

**11<sup>th</sup> MEETING OF THE SCIENTIFIC COMMITTEE**

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**SC11 – DW09**

**NZ Update on development of identification guide for benthic bycatch**

*New Zealand*

South Pacific Regional Fisheries Management Organisation

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**Update on development of the identification guide  
for benthic bycatch**

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## 1. Purpose

The purpose of this paper is to provide an update on the SC multi-annual workplan subtask to develop an ID guide for benthic bycatch, following the steps proposed in [SC9-DW12](#). It is intended that this work will enable fishers, observers and researchers to recognise benthic bycatch taxa more readily, and to improve the quality of benthic bycatch records from the SPRFMO Convention Area.

## 2. Background

Accurate taxonomic identification of invertebrate bycatch samples from commercial bottom fishing vessels is important in determining if taxon-specific threshold weights and biodiversity thresholds have been exceeded, triggering the encounter protocol within SPRFMO [CMM03-2023](#) (Bottom fishing). Improved identification of benthic invertebrates is also important for informing predictive habitat suitability and abundance models, spatial planning processes and the development of ecological risk assessments of fishing impacts on benthic habitats.

At the Deepwater workshop held in 2021 (SCW13), New Zealand presented [SC9-DW12](#), which proposed the development of a pictorial guide for the identification of benthic bycatch. [SC9-DW12](#) proposed 10 steps for the development of the guide to ensure information provided to observers and fishers is standardised, accurate and clear, and pays particular attention to the identification, weighing, photographing, and sampling of benthic bycatch (Table 1).

Following discussion of [SC9-DW12](#), the SC **recommended** *“that the development of ID guide for benthic bycatch, following the steps proposed in this paper, and associated training videos, are added to the SC Multi-annual Work Plan with a 2022+ timeframe”*. Subsequently, COMM10 added a task to the SC multi-annual workplan to *“Develop VME taxa ID guide for benthic bycatch, following the steps proposed in SC9-DW12, and associated training videos”*.

Following COMM10, New Zealand undertook work in 2022 to progress 7 of the 10 steps identified in [SC9-DW12](#). That work included determining the purpose of the ID guides (Step 1), determining which taxa to include in the guide and at what taxonomic resolutions (Steps 2-4), determining what taxon-specific information to include in the guide (Step 5), and determining procedures for subsampling and when subsamples should be collected and returned for expert identification (Steps 7 and 8). At SC10, New Zealand presented [SC10-DW06](#) as a progress report on this work, and sought the SCs endorsement of the appropriateness of the work to date for informing the development of the ID guide. Following review of [SC10-DW06](#), the SC noted that development of an ID guide for benthic bycatch within the SPRFMO Convention Area has been progressed. The SC agreed that:

- i. The purpose of the ID Guide should be to help observers and fishers to identify and collect data on benthic bycatch landed during bottom fishing activities at taxonomic resolutions that are suitable for science and decision-making needs and meet minimum data collection requirements outlined in [CMM02-2022](#) (Data Standards) and [CMM03-2023](#) (Bottom Fishing).
- ii. The list of taxa provided in Annex 2 (of [SC10-DW06](#)) is used to populate the ID guide once Step 4 (determine the taxonomic resolution required to improve data quality and avoid misclassification) has been applied.
- iii. Where species within a genus can be easily distinguished by users in the field, they should be included at the species-level in the ID guide, and where species and genera cannot be readily

distinguished by users in the field, taxa within the guide should be collapsed into higher taxonomic levels.

- iv. The taxon-specific information identified for inclusion in the guide is appropriate.
- v. The instructions for handling, sampling, labelling, and photographing bycatch are appropriate.
- vi. The procedures for when samples should be collected and returned for expert identification are appropriate.

The SC10 advice identified that additional work to develop the ID guide was dependent upon determining the appropriate level of taxonomic classification (to avoid misclassification while being as informative as possible) for each taxon included in Annex 2 of [SC10-DW06](#).

This working paper introduces assessments by taxonomists and para-taxonomists of the taxonomic resolution at which taxa reported in Annex 2 of [SC10-DW06](#) should be included within the ID guide. Additionally, the paper also identifies several additional taxa that should be included within the ID guide, based on their known occurrence within the SPRFMO evaluated area.

**Table 1 | Steps for the development of the benthic bycatch ID guide (as proposed in [SC9-DW12](#)), progress to date, associated SC recommendations, and next steps.**

