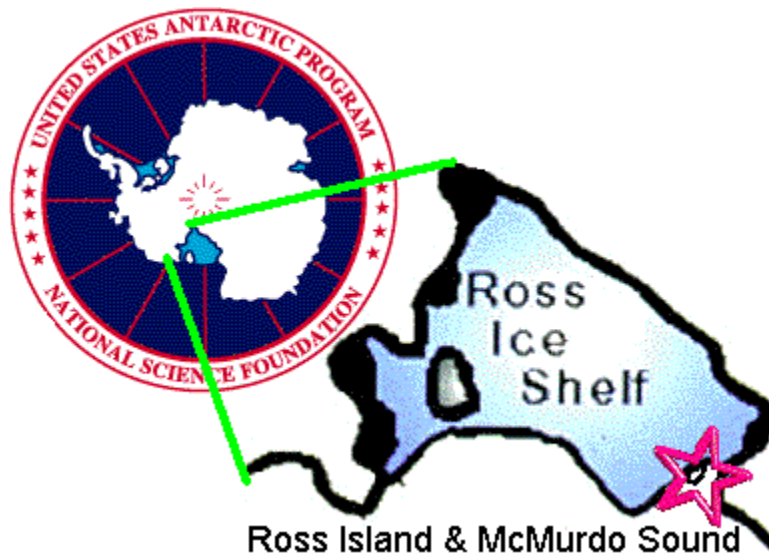


Arthropoda -- Chelicerata: sea spiders

UNDERWATER FIELD GUIDE TO ROSS ISLAND & MCMURDO SOUND, ANTARCTICA

Peter Brueggeman

Photographs: Norbert Wu, Steve Alexander, Peter Brueggeman, Canadian Museum of Nature (Kathleen Conlan), Rob Robbins, & M. Dale Stokes



The National Science Foundation's Office of Polar Programs sponsored Norbert Wu on an Artist's and Writer's Grant project, in which Peter Brueggeman participated. One outcome from Wu's endeavor is this Field Guide. This Field Guide builds upon principal photography by Norbert Wu, with photos from other photographers, who are credited on their photographs and above. This Field Guide is intended to facilitate underwater/topside field identification from visual characters. Organisms were identified from photographs with no specimen collection. Therefore these identifications are to the taxonomic level possible from photographs, and there can be some uncertainty in identifications solely from photographs.

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sea spider *Achelina* sp.

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sea spider *Ammonothea clausi*

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sea spider *Ammonothea* sp., probably *A. carolinensis*

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sea spider, possibly *Pallenopsis* sp. or *Ammothea clausi*

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sea spider *Pentanymphe antarcticum*

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sea spider *Achelias* sp.

Here are *Achelias* sp. clinging to the nephtheid soft coral *Gersemia antarctica*.

Adult *Achelias* pycnogonids are small, spending their lives clinging to the substrate on which they feed [1]. The protonymphon stage of *Achelias* may be passed in the tissues of the organism on which juveniles and adults feed [1].

Achelias species are tangled and would be a good subject for molecular biology study to determine speciation [2]. *Achelias* species are found worldwide with almost half found around the perimeter of the Pacific Ocean [3].

Antarctic and subantarctic sea spiders comprise 251 species, representing 21.5% of worldwide species, with 101 species endemic to Antarctica and 60 endemic to subantarctic areas [4].

Sea spiders are also called pycnogonids. Sea spiders are exclusively marine and mostly bottom dwelling (benthic) [3]. Adult sea spiders either suck the juices from soft-bodied invertebrates or browse on hydroids and bryozoans. Male sea spiders carry cemented egg clutches gathered from females until hatching and often after hatching in the larval stages [3]. Since sea spider larvae are not planktonic, sea spider dispersal is slow and intermittent leading to the development of many endemic species among shallow-water

sea spiders [3].

