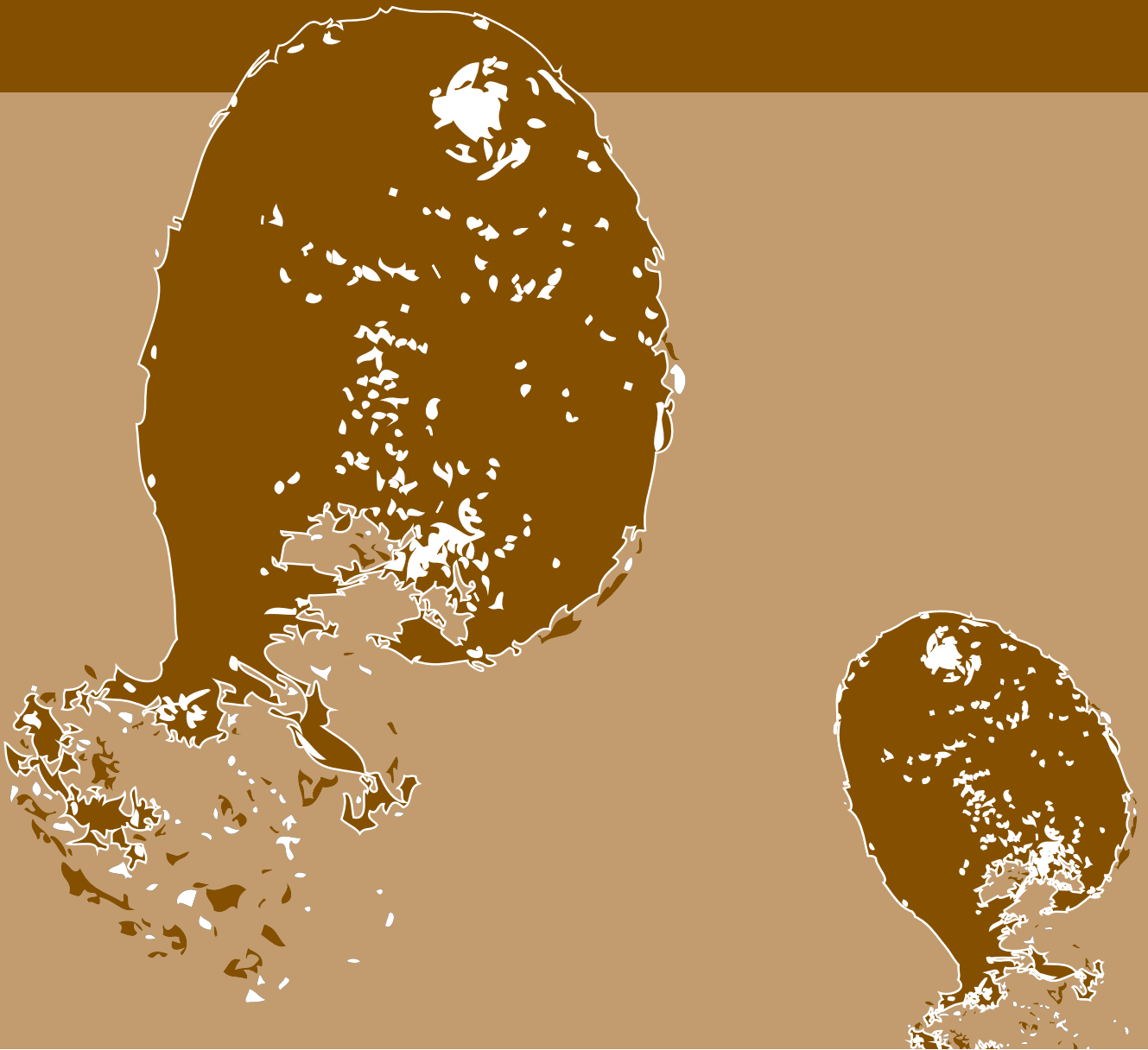


Phylum
TUNICATA
Sea squirts, salps

Mike Page, Megan Oliver



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 — **Ascidacea** (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.

Ascidacea

Sea squirts are solitary or colonial. The name Ascidacea 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)



TUNICATA

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.

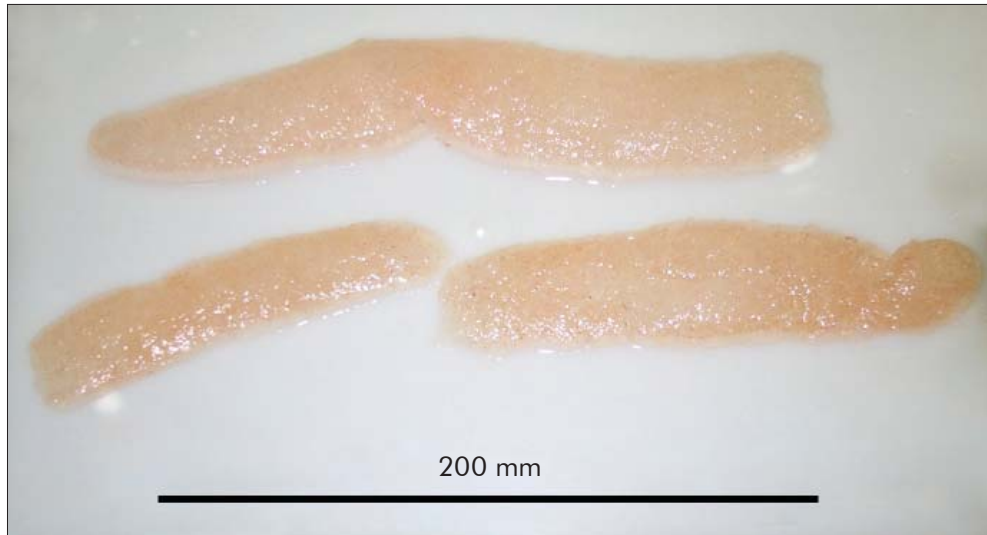
Similar species: Several tunicate species are found in New Zealand waters.

