CDY	235
Cranchiidae	Glass squid	CHQ	126
Crella incrustans	Orange frond sponge	CIC	47
Crossaster multispinus	Sun-star	CJA	256
Dagnaudus petterdi	Antlered crab	DAP	174
Delectopecten fosterianus	Scallop	DFO	114
Dermechinus horridus	Deepsea urchin	DHO	268
Desmophyllum dianthus	Crested cup coral	DDI	86
Diacanthurus rubricatus	Hermit crab	DIR	191
Diplopteraster sp.	Sea-star	DPP	254
Dipsacaster magnificus	Magnificent sea-star	DMG	242
Echinothuriidae	Tam O'Shanters	ECT	271
Echinothurioida	Tam O'Shanters	TAM	270
Ecionemia novaezelandiae	Knobbly sandpaper sponge	ANZ	32
Elthusa neocytta	Gill biter or tongue biter	ENE	202
Elthusa propinqua	Gill biter	ELP	203
Enallopsammia rostrata	Deepwater branching coral	ERO	90
Enteroctopus zealandicus	Yellow octopus	EZE	118
Enypniastes eximia	Sea cucumbers	EEX	287
Epizoanthus spp.	Zoanthid anemone	EPZ	95
Errina spp.	Red hydrocorals	ERR	81
Euciroa galatheae	Euciroa	EGA	116
Eunice (undescribed)	Eunice sea-worm	EUN	102
Euplectella regalis	Basket-weave horn sponge	ERE	53
Eurythenes gryllus	Amphipod	EUG	165
Farrea spp.	Lacey honeycomb sponges	FAR	52
Flabellum spp.	Flabellum cup corals	COF	91
Funchalia spp.	Funchalia prawn	FUN	218
Fusitriton magellanicus	Tritons	FMA	145
Gastroptychus spp.	Squat lobsters	GAT	168
Geodia regina	Curling stone sponge	GRE	36
Geodia vestigifera	Ostrich egg sponge	GVE	37
Glyphocrangon spp.	Goblin prawn	GLO	210
Goniocidaris parasol	Parasol urchin	GPA	261
Goniocidaris umbraculum	Umbrella urchin	GOU	262
Goniocorella dumosa	Bushy hard coral	GDU	87
Gorgonocephalus spp.	Gorgon's head basket-stars	GOR	292
Gracilechinus multidentatus	Deepsea kina	GRM	269
Graneledone spp.	Deepwater octopus	DWO	119
Gyrophyllum sibogae	Siboga sea pen	GYS	83
Haliporoides sibogae	Jack-knife prawn	HSI	220
Henricia compacta	Sea-star	HEC	247
Heteroteuthis dagamensis	Bobtail squids	HES	142
Hexactinellida	Glass sponges	GLS	51
Hippasteria phrygiana	Trojan star	HTR	249
Hippellozoon novaezelandiae	Erect cheilostome bryozoan	HNO	227
Histioteuthis spp.	Violet squid	VSQ	127
Histocidaris spp.	Cidaroid urchin	HIS	265

Scientific name	Common Name	MFish code	Page
Holothuroidea	Sea cucumbers	HTH	282
Homola orientalis	Carrier crab	HOO	175
Hormathiidae	Warty deepsea anemones	HMT	61
Hyalascus sp.	Floppy tubular sponge	HYA	54
Hyalinoecia tubicola	Quill worm	HTU	103
Hymenaster carnosus	Sea-star	HYC	255
Ibacus alticrenatus	Prawn killer	PRK	200
Isididae	Bamboo corals	ISI	70
Isocrinida	Sea lilies with cirri	CRN	259
Jacquinotia edwardsii	Giant spider crab	GSC	184
Keratoisis spp.	Branching bamboo coral	BOO	72
Laetmogone spp.	Sea cucumbers	LAG	285
Leiopathes secunda	Black coral	LSE	66
Lepidisis spp.	Bamboo coral	LLE	73
Lepidoteuthis grimaldii	Scaled squid	LGR	128
Lepidotheca spp.	Spiny white hydrocorals	LPT	82