Step	Progress	Recommendations from <a href="#">SC10 Report</a>	Next Steps
1. Determine the purpose of the ID guides	Complete	The SC agreed that <i>“the purpose of the ID Guide should be to help observers and fishers to identify and collect data on benthic bycatch landed during bottom fishing activities at taxonomic resolutions that are suitable for science and decision-making needs and meet minimum data collection requirements outlined in CMM 02-2022 (Data Standards) and CMM 03-2022 (Bottom Fishing).”</i>	NA
2. Determine which taxa to include	Partially complete	The SC agreed that <i>“the list of taxa provided in Annex 2 (of SC10-DW06) is used to populate the ID guide once Step 4 (determine the taxonomic resolution required to improve data quality and avoid misclassification) has been applied.”</i>	This paper, <a href="#">SC11-DW09</a> , presents assessments by taxonomists and para-taxonomists of the taxonomic resolution at which taxa reported in Annex 2 of SC10-DW06 should be included within the ID guide. This assessment is a precursor to progressing steps 5-10.
3. Determine the taxonomic resolution required to inform management	Underway	The SC agreed that <i>“where species within a genus can be easily distinguished by users in the field, they should be included at the species-level in the ID guide, and where species and genera cannot be readily distinguished by users in the field, taxa within the guide should be collapsed into higher taxonomic levels.”</i>	
4. Determine the taxonomic resolution required to improve data quality and avoid misclassification	Underway		
5. Determine what taxon-specific information to include	Complete	Having reviewed SC10-DW06, SC agreed that <i>“the taxon-specific information identified for inclusion in the guide is appropriate”</i>	
6. Engage with fishers and observers to determine what format and properties the ID guide should have	Underway	-	Ongoing engagement with fishers and observers.
7. Determine procedures for subsampling	Complete	Having reviewed SC10-DW06, SC agreed that <i>“the instructions for handling, sampling, labelling, and photographing bycatch are appropriate.”</i>	Incorporate within the guide clear handling instructions for observers and researchers, sample labelling instructions and instructions for the digital collection of photographic images, as agreed by SC10.
8. Determine procedures for when samples should be collected and returned for expert identification	Complete	Having reviewed SC10-DW06, SC agreed that <i>“the procedures for when samples should be collected and returned for expert identification are appropriate.”</i>	Incorporate within the guide instructions to collect samples when genera or species-level identification is difficult or uncertain, the specimen has been caught outside its accepted depth range or distribution, it is a rare or unusual specimen, or appears different to the images in ID guides, samples have been specifically requested by the Scientific Committee, a member or CNCp, as agreed by SC10.
9. Expert technical review of ID guides	Not started	-	Commission technical peer review of ID guides once they have been developed.
10. Co-development of ID guides	Underway	-	Ongoing co-development of ID guide through Fisheries New Zealand South Pacific Working Group.

### 3. Assessment of taxonomic resolution

Taxonomists and para-taxonomists assessed the taxonomic level at which taxa should be included within the ID guide. Due to capacity issues, assessments were not undertaken for Zoantharia, Hydrozoa within the Order Leptothecata, Bivalves and Gastropoda. Assessments for these taxa will be completed as part of going work.

Assessments by taxonomists and para-taxonomists identified an initial list of 258 taxa to include within the guide, pending the completion of assessments (Table 2 and Annex 1).

**Table 2** | For focal taxonomic groups, the number of taxa to be included within the ID guide at each taxonomic level. \* denotes VME indicator taxa as designated in Annex 5 of CMM03-2023. ∇ denotes taxonomic groups for which evaluation by taxonomists and para-taxonomists are yet to be completed.

Focal taxonomic group	Taxonomic level				# taxa
	Order	Family	Genus	Species	
Annelida (annelid worms)	0	2	8	2	12
Arthropoda (crabs, shrimp and lobsters)	0	3	15	36	54
Bryozoa (bryozoans)*	0	1	0	0	1
Actiniaria (anemones)*	0	2	3	0	5
Alcyonacea (soft corals)*	0	4	35	4	43
Antipatharia (black corals)*	0	0	17	5	22
Pennatulacea (sea pens)*	0	0	6	4	10
Scleractinia (stony corals)*	0	0	4	8	12
Hydrozoa (hydrozoans)* ∇	-	-	-	-	-
Stylasteridae (hydrocorals)*	0	1	12	1	14
Zoantharia (hexacorals)* ∇	-	-	-	-	-
Brisingida (armless stars)*	1	0	0	0	1
Asteroidea (starfish/sea stars)	0	0	7	17	24
Crinoidea (sea lillies)*	2	3	1	1	7
Echinoidea (sea urchins)	0	3	1	9	13
Holothuroidea (sea cucumbers)	0	0	1	4	5
Ophiuroidea (brittle stars and serpent stars)	0	1	3	5	9
Bivalves ∇	-	-	-	-	-
Gastropoda ∇	-	-	-	-	-
Cephalopoda (squid and octopus)	0	0	3	2	5
Demospongiae (sponges)*	0	1	1	9	11
Hexactinellida (sponges)*	1	0	2	7	10

### 4. Additional taxa to be included in guide

Several additional taxa that should be included within the ID guide, based on their known occurrence within the SPRFMO evaluated area, were identified by taxonomists and para-taxonomists (Annex 1), including:

- The Polychaeta (annelid worm) genus *Hyalinoecia*.
- The Arthropoda (crabs, shrimp, and lobsters) class Pycnogonida, the family Gnathophausiidae, the genera *Eumunida*, *Vitjazmaia*, *Platymaia*, *Vitjazmaia* and *Leptomithrax*, and the species *Trichopeltarion janetae*, *Notopandalus magnoculus* and *Sergia potens*.
- The Bryozoa family Phidoloporidae.
- The Alcyonacea (soft coral) families Clavulariidae and Nephtheidae, the genera *Orstomisis*, *Sclerisis*, *Paragorgia* and *Sibogagorgia*, and the species *Isidoides armata*, *Keratoisis glaesa*, *Keratoisis magnifica*.
- The Antipatharia (black coral) species *Antipathella fiordensis*.
- The Pennatulacea (seapen) genera *Anthoptilum*.
- The Stylasteridae (hydrocoral) genera *Distichopora*, *Inferiolabiata*, *Lepidopora*, *Sporadopora*, *Stephanohelia* and *Systemapora*.
- The Asteroidea (starfish/sea stars) genera *Cheiraster* and *Henricia*, and the species *Crossaster taitai*, *Sclerasterias mollis* and *Pseudechinaster rubens*.
- The Octopoda (octopus) genera *Muusoctopus* and *Graneledone*, and the species *Enteroctopus zealandicus* and *Callistoctopus kermadecensis*.
- The Porifera (sponge) family Cladorhizidae, the genus *Latrunculia*, and the species *Monoraphis chuni*, *Pheronema conicum*, *Euryplegma auriculare*, *Euplectella imperialis*.