References: **1:** Fauna of the Ross Sea, Part 7. Pycnogonida, 1. Colossendeidae, Pycnogonidae, Endeidae, Ammotheidae. WG Fry & JW Hedgpeth. New Zealand Department of Scientific and Industrial Research Bulletin 198. New Zealand Oceanographic Institute Memoir 49. 1969; **2:** Antarctic and Subantarctic Pycnogonida : Ammotheidae and Austrodecidae. CA Child. Antarctic Research Series Volume 63, Biology of the Antarctic Seas 23. Washington DC : American Geophysical Union, 1994; **3:** Marine Fauna of New Zealand: Pycnogonida (Sea Spiders). CA Child.. Wellington : National Institute of Water and Atmospheric Research, 1998. NIWA Biodiversity Memoir 109; **4:** Polar Biology 24:941-945, 2001



sea spider *Ammothea clausi*

Ammothea clausi is found in Antarctica and the Antarctic Peninsula, Peter I Island, South Shetland Islands, South Orkney Islands, South Sandwich Islands, and South Georgia Island at depths from 3 to 860 meters [1,2,7]. *A. clausi* is small for its genus with a leg span of five centimeters for males and nine centimeters for large females and a trunk up to six millimeters long [1].



Ammothea clausi has two morphs which are almost separated geographically:

- Magellanic: erect abdomen, longer ocular tubercle;
- Victoria Land: almost horizontal abdomen, ocular tubercle about half as tall as Magellanic [1].

Forms have been collected in the western Ross Sea which are intermediate between the two morphs [1].



Ammothea clausi appears to be eating the soft coral *Clavularia frankliniana* in this photo.

A. clausi appears similar in appearance to *A. minor*, but the proboscis on *A. minor* is longer and wider, and *A. clausi* has a pencil-like abdomen [4].



Here is *Ammothea clausi*.

Ammothea species are found predominantly in Antarctic and subantarctic regions (19 of 31 known species); seven other species are known from the southern hemisphere and only five from the northern hemisphere [3].

Antarctic and subantarctic sea spiders comprise 251 species, representing 21.5% of worldwide species, with 101 species endemic to Antarctica and 60 endemic to subantarctic areas [6].



Ammothea clausi appears to be climbing over or mating with another of the same species; without seeing them move, it is difficult to tell in a photo what they are doing when entwined [4].



Here's a closer look at these two entwined *Ammothea clausi*, so that you can see if they are being naughty or nice. The male finds a female with eggs, climbs under or over, and extrudes sperm from each of his leg vents (under one of the short joints near the trunk) as she extrudes eggs from similar vents in the same place [5]. In some sea spider genera, the eggs are relatively large and the female pops out only 4-5; in other genera, the eggs are not as wide as the smallest leg segment and the female puts out sometimes more than 100 eggs [5]. Sometimes males collect balls of eggs (they supply the binding cement) from 5-7 different females and walk with them carried under their body [5].

Sea spiders are also called pycnogonids. Sea spiders are exclusively marine and mostly bottom dwelling (benthic) [3]. Adult sea spiders either suck the juices from soft-bodied invertebrates or browse on hydroids and bryozoans. Male sea spiders carry cemented egg clutches gathered from females until hatching and often after hatching in the

larval stages [3]. Since sea spider larvae are not planktonic, sea spider dispersal is slow and intermittent leading to the development of many endemic species among shallow-water sea spiders [3].

References: **1:** Antarctic and Subantarctic Pycnogonida : Ammotheidae and Austrodecidae. CA Child. Antarctic Research Series Volume 63, Biology of the Antarctic Seas 23. Washington DC : American Geophysical Union, 1994; **2:** US National Museum Polar Invertebrate Catalog, Smithsonian Institution <http://invertebrates.si.edu/>; **3:** Marine Fauna of New Zealand: Pycnogonida (Sea Spiders). CA Child.. Wellington : National Institute of Water and Atmospheric Research, 1998. NIWA Biodiversity Memoir 109; **4:** C Allan Child, personal communication, 2002; **5:** C Allan Child, personal communication, 2000; **6:** Polar Biology 24:941-945, 2001; **7:** Antarctic Science 13(2):144-149, 2001



sea spider *Ammonothea* sp., probably *A. carolinensis*

Ammonothea carolinensis is found throughout Antarctica and the Antarctic Peninsula, Peter I Island, South Shetland Islands, South Orkney Islands, South Georgia Island, and Bouvet Island from depths of 3 to 670 meters [1,2,3,6,7]. *A. carolinensis* has a leg span about fourteen centimeters for males and eighteen centimeters for females [1].