Leptomithrax australis	Giant masking crab	SSC	185
Leptomithrax garricki	Garrick's masking crab	GMC	186
Leptomithrax longimanus	Long-handed masking crab	LHC	187
Leptomithrax longipes	Long-legged masking crab	LLC	188
Liocarcinus corrugatus	Dwarf swimming crab	LCO	195
Lipkius holthuisi	Omega prawn	LHO	211
Liponema spp.	Deepsea anemones	LIP	62
Lissodendoryx bifacialis	Floppy chocolate plate sponge	LBI	46
Lithodes aotearoa	New Zealand king crab	LAO	179
Lithodes robertsoni	Robertson's king crab	LRO	180
Lithosoma novaezelandiae	Rock star	LNV	250
Lycoteuthis lorigera	Crowned firefly squid	LSQ	130
Madrepora oculata	Madrepora coral	MOC	92
Malluvium calcareum	Cap limpet	MCC	144
Mastigoteuthis spp.	Whip-lash squids	MSQ	131
Mediaster sladeni	Sladen's star	MSL	251
Metanephrops challengeri	Scampi	SCI	190
Millericrinida, Cyrtocrinida	Sea lilies without cirri (o+)	CRN	260
Minuisis spp.	Worm-commensal bamboo coral	MIN	74
Molpadia musculus	Molpadia sea cucumber	MOM	289
Munida spp.	Squat lobsters	MNI	170
Nectocarcinus antarcticus	Hairy red swimming crab	NCA	196
Nectocarcinus bennetti	Smooth red swimming crab	NCB	197
Nematocarcinus spp.	Spider prawn	NEC	212
Neognathophausia ingens	Giant red mysid	NEI	205
Neolithodes brodiei	Brodie's king crab	NEB	181
Neommatocarcinus huttoni	Policeman crab	NHU	173
Notostomus auriculatus	Scarlet prawn	NAU	214
Nototodarus gouldi	Gould's arrow squid	NOG	134
Nototodarus sloanii	Sloan's arrow squid	NOS	135
Nudibranchia	Sea slug, Nudibranch	NUD	154
Octopoteuthis spp.	Octopoteuthis squid	OPO	132
Octopus spp.	Octopus	OCO	120
Oculina virgosa	Deepwater branching coral	OVI	93
Odontaster benhami	Pentagonal tooth-star	ODT	253
Ogmocidaris benhami	Cidaroid urchin	OBE	263

Scientific name	Common Name	MFish code	Page
Ommastrephes spp.	Ommastrephid squid	OMM	136
Onykia (formerly *Moroteuthis*) *ingens*	Warty squid	MIQ	138
Onykia (formerly *Moroteuthis*) *robsoni*	Warty squid	MRQ	139
Ophiocreas sibogae	Brittle star	OSI	290
Ophiomusium lymani	Brittle star	OLY	294
Ophiophthalmus relictus	Deepsea brittle star	ORE	295
Opisthoteuthis spp.	Umbrella octopus	OPI	122
Oplophorus spp.	Deepwater prawns	OPP	215
Ovalipes catharus	Paddle crab	PAD	198
Ovalipes molleri	Swimming crab	OVM	199
Pachymatisma sp.	Rocky dumpling sponge	PAZ	38
Pannychia moseleyi	Sea cucumbers	PAM	286
Paragorgia arborea	Bubblegum coral	PAB	75
Paralomis dawsoni	Warty king crab	PDA	182
Paralomis zealandica	Prickly king crab	PZE	183
Paramaretia peloria	Microsoft mouse	PMU	278
Pasiphaea aff. *tarda*	Deepwater prawn	PTA	217
Penares sp.	Golden brown crater sponge	PNR	33
Penion chathamensis	Whelk	PCH	148
Pennatula spp.	Purple sea pen	PNN	84
Peronella hinemoae	Sand dollar	PHI	267
Pholidoteuthis massyae	Large red scaly squid	PSQ	140
