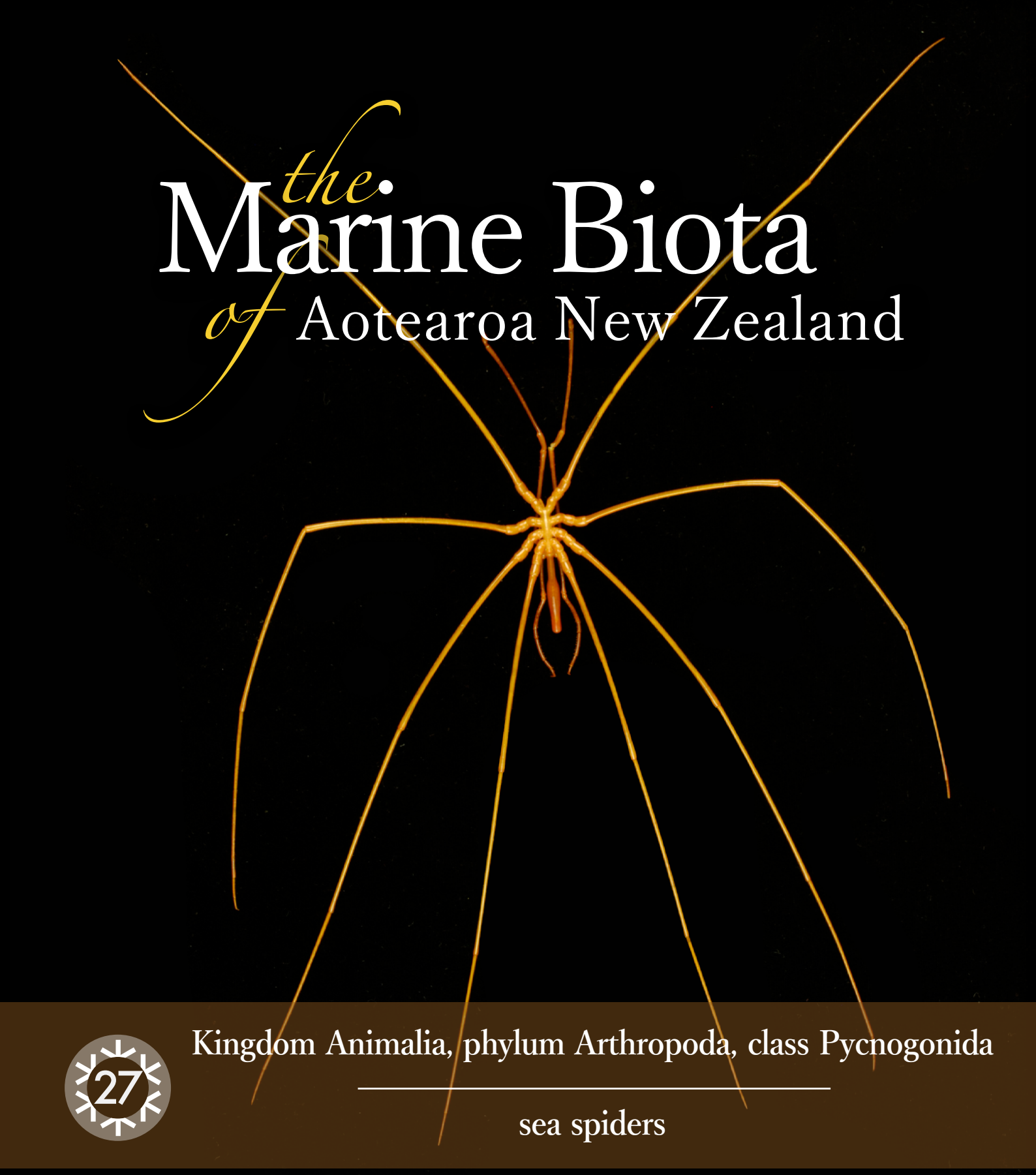
the Marine Biota of Aotearoa New Zealand



