Arthropoda – Amphipoda: amphipods

UNDERWATER FIELD GUIDE TO ROSS ISLAND & McMURDO SOUND, ANTARCTICA

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Photographs: Norbert Wu, Steve Alexander, Peter Brueggeman, Canadian Museum of Nature (Kathleen Conlan), Paul Cziko, Shawn Harper, Uwe Kils, Jim Mastro, & 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, which 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, and there can be some uncertainty in identifications solely from photographs.

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May 2019: taxonomic names checked in Zoological Record and World Register of Marine Species
corophiid amphipod

*Haplocheira plumosa*

*Haplocheira plumosa* is found in Antarctica and the Antarctic Peninsula, South Orkney Islands, South Georgia Island, and Kerguelen Island at depths from 0 to 250 meters [1].

*Haplocheira plumosa* is a filter-feeder and has been collected up to nine millimeters in length [1].

Antarctic benthic amphipod predators include fish and squid [3].

Among malacostracan crustaceans, amphipods are the most abundant and diverse group in benthic Antarctica [2].

Epimeriid amphipod

*Epimeria* (*Drakepimeria*) sp.

*Epimeria* (*Drakepimeria*) species are differentiated by anatomical features not sufficiently evident in this photo [6]. *Epimeria* species are found throughout Antarctica [4]. Most *Epimeria* species have characteristic dorsal outgrowths on their bodies, though a few are smooth [3]. The body of many *Epimeria* species have protrusions, crests or teeth, which might function as disruptive camouflage, wherein their protrusions in combination with variegated coloration makes them blend into rocky habitat covered in flora and fauna [6].

The stomach contents of one species of *Epimeria* had 42% organic matter including 10% holothurian matter [1]. Some *Epimeria* species have been observed as ambush predators, sensing food or prey with their antennae and then grasping it [1,2]. With live, swimming zooplankton prey, one *Epimeria* species moves its first pair of antennae back and forth, creating a current to bring the prey closer to grasp [1].

Predators of Antarctic benthic amphipods include fish and squid [5]. Among malacostracan crustaceans, amphipods are the most abundant and diverse group in benthic Antarctica [1].

**Taxonomic Note:** Antarctic *Epimeria* species were distributed into subgenera in 2017 [6].

epimeriid amphipod *Epimeria (Hoplepimeria) robusta*

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*Epimeria (Hoplepimeria) robusta* occurs on the Adelie Coast to the western Ross Sea, and has been collected at 85 to 814 meters depth, and observed at scuba diving depths [5,7,8,9].
Some *Epimeria* species have been observed as ambush predators, sensing food or prey with their antennae and then grasping it [1,2]. With live, swimming zooplankton prey, one *Epimeria* species moves its first pair of antennae back and forth, creating a current to bring the prey closer to grasp [1].
A Weddell Sea species very similar to *Epimeria (Hoplepimeria) robusta* is an opportunistic predator, with its stomach contents including sedimenting plankton, sponges, cnidarians, polychaete worms, crustaceans, and holothurians [4].

Antarctic benthic amphipod predators include fish and squid [6].
Here a juvenile *Epimeria (Hoplepimeria) robusta* is perched on the back of its parent; clusters of juveniles have been observed riding piggy-backed on adults [5].

Here are several juvenile *Epimeria (Hoplepimeria) robusta* clustered on the bush sponge *Homaxinella balfourensis.*
A few *Epimeria* species are smooth dorsally as *Epimeria (Hoplepimeria) robusta* shown here, but most species have characteristic dorsal outgrowths [3]. *Epimeria* species are found throughout Antarctica [7]. Among malacostracan crustaceans, amphipods are the most abundant and diverse group in benthic Antarctica [1].

**Taxonomic Note:** *Epimeria robusta* formerly reported in the Weddell Sea were assigned to a new species *robustoides* [7,9]. Antarctic *Epimeria* species were distributed into subgenera in 2017 [9].