Phorbas sp.	Grey fibrous massive sponge	PHB	48
Phormosoma spp.	Tam O'Shanters	PHM	272
Pillsburiaster aoteanus	Sea-star	PAO	252
Pinnoctopus cordiformis	Common octopus	OCT	121
Platymaia maoria	Dell's spider crab	PTM	177
Plesionika martia	Golden prawn	PLM	216
Plexauridae	Plexaurid sea fans	PLE	76
Plutonaster knoxi	Abyssal star	PKN	243
Poecillastra laminaris	Fibreglass cup sponge	PLN	39
Polycheles spp.	Deepsea blind lobster	PLY	194
Poriocidaris purpurata	Cidaroid urchin	PCD	266
Primnoa spp.	Primnoa sea fans	PMN	78
Primnoidae	Primnoid sea fans	PRI	77
Projasus parkeri	Deepwater rock lobster	PPA	192
Proserpinaster neozelanicus	Sea-star	PNE	244
Provocator mirabilis	Golden volute	GVO	153
Psammocinia sp.	Rubber sponge	PHW	41
Pseudechinaster rubens	Sea-star	PRU	236
Pseudechinus flemingi	Fleming's urchin	PFL	281
Pseudostichopus mollis	Sea cucumbers	PMO	284
Psilaster acuminatus	Geometric star	PSI	245
Pteropeltarion novaezelandiae	Pteropeltarion crab	PNO	166
Pycnooplax victoriensis	Two-spined crab	CVI	172
Pyrosoma atlanticum	Salp	PYR	302
Radiaster gracilis	Sea-star	RGR	246
Rhabdastrella sp.	Pink ice egg sponge	RHA	34
Scalpellidae	Stalked barnacle	SBN	222
Sclerasterias mollis	Cross-fish	SMO	237

Scientific name	Common Name	MFish code	Page
Sepioloidea spp.	Bobtail squids	SSQ	141
Sepioteuthis australis	Broad squid	BSQ	129
Sergestes spp.	Sergestid prawn	SER	219
Solaster torulatus	Chubby sun-star	SOT	257
Solenosmilia variabilis	Deepwater branching coral	SVA	88
Spatangus mathesoni	Matheson's heart urchin	SMT	279
Spatangus multispinus	Purple-heart urchin	SPT	280
Stelletta sp.	Orange fat finger sponge	SLT	35
Stenolaemata Cyclostomata	Erect cyclostome bryozoans	ECB	228
Stephanocyathus platypus	Solitary bowl coral	STP	89
Stereocidaris spp.	Cidaroid urchin	STC	264
Stoloteuthis (sometimes *Iridoteuthis*) *maoria*	Bobtail squids	IRM	143
Suberites affinis	Fleshy club sponge	SUA	42
Sympagurus dimorphus	Hermit crab	SDM	193
Taningia danae	Dana octopus squid	TDQ	133
Telesto spp.	Long polyp soft corals	TLO	64
Teratomaia richardsoni	Spiny masking crab	SMK	189
Tetilla australe	Bristle ball sponge	TTL	49
Tetilla leptoderma	Furry oval sponge	TLD	50
Thenea novaezelandiae	Yoyo sponge	THN	40
Thermiphione (undescribed)	Thermiphione scale-worm	THE	105
Thouarella spp.	Bottlebrush coral	THO	79
Todarodes filippovae	Todarodes squid	TSQ	137
Trichopeltarion fantasticum	Frilled crab	TFA	167
Uroptychus spp.	Squat lobsters	URP	169
Veprichlamys kiwaensis	Scallop	VKI	115
Vitjazmaia latidactyla	Deep-sea spider crab	VIT	178
Yaldwynopsis spinimana	Yaldwyn's crab	YSP	176
Zoantharia	Zoanthids	ZAH	94
Zoroaster spp.	Rat-tail stars	ZOR	238
Zygochlamys delicatula	Queen scallop	QSC	113

MFish code	Common Name	Scientific name	Page