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 Salpidae

***Pyrosoma atlanticum* (PYR)**



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 (s)	<i>Plutonaster knoxi</i>	PKN	215
Airy finger sponge (s)	<i>Callyspongia</i> sp.	CRM	36
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Antlered crab (s)	<i>Dagnaudus petterdi</i>	DAP	152
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Bamboo coral (f)	<i>Lepidisis</i> spp.	LLE	63
Bamboo coral (f)	Isididae	ISI	64
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Basket-weave horn sponge (s)	<i>Euplectella regalis</i>	ERE	43
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Bubblegum coral (s)	<i>Paragorgia arborea</i>	PAB	60
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Carrier crab (s)	<i>Homola orientalis</i>	HOO	153
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Deepsea anemones (g+)	<i>Bolocera</i> spp.	BOC	51
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Deepsea brittle star (s)	<i>Bathypectinura heros</i>	BHE	262
Deepsea kina (s)	<i>Gracilechinus multidentatus</i>	GRM	241
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Deepsea urchin (s)	<i>Dermechinus horridus</i>	DHO	240
Deepwater branching coral (g+)	<i>Solenosmilia variabilis</i>	SVA	75
Deepwater branching coral (g+)	<i>Enallopsammia rostrata</i>	ERO	76
Deepwater branching coral (g+)	<i>Oculina virgosa</i>	OVI	79
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Deepwater octopus (s+)	<i>Graneledone</i> spp.	DWO	105
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Deepwater rock lobster (s)	<i>Projasus parkeri</i>	PPA	175
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Dwarf swimming crab (s)	<i>Liocarcinus corrugatus</i>	LCO	181
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Erect cyclostome bryozoans (s+)	Stenolaemata	ECB	202
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Eunice sea-worm (s)	<i>Eunice</i> (undescribed)	EUN	86

Feather stars (o)	Comatulida	CMT	230
Fibreglass cup sponge (s)	<i>Poecillastra laminaris</i>	PLN	32
Fire worm (s)	<i>Chloeia inermis</i>	CIM	85
Fish biter (s)	<i>Aega monophthalma</i>	AMO	189
Flabellum cup corals (g)	<i>Flabellum</i> spp.	COF	77
Fleming's urchin (s)	<i>Pseudechinus flemingi</i>	PFL	251
Fleshy club sponge (s)	<i>Suberites affinis</i>	SUA	35
Floppy tubular sponge (s)	<i>Hyalascus</i> sp.	HYA	44
Funchalia prawn (s)	<i>Funchalia</i> spp.	FUN	191
Furry oval sponge (s)	<i>Tetilla leptoderma</i>	TLD	41
Garrick's masking crab (s)	<i>Leptomithrax garricki</i>	GMC	164
Geometric star (s)	<i>Psilaster acuminatus</i>	PSI	216
Giant file shell (s)	<i>Acesta maui</i>	AMA	97
Giant masking crab (s)	<i>Leptomithrax australis</i>	SSC	163
Giant purple pedinid (s)	<i>Caenopedina</i> sp.	CAL	247
Giant red mysid (s)	<i>Neognathophausia ingens</i>	NEI	193
Giant sea spiders (g)	<i>Colossendeis</i> spp.	PYC	194
Giant spider crab (s)	<i>Jacquintia edwardsii</i>	GSC	162
Giant squid (g)	<i>Architeuthis</i> spp.	GSQ	108
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Gill biter or tongue biter (f)	<i>Elthusa neocyttia</i>	ENE	190
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Golden corals (g+)	<i>Chrysogorgia</i> spp.	CHR	61
Golden prawn (s)	<i>Plesionika martia</i>	PLM	189
Golden volute (s)	<i>Provocator mirabilis</i>	GVO	127
Gorgon's head basket-stars (g)	<i>Gorgonocephalus</i> spp.	GOR	261
Gould's arrow squid (s)	<i>Nototodarus gouldi</i>	NOG	111
Grey fibrous massive sponge (g)	<i>Phorbas</i> spp.	PHB	40
Hairy red swimming crab (s)	<i>Nectocarcinus antarcticus</i>	NCA	182
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Jack-knife prawn (s)	<i>Haliporoides sibogae</i>	HSI	193
Knobbed whelk (f+)	<i>Austrofuscus glans</i>	KWH	121
Knobbly sandpaper sponge (s)	<i>Ancorina novaezelandiae</i>	ANZ	30
Krill (g)	<i>Munida</i> spp.	MNI	147
Lacey honeycomb sponge (s)	<i>Farrea</i> sp.	FAR	42
Large red scaly squid (s)	<i>Pholidoteuthis boschmai</i>	PSQ	117
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Magnificent sea-star (s)	<i>Dipsacaster magnificus</i>	DMG	214
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Maurea (s)	<i>Calliostoma selectum</i>	CSS	129
Microsoft mouse (s)	<i>Paramaretia peloria</i>	PMU	248
Murray's king crab (s)	<i>Lithodes murrayi</i>	LMU	158
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Ostrich egg sponge (s)	<i>Geodinella vestigifera</i>	GVE	31
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Policeman crab (s)	<i>Neommatocarcinus huttoni</i>	NHU	151
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Precious corals (g+)	<i>Corallium</i> spp.	CLL	59
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Purple-heart urchin (s)	<i>Spatangus multispinus</i>	SPT	250
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Tritons (f)	<i>Fusitriton magellanicus</i>	FMA	119
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Warty squid (g)	<i>Moroteuthis ingens</i>	MIQ	115
Warty squid (g)	<i>Moroteuthis robsoni</i>	MRQ	116
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Whelk (f+)	<i>Penion chathamensis</i>	PCH	122
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*Includes families Brisingidae,
Hymenodiscidae, Novodiniidae,
Freyellidae

