Echinodermata: Other urchins, brittle stars, sea cucumbers, crinoids

UNDERWATER FIELD GUIDE TO ROSS ISLAND & MCMURDO SOUND, ANTARCTICA

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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 usually identified from photographs with no specimen collection. Therefore these identifications are to the taxonomic level possible from photographs, with some uncertainty in identifications solely from photographs.

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June 2019: Taxonomic names checked in Zoological Record and World Register of Marine Species
heart urchin Abatus sp.

Species of Abatus urchins found in McMurdo Sound area are koehleri (formerly elongatus), ingens, nimrodi, and shackletoni [15].

Urchins of the genus Abatus are characterized by what's called a peripetalous fasciole in adult urchin tests (shells); this is a different-looking band of fine densely-packed spines circum-navigating the top of the test (see it below this red line) [15].
A live *Abatus* urchin showing its peripetalous fasciole, a band of fine densely-packed spines circum-navigating the top.
Heart urchins are deposit feeders, using their oral tube feet to gather up detritus [13]. Heart urchins have a dense coat of spines which keeps sediment away from the urchin's surface, thus maintaining a water-filled surrounding space that the urchin uses for respiration while buried [13].
An *Abatus* sp. urchin.

*Abatus koehleri* (formerly *A. elongatus*) has been found in McMurdo Sound and the South Orkney Islands from 11 to 804 meters depth, is typically 4.5 centimeters in length, and rarely up to 6.5 centimeters [15]. *Abatus koehleri* has an elongate test (shell) irregularly ovoid, without a frontal notch, and has a sinuous-looking peripetalous fasciole [15]. *Abatus koehleri* is colored dark gray in alcohol [15]. *Abatus shackletoni* and *Abatus koehleri* are similar; *Abatus shackletoni* has a broader fasciole closer to the ambitus at the posterior region, and *Abatus elongatus* adults are about twice the size of *Abatus shackletoni* adults [15].

An *Abatus* sp. urchin.

*Abatus (Pseudabatus) nimrodi* is found in eastern Antarctica from 2 to 716 meters depth [1,4,5,6,9,14]. *Abatus (Pseudabatus) nimrodi* can be found partly or completely burrowed into muddy or silty sediment [7,14]. *Abatus (Pseudabatus) nimrodi* is common along the western oligotrophic side of McMurdo Sound including New Harbor; it can be found buried just below the surface of fine, silty sediment at New Harbor [1,6,9]. The shell (test) length of *Abatus (Pseudabatus) nimrodi* can be up to six centimeters with an average size of 3 - 4 centimeters [15]. The brood pouches of *Abatus (Pseudabatus) nimrodi* are widely separated from the apical system at the top of the test (shell) [15]. The color of *Abatus (Pseudabatus) nimrodi* is dark brown to nearly black [4,15].
An *Abatus* sp. urchin.

*Abatus shackletoni* is found throughout Antarctica and the Antarctic Peninsula from 8 to 631 meters depth [1,2,3,4,9,10,12,14,15]. Near Cape Evans, *Abatus shackletoni* occurs in loose gravel and cobble habitats [1]. At Rocher Jacobsen in the Pointe Géologie Archipelago of Terre Adélie, *Abatus shackletoni* individuals live completely buried in the silty sediment [14]. The shell (test) length of *Abatus shackletoni* can be up to 6.7 centimeters in length, with a typical size being four centimeters [6,11,15]. The test of *Abatus shackletoni* is more or less ovoid, about as long as it is broad, has a regular peripetalous fasciole, and may or may not have a faint notch at the anterior end [4,5,9,10,15]. The color of *Abatus shackletoni* is brown to grayish-purple [15].
An Abatus sp. urchin.

*Abatus ingens* has been found along the Antarctic coast from 20 to 761 meters depth, and is very large, up to six to seven centimeters in length [15]. *Abatus ingens* has a triangular-looking ambitus at its posterior end, has a sinuous-looking peripetalous fasciole, and is very dark, almost black, including its spines [15].