ACA	Subantarctic ruby prawn	*Acanthephyra* spp.	213
ACN	Bushy bamboo coral	*Acanella* spp.	71
ACS	Smooth deepsea anemones	Actinostolidae	60
ACU	Spiny serolid isopod	*Brucerolis* spp.	204
ADT	Sea mice	*Aphrodita* spp.	104
AER	Whelk	*Aeneator recens*	146
AFO	Royal red prawn	*Aristaeomorpha foliacea*	206
ALH	Three-and-three stars	*Allostichaster* spp.	234
ALL	Volute	*Alcithoe larochei*	151
AMA	Giant file shell	*Acesta maui*	111
AMO	Fish biter	*Aega monophthalma*	201
ANI	Gamba prawns	*Austropenaeus nitidus*	208
ANZ	Knobbly sandpaper sponge	*Ecionemia novaezelandiae*	32
APM	Sea-star	*Astromesites primigenius*	241
APU	Pimpled ear sponge	*Aciculites pulchra*	45
ARO	Gigantic coral	*Anthomastus (Bathyalcyon) robustus*	63
ASC	Sea squirt or Ascidian	Ascidacea	301
ASG	Acesta	*Acesta saginata*	112
AWA	Waite's snake-star	*Astrothorax waitei*	291
AWI	Volute	*Alcithoe wilsonae*	152
BAM	Sea cucumbers	*Bathyplotes* sp.	283
BES	Sea-star	*Benthopecten* spp.	239
BHE	Deepsea brittle star	*Bathypectinura heros*	293
BNO	Deepwater octopii	*Benthoctopus* spp.	117
BOC	Deepsea anemones	*Bolocera* spp.	59
BOO	Branching bamboo coral	*Keratoisis* spp.	72
BRG	Armless stars	Brisingidae, Hymenodiscidae, Novodiniidae, Freyellidae	233
BRO	Heart urchin	*Brissopsis oldhami*	277
BSQ	Broad squid	*Sepioteuthis australis*	129
BTD	Sea cucumbers	*Benthodytes* spp.	288
CAL	Giant purple pedinid	*Caenopedina porphyrogigas*	275
CAM	Sabre prawn	*Campylonotus rathbunae*	209
CAO	Sea urchin	*Caenopedina otagoensis*	274
CAY	Carnation cup coral	*Caryophyllia* spp.	85
CDY	Cat's-foot star	*Cosmasterias dyscrita*	235
CFU	Smooth white cup sponge	*Corallistes fulvodesmus*	44
CHC	Red crab	*Chaceon bicolor*	171
CHQ	Glass squid	Cranchiidae	126
CHR	Golden corals	*Chrysogorgia* spp.	69
CHT	Chiton	Amphineura	157
CIC	Orange frond sponge	*Crella incrustans*	47
CIM	Fire worm	*Chloeia inermis*	101
CJA	Sun-star	*Crossaster multispinus*	256
CLL	Precious corals	*Corallium* spp.	68
CLM	Coral-like anemones	Corallimorphidae	67
CMP	Sea-star	*Cheiraster monopedicellaris*	240
CMR	Pagoda shell	*Coluzea mariae*	149
CMT	Feather stars	Comatulida	258
CNO	Banded-spine urchin	*Caenopedina novaezelandiae*	273
COB	Black corals	Antipatharia	65
COF	Flabellum cup corals	*Flabellum* spp.	91

MFish code	Common Name	Scientific name	Page
COV	Turrid	*Comitas onokeana vivens*	150
CPA	Pentagon star	*Ceramaster patagonicus*	248
CPU	Sea urchin	*Caenopedina pulchella*	276
CRE	White hydrocoral	*Calyptopora reticulata*	80
CRM	Airy finger sponge	*Callyspongia* sp.	43
CRN	Sea lilies with cirri	Isocrinida	259
CRN	Sea lilies without cirri (o+)	*Millericrinida, Cyrtocrinida*	260
CSS	Maurea	*Calliostoma selectum*	155
CTN	Top shell	*Calliostoma turnerarum*	156
CVE	Chiroteuthid squid	*Chiroteuthis veryani*	125