Index 2: Scientific Names

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Lesser giant file shell (s)	<i>Acesta saginata</i>	ASG	98
Pimpled ear sponge (s)	<i>Aciculites pulchra</i>	APU	38
Smooth deepsea anemones (f)	Actinostolidae	ACS	52
Spiny serolid isopod (s)	<i>Acutiserolis</i> spp.	ACU	192
Fish biter (s)	<i>Aega monophthalma</i>	AMO	189
Whelk (f+)	<i>Aeneator recens</i>	AER	120
Volute (f)	<i>Alcithoe larochei</i>	ALL	125
Volute (f)	<i>Alcithoe wilsonae</i>	AWI	126
Knobbly sandpaper sponge (s)	<i>Ancorina novaezelandiae</i>	ANZ	30
Gigantic coral (s)	<i>Anthomastus (Bathyalcyon) robustus</i>	ARO	55
Black corals (o)	<i>Antipatharia</i>	COB	58
Sea mice (f)	<i>Aphrodita</i> spp.	ADT	88
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Deepsea brittle star (s)	<i>Bathypectinura heros</i>	BHE	262
Sea cucumbers (c)	<i>Bathyplores moseleyi</i>	BAM	252
Deepwater octopii (f)	<i>Benthoctopus</i> spp.	BNO	103
Sea cucumbers (c)	<i>Benthodytes</i> sp.	BTD	257
Sea-star (c)	<i>Benthopecten</i> spp.	BES	212
Deepsea anemones (g+)	<i>Bolocera</i> spp.	BOC	51
Armless stars (f+)	Brisingidae etc.*	BRG	207
Banded-spine urchin (s)	<i>Caenopedina novaezelandiae</i>	CNO	245
Sea urchin (c)	<i>Caenopedina otagoensis</i>	CAO	246
Giant purple pedinid (s)	<i>Caenopedina</i> sp.	CAL	247
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Top shell (f+)	<i>Calliostoma turnerarum</i>	CTN	130
Airy finger sponge (s)	<i>Callyspongia</i> sp.	CRM	36
White hydrocoral (s)	<i>Calyptopora reticulata</i>	CRE	66
Sabre prawn (s)	<i>Campylonotus rathbunae</i>	CAM	182
Two-spined crab (s)	<i>Carcinoplax victoriensis</i>	CVI	150
Carnation cup coral (g)	<i>Caryophyllia</i> spp.	CAY	72
Pentagon star (s+)	<i>Ceramaster patagonicus</i>	CPA	220
Red crab (s)	<i>Chaceon bicolor</i>	CHC	148
Sea-star (c)	<i>Cheiraster monopedicellaris</i>	CMP	213
Fire worm (s)	<i>Chloeia inermis</i>	CIM	85
Golden corals (g+)	<i>Chrysogorgia</i> spp.	CHR	61
Giant sea spiders (g)	<i>Colossendeis</i> spp.	PYC	194
Pagoda shell (s)	<i>Coluzea mariae</i>	CMR	123
Feather stars (o)	Comatulida	CMT	230
Turrid (f)	<i>Comitas onokeana vivens</i>	COV	124
Smooth white cup sponge (s)	<i>Corallistes fulvodesmus</i>	CFU	37
Precious corals (g+)	<i>Corallium</i> spp.	CLL	59
Cat's-foot star (s)	<i>Cosmasterias dyscrita</i>	CDY	208
Glass squid (f)	Cranchiidae	CHQ	109
Orange frond sponge (s)	<i>Crella incrustans</i>	CIC	39