A. carolinensis is the most common Antarctic species of its genus [1]. *Ammonothea* species are found predominantly in Antarctic and subantarctic regions (19 of 31 known species); seven other species are known from the southern hemisphere and only five from the northern hemisphere [4]. Antarctic and subantarctic sea spiders comprise 251 species, representing 21.5% of worldwide species, with 101 species endemic to Antarctica and 60 endemic to subantarctic areas [5].

Sea spiders are exclusively marine and mostly bottom dwelling (benthic) [4]. Adult sea spiders either suck the juices from soft-

bodied invertebrates or browse on hydroids and bryozoans. Male sea spiders carry cemented egg clutches gathered from females until hatching and often after hatching in the larval stages [4]. Since sea spider larvae are not planktonic, sea spider dispersal is slow and intermittent leading to the development of many endemic species among shallow-water sea spiders [4].

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sea spider *Colossendeis australis*

Colossendeis australis is found throughout Antarctica and the Antarctic Peninsula, South Shetland Islands, South Sandwich Islands, South Georgia Island, Falkland Islands, Kerguelen Island, New Zealand, and Southeast Pacific and Southwest Atlantic Basins off Chile and Argentina from depths of 15 to 3,935 meters [1,2,3,4,7]. *C. australis* has relatively short propodal claws and a leg span about 25 centimeters [1,4]. The *Colossendeis* sea spiders are mostly giant deep-sea species though some Antarctic species live in shallow depths [1,4]. The *Colossendeis* sea spiders are the largest

sea spiders with some having leg spans as wide as fifty centimeters and trunks of five centimeters or more [1,4].



The large downcurved proboscis is characteristic of *Colossendeis australis*; there is one other species with such a bulbous curved proboscis, but its proboscis is longer and has almost a lip on its dorsal surface [1,5]. Antarctic and subantarctic sea spiders comprise 251 species, representing 21.5% of worldwide species, with 101 species endemic to Antarctica and 60 endemic to subantarctic areas [6]. Sea spiders are also called pycnogonids. Sea spiders are exclusively marine and mostly bottom dwelling (benthic) [4]. Adult sea spiders either suck the juices from soft-bodied invertebrates or browse on hydroids and bryozoans. Male sea spiders carry cemented egg clutches gathered from females until hatching and often after hatching in the larval stages [4]. Since sea spider larvae are not planktonic, sea spider dispersal is slow and intermittent leading to the development of many endemic species

among shallow-water sea spiders [4].

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sea spider *Colossendeis drakei*

Colossendeis drakei is found in Antarctica and the South Shetland Islands, South Sandwich Islands, South Georgia Island, Falkland Islands, and off Tasmania from depths of 3 to 3,000 meters [1,5].

The *Colossendeis* sea spiders are mostly giant deep-sea species though some Antarctic species live in shallow depths [1,2]. The *Colossendeis* sea spiders are the largest sea spiders with some having leg spans as wide as fifty centimeters and trunks of five centimeters or more [1,2].



C. drakei is one of only two Antarctic species with its proboscis shorter or equal to the length of its trunk [1]. The very short proboscis of *C. drakei* is rare, and the only similar species is *C. hoeki*, which has other character differences [3].

Antarctic and subantarctic sea spiders comprise 251 species, representing 21.5% of worldwide species, with 101 species endemic to Antarctica and 60 endemic to subantarctic areas [4]. Sea spiders are also called pycnogonids. Sea spiders are exclusively marine and mostly bottom dwelling (benthic) [2]. Adult sea spiders either suck the juices from soft-bodied invertebrates or browse on hydroids and bryozoans. Male sea spiders carry cemented egg clutches gathered from

females until hatching and often after hatching in the larval stages [2]. Since sea spider larvae are not planktonic, sea spider dispersal is slow and intermittent leading to the development of many endemic species among shallow-water sea spiders [2].