**Eusirus perdentatus**

*Eusirus perdentatus* is found throughout Antarctica and the Antarctic Peninsula, South Shetland Islands, and South Orkney Islands from 20 to 928 meters depth; it has also been collected in the Indian sector of the Southern Ocean from 0 to 2,000 meters depth [3,4,7].

*Eusirus perdentatus* is benthic, waiting to sense prey with its antennae (and probably vision), and then quickly grasping prey to capture it [1].

*Eusirus perdentatus* has been observed preying on *Epimeria* amphipods and lysianassid amphipods [1]. *E. perdentatus* stomach contents have included polychaetes such as *Pontodora pelagica*, calanoid copepods, crustaceans, and cnidarians [1,6]. Predators of *Eusirus perdentatus* include the fish *Trematomus hansoni* and *Trematomus loennbergii* [5].
Taxonomic Note: *Eusirus giganteus* was described in 2002, and had been commingled with *E. perdentatus* in past literature [2].

looks like Eusirus giganteus, and certainly large enough to be E. giganteus [2,3].

Captured in a fish trap 2 miles off the end of Hut Point peninsula, from 415 meters [1].

**Taxonomic Note:** Eusirus giganteus was described in 2002, and had been commingled with E. perdentatus in past literature [3].

eusirid amphipod, probably *Paramoera walkeri*

*Paramoera walkeri* is found throughout Antarctica and the Antarctic Peninsula, South Shetland Islands, and South Georgia Island from intertidal to 310 meters depth [1]. *P. walkeri* is usually found in shallow water and, at some locations, can be the most abundant benthic animal from 0 to 15 meters depth [2,3,5].

Here *Paramoera walkeri* is swarming on an anchor ice formation. Though living in close association with ice, *P. walkeri* doesn't freeze because its haemolymph ("blood") is hyperosmotic compared to seawater; seawater freezes at -1.86°C whereas *P. walkeri* haemolymph freezes at -2.06°C [3]. *P. walkeri* is a major benthic species during summer, and dominates the sub-fast ice community during winter [2,5]. *P. walkeri* moves off the bottom during late autumn and is found clinging to the underside of young fast ice soon after diatoms begin populating that ice [3]. *P. walkeri* is a detritivore-omnivore and feeds near the bottom or under fast ice upon fungi, bacteria, diatoms, algae, and zooplankton [2,5]. Predators of *P. walkeri* include...
the fish *Trematomus bernacchii, Trematomus borchgrevinki, Trematomus newnesii,* and *Notothenia coriiceps neglecta* and the Adelie penguin [3,4].

Here is a closer view of *Paramoera walkeri* on anchor ice. *P. walkeri* grows rapidly during summer phytoplankton blooms, doesn't grow during winter, and breeds seasonally after its first or second year [2]. *P. walkeri* lays its large yolky eggs into a brood pouch in June [3]. The young hatch after 4.5 months and then remain in the pouch for another month while they do not grow or feed [3]. Newly-released young *P. walkeri* migrate offshore populating the fast ice, and then return to shallow water starting in December [3].

*Paramoera walkeri* has been collected at lengths up to 2.28 centimeters, and lives up to four summers [3].

hyperiid amphipod *Hyperia macrocephala*

*Hyperia macrocephala* is found in Antarctic coastal regions and South Georgia Island [1].

*Hyperia macrocephala* is up to 2.9 centimeters long [1].

Hyperiid amphipods are highly variable in body morphology due to their lifestyle and encompass these body forms: near-spherical; needle-like; very large -- up to fourteen centimeters with eyes comprising up to 25% of the body; nearly sightless; house-constructors; and free-living pelagic [1].
The medusa *Diplulmaris antarctica* can also be infested with a hyperiid amphipod *Hyperiella dilatata* which sits with its dorsal (top) surface against the outside top of the medusa's bell, the exumbrellar surface [2]. The hyperiid amphipods are those white dots on the surface of the clear bell.