Sun-star (f)	<i>Crossaster multispinus</i>	CJA	228
Antlered crab (s)	<i>Dagnaudus petterdi</i>	DAP	152
Scallop (f)	<i>Delectopecten fosterianus</i>	DFO	100
Deepsea urchin (s)	<i>Dermechinus horridus</i>	DHO	240
Crested cup coral (s)	<i>Desmophyllum dianthus</i>	DDI	73
Hermit crab (f+)	<i>Diacanthurus rubricatus</i>	DIR	174
Sea-star (c)	<i>Diplopteraster</i> sp.	DPP	226
Magnificent sea-star (s)	<i>Dipsacaster magnificus</i>	DMG	214
Tam O'Shanters (o)	Echinothuriidae	ECT	242
Tam O'Shanters (o)	Echinothurioida	TAM	243
Gill biter or tongue biter (f)	<i>Elthusa neocyttia</i>	ENE	190
Gill biter (s)	<i>Elthusa propinqua</i>	ELP	191
Deepwater branching coral (g+)	<i>Enallopsammia rostrata</i>	ERO	76
Yellow octopus (s)	<i>Enteroctopus zealandicus</i>	EZE	104
Sea cucumbers (c)	<i>Enypniastes eximia</i>	EEX	256
Zoanthid anemone (o)	<i>Epizoanthus</i> sp.	EPZ	80
Red hydrocorals (g)	<i>Errina</i> spp.	ERR	67
Euciroa bivalve (g)	<i>Euciroa galatheae</i>	EGA	102
Eunice sea-worm (s)	<i>Eunice</i> (undescribed)	EUN	86
Basket-weave horn sponge (s)	<i>Euplectella regalis</i>	ERE	43
Amphipod (o)	<i>Eurythenes gryllus</i>	EUG	139
Lacey honeycomb sponge (s)	<i>Farrea</i> sp.	FAR	42
Flabellum cup corals (g)	<i>Flabellum</i> spp.	COF	77
Funchalia prawn (s)	<i>Funchalia</i> spp.	FUN	191
Tritons (f)	<i>Fusitriton magellanicus</i>	FMA	119
Squat lobsters (f+)	<i>Gastroptychus</i> spp.	GTC	146
Ostrich egg sponge (s)	<i>Geodinella vestigifera</i>	GVE	31
Goblin prawn (s)	<i>Glyphocrangon lowryi</i>	GLO	183
Parasol urchin (s)	<i>Goniocidaris parasol</i>	GPA	233
Umbrella urchin (s)	<i>Goniocidaris umbraculum</i>	GOU	234
Bushy hard coral (s)	<i>Goniocorella dumosa</i>	GDU	74
Gorgon's head basket-stars (g)	<i>Gorgonocephalus</i> spp.	GOR	261
Deepsea kina (s)	<i>Gracilechinus multidentatus</i>	GRM	241
Deepwater octopus (s+)	<i>Graneledone</i> spp.	DWO	105
Siboga sea pen (s)	<i>Gyrophyllum sibogae</i>	GYS	69
Jack-knife prawn (s)	<i>Haliporoides sibogae</i>	HSI	193
Sea-star (c)	<i>Henricia compacta</i>	HEC	218
Glass sponges (c)	Hexactinellida	GLS	45
Trojan star (s)	<i>Hippasteria phrygiana</i>	HTR	221
Erect cheilostome bryozoan (s)	<i>Hippellozoon novaezelandiae</i>	HNO	201
Violet squid (g)	<i>Histioteuthis</i> spp.	VSQ	110
Cidaroid urchin (o)	<i>Histocidaris</i> spp.	HIS	237
Sea cucumbers (c)	Holothuroidea	HTH	258
Carrier crab (s)	<i>Homola orientalis</i>	HOO	153
Warty deepsea anemones (f)	Hormathiidae	HMT	53
Floppy tubular sponge (s)	<i>Hyalascus</i> sp.	HYA	44
Quill worm (g)	<i>Hyalinoecia tubicola</i>	HTU	87
Sea-star (c)	<i>Hymenaster carnosus</i>	HYC	227
Prawn killer (s+)	<i>Ibacus alticrenatus</i>	PRK	186
Bamboo coral (f)	Isididae	ISI	64
Sea lilies with cirri (o)	Isocrinida	CRN	231
Giant spider crab (s)	<i>Jacquintotia edwardsii</i>	GSC	162
Branching bamboo coral (g)	<i>Keratoisis</i> spp.	BOO	62

Sea cucumbers (c)	<i>Laetmogone</i> sp.	LAG	254
Leiopathes black coral (g)	<i>Leiopathes secunda</i>	LSE	57
Bamboo coral (f)	<i>Lepidisis</i> spp.	LLE	63
Spiny white hydrocorals (g)	<i>Lepidotheca</i> spp.	LPT	68
Giant masking crab (s)	<i>Leptomithrax australis</i>	SSC	163
Garrick's masking crab (s)	<i>Leptomithrax garricki</i>	GMC	164
Long-handed masking crab (s)	<i>Leptomithrax longimanus</i>	LHC	165
Long-legged masking crab (s)	<i>Leptomithrax longipes</i>	LLC	166
Dwarf swimming crab (s)	<i>Liocarcinus corrugatus</i>	LCO	181
Omega prawn (s)	<i>Lipkius holthuisi</i>	LHO	184
Deepsea anemones (g)	<i>Liponema</i> spp.	LIP	54
Long-spined king crab (s)	<i>Lithodes cf. longispinus</i>	LLT	157
Murray's king crab (s)	<i>Lithodes murrayi</i>	LMU	158
Rock star (s)	<i>Lithosoma novaezelandiae</i>	LNV	222
Madrepora coral (g)	<i>Madrepora oculata</i>	MOC	78
Cap limpet (s)	<i>Malluvium calcareum</i>	MCC	118
Sladen's star (s)	<i>Mediaster sladeni</i>	MSL	223
Scampi (f)	<i>Metanephrops challengerii</i>	SCI	170
Sea lilies without cirri (o+)	Millericrinida, Cyrtocrinida	CRN	232
Warty squid (g)	<i>Moroteuthis ingens</i>	MIQ	115
Warty squid (g)	<i>Moroteuthis robsoni</i>	MRQ	116
Krill (g)	<i>Munida</i> spp.	MNI	147
Hairy red swimming crab (s)	<i>Nectocarcinus antarcticus</i>	NCA	182
Smooth red swimming crab (s)	<i>Nectocarcinus bennetti</i>	NCB	183
Spider prawns (f)	<i>Nematocarcinus</i> spp.	NEC	185
Giant red mysid (s)	<i>Neognathophausia ingens</i>	NEI	193
Brodie's king crab (s)	<i>Neolithodes brodiei</i>	NEB	159
Policeman crab (s)	<i>Neommatocarcinus huttoni</i>	NHU	151
Scarlet prawn (s)	<i>Notostomus auriculatus</i>	NAU	187
Gould's arrow squid (s)	<i>Nototodarus gouldi</i>	NOG	111
Sloan's arrow squid (s)	<i>Nototodarus sloanii</i>	NOS	112
Sea slug, Nudibranch (o)	Nudibranchia	NUD	128
Deepwater branching coral (g+)	<i>Oculina virgosa</i>	OVI	79
Pentagonal tooth-star (s)	<i>Odontaster benhami</i>	ODT	225
Cidaroid urchin (o)	<i>Ogmocidaris benhami</i>	OBE	235
Ommastrephid squids (g)	<i>Ommastrephes</i> spp.	OMM	113
Brittle star (c)	<i>Ophiocreas sibogae</i>	OSI	259
Brittle star (c)	<i>Ophiomusium lymani</i>	OLY	263
Umbrella octopus (s)	<i>Opisthoteuthis</i> spp.	OPI	107
Deepwater prawns (s+)	<i>Oplophorus</i> spp.	OPP	188
Paddle crab (s+)	<i>Ovalipes catharus</i>	PAD	184
Swimming crab (f)	<i>Ovalipes mollerii</i>	OVM	185
Sea cucumbers (c)	<i>Pannychia moseleyi</i>	PAM	255
Bubblegum coral (s)	<i>Paragorgia arborea</i>	PAB	60
Prickly king crab (s)	<i>Paralomis zealandica</i>	PZE	161
Warty king crab (s)	<i>Paralomis dawsoni</i>	PDA	160
Microsoft mouse (s)	<i>Paramaretia peloria</i>	PMU	248
Deepwater prawn (s)	<i>Pasiphaea aff. tarda</i>	PTA	190
Whelk (f+)	<i>Penion chathamensis</i>	PCH	122
Purple sea pen (g)	<i>Pennatula</i> spp.	PNN	70
Sand dollar (o)	<i>Peronella hinemoae</i>	PHI	239
Large red scally squid (s)	<i>Pholidoteuthis boschmai</i>	PSQ	117
Grey fibrous massive sponge (g)	<i>Phorbas</i> spp.	PHB	40