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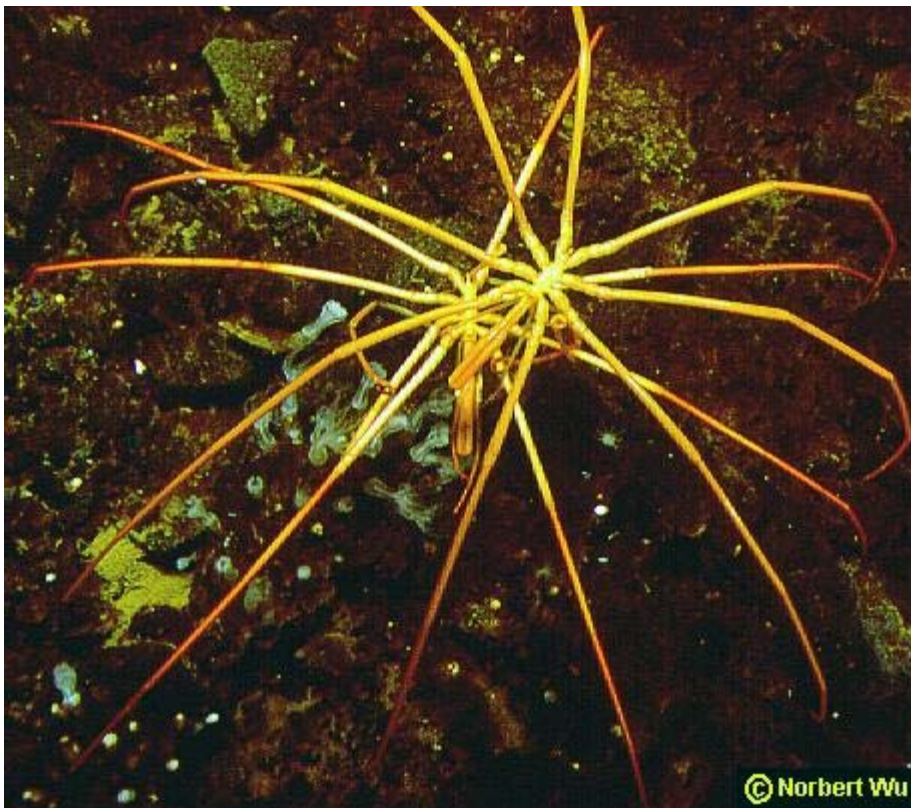


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sea spider *Colossendeis megalonyx sensu lato*

Colossendeis megalonyx is found throughout Antarctica and the South Shetland Islands, South Georgia Island, Antipodes Islands off New Zealand, Peter I Island, Marion and Prince Edward Islands, South Africa, southern Madagascar, South America, New Zealand, and the South Atlantic from depths of 3 to 4,900 meters [1,5,6,7,9]. *C. megalonyx* is the most common of its genus in Antarctic waters [1]. *C. megalonyx* has a long proboscis, short eighth palp segment in relation to the two longer distal segments, and long slender legs bearing a tarsus longer than the propodus and a long slender claw [1]. Legs vary in length; the femur can be the longest

segment or the first tibia can be longest [1]. *C. megalonyx* is shown here walking over an anchor ice formation with possibly some food in its mouth. *C. megalonyx* eats the soft corals *Alcyonium antarcticum* and *Clavularia frankliniana*, and has been observed eating small hydroids on sponges [2,3,4].



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Two *Colossendeis megalonyx* crossing paths.

C. megalonyx subspecies are insufficiently defined and would be a good subject for molecular biology study to determine speciation [1].

Sea spiders are also called pycnogonids and sometimes whip scorpions. Sea spiders are exclusively marine and mostly bottom dwelling (benthic) [7]. Adult sea spiders either suck the juices from soft-bodied invertebrates or browse on hydroids and bryozoans. Male sea spiders carry cemented egg clutches gathered from females until hatching and often after hatching in the larval stages [7]. Since sea spider larvae are not planktonic, sea spider dispersal is slow and intermittent leading to the development of many endemic

species among shallow-water sea spiders [7].