## 5. Next Steps

If the SC agrees that the determination of the taxonomic resolution required to improve data quality and avoid misclassification has been appropriately applied to the taxa assessed to date from the list of taxa provided in Annex 2 of SC10-DW06, and the list of taxa in Annex 1 can be used to begin populating the ID guide, the next steps in developing the ID guide will be to:

- Develop taxon-specific ID pages for the guide, incorporating information on the following, as agreed by SC10:
  - taxonomic hierarchy,
  - common and scientific names,
  - if the taxon is a VME indicator taxa,
  - FAO reporting codes and reporting codes used by Members or CNCPs,
  - Aphia ID,
  - images,
  - distinguishing features,
  - colour and size information,
  - known distribution and depth,
  - species or genera that can also be commonly confused (and associated FAO codes).
- Incorporate within the guide clear handling instructions for observers and researchers, sample labelling instructions, and instructions for the digital collection of photographic images, as agreed by SC10.



- Incorporate within the guide instructions on when to collect samples, as agreed by SC10, including collection of samples when:
  - when genera or species- level identification is difficult or uncertain,
  - the specimen has been caught outside it's accepted depth range or distribution,
  - it is a rare or unusual specimen, or appears different to the images in ID guides,
  - samples have been specifically requested by the Scientific Committee, a member or CNCP.

As these steps are undertaken, ongoing co-development of the ID guide will continue through the Fisheries New Zealand South Pacific Working Group, with technical peer review of ID guides once they have been completed.

## 6. Recommendations

It is recommended that the Scientific Committee:

- **Notes** that assessments by taxonomists and para-taxonomists of the taxonomic resolution at which taxa reported in Annex 2 of SC10-DW06 should be included within the ID guide has been undertaken, although there remain several taxonomic groups for which assessments are yet to be completed.
- **Agrees** that the list of taxa provided in Annex 1 is used to begin populating the ID guide.

## 7. Acknowledgements

We thank the following experts for reviewing the taxonomic level at which taxa should be included within the ID guide: Geoff Read (Polychaetes), Kareen Schnabel (Arthropods), Jeff Forman (Arthropods), Kate Neill (Asterozoans, Pennatulaceans, Pycnogonids), Dennis Gordon (Bryozoans), Sadie Mills (Ophiuroids, Actiniarians), Jaret Bilewicz (Octocorals), Rob Stewart (Antipatharians), Jennifer Beaumont (Scleractinians), Peter Marriott (Stylasterids), Owen Anderson (Crinoids, Echinoids), Niki Davey (Holothuroids), Mark Fenwick (Octopods) and Michelle Kelly (Porifera). We also thank members of the New Zealand South Pacific working group for constructive review and helpful comment on this report.

## Annex 1

**Table A1** | Taxonomic resolution of taxa for inclusion in the Benthic Bycatch ID Guide, as by taxonomists and para-taxonomists. + only known from New Zealand or Australia Exclusive Economic Zone, \*new additions.