Tam O'Shanters (o)	<i>Phormosoma</i> spp.	PHM	244
Sea-star (c)	<i>Pillsburiaster aoteanus</i>	PAO	224
Common octopus (s)	<i>Pinnoctopus cordiformis</i>	OCT	106
Dell's spider crab (s)	<i>Platymaia maoria</i>	PTM	155
Golden prawn (s)	<i>Plesionika martia</i>	PLM	189
Abyssal star (s)	<i>Plutonaster knoxi</i>	PKN	215
Fibreglass cup sponge (s)	<i>Poecillastra laminaris</i>	PLN	32
Chiton (c)	Polyplacophora	CHT	131
Cidaroid urchin (o)	<i>Poriodaridaris purpurata</i>	PCD	238
Deepwater rock lobster (s)	<i>Projasus parkeri</i>	PPA	175
Sea-star (c)	<i>Proserpinaster neozelanicus</i>	PNE	219
Golden volute (s)	<i>Provocator mirabilis</i>	GVO	127
Rubber sponge (s)	<i>Psammocinia</i> sp.	PHW	34
Sea-star (c)	<i>Pseudechinaster rubens</i>	PRU	209
Fleming's urchin (s)	<i>Pseudechinus flemingi</i>	PFL	251
Sea cucumbers (c)	<i>Pseudostichopus mollis</i>	PMO	253
Geometric star (s)	<i>Psilaster acuminatus</i>	PSI	216
Pteropeltarion crab (s)	<i>Pteropeltarion novaezelandiae</i>	PNO	142
Salp (c)	<i>Pyrosoma atlanticum</i>	PYR	270
Sea-star (c)	<i>Radiaster gracilis</i>	RGR	217
Stalked barnacles (f+)	Scalpellidae	SBN	195
Cross-fish (s)	<i>Sclerasterias mollis</i>	SMO	210
Sergestid prawn (g)	<i>Sergestes</i> spp.	SER	192
Chubby sun-star (s)	<i>Solaster torulatus</i>	SOT	229
Deepwater branching coral (g+)	<i>Solenosmilia variabilis</i>	SVA	75
Matheson's heart urchin (s)	<i>Spatangus mathesoni</i>	SMT	249
Purple-heart urchin (s)	<i>Spatangus multispinus</i>	SPT	250
Erect cyclostome bryozoans (s+)	Stenolaemata	ECB	202
Solitary bowl coral (s)	<i>Stephanocyathus platypus</i>	STP	71
Cidaroid urchin (o)	<i>Stereocidaridaris</i> spp.	STC	236
Deepsea blind lobster (s)	<i>Stereomastis suhmi</i>	PLY	180
Fleshy club sponge (s)	<i>Suberites affinis</i>	SUA	35
Hermit crab (f+)	<i>Sympagurus dimorphus</i>	SDM	177
Long polyp soft corals (g)	<i>Telesto</i> spp.	TLO	56
Spiny masking crab (s)	<i>Teratomaia richardsoni</i>	SMK	167
Furry oval sponge (s)	<i>Tetilla leptoderma</i>	TLD	41
Yoyo sponge (s)	<i>Thenea novaezelandiae</i>	THN	33
Thermiphione scaleworm (g)	<i>Thermiphione</i> (undescribed)	THE	89
Bottlebrush coral (g)	<i>Thouarella</i> spp.	THO	65
Todarodes squid (g)	<i>Todarodes filippovae</i>	TSQ	114
Trichopeltarion crab (s)	<i>Trichopeltarion fantasticum</i>	TFA	143
Squat lobsters (f+)	<i>Uroptychus</i> spp.	URP	145
Scallop (f)	<i>Veprichlamys kiwaensis</i>	VKI	101
Deep-sea spider crab (s)	<i>Vitjazmaia latidactyla</i>	VIT	156
Yaldwyn's crab (s)	<i>Yaldwynopsis spinimana</i>	YSP	154
Rat-tail stars (g)	<i>Zoroaster</i> spp.	ZOR	211
Queen scallop (s)	<i>Zygochlamys delicatula</i>	QSC	99