Collectors have found up to 54 of these amphipods riding along, clinging tightly to the medusa. These riding amphipods are predominantly juveniles and females; this suggests that the medusa is both an amphipod mating platform (where females await more mobile males) and a predation refuge for juveniles and females [2]. The hyperiid amphipods do not appear to feed on the medusa and probably use it as a safe harbor between feeding forays [2].

The hyperiid amphipod *Hyperiella dilatata* grabs the pteropod *Clione antarctica* from the water and holds it to itself as a chemical defense against predation [6,7,9]. Predatory fish won't eat the amphipod/pteropod combination or the pteropod *Clione antarctica* itself which has a chemical, pteroenone, which deters feeding [6,7,8,9]. *C. antarctica* preys on the shelled pteropod *Limacina helicina antarctica* which doesn't have pteroenone so it appears that *C. antarctica* synthesizes it as part of its metabolic processes [8,9].
Here’s *Hyperia macrocephala* on the medusa *Diplulmaris antarctica* [3].

Hyperiid amphipods are found throughout the world oceans and are found from the surface down to abyssopelagic depths, though they have not been collected deeper than 7,000 meters [1].

Hyperiid amphipods are mostly commensals and parasitoids of gelatinous zooplankton like medusas, salps, and coelenterates; they are pelagic and none are benthic [1].
Diplulmaris antarctica medusa which get close enough to the bottom in shallow water are prey to be captured by the tentacles of an anemone (Isotealia antarctica shown here) [4]. The struggle can continue for quite awhile. The medusa pulses its bell as it tries to swim away while the anemone slowly pulls the medusa into its mouth. Some of the hyperiid amphipods hitchhiking on this medusa are going to get consumed by the anemone, so the anemone is an indirect predator of the hyperiid amphipod.

Other hyperiid amphipod predators are the nototheniid fish (Pagothenia borchgrevinki, Trematomus bernacchii, T. hansoni, T. centronotus) which eat Hyperiella dilatata [5,10].

Echiniphimedia hodgsoni is found in Antarctica and the Antarctic Peninsula, South Shetland Islands, South Orkney Islands, and South Georgia Island, at depths from 20 to 1,120 meters [1].

Looks like Echiniphimedia hodgsoni [4,5].

Echiniphimedia hodgsoni feeds on sponges with a special cutting mechanism [2,3]. Sponge spicules found in the gut of E. hodgsoni correspond to haplosclerid sponges, possibly the genera Gellius, Hemigellius, or Haliclona [2].

Gut content analysis of E. hodgsoni indicates that diatoms are either a food source or a prey item for a food source [3].

lysianassoid amphipod

*Pseudorchomene plebs*

*Pseudorchomene plebs* is found throughout Antarctica and the Antarctic Peninsula, South Shetland Islands, South Orkney Islands, South Sandwich Islands, and Macquarie Island, from 0 to 2889 meters depth [2,6,8,11]. *P. plebs* is a dominant benthic amphipod in McMurdo Sound and is more commonly found deeper than fifty meters [1,4]. *Pseudorchomene plebs* has been collected at lengths up to 2.6 centimeters, and its eyes are dark brownish/reddish when alive [5,11]. *P. plebs* is a voracious scavenger; it can swarm in hordes feeding on dead animals (necrophagous) and fecal material [1,4]. *Pseudorchomene plebs* can swarm a dead fish by the thousands, leaving a clean skeleton in three days [11]. *P. plebs* has also been observed attacking fish, clustering on gills, and causing death quickly [1]. *Pseudorchomene plebs* develop their eggs in winter with young hatching in spring [1]. Predators of *P. plebs* include the fish *Pagothenia borchgrevinki* and *Trematomus bernacchii*, and the Antarctic tern, who picks it from carrion washed ashore, on which the amphipod feeds in deeper water [3,6,10].