27

Kingdom Animalia, phylum Arthropoda, class Pycnogonida

sea spiders

David Staples & Kate Neill

CHAPTER 27

NIWA Biodiversity Memoir 136 2023

NIWA Taihoro Nukurangi

To cite this article: Staples, D., Neill, K. (2023) Chapter 27. Kingdom Animalia, phylum Arthropoda, class Pycnogonida (sea spiders). Pp. 406–409 *in*: Kelly, M., Mills, S., Terezow, M., Sim-Smith, C., Nelson, W. (Eds) The Marine Biota of Aotearoa New Zealand. Updating our marine biodiversity inventory. *NIWA Biodiversity Memoir* 136, 494 pp. https://docs.niwa.co.nz/library/public/NIWAbm136-ch27.zip

Kingdom Animalia, phylum Arthropoda, class Pycnogonida (sea spiders)

David Staples[1] & Kate Neill[2]

[1]Museums Victoria, GPO Box 666, Melbourne, Victoria, Australia 3001; David Staples https://orcid.org/0000-0002-4668-6197
[2]Oceans Centre, National Institute of Water and Atmospheric Research, Private Bag 14901, Wellington 6241, New Zealand; Corresponding author: kate.neill@niwa.co.nz; Kate Neill https://orcid.org/0000-0002-1639-2403

Summary

The Pycnogonida is a small group of arthropods with about 1380 extant species worldwide, 106 of which are nominally recorded from the Aotearoa New Zealand region (Fig. 27.1). Fifteen additional pycnogonids have been reported from New Zealand waters since the review of Sirvid *et al.* (2010), which included 92 species (Table 27.1). *Ammothea longispina* Gordon, 1932 is now removed from the New Zealand record as all occurrences appear to be Antarctic. This equates to a net increase of 14 species, or 15%. Of these 14 taxa, two are undescribed, 11 are new records for the region, and one new species has been described (*Sericosura hedgpethi* Bamber, 2009). An up-to-date list of accepted pycnogonid taxa may be found in World Register of Marine Species (WoRMS) (https://www.marinespecies.org/) and Pycnobase: World Pycnogonida Database (https://www.marinespecies.org/pycnobase) (Bamber *et al.* 2022). A checklist of New Zealand Pycnogonida is provided.

Introduction

Class Pycnogonida (subphylum Chelicerata) is a small group with about 1380 extant species worldwide, of which 106 are nominally recorded from the New Zealand region (Table 27.1). Ten of the eleven families and 26 of the 86 or so genera are represented in New Zealand collections (Fig. 27.1). Many species remain undescribed in museum collections and no doubt many more remain undiscovered. No widely accepted common names have been assigned to species. Pycnogonid taxonomy is largely based on external morphology, and whilst their body design is relatively simple, the morphological combinations within the group are nothing short of bewildering. The body is made up of a proboscis, a cephalothorax (usually four segments) and a reduced abdomen (anal tubercle). Legs are attached to lateral processes of each trunk segment. Classification is primarily based on the various combinations of the three anterior "head" appendages (chelifores, palps, and ovigers), their presence or absence, and extent of development. Sexual dimorphism is extensive.

Pycnogonids are found in all oceans, ranging from the intertidal to water depths of more than 7000 m. They are harmless and may be found individually, in small groups, or in large breeding aggregations (Staples 1979). Females are generally larger than males and the diameter of the body is no greater than the diameter of the legs, which constitute the bulk of the animal. Leg spans of adult specimens range from a few millimetres in the genera *Austrodecus* and *Rhynchothorax*, to reportedly 76 cm in species of *Colossendeis*. Pycnogonid distribution extends across all latitudes, but they are generally more common in temperate to cold seas. Pycnogonids typically have eight legs, but seven polymerous species have five pairs, and two species have six pairs. The ten-legged *Pentanymphon antarcticum* Hodgson, 1904 is the only polymerous species recorded from New Zealand waters, and only one of three polymerous forms found outside the Antarctic.