*Includes families Brisingidae, Hymenodiscidae, Novodiniidae, Freyelliidae

Index 3: Mfish code

Common Name	Scientific name	Mfish code	Page
Subantarctic ruby prawn (s)	<i>Acanthephyra</i> spp.	ACA	186
Smooth deepsea anemones (f)	Actinostolidae	ACS	52
Spiny serolid isopod (s)	<i>Acutiserolis</i> spp.	ACU	192
Sea mice (f)	<i>Aphrodita</i> spp.	ADT	88
Whelk (f+)	<i>Aeneator recens</i>	AER	120
Royal red prawn (s)	<i>Aristaeomorpha foliacea</i>	AFO	180
Volute (f)	<i>Alcithoe larochei</i>	ALL	125
Giant file shell (s)	<i>Acesta mauri</i>	AMA	97
Fish biter (s)	<i>Aega monophthalma</i>	AMO	189
Knobbly sandpaper sponge (s)	<i>Ancorina novaezelandiae</i>	ANZ	30
Pimpled ear sponge (s)	<i>Aciculites pulchra</i>	APU	38
Gigantic coral (s)	<i>Anthomastus (Bathyalcyon) robustus</i>	ARO	55
Sea squirt or Ascidian (c)	Ascidacea	ASC	269
Lesser giant file shell (s)	<i>Acesta saginata</i>	ASG	98
Waite's snake-star (s)	<i>Astrothorax waitei</i>	AWA	260
Volute (f)	<i>Alcithoe wilsonae</i>	AWI	126
Sea cucumbers (c)	<i>Bathyploetes moseleyi</i>	BAM	252
Sea-star (c)	<i>Benthopecten</i> spp.	BES	212
Deepsea brittle star (s)	<i>Bathypectinura heros</i>	BHE	262
Deepwater octopii (f)	<i>Benthoctopus</i> spp.	BNO	103
Deepsea anemones (g+)	<i>Bolocera</i> spp.	BOC	51
Branching bamboo coral (g)	<i>Keratoisis</i> spp.	BOO	62
Armless stars (f+)	Brisingidae etc.*	BRG	207
Sea cucumbers (c)	<i>Benthodytes</i> sp.	BTD	257
Giant purple pedinid (s)	<i>Caenopedina</i> sp.	CAL	247
Sabre prawn (s)	<i>Campylonotus rathbunae</i>	CAM	182
Sea urchin (c)	<i>Caenopedina otagoensis</i>	CAO	246
Carnation cup coral (g)	<i>Caryophyllia</i> spp.	CAY	72
Cat's-foot star (s)	<i>Cosmasterias dyscrita</i>	CDY	208
Smooth white cup sponge (s)	<i>Corallistes fulvodesmus</i>	CFU	37
Red crab (s)	<i>Chaceon bicolor</i>	CHC	148
Glass squid (f)	Cranchiidae	CHQ	109
Golden corals (g+)	<i>Chrysogorgia</i> spp.	CHR	61
Chiton (c)	Polyplacophora	CHT	131
Orange frond sponge (s)	<i>Crella incrustans</i>	CIC	39
Fire worm (s)	<i>Chloeia inermis</i>	CIM	85
Sun-star (f)	<i>Crossaster multispinus</i>	CJA	228
Precious corals (g+)	<i>Corallium</i> spp.	CLL	59
Sea-star (c)	<i>Cheiraster monopedicellaris</i>	CMP	213
Pagoda shell (s)	<i>Coluzea mariae</i>	CMR	123
Feather stars (o)	Comatulida	CMT	230
Banded-spine urchin (s)	<i>Caenopedina novaezelandiae</i>	CNO	245
Black corals (o)	Antipatharia	COB	58
Flabellum cup corals (g)	<i>Flabellum</i> spp.	COF	77
Turrid (f)	<i>Comitas onokeana vivens</i>	COV	124
Pentagon star (s+)	<i>Ceramaster patagonicus</i>	CPA	220
White hydrocoral (s)	<i>Calyptopora reticulata</i>	CRE	66
Airy finger sponge (s)	<i>Callyspongia</i> sp.	CRM	36
Sea lilies with cirri (o)	Isocrinida	CRN	231
Sea lilies without cirri (o+)	Millericrinida, Cyrtocrinida	CRN	232
Maurea (s)	<i>Calliostoma selectum</i>	CSS	129