Colossendeis megalonyx orcadense or *C. australis* with stalked lepadiform barnacles attached .

The *Colossendeis* sea spiders are mostly giant deep-sea species though some Antarctic species live in shallow depths [1,7]. The *Colossendeis* sea spiders are the largest sea spiders with some having leg spans as wide as fifty centimeters and trunks of five centimeters or more [1,7]. Antarctic and subantarctic sea spiders comprise 251 species, representing 21.5% of worldwide species, with 101 species endemic to

Antarctica and 60 endemic to subantarctic areas [8].

References: **1:** Antarctic and Subantarctic Pycnogonida : Nymphonidae, Colossendeidae, Rhynchothoraxidae, Pycnogonidae, Endeididae, and Callipallenidae. CA Child Antarctic Research Series Volume 69, Biology of the Antarctic Seas 24. Washington DC : American Geophysical Union, 1995; **2:** Antarctic Ecology, Volume 1. MW Holdgate, ed. NY: Academic Press, 1970. pp.244-258; **3:** Marine Biology 122(3):461-470, 1995; **4:** Ecological Monographs 44(1):105-128, 1974; **5:** South African Journal of Antarctic Research 21(1):65-71, 1991; **6:** US National Museum Polar Invertebrate Catalog, Smithsonian Institution <http://invertebrates.si.edu/>; **7:** Marine Fauna of New Zealand: Pycnogonida (Sea Spiders). CA Child.. Wellington : National Institute of Water and Atmospheric Research, 1998. NIWA Biodiversity Memoir 109; **8:** Polar Biology 24:941-945, 2001; **9:** Antarctic Science 13(2):144-149, 2001



sea spider *Colossendeis wilsoni*

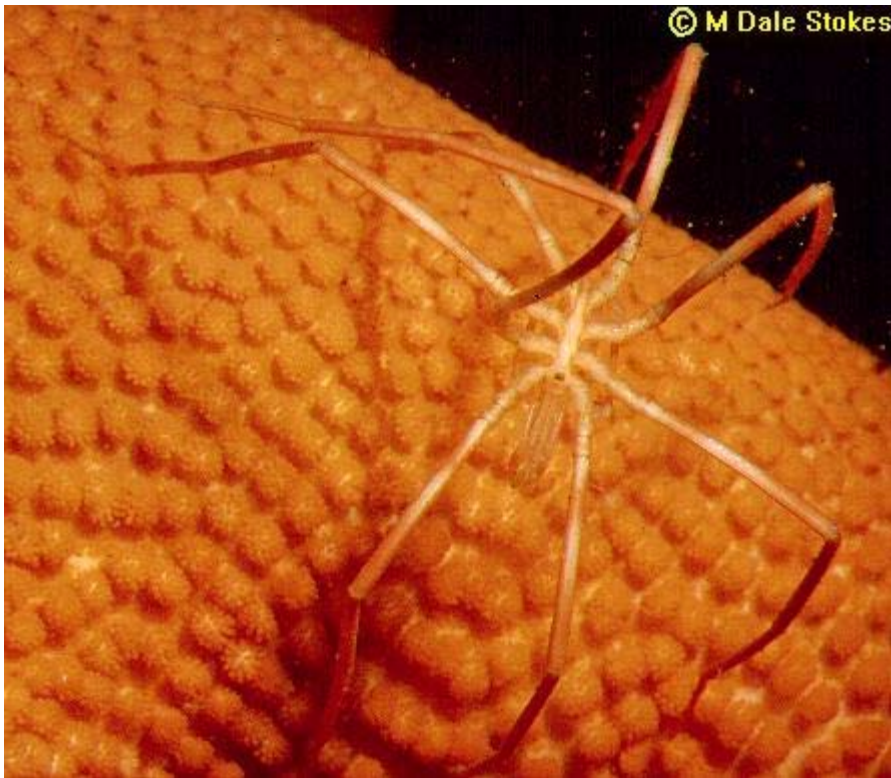
Colossendeis wilsoni is found in Antarctica and the South Shetland Islands from depths of 36 to 801 meters [1,2,3]. *C. wilsoni* is small and compact, with short legs and short proboscis compared with many other Antarctic species [1].