Phylum	Class	Order	Family	Genus	Species	Subspecies
Annelida	Polychaeta	Amphinomida	Amphinomidae	<i>Chloeia</i>		<i>inermis</i>
Annelida	Polychaeta	Eunicida	Eunicidae	<i>Eunice</i>		
Annelida	Polychaeta	Eunicida	Onuphidae	<i>Hyalinoecia*</i>		
Annelida	Polychaeta	Phyllodocida	Aphroditidae	<i>Aphrodita</i>		
Annelida	Polychaeta	Phyllodocida	Polynoidae	<i>Thermiphione</i>		
Annelida	Polychaeta	Sabellida	Serpulidae	<i>Spirobranchus</i>		<i>laticapus</i>
Annelida	Polychaeta	Sabellida	Serpulidae	<i>Hyalopomatus</i>		
Annelida	Polychaeta	Sabellida	Serpulidae	<i>Neovermilia</i>		
Annelida	Polychaeta	Sabellida	Serpulidae	<i>Placostegus</i>		
Annelida	Polychaeta	Sabellida	Serpulidae	<i>Protula</i>		
Annelida	Polychaeta	Sedentaria incertae	Siboglinidae*			
Arthropoda	Malacostraca	Decapoda	Acanthephyridae	<i>Notostomus</i>		<i>auriculatus</i>
Arthropoda	Malacostraca	Decapoda	Acanthephyridae	<i>Acanthephyra</i>		
Arthropoda	Malacostraca	Decapoda	Aristaeidae	<i>Aristaeomorpha</i>		<i>foliacea</i>
Arthropoda	Malacostraca	Decapoda	Aristaeidae	<i>Austropeneus</i>		<i>nitidus</i>
Arthropoda	Malacostraca	Decapoda	Aristeidae	<i>Aristaeopsis</i>		<i>edwardsiana</i>
Arthropoda	Malacostraca	Decapoda	Aristeidae	<i>Aristeus</i>		
Arthropoda	Malacostraca	Decapoda	Atelecyclidae	<i>Trichopeltarion</i>		<i>fantasticum</i>
Arthropoda	Malacostraca	Decapoda	Atelecyclidae	<i>Trichopeltarion</i>		<i>janetae*</i>
Arthropoda	Malacostraca	Decapoda	Atelecyclidae	<i>Pteropeltarion</i>		<i>novaezealandiae</i>
Arthropoda	Malacostraca	Decapoda	Campylonotidae	<i>Campylonotus</i>		<i>rathbunae</i>
Arthropoda	Malacostraca	Decapoda	Chirostylidae	<i>Uroptychus</i>		
Arthropoda	Malacostraca	Decapoda	Chirostylidae			
Arthropoda	Malacostraca	Decapoda	Eumunidae*	<i>Eumunida*</i>		
Arthropoda	Malacostraca	Decapoda	Geryonidae	<i>Chaceon</i>		<i>bicolor</i>
Arthropoda	Malacostraca	Decapoda	Glyphocrangonidae	<i>Glyphocrangon</i>		
Arthropoda	Malacostraca	Decapoda	Goneplacidae	<i>Neommatocarcinus</i>		<i>huttoni</i>
Arthropoda	Malacostraca	Decapoda	Goneplacidae	<i>Pycnooplax</i>		<i>victoriensis</i>
Arthropoda	Malacostraca	Decapoda	Homolidae	<i>Homola</i>		<i>orientalis</i>
Arthropoda	Malacostraca	Decapoda	Homolidae	<i>Dagnaudus</i>		<i>petterdi</i>
Arthropoda	Malacostraca	Decapoda	Homolidae	<i>Yaldwynopsis</i>		<i>spiniimana</i>
Arthropoda	Malacostraca	Decapoda	Inachidae	<i>Vitjazmaia*</i>		
Arthropoda	Malacostraca	Decapoda	Inachidae	<i>Platymaia*</i>		
Arthropoda	Malacostraca	Decapoda	Lithodidae	<i>Lithodes</i>		<i>aotearoa</i>
Arthropoda	Malacostraca	Decapoda	Lithodidae	<i>Neolithodus</i>		<i>brodiei</i>
Arthropoda	Malacostraca	Decapoda	Lithodidae	<i>Paralomis</i>		<i>dawsoni</i>
Arthropoda	Malacostraca	Decapoda	Lithodidae	<i>Lithodes</i>		<i>murrayi</i>
Arthropoda	Malacostraca	Decapoda	Lithodidae	<i>Lithodes</i>		<i>robertsoni</i>
Arthropoda	Malacostraca	Decapoda	Lithodidae	<i>Paralomis</i>		<i>zealandica</i>
Arthropoda	Malacostraca	Decapoda	Majidae	<i>Jacquintia</i>		<i>edwardsii</i>
Arthropoda	Malacostraca	Decapoda	Majidae	<i>Teratomaia</i>		<i>richardsoni</i>
Arthropoda	Malacostraca	Decapoda	Majidae	<i>Leptomithrax*</i>		
Arthropoda	Malacostraca	Decapoda	Munidae			
Arthropoda	Malacostraca	Decapoda	Nematocarcinidae	<i>Lipkius</i>		<i>holthuisi</i>
Arthropoda	Malacostraca	Decapoda	Nematocarcinidae	<i>Nematocarcinus</i>		
Arthropoda	Malacostraca	Decapoda	Nephropidae	<i>Metanephrops</i>		<i>challengeri</i>
Arthropoda	Malacostraca	Decapoda	Oplophoridae	<i>Oplophorus</i>		
Arthropoda	Malacostraca	Decapoda	Paguridae	<i>Diacanthurus</i>		<i>rubricatus</i>
Arthropoda	Malacostraca	Decapoda	Palinuridae	<i>Prajasus</i>		<i>parkeri</i>
Arthropoda	Malacostraca	Decapoda	Pandalidae	<i>Notopandalus</i>		<i>magnoculus*</i>
Arthropoda	Malacostraca	Decapoda	Pandalidae	<i>Plesionika</i>		<i>martia</i>
Arthropoda	Malacostraca	Decapoda	Parapaguridae	<i>Sympagurus</i>		<i>dimorphus</i>
Arthropoda	Malacostraca	Decapoda	Pasiphaeidae	<i>Pasiphaea</i>		<i>aff.</i>
Arthropoda	Malacostraca	Decapoda	Penaeidae	<i>Funchalia</i>		
Arthropoda	Malacostraca	Decapoda	Penaeidae	<i>Penaeus</i>		
Arthropoda	Malacostraca	Decapoda	Polychelidae	<i>Polycheles</i>		
Arthropoda	Malacostraca	Decapoda	Portunidae	<i>Ovalipes</i>		<i>catharus</i>
Arthropoda	Malacostraca	Decapoda	Portunidae	<i>Liocarcinus</i>		<i>corrugatus</i>
Arthropoda	Malacostraca	Decapoda	Portunidae	<i>Ovalipes</i>		<i>molleri</i>
Arthropoda	Malacostraca	Decapoda	Portunidae	<i>Nectocarcinus</i>		
Arthropoda	Malacostraca	Decapoda	Scyllaridae	<i>Ibacus</i>		<i>alticrenatus</i>
Arthropoda	Malacostraca	Decapoda	Sergestidae	<i>Sergia</i>		<i>potens*</i>