Here's a look at the four brood pouches on an *Abatus* test (shell).

*Abatus shackletoni* broods an average 22 yolk-feeding embryos and juveniles in each of four depressed elongated brood pouches on the urchin's dorsal (aboral) surface; *Abatus (Pseudabatus) nimrodi* broods an average of eighteen [1,6].
Here, *Abatus* embryos and juveniles are pulled out of their brood pouches for illustration. Development of embryos within the brood pouch takes at least eight months [6]. Eggs are released into the brood pouches and fertilized there throughout most or all of the year [6]. From August to January, 71-100% of *Abatus shackletoni* females are brooding embryos [6]. From November to January, 60-84% of *Abatus (Pseudabatus) nimrodi* females are brooding embryos [6].

Two types of spines form a protective arch over the *Abatus* brood pouch [1,6]. *Abatus (Pseudabatus) nimrodi* juveniles are spine-covered in later stages of development in the brood pouch and are larger in size relative to the juveniles of *Abatus shackletoni* [1,6].
The production of large, robust *Abatus (Pseudabatus) nimrodi* juveniles may increase their survival for escaping the predatory brittle stars which occur in their environment; these brittle stars are not abundant where *Abatus shackletoni* is found [6].

An *Abatus* sp. urchin

The diversity of Antarctic sea urchins with its prevalence of brooding (thirty-nine of sixty Antarctic and subantarctic species -- 65%) may be a process of species-level selection via extinction and speciation rates related to pelagic or protected development of their young [7,8].

pencil urchin *Ctenocidaris perrieri*

*Ctenocidaris perrieri* is found in Antarctica and the Antarctic Peninsula, Kerguelen Island, Crozet Island, and Heard Island from 6 to 602 meters depth [1,2,5,6,7].
The test (shell) of *Ctenocidaris perrieri* has been measured at sizes up to 6.7 centimeters and is purple or purple brown in color [7,8,9].
Ctenocidaris perrieri has long, slender, coarsely thorny primary spines measured at lengths up to 8.5 centimeters and covered with a thick, spongy coat of hairs [2].
The primary spines of *Ctenocidaris perrieri* are typically twice as long as the horizontal diameter of the test (shell) [2].

Eleven sponge species were found to grow on the spines of *Ctenocidaris perrieri*, with the most common being *Homaxinella balfourensis*, *Isodictya erinacea*, *Iophon unicorne*, and *Haliclona (Rhizoniera) dancoi*; the urchins increase the dispersal of the sponges by being “islands” of suitable habitat [10].
Ctenidaris perrieri broods its embryos and juveniles in the region surrounding its mouth (the peristome) [3,8].
The diversity of Antarctic sea urchins with its prevalence of brooding (thirty-nine of sixty Antarctic and subantarctic species -- 65%) may be a process of species-level selection via extinction and speciation rates related to pelagic or protected development of their young [3,4].
sea urchin *Stereochinus neumayeri*

*Stereochinus neumayeri* is found in Antarctica and the Antarctic Peninsula, South Shetland Islands, South Orkney Islands, South Sandwich Islands, South Georgia Island, South Patagonia Island, Prince Edward Island, Marion Island, Crozet Island, and Kerguelen Island at depths from 5 to 640 meters [8,9,10].
Sterechinus neumayeri is abundant in shallow waters of McMurdo Sound at depths less than fifteen meters and plays a major role in McMurdo Sound's benthic ecosystem.
Color of the test (shell) and spines of *Stereochinus neumayeri* is variable, from greenish-olive to dark purplish/violet or whitish; the test is more generally greenish-olive or green-gray \[8,9,10\]. It is slow growing, reaching a maximum diameter of seven centimeters at forty years of age \[1\].