The *Colossendeis* sea spiders are mostly giant deep-sea species though some Antarctic species live in shallow depths [1,4]. The *Colossendeis* sea spiders are the largest

sea spiders with some having leg spans as wide as fifty centimeters and trunks of five centimeters or more [1,4].

Antarctic and subantarctic sea spiders comprise 251 species, representing 21.5% of worldwide species, with 101 species endemic to Antarctica and 60 endemic to subantarctic areas [5]. Sea spiders are also called pycnogonids. Sea spiders are exclusively marine and mostly bottom dwelling (benthic) [4]. Adult sea spiders either suck the juices from soft-bodied invertebrates or browse on hydroids and bryozoans. Male sea spiders carry cemented egg clutches gathered from females until hatching and often after hatching in the larval stages [4]. Since sea spider larvae are not planktonic, sea spider dispersal is slow and intermittent leading to the development of many endemic species among shallow-water sea spiders [4].

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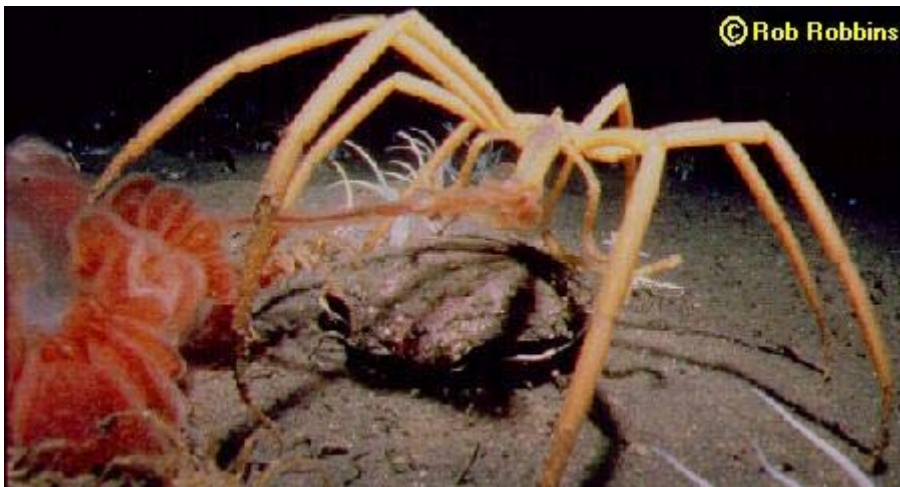


sea spider *Colossendeis* sp.

The *Colossendeis* sea spiders are mostly giant bright-red deep-sea species though some Antarctic species live in shallow depths [1]. The *Colossendeis* sea spiders are the largest sea spiders with some having leg spans as wide as fifty centimeters and trunks of five centimeters or more [1,4]. Antarctic *Colossendeis* species are identified by several characters that are hard to see in distant photos [2].

This sea spider is walking across the top of a seastar. Sea spiders are also called pycnogonids. Antarctic and subantarctic sea spiders comprise 251 species, representing 21.5% of worldwide species, with 101 species endemic to Antarctica and 60

endemic to subantarctic areas [4].



Adult sea spiders either suck the juices from soft-bodied invertebrates (like this *Colossendeis* sea spider is doing here with a jellyfish,) or browse on hydroids and bryozoans.



This *Colossendeis* sea spider is dining on an anemone.

Sea spiders are exclusively marine and mostly bottom dwelling (benthic) [3]. Male sea spiders carry cemented egg clutches gathered from females until hatching and often after hatching in the larval stages [3]. Since sea spider larvae are not planktonic, sea spider dispersal is slow and intermittent leading to the development of many endemic species among shallow- water sea spiders [3].



This might be a photo of egg transfer/fertilization between female and male *Colossendeis* sea spiders [2].

The male finds a female with eggs, climbs under or over, and extrudes sperm from each of his leg vents (under one of the short joints near the trunk) as she extrudes eggs from similar vents in the same place [2].