Littoral species are usually smaller than their deeper-water counterparts and are typically found in sheltered areas amongst algal turf and beneath rocks. Specimens are more likely to be encountered subtidally in association with arborescent bryozoans, hydroids, algal stands, and sponges. Specimens on sponges and amongst algae are probably feeding on epibionts rather than the actual host. Pycnogonids can be extremely cryptic; in many cases, otherwise-opaque specimens take up the colour of their gut content. Long-legged, spindly species are almost impossible to detect amongst hydroid stolons or whilst lying flat and motionless, spreadeagled on a detritus-covered sponge surface. Similarly, tiny, or moderately-sized knobbly species, can be difficult to find amongst bryozoan zooids of similar structure and colour. Species belonging to the

Table 27.1. Summary of Pycnogonida diversity in the Aotearoa New Zealand region expressed as total numbers and percentage change. Data for 2010 are derived from Sirvid *et al.* (2010: p. 51). OTU = Operational Taxonomic Unit.

	Pycnogonida		% change
	2010	2023	
Total species diversity	92	106	15
Described extant species	91	103	13
Undescribed extant species (OTU)	1	3	200
Described endemic genera	1	1	0
Described endemic species	43	40	−14

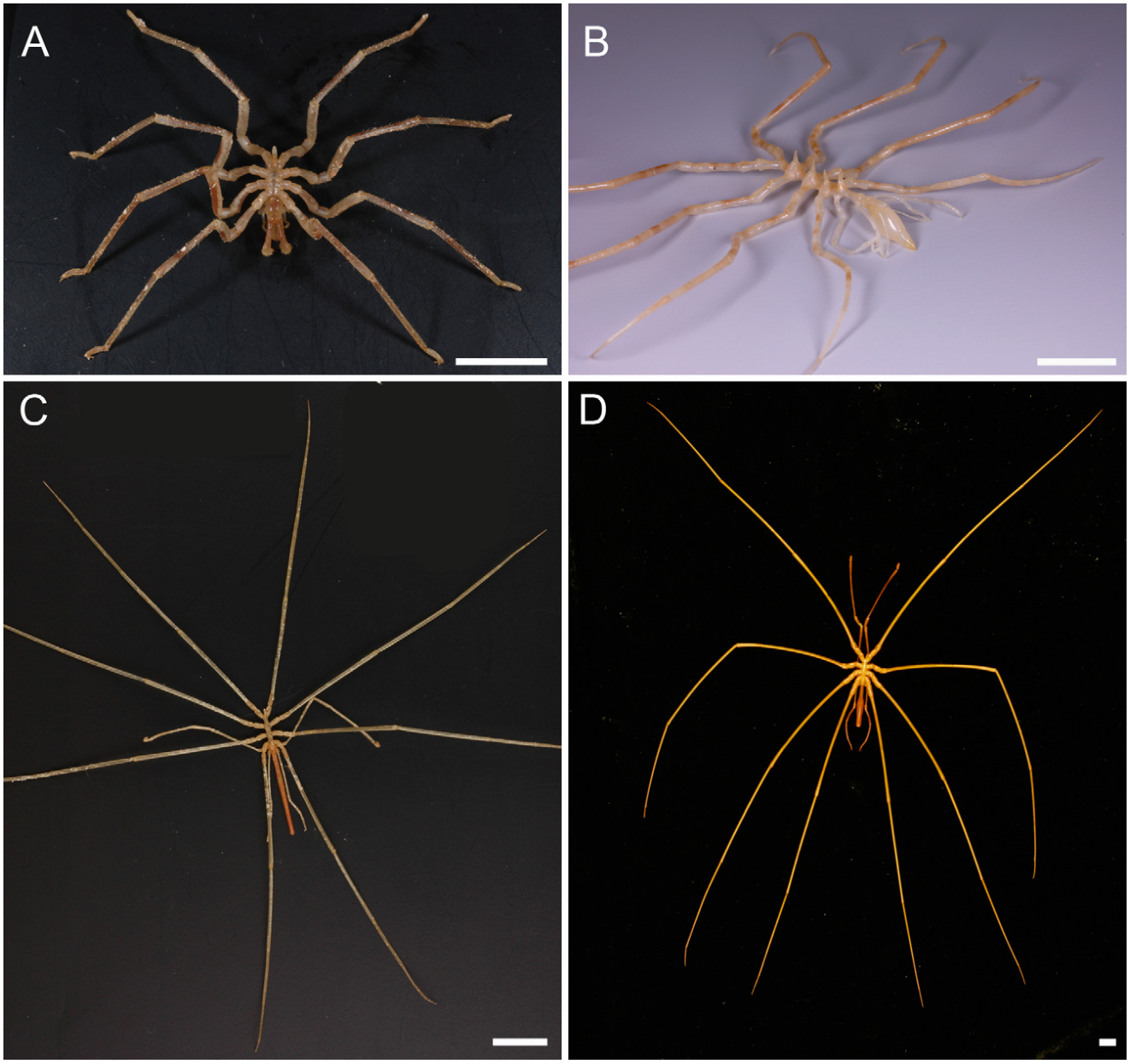


Figure 27.1. Examples of Pycnogonida (sea spiders) from the New Zealand EEZ: **A.** *Pallenopsis* cf. *kupei* Clark, 1971, Eltanin Seamount, Macquarie Ridge, 462–524 m (NIWA 39898, NIWA Stn TAN0803/48); **B.** *Ascorhynchus* cf. *cooki* Child, 1987, Challenger Plateau, 1730–1772 m (NIWA 34460, NIWA Stn TAN0707/61); **C.** *Colossendeis* cf. *macerrima* Wilson, 1881, Challenger Plateau, 1713–1770 m (NIWA 43369, NIWA Stn TAN0707/6); **D.** *Colossendeis colossea*, Wilson, 1881, Tangaroa Seamount, Kermadec Ridge, 1490–1422 m (NIWA 82148, NIWA Stn TAN1206/23). Scale in each image = 10 mm. Image **A** by Julian Finn (Museum Victoria), collected during the interdisciplinary New Zealand-Australian "MacRidge 2" research voyage (TAN0803), the biological component of which was part of NIWA's research project "Seamounts: their importance to fisheries and marine ecosystems" funded by the New Zealand Foundation for Research, Science and Technology (FRST), and CSIRO's Division of Marine and Atmospheric Research project "Biodiversity Voyages of Discovery" funded by the CSIRO