CVI	Two-spined crab	*Pycnooplax victoriensis*	172
DAP	Antlered crab	*Dagnaudus petterdi*	174
DDI	Crested cup coral	*Desmophyllum dianthus*	86
DFO	Scallop	*Delectopecten fosterianus*	114
DHO	Deepsea urchin	*Dermechinus horridus*	268
DIR	Hermit crab	*Diacanthurus rubricatus*	191
DMG	Magnificent sea-star	*Dipsacaster magnificus*	242
DPP	Sea-star	*Diplopteraster* sp.	254
DWO	Deepwater octopus	*Graneledone* spp.	119
ECB	Erect cyclostome bryozoans	Stenolaemata	228
ECT	Tam O'Shanters	Echinothuriidae	271
EEX	Sea cucumbers	*Enypniastes eximia*	287
EGA	Euciroa	*Euciroa galatheae*	116
ELP	Gill biter	*Elthusa propinqua*	203
ENE	Gill biter or tongue biter	*Elthusa neocytta*	202
EPZ	Zoanthid anemone	*Epizoanthus* spp.	95
ERE	Basket-weave horn sponge	*Euplectella regalis*	53
ERO	Deepwater branching coral	*Enallopsammia rostrata*	90
ERR	Red hydrocorals	*Errina* spp.	81
EUG	Amphipod	*Eurythenes gryllus*	165
EUN	Eunice sea-worm	Eunice (undescribed)	102
EZE	Yellow octopus	*Enteroctopus zealandicus*	118
FAR	Lacey honeycomb sponges	*Farrea* spp.	52
FMA	Tritons	*Fusitriton magellanicus*	145
FUN	Funchalia prawn	*Funchalia* spp.	218
GAT	Squat lobsters	*Gastroptychus* spp.	168
GDU	Bushy hard coral	*Goniocorella dumosa*	87
GLO	Goblin prawn	*Glyphocrangon* spp.	210
GLS	Glass sponges	Hexactinellida	51
GMC	Garrick's masking crab	*Leptomithrax garricki*	186
GOR	Gorgon's head basket-stars	*Gorgonocephalus* spp.	292
GOU	Umbrella urchin	*Goniocidaris umbraculum*	262
GPA	Parasol urchin	*Goniocidaris parasol*	261
GRE	Curling stone sponge	*Geodia regina*	36
GRM	Deepsea kina	*Gracilechinus multidentatus*	269
GSC	Giant spider crab	*Jacquinotia edwardsii*	184
GSQ	Giant squid	*Architeuthis* spp.	124
GVE	Ostrich egg sponge	*Geodia vestigifera*	37
GVO	Golden volute	*Provocator mirabilis*	153
GYS	Siboga sea pen	*Gyrophyllum sibogae*	83
HEC	Sea-star	*Henricia compacta*	247
HES	Bobtail squids	*Heteroteuthis dagamensis*	142

MFish code	Common Name	Scientific name	Page
HIS	Cidaroid urchin	*Histocidaris* spp.	265
HMT	Warty deepsea anemones	Hormathiidae	61
HNO	Erect cheilostome bryozoan	*Hippellozoon novaezelandiae*	227
HOO	Carrier crab	*Homola orientalis*	175
HSI	Jack-knife prawn	*Haliporoides sibogae*	220
HTH	Sea cucumbers	Holothuroidea	282
HTR	Trojan star	*Hippasteria phrygiana*	249
HTU	Quill worm	*Hyalinoecia tubicola*	103
HYA	Floppy tubular sponge	*Hyalascus* sp.	54
HYC	Sea-star	*Hymenaster carnosus*	255
IRM	Bobtail squids	*Stoloteuthis* (sometimes *Iridoteuthis*) *maoria*	143
ISI	Bamboo corals	Isididae	70
KWH	Knobbed whelk	*Austrofusus glans*	147
LAG	Sea cucumbers	*Laetmogone* spp.	285
LAO	New Zealand king crab	*Lithodes aotearoa*	179
LBI	Floppy chocolate plate sponge	*Lissodendoryx bifacialis*	46
LCO	Dwarf swimming crab	*Liocarcinus corrugatus*	195