The bare test (shell) of the genus *Stereochinus* is distinguished by a large periproct within its ring of apical plates, distinctly darker lines formed by tube feet in the pore zones, and denser distribution of tubercules on the oral side than the aboral side \[19\].
Largely herbivorous, half of the diet of *Sterechinus neumayeri* is algae; it also eats diatoms, foraminiferans, sponges, bryozoans, hydrozoans, polychaetes including *Spirorbis* sp., and amphipods [4,18].
Above, *Stereochinus neumayeri* and the seastar *Odontaster validus* cruise the shallow bottom foraging for food around the crystalline anchor ice.
Weddell seal feces are a food item for *Stereochinus neumayeri* in shallow water, which can be observed piled up on feces along with the seastar *Odontaster validus*. The gut content of *S. neumayeri* is filled with seal feces at locations where this occurs [5].

*Stereochinus neumayeri* has been observed feeding on the detrital film on the surface of the sponge *Cinachyra antarctica* [13].
Like many other urchins, *Sterechinus neumayeri* attaches bits of shell and debris to itself. The shells and debris often have stinging hydroids on them (see the whitish polyps on top left of the urchin). If an anemone like *Urticinopsis antarctica* touches the urchin's hydroids, it releases the urchin. If the urchin is aware of the anemone's tentacles, the urchin will release its protective camouflage and escapes the anemone's grasp. If this camouflage isn't present on the urchin, the anemone captures and eats the urchin [3].
Predators of the urchin *Stereochinus neumayeri* include the anemones *Urticina antarcticus* and *Isotealia antarctica*, the octopus *Pareledone* sp., the fish *Trematomus bernacchii*, the seastars *Macroptychaster accrescens* and *Odontaster validus* [shown here], and the brittle star *Ophiosparte gigantic* [6,7,11,12,14,16].
Stereochinus neumayeri attaches pieces of algae like Phyllophora antarctica and Iridaea cordata to itself as protection against the anemone Isotealia antarctica [14].

Both algae manufacture unpalatable defensive chemicals to avoid getting eaten by Stereochinus. neumayeri, yet the urchin attaches algal pieces to itself as a detachable shield to shed when the anemone's tentacles grab onto the attached algae [14,15].
The Antarctic scallop *Adamussium colbecki* may be colonized on either shell by small hydroids *Hydractinia angusta* [17]. *H. angusta* hydroids eat tube feet and pedicellariae of sea urchins including *Stereochinus neumayeri*, which graze on the algal film growing on the surface of the scallop's shell, but is not a predator of the scallop [17]. *Adamussium colbecki* shells are very thin, and such urchin grazing may damage the shell; thus the hydroids act in defense of the scallop [17].
At some sites where these algae occur with *Stereochinus neumayeri*, 96.5% of the urchins were using *Phyllophora antarctica* for 90% or more of their cover [14]. This is a mutually beneficial relationship between *S. neumayeri* and the algae [14].

The urchins move fertile drift algae throughout sunlit waters, thereby keeping drift algae in the reproductive area with other attached and drift algae; the urchins also extend the vertical and horizontal range of the algae and facilitate recolonization after ice scouring of the bottom or when conditions allow growth of attached plants at greater depths [14].
Stereochinus neumayeri spawning is timed so that its feeding larvae are in the plankton during the short summer peak of phytoplankton abundance [2].

References:
brittle star *Astrotoma agassizii*

*Astrotoma agassizii* occurs throughout Antarctica and the Antarctic Peninsula, South Shetland Islands, South Georgia Island, Shag Rocks, Falkland Islands, Burdwood Bank, and southern Chile and Argentina, in depths from 55 to 1,335 meters [1,2,3,4,8,9].
Astrotoma agassizii is creamy white in color [2]. The central disk of A. agassizii can reach a diameter of six centimeters [2,6]. From its growth rings, maximum age of A. agassizii is estimated to be 91 years [7]. A. agassizii bears live young, and is hermaphrodite [3].
The unbranched arms of *Astrotoma agassizii* are stout, tapering, and flexible, reaching a length of seventy centimeters [2,6].