Wealth from Oceans Flagship. Images **B** & **C** by Peter Marriott (NIWA) collected during Ocean Survey 20/20 Chatham/Challenger Biodiversity and Seabed Habitat Project, jointly funded by the New Zealand Ministry of Fisheries, Land Information New Zealand, NIWA, and Department of Conservation. Image **D** by Owen Anderson (NIWA) collected by NIWA as part of the 'Impact of resource use on vulnerable deep-sea communities' project, funded by FRST.

genera *Ascorhynchus*, *Hedgpethius* and *Rhynchothorax* live amongst the sediments. Whilst tiny species are common in both shallow water and in the deep-sea, the deep-sea is the exclusive domain of the so-called giant species with leg spans commonly in the range of 20 to 50 cm. The leg span of the largest specimens found in New Zealand waters, that of *Colossendeis colossea*, Wilson, 1881 (Fig. 27.1D), is typically about 55 cm. Globally, the deepest collection record is from 7370 m, and in the New Zealand dataset, the deepest record is from 5850 m. Deep-sea species are typified by giant species of *Colossendeis*, the dominant feature of which is the long legs, prompting the observation that they resemble a collection of straws.

Knowledge gaps, research progress and future priorities

Child (1998) provided an excellent synopsis of earlier studies of the New Zealand fauna and recorded 93 species, but he overlooked several species recorded by Fage (1956a, b) from the Kermadec Islands. Species from the Kermadec Islands have been included in checklists by Duffy & Ahyong (2015) and Keable & Read (2015). The fact that only 15 species have been added (and one removed) since Sirvid *et al*. (2010) highlights the lack of taxonomic expertise available in New Zealand and how little the New Zealand pycnogonid fauna is known.

Acknowledgements

We are grateful to Georg Brenneis and Claudia Arango for their helpful reviews.

References

References to the taxonomic authorities and dates for pycnogonid taxa in this chapter and the associated checklist can be located in WoRMS (https://www.marinespecies.org/), specifically Pycnobase: World Pycnogonida Database (https://www.marinespecies.org/pycnobase) (Bamber *et al*. 2022).

Bamber, R.N., El Nagar, A., Arango, C.P. (Eds) (2022) Pycnobase: World Pycnogonida Database. Available from the World Register of Marine Species at: https://www.marinespecies.org/pycnobase (Accessed 25 Jan 2022).