Phylum	Class	Order	Family	Genus	Species	Subspecies
Arthropoda	Malacostraca	Decapoda	Sergestidae	<i>Sergestes</i>		
Arthropoda	Malacostraca	Decapoda	Solenoceridae	<i>Haliporoides</i>	<i>sibogae</i>	
Arthropoda	Malacostraca	Lophogastrida	Gnathophausiidae*			
Arthropoda	Pycnogonida*					
Arthropoda	Thecostraca	Scalpelliformes	Scalpellidae			
Bryozoa	Cheilostomata	Cheilostomatida	Phidoloporidae*			
Cnidaria	Anthozoa	Actiniaria	Actiniidae	<i>Bolocera</i>		
Cnidaria	Anthozoa	Actiniaria	Actinoscyphiidae	<i>Actinoscyphia</i>		
Cnidaria	Anthozoa	Actiniaria	Actinostolidae			
Cnidaria	Anthozoa	Actiniaria	Hormathiidae			
Cnidaria	Anthozoa	Actiniaria	Liponematidae	<i>Liponema</i>		
Cnidaria	Anthozoa	Alcyonacea	Acanthogorgiidae	<i>Acanthogorgia</i>		
Cnidaria	Anthozoa	Alcyonacea	Alcyoniidae	<i>Anthomastus</i>		
Cnidaria	Anthozoa	Alcyonacea	Alcyoniidae	<i>Heteropolypus</i>		
Cnidaria	Anthozoa	Alcyonacea	Anthothelidae	<i>Anthothela</i>		
Cnidaria	Anthozoa	Alcyonacea	Anthothelidae	<i>Iciligorgia</i>		
Cnidaria	Anthozoa	Alcyonacea	Chrysogorgiidae	<i>Pseudochrysogorgia</i>		
Cnidaria	Anthozoa	Alcyonacea	Chrysogorgiidae	<i>Chrysogorgia</i>		
Cnidaria	Anthozoa	Alcyonacea	Chrysogorgiidae	<i>Iridogorgia</i>		
Cnidaria	Anthozoa	Alcyonacea	Chrysogorgiidae	<i>Metallogorgia</i>		
Cnidaria	Anthozoa	Alcyonacea	Chrysogorgiidae	<i>Radicipes</i>		
Cnidaria	Anthozoa	Alcyonacea	Clavulariidae*			
Cnidaria	Anthozoa	Alcyonacea	Corallidae	<i>Hemicorallium</i>		
Cnidaria	Anthozoa	Alcyonacea	Coralliidae	<i>Corallium</i>		
Cnidaria	Anthozoa	Alcyonacea	Keratoisididae	<i>Isidoides</i>	<i>armata*</i>	
Cnidaria	Anthozoa	Alcyonacea	Keratoisididae	<i>Keratoisis</i>	<i>glaesae*</i>	
Cnidaria	Anthozoa	Alcyonacea	Keratoisididae	<i>Keratoisis</i>	<i>magnifica*</i>	
Cnidaria	Anthozoa	Alcyonacea	Keratoisididae	<i>Keratoisis</i>		
Cnidaria	Anthozoa	Alcyonacea	Keratoisididae	<i>Lepidisis</i>		
Cnidaria	Anthozoa	Alcyonacea	Keratoisididae	<i>Acanella</i>		
Cnidaria	Anthozoa	Alcyonacea	Keratoisididae	<i>Isidella</i>		
Cnidaria	Anthozoa	Alcyonacea	Keratoisididae	<i>Orstomisis*</i>		
Cnidaria	Anthozoa	Alcyonacea	Mopseidae	<i>Minuisis</i>		
Cnidaria	Anthozoa	Alcyonacea	Mopseidae	<i>Primnoisis</i>		
Cnidaria	Anthozoa	Alcyonacea	Mopseidae	<i>Sclerisis*</i>		
Cnidaria	Anthozoa	Alcyonacea	Nephtheidae*			
Cnidaria	Anthozoa	Alcyonacea	Nidaliidae	<i>Chironephtya</i>		
Cnidaria	Anthozoa	Alcyonacea	Paragorgiidae	<i>Paragorgia*</i>		