*Astrotoma agassizii* is usually found on sponges (as shown here on *Anoxycalyx* (*Scolymastra*) *joubini*), corals, and other organisms on which it can climb to be more advantageously placed to feed on prey drifting by [1,2]. The stomach of *A. agassizii* contains diatoms, phytoplankton, foraminiferans, chaetognaths, bryozoans, polychaetes, holothurians, ascidians, and primarily crustaceans (including mysids, copepods particularly *Euchaeta antarctica* and *Calanoides acutus*, euphausiids, and amphipods, ostracods), indicating that it feeds on plankton, catching them with its flexible long arms, which are armed with hooks and spines to increase catch efficiency [1,2,5,6,7]. One or two arms clinging to the perch, while the others extend to feed [6]. The arms of *A. agassizii* can be looped and twisted, increasing its efficiency at contacting prey [1]. Prey caught by the arm tips of *A. agassizii* are rolled up into coils, and passed to the mouth [1].

brittle star *Ophiacantha antarctica*

*Ophiacantha antarctica* is found throughout Antarctica and the Antarctic Peninsula, South Shetland Islands, South Georgia Island, Bouvet Island, and the Antarctic Ocean south of the polar circle in depths from 20 to 3,398 meters [1,2,4,5,6,7].
The color of *Ophiacantha antarctica* is variable including disc colors of bluish-grey, grey, reddish, and purple and arm colors of orange, straw, and pinkish [2,3].
The pentagonal central disc of *Ophiacantha antarctica* is up to 1.3 centimeters in diameter with indentations on the sides between arms [2,4]. The slender, fragile arms of *O. antarctica* are up to nine centimeters in length [2,4].
*Ophiacantha antarctica* is generally found up on the substrate (rocks, sponges, sessile cnidarians, etc.) \cite{1,3}.

*Ophiacantha antarctica* is an active forager and its diet includes diatoms, foraminifera, copepods, and other microzooplankton \cite{1}.
Its flexible arms, long erect and thin arm spines, and climbing ability suggests that *Ophiacantha Antarctica* feeds by manipulating its arms and arm spines to capture its food on or near the bottom [1].

*Ophiacantha antarctica* is the most abundant and widely distributed echinoderm in the Ross Sea, playing an important role in the benthic biological balance [2].

brittle star *Ophionotus victoriae*

*Ophionotus victoriae* occurs throughout Antarctica and the Antarctic Peninsula, South Shetland Islands, South Sandwich Islands, South Georgia Island, and Bouvet Island in depths from 5 to 1,266 meters [3,4,5,6].
The arms of *Ophionotus victoriae* are short, flattened, robust, and depressed, taper rapidly, and can reach a length of nine centimeters [3].
Ophionotus victoriae uses its two leading arms in a typical brittle star rowing fashion as it moves on the seafloor searching for food [2].
The central disk of *Ophionotus victoriae* is large, flat and circular and can reach a diameter of four centimeters [3].
*Ophionotus victoriae* is variable in color, including brown, red-brown, brick-red, yellowish-pink, bluish grey, grey, white, brownish- violet with darker patches, grey with radial fawn streaks, and brownish-grey; pinkish-fawn banded arms have been observed [3,5].
Maximum age of *Ophionotus victoriae* has been estimated at 22 years [9].
*Ophionotus victoriae* is an opportunistic predator and also a scavenger and detrital feeder [2]. *O. victoriae* has a varied diet including seal feces, diatoms, foraminiferans, tunicates/ascidians, sponges, hydroids, bryozoans, polychaetes, bivalve molluscs, crustaceans (euphausiid krill, copepods, amphipods, mysids), sea urchins, and brittle stars [1,2,9].