Here's a closer view of those two *Colossendeis* sea spiders above.

In some sea spider genera, the eggs are relatively large and the female pops out only 4-5; in other genera, the eggs are not as wide as the smallest leg segment and the female puts out sometimes more than 100 eggs [2]. Sometimes males collect balls of eggs (they supply the binding cement) from 5-7 different females and walk with them carried under their body [2].

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sea spider *Nymphon australe*

Nymphon australe is found throughout Antarctica and Peter I Island, South Shetland Islands, South Sandwich Islands, Cook Strait in New Zealand, Falkland Islands, Bouvet Island, Argentina, Chile, and southern Indian Ocean at depths from 8 to 3,000 meters [1,2,3,4,6,7].

N. australe has a robust trunk with a short neck; its eight legs span up to three centimeters and usually have long or short spines in rows [1,4].

N. australe is the most common and most often collected pycnogonid species in Antarctic and subantarctic waters [1,4,5,6]. There is a wide range of variations among specimens in this species [4].



Here is *Nymphon australe* cruising on the tubular sponge *Sphaerotylus antarcticus*.

The genus *Nymphon* has more species in Antarctic and subantarctic waters than in other bodies of water of similar size; they occur in a large diversity of species and are collected in great numbers [1,4]. The *Nymphon* genus has two character groupings -- *Australe* and *Hamatum*; the remaining species of *Nymphon* are unrelated by character groups [1]. *Nymphon* sp. have eight legs with the ocular tubercle toward the posterior of the cephalic segment [1].

Antarctic and subantarctic sea spiders comprise 251 species, representing 21.5%

of worldwide species, with 101 species endemic to Antarctica and 60 endemic to subantarctic areas [5].



Here's a closer view of *Nymphon australe*.

Sea spiders are exclusively marine and mostly bottom dwelling (benthic) [4]. Adult sea spiders either suck the juices from soft-bodied invertebrates or browse on hydroids and bryozoans. Male sea spiders carry cemented egg clutches gathered from females until hatching and often after hatching in the larval stages [4]. Since sea spider larvae are not planktonic, sea spider dispersal is slow and intermittent leading to the development of many endemic species among shallow-water sea spiders [4].

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sea spider, possibly *Pallenopsis* sp. or *Ammothea clausi*

Several species of *Pallenopsis* sea spiders have been collected in the Ross Sea [1].

Antarctic and subantarctic sea spiders comprise 251 species, representing 21.5% of worldwide species, with 101 species endemic to Antarctica and 60 endemic to subantarctic areas [3]. Sea spiders are also called pycnogonids. Sea spiders are exclusively marine and mostly bottom dwelling (benthic) [2]. Adult sea spiders either suck the juices from soft-bodied invertebrates or browse on hydroids and bryozoans. Male sea spiders carry cemented egg clutches gathered from females until hatching and often after hatching in the

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sea spider *Pentanympion antarcticum*

Pentanympion antarcticum is found throughout Antarctica and the Antarctic Peninsula, South Shetland Islands, and New Zealand from depths of 3 to 3,227 meters [1,2,3,4,6]. *P. antarcticum* has similar characters as with *Nymphon* but with five pairs of legs instead of four [1,4]. *P. antarcticum* is a common Antarctic species and is the only species in its genus [1]. One predator of *P. antarcticum* is the fish *Trematomus bernacchii* [7]. .

Sea spiders are also called pycnogonids and sometimes whip scorpions. Sea spiders are exclusively marine and mostly bottom dwelling (benthic) [4]. Adult sea spiders either suck the juices from soft-bodied invertebrates or browse on hydroids and bryozoans. Male sea spiders carry

cemented egg clutches gathered from females until hatching and often after hatching in the larval stages [4]. Since sea spider larvae are not planktonic, sea spider dispersal is slow and intermittent leading to the development of many endemic species among shallow-water sea spiders [4]. Antarctic and subantarctic sea spiders comprise 251 species, representing 21.5% of worldwide species, with 101 species endemic to Antarctica and 60 endemic to subantarctic areas [5]

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