LGR	Scaled squid	*Lepidoteuthis grimaldii*	128
LHC	Long-handed masking crab	*Leptomithrax longimanus*	187
LHO	Omega prawn	*Lipkius holthuisi*	211
LIP	Deepsea anemones	*Liponema* spp.	62
LLC	Long-legged masking crab	*Leptomithrax longipes*	188
LLE	Bamboo coral	*Lepidisis* spp.	73
LNV	Rock star	*Lithosoma novaezelandiae*	250
LPT	Spiny white hydrocorals	*Lepidotheca* spp.	82
LRO	Robertson's king crab	*Lithodes robertsoni*	180
LSE	Black coral	*Leiopathes secunda*	66
LSQ	Crowned firefly squid	*Lycoteuthis lorigera*	130
MCC	Cap limpet	*Malluvium calcareum*	144
MIN	Worm-commensal bamboo coral	*Minuisis* spp.	74
MIQ	Warty squid	*Onykia* (formerly *Moroteuthis*) *ingens*	138
MNI	Squat lobsters	*Munida* spp.	170
MOC	Madrepora coral	*Madrepora oculata*	92
MOM	Molpadia sea cucumber	*Molpadia musculus*	289
MRQ	Warty squid	*Onykia* (formerly *Moroteuthis*) *robsoni*	139
MSL	Sladen's star	*Mediaster sladeni*	251
MSQ	Whip-lash squids	*Mastigoteuthis* spp.	131
NAU	Scarlet prawn	*Notostomus auriculatus*	214
NCA	Hairy red swimming crab	*Nectocarcinus antarcticus*	196
NCB	Smooth red swimming crab	*Nectocarcinus bennetti*	197
NEB	Brodie's king crab	*Neolithodes brodiei*	181
NEC	Spider prawn	*Nematocarcinus* spp.	212
NEI	Giant red mysid	*Neognathophausia ingens*	205
NHU	Policeman crab	*Neommatocarcinus huttoni*	173
NOG	Gould's arrow squid	*Nototodarus gouldi*	134
NOS	Sloan's arrow squid	*Nototodarus sloanii*	135
NUD	Sea slug, Nudibranch	Nudibranchia	154
OBE	Cidaroid urchin	*Ogmocidaris benhami*	263
OCO	Octopus	*Octopus* spp.	120
OCT	Common octopus	*Pinnoctopus cordiformis*	121
ODT	Pentagonal tooth-star	*Odontaster benhami*	253

MFish code	Common Name	Scientific name	Page
OLY	Brittle star	*Ophiomusium lymani*	294
OMM	Ommastrephid squid	*Ommastrephes* spp.	136
OPI	Umbrella octopus	*Opisthoteuthis* spp.	122
OPO	Octopoteuthis squid	*Octopoteuthis* spp.	132
OPP	Deepwater prawns	*Oplophorus* spp.	215
ORE	Deepsea brittle star	*Ophiophthalmus relictus*	295
OSI	Brittle star	*Ophiocreas sibogae*	290
OVI	Deepwater branching coral	*Oculina virgosa*	93
OVM	Swimming crab	*Ovalipes molleri*	199
PAB	Bubblegum coral	*Paragorgia arborea*	75
PAD	Paddle crab	*Ovalipes catharus*	198
PAM	Sea cucumbers	*Pannychia moseleyi*	286
PAO	Sea-star	*Pillsburiaster aoteanus*	252
PAZ	Rocky dumpling sponge	*Pachymatisma* sp.	38
PCD	Cidaroid urchin	*Poriocidaris purpurata*	266
PCH	Whelk	*Penion chathamensis*	148
PDA	Warty king crab	*Paralomis dawsoni*	182
PED	Scarlet prawn	*Aristaeopsis edwardsiana*	207
PFL	Fleming's urchin	*Pseudechinus flemingi*	281
PHB	Grey fibrous massive sponge	*Phorbas* sp.	48
PHI	Sand dollar	*Peronella hinemoae*	267
PHM	Tam O'Shanters	*Phormosoma* spp.	272
PHW	Rubber sponge	*Psammocinia* sp.	41