Top shell (f+)	<i>Calliostoma turnerarum</i>	CTN	130
Two-spined crab (s)	<i>Carcinoplax victoriensis</i>	CVI	150
Antlered crab (s)	<i>Dagnaudus petterdi</i>	DAP	152
Crested cup coral (s)	<i>Desmophyllum dianthus</i>	DDI	73
Scallop (f)	<i>Delectopecten fosterianus</i>	DFO	100
Deepsea urchin (s)	<i>Dermechinus horridus</i>	DHO	240
Hermit crab (f+)	<i>Diacanthurus rubricatus</i>	DIR	174
Magnificent sea-star (s)	<i>Dipsacaster magnificus</i>	DMG	214
Sea-star (c)	<i>Diplopteraster</i> sp.	DPP	226
Deepwater octopus (s+)	<i>Graneledone</i> spp.	DWO	105
Erect cyclostome bryozoans (s+)	<i>Stenolaemata</i>	ECB	202
Tam O'Shanters (o)	Echinothuriidae	ECT	242
Sea cucumbers (c)	<i>Enypniastes eximia</i>	EEX	256
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Gill biter or tongue biter (f)	<i>Elthusa neocyttia</i>	ENE	190
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Deepwater branching coral (g+)	<i>Enallopsammia rostrata</i>	ERO	76
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Bushy hard coral (s)	<i>Goniocorella dumosa</i>	GDU	74
Goblin prawn (s)	<i>Glyphocrangon lowryi</i>	GLO	183
Glass sponges (c)	Hexactinellida	GLS	45
Garrick's masking crab (s)	<i>Leptomithrax garricki</i>	GMC	164
Gorgon's head basket-stars (g)	<i>Gorgonocephalus</i> spp.	GOR	261
Umbrella urchin (s)	<i>Goniocidaris umbraculum</i>	GOU	234
Parasol urchin (s)	<i>Goniocidaris parasol</i>	GPA	233
Deepsea kina (s)	<i>Gracilechinus multidentatus</i>	GRM	241
Giant spider crab (s)	<i>Jacquintonia edwardsii</i>	GSC	162
Giant squid (g)	<i>Architeuthis</i> spp.	GSQ	108
Squat lobsters (f+)	<i>Gastroptychus</i> spp.	GTC	146
Ostrich egg sponge (s)	<i>Geodinella vestigifera</i>	GVE	31
Golden volute (s)	<i>Provocator mirabilis</i>	GVO	127
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Cidaroid urchin (o)	<i>Histocidaris</i> spp.	HIS	237
Warty deepsea anemones (f)	Hormathiidae	HMT	53
Erect cheilostome bryozoan (s)	<i>Hippellozoon novaezealandiae</i>	HNO	201
Carrier crab (s)	<i>Homola orientalis</i>	HOO	153
Jack-knife prawn (s)	<i>Haliporoides sibogae</i>	HSI	193
Sea cucumbers (c)	Holothuroidea	HTH	258
Trojan star (s)	<i>Hippasteria phrygiana</i>	HTR	221
Quill worm (g)	<i>Hyalinoecia tubicola</i>	HTU	87
Floppy tubular sponge (s)	<i>Hyalascus</i> sp.	HYA	44
Sea-star (c)	<i>Hymenaster carnosus</i>	HYC	227
Bamboo coral (f)	Isididae	ISI	64
Knobbed whelk (f+)	<i>Austrofusus glans</i>	KWH	121

Sea cucumbers (c)	<i>Laetmogone</i> sp.	LAG	254
Dwarf swimming crab (s)	<i>Liocarcinus corrugatus</i>	LCO	181
Long-handed masking crab (s)	<i>Leptomithrax longimanus</i>	LHC	165
Omega prawn (s)	<i>Lipkius holthuisi</i>	LHO	184
Deepsea anemones (g)	<i>Liponema</i> spp.	LIP	54
Long-legged masking crab (s)	<i>Leptomithrax longipes</i>	LLC	166
Bamboo coral (f)	<i>Lepidisis</i> spp.	LLE	63
Long-spined king crab (s)	<i>Lithodes cf. longispinus</i>	LLT	157
Murray's king crab (s)	<i>Lithodes murrayi</i>	LMU	158
Rock star (s)	<i>Lithosoma novaezelandiae</i>	LNW	222
Spiny white hydrocorals (g)	<i>Lepidotheca</i> spp.	LPT	68
Leiopathes black coral (g)	<i>Leiopathes secunda</i>	LSE	57
Cap limpet (s)	<i>Malluvium calcareum</i>	MCC	118
Warty squid (g)	<i>Moroteuthis ingens</i>	MIQ	115
Krill (g)	<i>Munida</i> spp.	MNI	147
Madrepora coral (g)	<i>Madrepora oculata</i>	MOC	78
Warty squid (g)	<i>Moroteuthis robsoni</i>	MRQ	116
Sladen's star (s)	<i>Mediaster sladeni</i>	MSL	223
Scarlet prawn (s)	<i>Notostomus auriculatus</i>	NAU	187
Hairy red swimming crab (s)	<i>Nectocarcinus antarcticus</i>	NCA	182
Smooth red swimming crab (s)	<i>Nectocarcinus bennetti</i>	NCB	183
Brodie's king crab (s)	<i>Neolithodes brodiei</i>	NEB	159
Spider prawns (f)	<i>Nematocarcinus</i> spp.	NEC	1185
Giant red mysid (s)	<i>Neognathophausia ingens</i>	NEI	193
Policeman crab (s)	<i>Neommatocarcinus huttoni</i>	NHU	151
Gould's arrow squid (s)	<i>Nototodarus gouldi</i>	NOG	111
Sloan's arrow squid (s)	<i>Nototodarus sloanii</i>	NOS	112
Sea slug, Nudibranch (o)	<i>Nudibranchia</i>	NUD	128
Cidaroid urchin (o)	<i>Ogmocidarid benhami</i>	OBE	235
Common octopus (s)	<i>Pinnoctopus cordiformis</i>	OCT	106
Pentagonal tooth-star (s)	<i>Odontaster benhami</i>	ODT	225
Brittle star (c)	<i>Ophiomusium lymani</i>	OLY	263
Ommastrephid squids (g)	<i>Ommastrephes</i> spp.	OMM	113
Umbrella octopus (s)	<i>Opisthoteuthis</i> spp.	OPI	107
Deepwater prawns (s+)	<i>Oplophorus</i> spp.	OPP	188
Brittle star (c)	<i>Ophiocreas sibogae</i>	OSI	259
Deepwater branching coral (g+)	<i>Oculina virgosa</i>	OVI	79
Swimming crab (f)	<i>Ovalipes mollerii</i>	OVM	185
Bubblegum coral (s)	<i>Paragorgia arborea</i>	PAB	60
Paddle crab (s+)	<i>Ovalipes catharus</i>	PAD	184
Sea cucumbers (c)	<i>Pannychia moseleyi</i>	PAM	255
Sea-star (c)	<i>Pillsburiaster aoteanus</i>	PAO	224
Cidaroid urchin (o)	<i>Poriocidarid purpurata</i>	PCD	238
Whelk (f+)	<i>Penion chathamensis</i>	PCH	122
Warty king crab (s)	<i>Paralomis dawsoni</i>	PDA	160
Scarlet prawn (s)	<i>Aristaeopsis edwardsiana</i>	PED	118141
Fleming's urchin (s)	<i>Pseudechinus flemingi</i>	PFL	251
Grey fibrous massive sponge (g)	<i>Phorbas</i> spp.	PHB	40
Sand dollar (o)	<i>Peronella hinemoae</i>	PHI	239
Tam O'Shanters (o)	<i>Phormosoma</i> spp.	PHM	244
Abyssal star (s)	<i>Plutonaster knoxi</i>	PKN	215
Golden prawn (s)	<i>Plesionika martia</i>	PLM	189
Fibreglass cup sponge (s)	<i>Pocillastra laminaris</i>	PLN	32