Cnidaria	Anthozoa	Alcyonacea	Paragorgiidae	<i>Sibogagorgia*</i>		
Cnidaria	Anthozoa	Alcyonacea	Plexauridae	<i>Paracis</i>	<i>squamata</i>	
Cnidaria	Anthozoa	Alcyonacea	Plexauridae			
Cnidaria	Anthozoa	Alcyonacea	Plexauridae	<i>Swiftia</i>		
Cnidaria	Anthozoa	Alcyonacea	Plexauridae	<i>Villogorgia</i>		
Cnidaria	Anthozoa	Alcyonacea	Primnoidae	<i>Callogorgia</i>		
Cnidaria	Anthozoa	Alcyonacea	Primnoidae	<i>Calyptrophora</i>		
Cnidaria	Anthozoa	Alcyonacea	Primnoidae	<i>Narella</i>		
Cnidaria	Anthozoa	Alcyonacea	Primnoidae	<i>Parastenella</i>		
Cnidaria	Anthozoa	Alcyonacea	Primnoidae	<i>Primnoa</i>		
Cnidaria	Anthozoa	Alcyonacea	Primnoidae	<i>Thouarella</i>		
Cnidaria	Anthozoa	Alcyonacea	Primnoidae			
Cnidaria	Anthozoa	Alcyonacea	Primnoidae	<i>Metafannyella</i>		
Cnidaria	Anthozoa	Alcyonacea	Primnoidae	<i>Primnoella</i>		
Cnidaria	Anthozoa	Alcyonacea	Primnoidae	<i>Tokoprymno</i>		
Cnidaria	Anthozoa	Alcyonacea	Victorgorgiidae	<i>Victorgorgia</i>		
Cnidaria	Anthozoa	Antipatharia	Antipathidae	<i>Antipathes</i>		
Cnidaria	Anthozoa	Antipatharia	Antipathidae	<i>Cirripathes</i>		
Cnidaria	Anthozoa	Antipatharia	Antipathidae	<i>Stichopathes</i>		
Cnidaria	Anthozoa	Antipatharia	Aphanipathidae	<i>Asteriopathes</i>		
Cnidaria	Anthozoa	Antipatharia	Cladopathidae	<i>Cladopathes</i>		
Cnidaria	Anthozoa	Antipatharia	Cladopathidae	<i>Trissopathes</i>		
Cnidaria	Anthozoa	Antipatharia	Leiopathidae	<i>Leiopathes</i>		
Cnidaria	Anthozoa	Antipatharia	Myriopathidae	<i>Antipathella</i>	<i>fiordensis*</i>	
Cnidaria	Anthozoa	Antipatharia	Myriopathidae	<i>Antipathella</i>		
Cnidaria	Anthozoa	Antipatharia	Myriopathidae	<i>Cupressopathes</i>		
Cnidaria	Anthozoa	Antipatharia	Schizopathidae	<i>Alternatipathes</i>	<i>alternata</i>	
Cnidaria	Anthozoa	Antipatharia	Schizopathidae	<i>Parantipathes</i>	<i>helcosticha</i>	
Cnidaria	Anthozoa	Antipatharia	Schizopathidae	<i>Bathypathes</i>	<i>patula</i>	
Cnidaria	Anthozoa	Antipatharia	Schizopathidae	<i>Bathypathes</i>		
Cnidaria	Anthozoa	Antipatharia	Schizopathidae	<i>Dendrobathypathes</i>		
Cnidaria	Anthozoa	Antipatharia	Schizopathidae	<i>Dendropathes</i>		
Cnidaria	Anthozoa	Antipatharia	Schizopathidae	<i>Lillipathes</i>		
Cnidaria	Anthozoa	Antipatharia	Schizopathidae	<i>Parantipathes</i>		
Cnidaria	Anthozoa	Antipatharia	Schizopathidae	<i>Telopathes</i>		
Cnidaria	Anthozoa	Antipatharia	Stylopathidae	<i>Tylopathes</i>	<i>glutinata</i>	
Cnidaria	Anthozoa	Antipatharia	Stylopathidae	<i>Stylopathes</i>		