Child, C.A. (1998) The Marine Fauna of New Zealand: Pycnogonida (Sea Spiders). *NIWA Biodiversity Memoir* 109, 71 pp.

Duffy, C., Ahyong, S.T. (2015) Annotated checklist of the marine flora and fauna of the Kermadec Islands Marine Reserve and northern Kermadec Ridge, New Zealand. *Bulletin of the Auckland Museum* 20: 19–124.

Fage, L. (1956a) Les Pycnogonides du genre *Nymphon*. *Galathea Report* 2: 159–166.

Fage, L. (1956b) Les Pycnogonides (excl. le genre *Nymphon*). *Galathea Report* 2: 167–182; 1–22.

Keable, S.J., Reid, A.L. (2015) Marine invertebrates collected during the Kermadec Biodiscovery Expedition 2011. *Bulletin of the Auckland Museum* 20: 263–310.

Sirvid, P.J., Zhang, Z.-Q., Harvey, M.S., Rhode, B.E., Cook, D.R., Bartsch, I., Staples, D.A. (2010) Chapter 6. Phylum Arthropoda, Subphylum Chelicerata: horseshoe crabs, arachnids, sea spiders. Pp. 50–89 *in*: Gordon, D.P. (Ed.) *New Zealand Inventory of Biodiversity Volume 2, Kingdom Animalia: Chaetognatha, Ecdysozoa, Ichnofossils.* Canterbury University Press, Christchurch, 566 pp.

Staples, D.A. (1979) Three new species of *Propallene* from Australian waters. *Transactions of the Royal Society of South Australia* 103: 85–93.

Checklist of extant Pycnogonida known from the New Zealand EEZ

The checklist of New Zealand Pycnogonida is arranged according to the currently accepted systematics and classificatory scheme employed by the World Pycnogonida Database (https://www.marinespecies.org/pycnobase) (Bamber *et al*. 2022). Endemic taxa are indicated by 'E' for those found within the New Zealand EEZ, or 'E2' for taxa endemic to the wider New Zealand region encompassing the New Zealand EEZ and surrounding international waters. All other taxa are considered native by default, i.e. naturally occurring in New Zealand and elsewhere.

Phylum ARTHROPODA
Class PYCNOGONIDA
Order PANTOPODA
Family AMMOTHEIDAE
Achelia assimilis (Haswell, 1885)
Achelia australiensis Miers, 1884
Achelia dohrni (Thomson, 1884)
Achelia transfuga Stock, 1954 E
Achelia sp. nov. A (MITS64300, 64326)
Ammothea acheliata Child, 1998
Ammothea adunca Child, 1994
Ammothea antipodensis Clark, 1972 E
Ammothea australiensis (Flynn, 1919)
Ammothea magniceps Thomson, 1884
Ammothea makara Clark, 1977 E
Ammothea uru Clark, 1977 E
Cilunculus cactoides Fry & Hedgpeth, 1969
Cilunculus sewelli Calman, 1938
Cilunculus spinicristus Child, 1987 E
Oorhynchus aucklandiae Hoek, 1881 E
Sericosura hedgpethi Bamber, 2009 E
Tanystylum antipodum Clark, 1977 E
Tanystylum excuriatum Stock, 1954 E
Tanystylum neorhetum Marcus, 1940
Tanystylum nesiotes Child, 1970
Tanystylum rehderi Child, 1970
Tanystylum sp. B (MITS65278)

Family ASCORHYNCHIDAE
Ascorhynchus antipodus Child, 1987 E2
Ascorhynchus cooki Child, 1987
Ascorhynchus insularum Clark, 1971 E
Ascorhynchus orthostomus Child, 1998 E

Family AUSTRODECIDAE
Austrodecus breviceps Gordon, 1938
Austrodecus cestum Child, 1994 E
Austrodecus enzoi Clark, 1971 E
Austrodecus frigorifugum Stock, 1954 E
Austrodecus fryi Child, 1994
Austrodecus glaciale Hodgson, 1907
Austrodecus gordonae Stock, 1954 E
Austrodecus sinuatum Stock, 1957 E
Austrodecus confusum Stock, 1957 E
Austrodecus minutum Clark, 1971 E
Pantopipetta australis (Hodgson, 1914)