**Taxonomic Note:** Genus revised from *Orchomene* to *Abyssorchomene*, and then to *Pseudorchomene* [9,11].

**References:**
**Hippomedon kergueleni**

*Hippomedon kergueleni* is found in Antarctica and the Antarctic Peninsula, South Shetland Islands, South Orkney Islands, South Sandwich Islands, South Georgia Island, Bouvet Island, Kerguelen Island, the Snares Islands, and New Zealand at depths from 0 to 750 meters [1,3,4,5,9].

*Hippomedon kergueleni* has been found at lengths up to 2.2 centimeters [5,6]. Males live up to four years and females longer [4]. *H. kergueleni* is a burrowing bottom-feeding and necrophagous (carrion feeding) amphipod; its gut content s have been found to include diatoms, algal chains, crustaceans, polychaetes, and probably detritus [3,4]. Males live up to four years and females longer [4]. Its predators include octopus and the fish *Trematomus bernacchii* [7,8].

*Hippomedon* species are found in the Northeastern Pacific, North Atlantic, Arctic Ocean, Australia, New Zealand, and subantarctic islands [1,2]. Lysianassoid amphipods are found in diverse habitats including fish ectoparasites, invertebrate commensals, abyssopelagic, soft-bottom deposit-feeders or algal-dwellers, and demersal scavengers [1].

**References:**
lysianassoid amphipod
Orchomenella pinguides

*Orchomenella pinguides* is found throughout Antarctica and South Shetland Islands, South Orkney Islands, and South Georgia Island, from 0 to 800 meters depth [2,7]. *O. pinguides* is a dominant benthic amphipod in McMurdo Sound and is commonly found on shallow water benches under ten meters depth [1]. *O. pinguides* has been collected at lengths up to 1.3 centimeter [3,7].

*Orchomenella pinguides* eats dead animals (including Weddell seals and grounded medusa), fecal matter, sedimenting plankton, and invertebrate prey, especially planktonic copepods that impact the bottom during winter [1,9]. *O. pinguides* is a much less aggressive and voracious swarming feeder compared to *A. plebs* [1]. Its predators include octopus and the fish *Trematomus bernacchii* [4,8].

**Taxonomic Note:** Genus revised from *Orchomene* to *Orchomenella* (*Orchomenopsis*), and then *Orchomenella* (*Orchomenella*) [5,6,10].

lysianassoid amphipod *Orchomenella franklini*

*Orchomenella franklini* is found in Antarctica and subantarctic islands [1]. *O. franklini* is sized up to 7.5 mm for males and 9 mm for females, and has been found to reach extremely high densities of >41,000 per square meter [4].

**Taxonomic Note:** Genus revised from *Orchomene* to *Orchomenella (Orchomenopsis)*, and then *Orchomenella (Orchomenella)* [1,2,3].

lysianassoid amphipod

Female with young in brood pouch, collected from the volcano sponge *Anoxycalyx (Scolymastra) joubini* [1]. Predators of Antarctic benthic amphipods include fish and squid [3].

Among malacostracan crustaceans, amphipods are the most abundant and diverse group in benthic Antarctica [2].

**Oedicerotid Amphipod**

*Monoculodes curtipediculus*

*Monoculodes curtipediculus* has been collected around the McMurdo Station seawater intake jetty, the Station sewer outfall, and Cinder Cones, at 20-23 meters depth [3]. *Monoculodes curtipediculus* has been collected in Admiralty Bay of King George Island in the South Shetland Islands, 20-23 meters depth [4].

An adult female is shown here, and a female has been collected up to 7.1 millimeters in length [1,3].

Here an adult male *Monoculodes curtipediculus* is above an adult female [1].

Among malacostracan crustaceans, amphipods are the most abundant and diverse group in benthic Antarctica [2].

Pagetinid amphipod, probably *Pagetina antarctica*

*Pagetina antarctica* has been collected from the Antarctic Peninsula, South Shetland Islands, South Georgia Island, and Kerguelen Island from 1 to 270 meters depth \[1,2\].