*Ophionotus victoriae* is a significant predator of brittle stars including its own species (cannibalism), which mostly involves adults eating juveniles [2].
Predators of *Ophionotus victoriae* include fish and the larger brittle star *Ophiosparte gigas* [2,7]. *Ophionotus victoriae* has been observed to respond to contact by the larger brittle star *Ophiosparte gigas* by quickly fleeing [7,8]. If successful in capture, *Ophiosparte gigas* holds the disc of *Ophionotus victoriae* under its own and clips off arms to ingest [7].
brittle star *Ophioplindthus* sp., probably *Ophioplindthus gelida*

Shown here on a lacy bryozoan, this *Ophioplindthus* sp. is probably *Ophioplindthus gelida* which is the most common member of the genus in McMurdo Sound [3]. Dorsal photos are inadequate for distinguishing *O. gelida* from other species [3]. *Ophioplindthus gelida* is found throughout Antarctica and the Antarctic Peninsula, South Shetland Islands, South Sandwich Islands, and Bouvet Island in depths from 40 to 2,725 meters [2,4,5,6,8,11].
The pentagonal or rounded-pentagonal disc of *Ophioplinthus gelida* is flattened and up to 2 centimeters in diameter [2]. The arms of *O. gelida* are long and tapering and reach a length of six centimeters [2,6]. *O. gelida* is colored orange-brown or yellowish-brown [2].
*Ophioplinthus gelida* captures prey or feeds by moving surface sediments into small mounds which are partially or completely engulfed; this feeding behavior gathers small organisms as well as eggs and fecal material [1]. *O. gelida* feeds on diatoms, silicoflagellates, bryozoans, tunicates/ascidians, foraminifera, polychaetes, gastropods, polychaetes, sponges, bivalve molluscs, amphipods, and euphausiid krill [1,9].
Predators of *Ophioplithus gelida* include the brittle star *Ophiosparte gigas* [7]. Maximum age of *O. gelida* has been estimated at 33 years [9].
Some *Ophioplinthus* species may be parasitized by an epizoic sponge *Iophon radiatum* [2]. *I. radiatum* is dark brown, obscures the brittle star's true color, and grows on the disc and arm bases of *Ophioplinthus* [2]. Presence of *I. radiatus* is not definitive for identifying *O. gelida*; some *O. gelida* lack it and other species of *Ophioplinthus* have it [2,3,5].

**Taxonomic Note:** *Ophiurolepis* genus was synonymized into *Ophioplinthus* [10].

**References:**
brittle star *Ophiosparte gigas*

*Ophiosparte gigas* is found throughout Antarctica and the Antarctic Peninsula at depths from 8 to 1,200 meters [1,2,3,4,5].

The disc of *Ophiosparte gigas* is thick, mucus-covered, convex, and up to seven centimeters in diameter; its large disc relative to the arms makes it easy to recognize [1,4,5]. The arms of *Ophiosparte gigas* have spatulate arm spines, conical tube feet, and are up to seventeen centimeters long [1,4,5].

*Ophiosparte gigas* is colored pink, deep pink, pinkish orange, deep reddish, purplish brown, or brick red [1,4,5].
Ophiosparte gigas lives on soft substrate; its movement is made more efficient by its paddle-like arm spines and stilt-like tube feet [1].
Ophiosparte gigas is an active benthic predator on large prey, primarily brittle stars (including its own species, Ophiurolepis gelida, Ophionotus victoriae, Ophiacantha sp., Ophiocten sp.), bivalves (including Adamussium colbecki, Yoldia (Aequiyoldia) eightsi, Yoldiella sabrina), polychaete worms, crustaceans, and sponges [2,5]. O. gigas also preys on diatoms, algae, foraminifera, hydroids, nematodes, gastropods (including Nacella concinna), sea spiders, ostracods,
mysids, amphipods, isopods, euphausiids (including *Euphausia crystallorophias, Euphausia superba*), the shrimp *Chorismus antarcticus*, bryozoans, cheilostomes, the crinoid *Promachocrinus kerguelensis*, seastars, and sea urchins (including *Sterechinus neumayeri*) [5].