Family CALLIPALLENIDAE
Austropallene cornigera (Möbius, 1902)
Austropallene cristata (Bouvier, 1911)
Austropallene tibicina Calman, 1915
Callipallene emaciata (Dohrn, 1881)
Callipallene novaezealandiae (Thomson, 1884)
Cheilopallene coralliophila Muller, 1992
Cheilopallene trappa Clark, 1971 E
Neopallene antipoda Stock, 1954 E
Oropallene dolichodera Child, 1995
Oropallene metacaula Child, 1995 E
Parapallene exigua Stock, 1954 E

Family COLOSSENDEIDAE
Colossendeis angusta Sars, 1877
Colossendeis arcuata H. Milne-Edwards, 1885
Colossendeis australis Hodgson, 1907
Colossendeis bruuni Fage, 1956 E
Colossendeis colossea Wilson, 1881
Colossendeis cucurbita Cole, 1909
Colossendeis hoeki Gordon, 1944
Colossendeis longirostris Gordon, 1938
Colossendeis minuta Hoek, 1881
Colossendeis macerrima Wilson, 1881
Colossendeis media Hoek, 1881
Colossendeis megalonyx Hoek, 1881
Colossendeis megalonyx arundirostris Fry & Hedgpeth, 1969

Colossendeis cf. *mycterismos* Bamber, 2004
Colossendeis pipetta Stock, 1991
Colossendeis stramenti Fry & Hedgpeth, 1969
Colossendeis tortipalpis Gordon, 1932
Hedgpethia eleommata Child, 1998 E

Family NYMPHONIDAE
Heteronymphon exiguum (Hodgson, 1927)
Nymphon australe Hodgson, 1902
Nymphon australe caecum Gordon, 1944
Nymphon bucuspidum Child, 1995 E
Nymphon chaetochir Utinomi, 1971
Nymphon compactum Hoek, 1881
Nymphon galatheae Fage, 1956
Nymphon immane Stock, 1954
Nymphon inerme Fage, 1956
Nymphon longicollum Hoek, 1881
Nymphon longicoxa Hoek, 1881
Nymphon maoriana Clark, 1958 E
Nymphon punctum Child, 1995 E
Nymphon trispinum Child, 1998 E
Nymphon typhlops (Hodgson, 1915)
Nymphon uncatum Child, 1998 E
Pentanymphon antarcticum Hodgson, 1904

Family PALLENOPSIDAE
Bathypallenopsis antipoda Clark, 1971
Bathypallenopsis californica Schimkewitsch, 1893
Pallenopsis kupei Clark, 1971
Pallenopsis latus Child, 1998 E2
Pallenopsis mauii Clark, 1958 E
Pallenopsis obliqua (Thomson, 1884) E2
Pallenopsis pilosa (Hoek, 1881)
Pallenopsis triregia Clark, 1962 E

Family PHOXICHILIDIIDAE
Anoplodactylus australis (Hodgson, 1914)
Anoplodactylus erectus Cole, 1904
Anoplodactylus laciniosus Child, 1995 E
Anoplodactylus pycnosoma (Helfer, 1938)
Anoplodactylus speculus Child, 1995
Anoplodactylus typhlops Sars, 1888
Anoplodactylus xenus Stock, 1980 E
Pycnosomia asterophila Stock, 1981

Family PYCNOGONIDAE
Pycnogonum anovigerum Clark, 1956 E
Pycnogonum magellanicum Hoek, 1898
Pycnogonum planum Stock, 1954 E

Family RHYNCHOTHORACIDAE
Rhynchothorax articulatus Stock, 1968 E
Rhynchothorax australis Hodgson, 1907
Rhynchothorax percivali Clark, 1976 E

This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivs 3.0 Unported License.
To view a copy of this license, visit http://creativecommons.org/licenses/by-nc-nd/3.0/.

All photographic images remain the copyright of the original credited photographers.

ISSN 1174-0043; 136
ISBN 978–1–99–117447–5 (digital edition)
Copyright NIWA 2023