Predators of Antarctic benthic amphipods include fish and squid \[2\].

phoxocephalid amphipod

**Heterophoxus videns**

*Heterophoxus videns* is found in Antarctica and the Antarctic Peninsula, South Shetland Islands, South Orkney Islands, South Georgia Island, Falkland Islands, Chile, and Argentina at depths from 2 to 457 meters [2,4,5,8]. *H. videns* has been collected at lengths up to one centimeter [6]. The family Phoxocephalidae is gammaridean amphipods with their head produced into a hood-like rostrum overhanging the antennae, a well-developed accessory flagellum on the first antennae, and pereopods armed with spines and setae for burrowing into soft bottom sediments [2]. A terminal stage male is shown here [3]. At twenty meters depth at McMurdo jetty, a density of 6,367 *H. videns* per square meter was observed; it is less abundant in the shallower anchor ice zone [1].

*Heterophoxus videns* is a motile deposit feeder and predator, living buried just below the sediment surface and rarely emerging [1]. *H. videns* eats polychaete worms (including *Spiophanes tcherniai*, *Tharyx* sp., *Haploscoloplos kerguelensis*, maldanids or oweniids), nematodes, copepods, ostracods (including *Philomedes* sp.), sponges, and diatoms [1,7]. *H. videns* is a dominant species in the McMurdo jetty soft-bottom macrofaunal community and is a foundation species for the ecological community there, regulating species composition and population size (age) structure by preying on small species and small individuals of large species [1]. *H. videns* is eaten by *Trematomus* fish which are hunt-and-peck predators [1]. A pre-terminal stage male is shown here [3].

Seba antarctica is found in Antarctica and South Georgia Island and Bouvet Island at depths from 5 to 399 meters [3,4,7,8]. S. antarctica has been collected at lengths up to seven millimeters [5].

Both of these photos are males collected from the volcano sponge *Anoxycalyx (Scolymastra) joubini* [1]. *Seba antarctica* shows a high preference for living in sponges, but not exclusively so, having also been recorded on ascidians [7]. *S. antarctica* is an ectoparasite on sponges, both eating the sponge and using it for shelter from predators [7]. Predators of *Seba antarctica* include the fish *Trematomus bernacchii* [6]. Among malacostracan crustaceans, amphipods are the most abundant and diverse group in benthic Antarctica [2].

stenothoid amphipod  
*Torometopa antarctica*

*Torometopa antarctica* has been reported from Ross Island and the South Shetland Islands and Bouvet Island at depths down to 391 meters \[1,4,8\]. *T. antarctica* has been collected at lengths up to seven millimeters \[5\].

Predators of Antarctic benthic amphipods include fish and squid \[6\].

Among malacostracan crustaceans, amphipods are the most abundant and diverse group in benthic Antarctica \[3\].

**Taxonomic Note:** Name changed from *Proboloides antarcticus* to *Torometopa antarctica* in 1987 \[2\] and from *Proboloides antarcticus* to *Metopoides antarcticus* in 1990 \[4\]. Affirmed as *Torometopa antarctica* in 1993 \[7\].

stenothoid amphipod, probably *Metopoides* sp.

This is a female collected from the volcano sponge *Anoxycalyx (Scolymastra) joubini* [1].

Predators of Antarctic benthic amphipods include fish and squid [3].

Among malacostracan crustaceans, amphipods are the most abundant and diverse group in benthic Antarctica [2].

stenothoid amphipod, probably *Scaphodactylus* sp. n. 4

Looks like *Scaphodactylus* sp. n. 4 [1].

**References:** 1: Rauschert Martin & Wolf Arntz. Antarctic Macrobenthos, a field guide to the invertebrates living at the Antarctic seafloor. Wurster Nordseekueste, Germany: Arntz & Rauschert Selbstverlag, 2015, p.79