Deepsea blind lobster (s)	<i>Stereomastis suhmi</i>	PLY	180
Rubber sponge (s)	<i>Psammocinia</i> sp.	PHW	34
Sea cucumbers (c)	<i>Pseudostichopus mollis</i>	PMO	253
Microsoft mouse (s)	<i>Paramaretia peloria</i>	PMU	248
Sea-star (c)	<i>Proserpinaster neozelandicus</i>	PNE	219
Purple sea pen (g)	<i>Pennatula</i> spp.	PNN	70
Pteropeltarion crab (s)	<i>Pteropeltarion novaezelandiae</i>	PNO	142
Deepwater rock lobster (s)	<i>Projasus parkeri</i>	PPA	175
Prawn killer (s+)	<i>Ibacus alticrenatus</i>	PRK	186
Sea-star (c)	<i>Pseudechinaster rubens</i>	PRU	209
Geometric star (s)	<i>Psilaster acuminatus</i>	PSI	216
Large red scaly squid (s)	<i>Pholidoteuthis boschmai</i>	PSQ	117
Deepwater prawn (s)	<i>Pasiphaea aff. tarda</i>	PTA	190
Dell's spider crab (s)	<i>Platymaia maoria</i>	PTM	155
Giant sea spiders (g)	<i>Colossendeis</i> spp.	PYC	194
Salp (c)	<i>Pyrosoma atlanticum</i>	PYR	270
Prickly king crab (s)	<i>Paralomis zealandica</i>	PZE	161
Queen scallop (s)	<i>Zygochlamys delicatula</i>	QSC	99
Sea-star (c)	<i>Radiaster gracilis</i>	RGR	217
Stalked barnacle (f+)	Scalpellidae	SBN	195
Scampi (f)	<i>Metanephrops challengerii</i>	SCI	170
Hermit crab (f+)	<i>Sympagurus dimorphus</i>	SDM	177
Sergestid prawn (g)	<i>Sergestes</i> spp.	SER	192
Spiny masking crab (s)	<i>Teratomaia richardsoni</i>	SMK	167
Cross-fish (s)	<i>Sclerasterias mollis</i>	SMO	210
Matheson's heart urchin (s)	<i>Spatangus mathesoni</i>	SMT	249
Chubby sun-star (s)	<i>Solaster torulatus</i>	SOT	229
Purple-heart urchin (s)	<i>Spatangus multispinus</i>	SPT	250
Giant masking crab (s)	<i>Leptomithrax australis</i>	SSC	163
Cidaroid urchin (o)	<i>Stereocidaris</i> spp.	STC	236
Solitary bowl coral (s)	<i>Stephanocyathus platypus</i>	STP	71
Fleshy club sponge (s)	<i>Suberites affinis</i>	SUA	35
Deepwater branching coral (g+)	<i>Solenosmilia variabilis</i>	SVA	75
Tam O'Shanters (o)	Echinothurioida	TAM	243
Trichopeltarion crab (s)	<i>Trichopeltarion fantasticum</i>	TFA	143
Thermiphione scaleworm (g)	<i>Thermiphione</i> (undescribed)	THE	89
Yoyo sponge (s)	<i>Thenea novaezelandiae</i>	THN	33
Bottlebrush coral (g)	<i>Thouarella</i> spp.	THO	65
Furry oval sponge (s)	<i>Tetilla leptoderma</i>	TLD	41
Long polyp soft corals (g)	<i>Telesto</i> spp.	TLO	56
Todarodes squid (g)	<i>Todarodes filippovae</i>	TSQ	114
Squat lobsters (f+)	<i>Uroptychus</i> spp.	URP	145
Deep-sea spider crab (s)	<i>Vitjazmaia latidactyla</i>	VIT	156
Scallop (f)	<i>Veprichlamys kiwaensis</i>	VKI	101
Violet squid (g)	<i>Histioteuthis</i> spp.	VSQ	110
Yaldwyn's crab (s)	<i>Yaldwynopsis spinimana</i>	YSP	154
Rat-tail stars (g)	<i>Zoroaster</i> spp.	ZOR	211

*Includes families Brisingidae,
Hymenodiscidae, Novodiniidae,
Freyellidae