Phylum	Class	Order	Family	Genus	Species	Subspecies
Cnidaria	Anthozoa	Antipatharia	Stylopathidae	<i>Triadopathes</i>		
Cnidaria	Anthozoa	Antipatharia	Stylopathidae	<i>Tylopathes</i>		
Cnidaria	Anthozoa	Anthoptillidae	Anthoptillidae	<i>Anthoptilum*</i>		
Cnidaria	Anthozoa	Balticinidae	Balticinidae	<i>Balticina</i>		
Cnidaria	Anthozoa	Funiculinidae	Funiculinidae	<i>Funiculina</i>		<i>quadrangularis</i>
Cnidaria	Anthozoa	Kophobelemnidae	Kophobelemnidae	<i>Kophobelemnion</i>		
Cnidaria	Anthozoa	Pennatulidae	Pennatulidae	<i>Gyrophyllum</i>		<i>sibogae</i>
Cnidaria	Anthozoa	Pennatulidae	Pennatulidae	<i>Pennatula</i>		
Cnidaria	Anthozoa	Pennatulidae	Pennatulidae	<i>Pteroeides</i>		
Cnidaria	Anthozoa	Protoptilidae	Protoptilidae	<i>Distichoptilum</i>		<i>gracile</i>
Cnidaria	Anthozoa	Umbellulidae	Umbellulidae	<i>Umbellula</i>		
Cnidaria	Anthozoa	Virgulariidae	Virgulariidae	<i>Acanthoptilum</i>		<i>longifolium</i>
Cnidaria	Anthozoa	Caryophylliidae	Caryophylliidae	<i>Desmophyllum</i>		<i>dianthus</i>
Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	<i>Goniocorella</i>		<i>dumosa</i>
Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	<i>Stephanocyathus</i>		<i>platypus</i>
Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	<i>Solenosmilia</i>		<i>variabilis</i>
Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	<i>Caryophyllia</i>		
Cnidaria	Anthozoa	Scleractinia	Dendrophylliidae	<i>Eguchipsammia</i>		<i>japonica</i>
Cnidaria	Anthozoa	Scleractinia	Dendrophylliidae	<i>Enallopsammia</i>		<i>rostrata</i>
Cnidaria	Anthozoa	Scleractinia	Dendrophylliidae	<i>Dendrophyllia</i>		
Cnidaria	Anthozoa	Scleractinia	Flabellidae	<i>Flabellum</i>		
Cnidaria	Anthozoa	Scleractinia	Fungiacyathidae	<i>Fungiacyathus</i>		
Cnidaria	Anthozoa	Scleractinia	Oculinidae	<i>Madrepora</i>		<i>oculata</i>
Cnidaria	Anthozoa	Scleractinia	Oculinidae	<i>Oculina</i>		<i>virgosa</i>
Cnidaria	Anthozoa	Scleractinia				
Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	<i>Lepidopora</i>		<i>dendrostylus</i>
Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	<i>Conopora</i>		
Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	<i>Crypthelia</i>		
Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	<i>Errina</i>		
Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	<i>Lepidotheca</i>		
Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	<i>Stenohelia</i>		
Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	<i>Stylaster</i>		
Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae			
Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	<i>Distichopora*</i>		
Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	<i>Inferiolabiata*</i>		
Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	<i>Lepidopora*</i>		
Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	<i>Sporadopora*</i>		
Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	<i>Stephanohelia*</i>		
Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	<i>Systemapora*</i>		
Echinodermata	Asteroidea	Brisingida				
Echinodermata	Asteroidea	Forcipulatacea	Asteriidae	<i>Allostichaster</i>		
Echinodermata	Asteroidea	Forcipulatida	Asteriidae	<i>Sclerasterias</i>		<i>mollis*</i>
Echinodermata	Asteroidea	Forcipulatida	Asteriidae	<i>Pseudechinaster</i>		<i>rubens*</i>
Echinodermata	Asteroidea	Forcipulatida	Stichasteridae	<i>Cosmasterias</i>		<i>dyscrita</i>
Echinodermata	Asteroidea	Forcipulatida	Zoroasteridae	<i>Zoroaster</i>		
Echinodermata	Asteroidea	Notomyotida	Benthopectinidae	<i>Benthopecten</i>		
Echinodermata	Asteroidea	Notomyotida	Benthopectinidae	<i>Cheiraster*</i>		
Echinodermata	Asteroidea	Paxillosida	Astropectinidae	<i>Psilaster</i>		<i>acuminatus</i>
Echinodermata	Asteroidea	Paxillosida	Astropectinidae	<i>Dipsacaster</i>		<i>magnificus</i>
Echinodermata	Asteroidea	Paxillosida	Astropectinidae	<i>Praserpinaster</i>		<i>neozelandicus</i>
Echinodermata	Asteroidea	Paxillosida	Astropectinidae	<i>Astromesites</i>		<i>primigenius</i>
Echinodermata	Asteroidea	Paxillosida	Astropectinidae	<i>Plutanaster</i>		
Echinodermata	Asteroidea	Paxillosida	Radiasteridae	<i>Radiaster</i>		<i>gracilis</i>
Echinodermata	Asteroidea	Spinulosida	Echinasteridae	<i>Henricia*</i>		
Echinodermata	Asteroidea	Valvatida	Goniasteridae	<i>Pillsburiaster</i>		<i>aoteanus</i>
Echinodermata	Asteroidea	Valvatida	Goniasteridae	<i>Lithosoma</i>		<i>novaezealandiae</i>
Echinodermata	Asteroidea	Valvatida	Goniasteridae	<i>Ceramaster</i>		<i>patagonicus</i>
Echinodermata	Asteroidea	Valvatida	Goniasteridae	<i>Hippasteria</i>		<i>phrygiana</i>
Echinodermata	Asteroidea	Valvatida	Goniasteridae	<i>Mediaster</i>		<i>sladeni</i>
Echinodermata	Asteroidea	Valvatida	Odontasteridae	<i>Odontaster</i>		<i>benhami</i>
Echinodermata	Asteroidea	Valvatida	Solasteridae	<i>Crossaster</i>		<i>taitai*</i>
Echinodermata	Asteroidea	Valvatida	Solasteridae	<i>Solaster</i>		<i>torulatus</i>
Echinodermata	Asteroidea	Velatida	Pterasteridae	<i>Hymenaster</i>		<i>carnosus</i>
Echinodermata	Asteroidea	Velatida	Pterasteridae	<i>Diplopteraster</i>		
Echinodermata	Crinoidea	Comatulida	Bathycrinidae			
Echinodermata	Crinoidea	Comatulida	Charitometridae			
Echinodermata	Crinoidea	Comatulida	Comatulidae			
Echinodermata	Crinoidea	Comatulida	Pentametrocrinidae	<i>Pentametrocrinus</i>		
Echinodermata	Crinoidea	Comatulida				
Echinodermata	Crinoidea	Cyrtocrinida				
Echinodermata	Crinoidea	Isocrinida	Isselicrinidae	<i>Metacrinus</i>		<i>wywillii</i>
Echinodermata	Echinoidea	Camarodonta	Echinidae	<i>Dermechinus</i>		<i>horridus</i>
Echinodermata	Echinoidea	Camarodonta	Echinidae	<i>Gracilechinus</i>		
Echinodermata	Echinoidea	Camarodonta	Echinometridae	<i>Evechinus</i>		<i>chloroticus</i>