The brittle star *Ophionotus victoriae* has been observed to respond to *Ophiosparte gigas* contact by quickly fleeing [5,6]. If successful in capture, *Ophiosparte gigas* holds the disc of *Ophionotus victoriae* under its own and clips off arms to ingest [5].

*Ophiosparte gigas* is also a scavenger [2,5].

sea cucumber *Staurocucumis liouvillei*

*Staurocucumis liouvillei* has been collected in Antarctica and the Antarctic Peninsula and Bouvet Island, Heard Island and South Georgia Island from 60 to 791 meters depth [2,3,5]. *S. liouvillei* has been collected at sizes up to eight centimeters long [1,5].

*Staurocucumis liouvillei* lives attached to sponges, gorgonians (as shown here), and large stones [4].

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Taxonomic Note: In earlier literature, it may appear under the genera *Cucumaria* or *Abyssocucumis* [1,3,5].

*Staurocucumis liouvillei* is a species complex comprising a number of discrete species [6].

sea cucumber *Staurocucumis turqueti*

*Staurocucumis turqueti* is found in Antarctica and the Antarctic Peninsula and South Orkney Islands from 10 to 385 meters depth [2,4,5,8]. *S.turqueti* has been collected at lengths up to thirty centimeters [2].

*Staurocucumis turqueti* is chestnut or brown colored [1,2].
Staurocucumis turqueti is a suspension feeder and has been observed on the sediment surface holding the anterior half of its body vertically up in the water to suspension feed \[6\]. S. turqueti has been observed attached to sponges \[6\].

**Taxonomic Note:** Appears under other genera in the older literature including Abyssocucumis, Cucumaria and Ekmocucumis \[2,3,4,7\]. Staurocucumis grandis is a synonym of S. turqueti \[9\].

*Bathyplotes bongraini* is found throughout Antarctica and the Antarctic Peninsula and Bouvet Island at depths from 4.5 to 768 meters [1,3,4,5,6,7,8]. *B. bongraini* has been collected at lengths up to 26 centimeters [1,6]. *B. bongraini* is usually colored dark pink with a distinct dark brown cross-band, two to three centimeters wide, slightly behind the middle of the body [1].

The dorsal conical papillae of *Bathyplotes bongraini* are 1-5 millimeters high [1].

*B. bongraini* is a sediment feeder [2]. The mouth of *B. bongraini* is turned down (ventrally) and its anus is subdorsal [1].

**Taxonomic Note:** Older species name was *fuscivinculum* [6].

These *Cucumaria* spp. sea cucumbers are impossible to identify to the species level from this photo [1]. Even with specimens on hand, identification is difficult; the literature of this group is confusing and they have been referred to as *Cucumaria georgiana*-group [1,2].

*Cucumaria* spp. has been observed attached to sea urchins, branched bryozoans, and hydroid stalks [2]. Here *Cucumaria* spp. sea cucumber is perched on algae *Phyllophora antarctica* on top of the sea urchin *Stereochinus neumayeri*.

Echinopsolus acanthocola has been collected in the Weddell Sea and Bouvet Island at depths from 177 to 650 meters [1,4,5]. Here it is photographed at scuba diving depth in McMurdo Sound. *E. acanthocola* has scattered peaked cone-shaped processes on its body wall and its color is rose to brownish-red [1,6].