PKN	Abyssal star	*Plutonaster knoxi*	243
PLE	Plexaurid sea fans	Plexauridae	76
PLM	Golden prawn	*Plesionika martia*	216
PLN	Fibreglass cup sponge	*Poecillastra laminaris*	39
PLY	Deepsea blind lobster	*Polycheles* spp.	194
PMN	Primnoa sea fans	*Primnoa* spp.	78
PMO	Sea cucumbers	*Pseudostichopus mollis*	284
PMU	Microsoft mouse	*Paramaretia peloria*	278
PNE	Sea-star	*Proserpinaster neozelanicus*	244
PNN	Purple sea pen	*Pennatula* spp.	84
PNO	Pteropeltarion crab	*Pteropeltarion novaezelandiae*	166
PNR	Golden brown crater sponge	*Penares* sp.	33
PPA	Deepwater rock lobster	*Projasus parkeri*	192
PRI	Primnoid sea fans	Primnoidae	77
PRK	Prawn killer	*Ibacus alticrenatus*	200
PRU	Sea-star	*Pseudechinaster rubens*	236
PSI	Geometric star	*Psilaster acuminatus*	245
PSQ	Large red scaly squid	*Pholidoteuthis massyae*	140
PTA	Deepwater prawn	*Pasiphaea aff. tarda*	217
PTM	Dell's spider crab	*Platymaia maoria*	177
PYC	Giant sea spiders	*Colossendeis* spp.	221
PYR	Salp	*Pyrosoma atlanticum*	302
PZE	Prickly king crab	*Paralomis zealandica*	183
QSC	Queen scallop	*Zygochlamys delicatula*	113
RGR	Sea-star	*Radiaster gracilis*	246
RHA	Pink ice egg sponge	*Rhabdastrella* sp.	34
SBN	Stalked barnacle	Scalpellidae	222
SCI	Scampi	*Metanephrops challengeri*	190
SDM	Hermit crab	*Sympagurus dimorphus*	193

MFish code	Common Name	Scientific name	Page
SER	Sergestid prawn	*Sergestes* spp.	219
SLT	Orange fat finger sponge	*Stelletta* sp.	35
SMK	Spiny masking crab	*Teratomaia richardsoni*	189
SMO	Cross-fish	*Sclerasterias mollis*	237
SMT	Matheson's heart urchin	*Spatangus mathesoni*	279
SOT	Chubby sun-star	*Solaster torulatus*	257
SPT	Purple-heart urchin	*Spatangus multispinus*	280
SSC	Giant masking crab	*Leptomithrax australis*	185
SSQ	Bobtail squids	*Sepioloidea* spp.	141
STC	Cidaroid urchin	*Stereocidaris* spp.	264
STP	Solitary bowl coral	*Stephanocyathus platypus*	89
SUA	Fleshy club sponge	*Suberites affinis*	42
SVA	Deepwater branching coral	*Solenosmilia variabilis*	88
TAM	Tam O'Shanters	Echinothurioida	270
TDQ	Dana octopus squid	*Taningia danae*	133
TFA	Frilled crab	*Trichopeltarion fantasticum*	167
THE	Thermiphione scale-worm	*Thermiphione* (undescribed)	105
THN	Yoyo sponge	*Thenea novaezelandiae*	40
THO	Bottlebrush coral	*Thouarella* spp.	79
TLD	Furry oval sponge	*Tetilla leptoderma*	50
TLO	Long polyp soft corals	*Telesto* spp.	64
TSQ	Todarodes squid	*Todarodes filippovae*	137
TTL	Bristle ball sponge	*Tetilla australe*	49
URP	Squat lobsters	*Uroptychus* spp.	169
VIT	Deep-sea spider crab	*Vitjazmaia latidactyla*	178
VKI	Scallop	*Veprichlamys kiwaensis*	115
VSQ	Violet squid	*Histioteuthis* spp.	127
YSP	Yaldwyn's crab	*Yaldwynopsis spinimana*	176
ZAH	Zoanthids	Zoantharia	94
ZOR	Rat-tail stars	*Zoroaster* spp.	238