Phylum	Class	Order	Family	Genus	Species	Subspecies
Echinodermata	Echinoidea	Cidaroida	Cidaridae	<i>Goniocidaris</i>	<i>parasol</i>	
Echinodermata	Echinoidea	Cidaroida	Cidaridae	<i>Goniocidaris</i>	<i>umbraculum</i>	
Echinodermata	Echinoidea	Cidaroida	Histocidaridae	<i>Poriocidaris</i>	<i>purpurata</i>	
Echinodermata	Echinoidea	Cidaroida*				
Echinodermata	Echinoidea	Echinothurioida	Phormosomatidae	<i>Phormosoma</i>		
Echinodermata	Echinoidea	Echinothurioida				
Echinodermata	Echinoidea	Pedinoida	Pedinidae	<i>Caenopedina</i>	<i>novaezealandiae</i>	
Echinodermata	Echinoidea	Pedinoida	Pedinidae	<i>Caenopedina</i>	<i>porphyrogigas</i>	
Echinodermata	Echinoidea	Pedinoida	Pedinidae	<i>Caenopedina</i>	<i>pulchella</i>	
Echinodermata	Echinoidea	Spatangoida	Spatangidae	<i>Paramaretia</i>	<i>peloria</i>	
Echinodermata	Echinoidea	Spatangoida	Spatangidae	<i>Spatangus</i>		
Echinodermata	Echinoidea	Spatangoida*				
Echinodermata	Holothuroidea	Elasipodida	Laetmogonidae	<i>Pannychia</i>	<i>moseleyi</i>	
Echinodermata	Holothuroidea	Elasipodida	Laetmogonidae	<i>Laetmogone</i>		
Echinodermata	Holothuroidea	Elasipodida	Pelagothuriidae	<i>Enypniastes</i>	<i>eximia</i>	
Echinodermata	Holothuroidea	Molpadida	Molpadiidae	<i>Molpadia</i>	<i>musculus</i>	
Echinodermata	Holothuroidea	Synallactida	Synallactidae	<i>Pseudostichopus</i>	<i>mollis</i>	
Echinodermata	Ophiuroidea	Amphilepidida	Ophiactidae	<i>Ophiactis</i>	<i>abyssicola</i>	
Echinodermata	Ophiuroidea	Euryalida	Euryalidae	<i>Asteroschema</i>		
Echinodermata	Ophiuroidea	Euryalida	Euryalidae	<i>Ophiocreas</i>		
Echinodermata	Ophiuroidea	Euryalida	Gorgonocephalidae	<i>Astrothorax</i>	<i>waitei</i>	
Echinodermata	Ophiuroidea	Euryalida	Gorgonocephalidae	<i>Gorgonocephalus</i>		
Echinodermata	Ophiuroidea	Ophiacanthida	Ophiacanthidae	<i>Ophiophthalmus</i>	<i>relictus</i>	
Echinodermata	Ophiuroidea	Ophiacanthida	Ophiacanthidae*			
Echinodermata	Ophiuroidea	Ophiacanthida	Ophiidermatidae	<i>Bathypectinura</i>	<i>heros</i>	
Echinodermata	Ophiuroidea	Ophiurida	Ophiacanthidae	<i>Ophiomusa</i>	<i>lymani</i>	
Mollusca	Cephalopoda	Octopoda	Enterocotopodidae	<i>Enterocotopus</i>	<i>zealandicus*</i>	
Mollusca	Cephalopoda	Octopoda	Enterocotopodidae	<i>Muusoctopus*</i>		
Mollusca	Cephalopoda	Octopoda	Megaleledonidae	<i>Graneledone*</i>		
Mollusca	Cephalopoda	Octopoda	Octopodidae	<i>Callistoctopus</i>	<i>kermadecensis*</i>	
Mollusca	Cephalopoda	Octopoda	Opisthoteuthidae	<i>Opisthoteuthis</i>		
Porifera	Demospongiae	Poecilosclerida	Cladorhizidae*			
Porifera	Demospongiae	Poecilosclerida	Coelosphaeridae	<i>Lissodendoryx</i>	<i>bifacialis</i>	
Porifera	Demospongiae	Poecilosclerida	Latrunculiidae	<i>Latrunculia*</i>		
Porifera	Demospongiae	Suberitida	Suberitidae	<i>Suberites</i>	<i>affinis</i>	
Porifera	Demospongiae	Tetractinellida	Corallistidae	<i>Herengeria</i>	<i>vasiformis</i>	
Porifera	Demospongiae	Tetractinellida	Geodiidae	<i>Geodia</i>	<i>vestigifera</i>	
Porifera	Demospongiae	Tetractinellida	Pleromidae	<i>Pleroma</i>	<i>menoui</i>	
Porifera	Demospongiae	Tetractinellida	Scleritodermidae	<i>Aciculites</i>	<i>pulchra</i>	
Porifera	Demospongiae	Tetractinellida	Tetillidae	<i>Antarctotetilla</i>	<i>leptoderma</i>	
Porifera	Demospongiae	Tetractinellida	Theneidae	<i>Thenea</i>	<i>novaezealandiae</i>	
Porifera	Demospongiae	Tetractinellida	Vulcanellidae	<i>Pocillastra</i>	<i>laminaris</i>	
Porifera	Demospongiae					
Porifera	Hexactinellida	Amphidiscosida	Hyalonematidae	<i>Hyalonema</i>		
Porifera	Hexactinellida	Amphidiscosida	Monorhaphididae	<i>Monoraphis</i>	<i>chuni*</i>	
Porifera	Hexactinellida	Amphidiscosida	Pheronematidae	<i>Pheronema</i>	<i>conicum*</i>	
Porifera	Hexactinellida	Lyssacinosida	Aulocalycidae	<i>Euryplegma</i>	<i>auriculare*</i>	
Porifera	Hexactinellida	Lyssacinosida	Euplectellidae	<i>Euplectella</i>	<i>imperialis*</i>	
Porifera	Hexactinellida	Lyssacinosida	Euplectellidae	<i>Walteria</i>	<i>leuckarti</i>	
Porifera	Hexactinellida	Lyssacinosida	Rosellidae	<i>Hyalascus</i>		
Porifera	Hexactinellida	Sceptrulophora	Aphrocallistidae	<i>Aphrocallistes</i>	<i>beatrice</i>	<i>beatrice</i>
Porifera	Hexactinellida	Sceptrulophora	Farreidae	<i>Farrea</i>	<i>similaris</i>	
Porifera	Hexactinellida	Sceptrulophora*				