*Echinopsolus acanthocola* is a suspension feeder and has a narrow sole delimited by tube feet, which restricts it to using narrow, rod-like structures as substrate; it has been collected attached to sea urchin spines [2,6]. Here *E. acanthocola* is attached to the sea urchin *Sterechinus neumayeri* and it has been collected attached to the pencil urchin *Ctenocidaris perrieri* [3].
Echinopsolus acanthocola has been collected at lengths up to 2.3 centimeters long.
The species name *acanthocola* is composed of *Colere* (meaning "to inhabit") and *Acantha* (meaning "spine, thorn") to indicate that this sea cucumber species is well adapted to live on sea urchin spines and similar structures [1].

sea cucumber *Heterocucumis steineni*

*Heterocucumis steineni* is found in Antarctica and the Antarctic Peninsula, South Shetland Islands, South Orkney Islands, South Georgia Island, Falkland Islands, and Burdwood Bank from 0 to 1,200 meters depth [2,3,5]. *H. steineni* is beige to chestnut brown, can be almost white or white and brown in one specimen, and has dark spots between tentacles [1,5,6]. *H. steineni* is up to fifteen centimeters long [2].
Heterocucumis steinei may attach to other organisms like hydroids and fan-shaped bryozoans or it may live with the lower half of its body in sediment [4,7]. This facultative life style may explain why its posterior feet are wart-like and its anterior feet are exceptionally long, up to five millimeters [4,7].
Heterocucumis steineni is a suspension feeder [4,7].

Heterocucumis steineni is one of the most widely spread Dendrochirotida sea cucumbers in the Weddell Sea [4].

**Taxonomic Note:** In earlier literature, appears under different genera including Cucumaria, Ekmocucumis, and Heterocucumis [8].

**References:**
sea cucumber, group
Aspidochirotida

Taxonomic Note: Not *Staurocucumis turqueti* [1].

References: 1: Julian Gutt, personal communication, 2000
Promachocrinus kerguelensis is found throughout Antarctica and the Antarctic Peninsula, South Shetland Islands, South Georgia Island, Bouvet Island, Kerguelen Island, and Heard Island, from 10 to 2,100 meters depth \cite{3,4,6}. \textit{P. kerguelensis} is also found in the Strait of Magellan, and between Australia/New Zealand and the Antarctic continent \cite{3,4,7}.
Promachocrinus kerguelensis has ten biradiate rays (20 arms), is the most widely distributed and abundant crinoid in Antarctica and subantarctic islands, is the largest comatulid (unstalked) crinoid in southern latitudes, and is the only 20-armed comulatid crinoid in high southern latitudes [3,4].
Promachocrinus kerguelensis can be solid colored or banded; its color ranges from ivory to buff with light to dark brown pinnules and if banded, the bands can be dark to reddish brown \([3,4]\). Individuals from the Ross Sea may be more uniform in color; solid color and banded specimens can occur in the same population \([4]\).
The arms of *Promachocrinus kerguelensis* are edged with feathery pinnules containing sensory tube feet and reproductive organs. The arms are used to trap drifting plankton and they have grooves down which food particles are carried by hair-like cilia to the upward-facing mouth. Its different feeding postures (a filtration fan, a radial posture with its pinnules in one plane, and a collecting bowl) are suggested as a response to ocean currents. 
Promachocrinus kerguelensis produces large numbers of buoyant eggs which it spawns into the plankton in November and December in McMurdo Sound; it doesn't brood eggs in its arms as do some Antarctic crinoids. Settlement of its free-floating larvae occurs 2 to 3 months later when the seasonal Antarctic plankton bloom is high and offers a rich food source.
Promachocrinus kerguelensis (and other comatulid crinoids) cling and move by walking on specialized curved structures called cirri (seen at lower left). P. kerguelensis clings to sponges, worm tubes, gorgonians, and rocks as well as mud and gravel [2,3]. This gives P. kerguelensis a high perch above the seafloor which may protect it from fish nibbling on its extended arms [2].
Promachocrinus kerguelensis is not toxic to fish but there are no Antarctic fish living in the water above the seafloor to nibble at its arms [2]. The predatory brittle star Ophiosparte gigas has been found to have *P. kerguelensis* in its gut contents [5].

**Taxonomic Note:** Genetic analysis shows that *Promachocrinus kerguelensis* may be comprised of two cryptic species [8].